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AN INVESTIGATION OF THE SOCIO-TECHNICAL IMPLICATIONS OF A COMPUTER BASED WALK OPTIMISATION SYSTEM

By
Debbie May Philpott

A Doctoral Thesis

SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF
DOCTOR OF PHILOSOPHY
OF LOUGHBOROUGH UNIVERSITY

September 1998

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ABSTRACT

This research utilises existing problem solving and decision making theories to explain the complex organisational process by which Royal Mail revises Postal Officers' walks in mail delivery. A field study in the RM demonstrates that this is a complex task involving a political / negotiation process comprising many stakeholders with different agendas. Two conclusions are drawn. First, a pluralistic model of decision making is required to explain this process. Second, the model that guides the RM is a rational / optimal decision making model.

The RM has employed computer-based systems to support the revision process. Case studies are reported of the revision processes undertaken with and without computer aids. These demonstrate that the existing computer system provides limited assistance and its use is sporadic. A new Walk Optimisation system was being considered for purchase and development and the thesis follows the processes employed. Three conclusions were drawn. First, the development process for the new system utilised a technical agenda similar to the rational model of decision making. Second, by reference to the case study material, it was likely the new system would have organisational implications which could lead to dysfunction. Third the current development process being followed would not address these issues.

In the final part of the thesis a series of Future Implementation Scenario workshops are described which attempted to assist the RM staff in identifying the organisational implications of the WO system before it was implemented. The scenario exercise explored three characteristics of participants; knowledge of the stakeholder roles affected, knowledge of the RM, and knowledge of the WO system. The workshops succeeded in revealing many organisational issues which need addressing if the new system is to improve decision making in the Revision Process. Contrary to expectations the greater knowledge of participants did not translate into a richer analysis of the implications.

The thesis concludes that a full understanding of organisational decision making requires the integration of rational, bounded and social / political approaches, and that this also applies to systems design process. It also concludes that the models and methods used within organisations need to be broadened and recognise the social / organisational agenda but that the methods currently available are difficult to apply. Furthermore, by continuing with a rational / technological approach to decision making, organisations limit their future decision making options and the process is, therefore, self-perpetuating.

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CHAPTER ONE:

INTRODUCTION

CHAPTER 1: INTRODUCTION

This research was established with a broadly defined aim of investigating the area of real world, complex, problem solving. At the time of its conception, links were established between the Royal Mail (RM) and Loughborough University. From this opportunity a CASE studentship was established, sponsored by the Biotechnology and Biological Sciences Research Council (BBSRC), and the RM.

The aim from the outset was to investigate the complexities of problem solving within its organisational setting. In order to achieve this much of the work reported here has been conducted within the RM, and has depended on their own projects. This has resulted in a number of opportunities to develop an understanding of problem solving within the RM. But it has also led to additional complications, due to issues of access and availability. Despite these difficulties this project includes accounts of four case studies and a series of workshops conducted with the RM's approval. The research has been defined over the three years, as the organisation and the issues have become better understood, and available opportunities have been exploited. This thesis plots the project's progress.

1.1. THE ROYAL MAIL

The Royal Mail is responsible for collecting, sorting and delivering letters and parcels throughout the UK, as well as in a number of overseas countries. The organisation handles an average of approximately 63 million letters every working day, a total of 15.7 billion letters per year. Mail is collected from over 120,000 points daily, and delivered to all the UK's 25 million addresses.

In the last decade the RM has faced an increase in the volume of mail it processes. This is mainly attributable to the growth in its business customers. However, it is also facing increasing competition from new innovations and improved methods for delivery. This has led to a need to improve the efficiencies of current services and to look for opportunities to expand into new areas. These changes have affected both technical and social components of the organisation (e.g. the improved national mail distribution network and the introduction of integrated mail processing centres). The need to address the changing environment is an ongoing problem.

1.2. PROBLEM SOLVING

Problem solving is an inherent part of our day to day living and has been researched from many different perspectives for many years. This has led to a number of theories being proposed, some opposing and some building on earlier theories. A review of the literature highlights there is much human problem solving which cannot be accounted for by these theories. Among the areas which frustrate our understanding is that of complex problem solving, within the limitations of our cognitive system. The literature shows a dominance of studies reporting well defined, simplified problems, but little is reported on how we balance a complexity of issues in order to achieve a solution. This is further complicated when the problem solving is considered in situ. Other factors, external to the solver, then need to be considered. This is demonstrated in organisational decision making. Here many constraints and influences are liable to affect the ultimate decisions, and these decisions will impact on many people within the organisation.

1.3. THE RESEARCH

This section describes the general research aims, the approach and methodology of the project. The studentship was established with the Midlands Division with the aim of investigating complex decision making. In order to secure commitment to the project, an early meeting was held with the Director of Delivery and a letter of introduction was written by him (see Appendix A.1 and A.2). The letter introduced the study and researcher, outlined likely research activities, asked for co-operation from those asked to participate, and assured participants of confidentiality. From this initial contact a number of further contacts were made in the Midlands and eventually throughout the UK.

1.3.1. Aims

The aim of the research is to explore the relationships between theories of decision making, and the real world setting in which the decision making occurs. Throughout the research a number of areas are explored, both within the organisational setting and the literature. These investigations aim to determine whether one theory exists which encapsulates the decision making observed, or whether several different theories are needed to account for the complexity of the decisions.

The prevailing aim throughout the research is to find and exploit opportunities within the RM to allow the study and development of organisational decision making theories. The aims are further defined as the project progresses.

1.3.2. An Appropriate Methodology

Having established the aim of exploring organisational problem solving, the appropriate methodology has to be real world oriented research. The initial methodology involves looking for opportunities where complex problem solving is apparent, based on interviews. In order to collect the data necessary to determine the problem solving strategies the organisation, and people within it adopt, case studies will be used. If possible a longitudinal study will be conducted, as organisational decisions are often taken over time. This will also allow the organisational issues and constraints to be understood, as well as the decision making process employed and its effects. If the opportunity arises an interventionist approach may also be employed, in an action research mode to further explore the issues which arise.

1.4. OUTLINE OF THE THESIS

This section outlines the contents of the remaining thesis chapters. A review of literature related to problem solving is presented in Chapter 2. Beginning with a broad background, the review then focuses on the specific areas of complex problem solving and organisational decision making which form the theoretical basis for the remainder of the work. An introduction to the RM is also presented to establish the broad basis for the organisational setting. The specific areas of the Delivery Process and Delivery Revisions are then addressed, as a setting for future work. The chapter concludes by comparing and contrasting the theories described, and establishing, at a fairly high level, their potential application to the RM setting.

Chapter 3 presents two case studies which explore the processes of Delivery Revisions used by the RM. The first investigates the manual revision process; conducted over a ten month period, it follows the revision of a local Delivery Office. The second investigates the use of a Computer Aided Delivery Revision (CADR) system. From these case studies a number of conclusions are drawn about the processes involved and the problem solving exhibited. The problem solving strategies are then compared to the models discussed in Chapter 1. The chapter concludes by highlighting the relative strengths and weaknesses of the models and their ability to account for the decision making under consideration.

Chapter 4 discusses a number of possible opportunities which would allow the research to develop by following different avenues. The role that technological intervention could play in improving the decision making process is then focused on. This includes a review of the literature on the current approaches to systems design and the issues they aim to address. The chapter concludes by making a number of comparisons: i) comparing the theories reviewed with the actual practice of systems design ii) comparing the theories described in the systems design literature with those discussed earlier, in problem solving and organisational decision making and finally iii) comparing the design theories to the problem faced by the RM.

Chapter 5 presents the findings of a number of interviews and meetings with the RM's Walk Optimisation project team. It charts the progress of the project and the decision making approaches employed. Case study work is also presented, detailing the feasibility trials and the process trials conducted by the RM. The chapter then compares the decision making approaches employed by the RM, with the decision making literature from earlier reviews. It concludes that there are a number of potential implications associated with the methods used.

Chapter 6 reviews the literature on participative design methods. It address the questions of why stakeholders need to be considered, who the stakeholders should be, where in the process they should be involved and how this should be achieved. It focuses particularly on the use of scenarios for implementation.

Chapter 7 introduces the scenario workshops and their development. In chapter 8 the results are presented from the six RM Divisional workshops and two student workshops. Comparisons are made of the detailed responses of the RM and student groups. Further comparisons explore the type and frequency of responses recorded by i) the student participants compared to the RM participants; ii) RM participants responding from their own role compared to those who had assumed roles for the workshop; and iii) RM participants with Walk Optimisation (WO) experience compared to those without. The chapter concludes with an interpretation and conclusions of the findings.

Chapter 9 provides a summary of the research project, reviewing the objectives and hypotheses explored. The key findings are presented in relation to the projects aims, along with the theoretical and practical implications of the research. Finally directions for future research are suggested.

1.5. ACKNOWLEDGEMENTS

Firstly, I would like to thank Professor Ken Eason (my supervisor) for inspiring the direction of this research. He has spent many hours providing wisdom, guidance and criticism, and the encouragement to persevere.

I am indebted to many, many people within the RM who have aided my understanding of their organisation, including their much favoured acronyms. Many people have assisted my research by allowing me access to their valuable time and knowledge, and all have done so willingly.

I am particularly appreciative of the Midlands Division staff who were invaluable in the earlier stages of this work. To Geoffrey Ellis (Director Delivery) for consenting to this project; to Nick Edwards (Delivery Area Manager) for his introduction to the revision process and team, and for allowing me the (unforgettable) opportunity to follow Postal Delivery Officers on a bicycle at dawn!

I would like to thank members of the Midlands Revision Team for allowing me to attend meetings and ask innumerable questions. Specifically Clive Douthwaite and Steve Saunders for permitting me to observe, over a 10 month period, the revision conducted at Hinckley. Also, Paul Challands for allowing me access to the WO trial at Longton, providing detailed accounts of his activities and for the hours of debating issues relating to this project.

The Walk Optimisation work was only possible through the consent and co-operation of the Project Team in London. I am indebted to Phil Berquez (Project Manager) for allowing me to join the Project Team. The team allowed me to participate in all of their meetings and in the circulation of (the wealth of) documentation associated with the project. This was invaluable. Clare Dewick is also to be thanked for taking my phone calls and keeping me abreast of the project's development.

I greatly appreciate the time taken by Terry Delbridge to provide the background information on the Walk Optimisation system and initial feasibility trials. He was also a great help during the creation of the workshop scenario, spending time discussing and assisting with its development. I would also like to thank all the members of the User Reference Group for allowing me to join the group and for sharing their views. Martin Bashforth provided a great deal of help and advice in tailoring the workshops to the RM's setting. I am especially grateful to the members

of the group who were instrumental in the organisation of workshops, the recruitment of attendees, and who themselves attended the workshops (and provided hot bacon butties!).

Thanks also goes to all of the workshop attendees, from the RM and Loughborough University. They generously gave up their time to participate in the workshops, and provided much valuable and informative data.

Finally I would like to thank family, friends and colleagues for their understanding, support and encouragement. This has been a long journey, and it would have been lonely without them.

CHAPTER TWO:

PROBLEM SOLVING AND THE ROYAL MAIL

CHAPTER 2: PROBLEM SOLVING AND THE ROYAL MAIL

2.1. INTRODUCTION

This chapter presents the background for both the theory and organisational setting, which form the basis of the thesis. A review of published literature related to problem solving and organisational decision making is presented to establish the existing theories, both normative and descriptive. A number of models are reviewed and their appropriateness to various types of problems and their limitations are discussed. Factors affecting the ability to solve complex problems are identified and attention is drawn to the growing amount of information which is available to today's decision makers.

Further literature introduces some of the interventions which may be used to aid the decision process. These fall into two broad categories: the human aids, e.g. brainstorming techniques, and technological aids such as Management Information Systems. Having reviewed existing theories of decision making the chapter goes on to describe the approach used throughout the remainder of this thesis. Recognising that this work is to be conducted within the RM setting, a review is undertaken to establish an appropriate methodology for the initial phase of the work, which aims to enable an understanding of the organisational setting.

The remainder of the chapter describes the results of this initial phase of exploration. Through a number of interviews and meetings with various people within the RM, a basic understanding of the processes and issues involved was gained in order to identify areas of complex problem solving. The chapter concludes with a summary combining the issues and problems discovered through the exploratory work with the RM, with the models and issues raised in the literature and outlines the next research question to be addressed.

2.2. REAL WORLD PROBLEM SOLVING

At the outset of this research the broad aim was to investigate an area of real world complex problem solving within the Royal Mail. There are many difficulties associated with researching the area of real world problem solving and the following

sections focus on these inherent difficulties, clarifying why an exploratory approach has been chosen.

2.2.1. Problem Solving

Problem solving has been of interest to researchers for many years; from the Associationist theorists at the beginning of this century, studying problem solving in animals, to Artificial Intelligence theorists of today who attempt to model the human brain. It is one of the main areas of interest to Cognitive Psychologists and, along with learning and perception, forms the basis of human cognition. Problem solving has been stressed as playing an important role in other cognitive tasks e.g. perception (Bruner 1973) and memory and learning (Bartlett 1932) and it is necessary, therefore, to understand problem solving in order to understand ourselves and how we function. Despite this interest, the process remains almost as much of a mystery as it always has.

Although theories have progressed from the early stimulus-response approaches there is still no universally accepted theory that accounts for the diversity of human problem solving within the limitations of our cognitive system. Most of the research in the area has been conducted using well-defined problems which are not representative of situations encountered in everyday life and it is debatable therefore whether or not the theories so far proposed will carry over to real world complex problem solving.

2.2.1.1. Definitions

What then is a problem? Many definitions exist Duncker (1945), a Gestalt psychologist, states "a problem exists when a living organism has a goal but does not know how this goal is to be reached." Gilhooly (1989) restates this in cognitive science terms as "a problem exists when an information processing system has a goal condition that cannot be satisfied without a search process." This emphasises the necessity for a search process, as Mayer (1989 p.40) points out "a problem always exists relative to the problem solver", i.e. a task may be a problem for one person but not for another.

Theorists have made many attempts to produce a taxonomy of problems by breaking the subject down into broad divisions but, as Eysenck and Keane (1992) note, these are divisions that exist in the minds of theorists to make the subject more amenable to

investigation. The problems that are encountered in everyday situations are unlikely to fall into such neat categories and will usually involve a complex mixture of various types of problems. All problems can though be described as having a three-part structure (Reitman 1965); a start state, a goal state and intermediate actions taken to transform the starting state into the desired goal; though the level of detail to which they are specified, will depend on the nature of the problem under consideration and how well- or ill-defined it is.

2.2.1.2. A Potted History

At the start of this century Gestalt psychologists were conducting research on problem solving; the origins of their work were in early Associationist and Behaviourist research using animals (see Thorndike 1911) which characterised problem solving as the result of trial-and-error and the reproduction of earlier learned responses.

The Gestalt proposition emphasises that problem solving, as well as being reproductive (relying on rote application of past solutions), is also productive, i.e. people have 'insight' into the structure of a problem and this is used to 'restructure' the problem in order to find a solution (see Ohlsson 1984; Wertheimer 1959 for an account of the theory). Two classic studies of insight and restructuring are that of Kohler (1925) who demonstrated that apes could solve a novel problem by using insight and Maier's (1931) two string problem. There is also evidence from this time of reproductive processes hindering problem solving; Duncker's (1926; 1945) experiments demonstrated "functional fixedness", i.e. subjects could not reconceptualise objects, because they were "fixated" on the object's normal use. The major drawback of Gestalt theories, and even of those contemporary views e.g. Van Hiele (1986) inspired by them, is that they do not give a clear definition of insight. They have however highlighted that problem solving is a dynamic process and a theory based on mere reproductive processes is not sufficient. They have also provided a large body of experimental material and evidence that has been reinterpreted by later theorists.

2.2.1.3. The Information Processing Approach

Newell and Simon, in the late 1950s, produced the first computational model of problem solving called the General Problem Solver (GPS; see Newell, Shaw & Simon 1958; 1960) and this formed the basis of the information processing framework which

remains at the centre of problem solving research in Cognitive Psychology and Artificial Intelligence today.

According to the information-processing (IP) model, (see Newell and Simon 1972; Simon 1978 for a full account) problem solving can be analysed in 2 major phases: i) representation, mentally encoding the given problem into the start state, the goal state and the operators, legal moves and restrictions and ii) solution, devising a plan and implementing it so as to move between the start and goal states using the legal operators. At any given stage in the solution there will be a number of legal operators that may be applied leading to an even greater number of alternative states; because of the large number of alternative paths possible, people use their prior knowledge to plan and evaluate moves, e.g. means-end analysis. Heuristics are also employed, i.e. rules of thumb (Tversky and Khaneman 1974) which usually result in the correct answer but cannot be guaranteed.

Table 2.1: A Model of Problem Solving.

PROBLEM PRESENTATION
- - (apply representational processes)->
PROBLEM REPRESENTATION
- - (apply solution processes)->
PROBLEM SOLUTION

(From Mayer, R. E. (1989))

This summarises a straightforward model of human problem solving. The states are represented by capitalised words and the arrows represent the transitions between states; it shows that the problem is first transformed into a cognitive representation by applying the representational processes then the solution processes are applied to the representation to reach a solution.

2.2.1.4. Challenges To The Information Processing Model

Mayer (1989) highlights 6 challenges to this straightforward model of problem solving:

i) "Humans Systematically Distort the Problem To Be Consistent with Prior Knowledge." When encoding a problem people use their prior experiences, which Mayer (1982;1987) refers to as "schematic knowledge", to guide their interpretation of the current problem. Distortions can mean that the solver is working on a different problem than that presented.

ii) "Humans Focus on Inappropriate Aspects of the Problem." The solver may concentrate on a particular representation of the problem which, although consistent with the problem presented, may limit the solution process e.g. Scheerer's (1963) nine-dot problem. Adams (1974) suggests that many solvers create "conceptual blocks" by imposing constraints which do not actually exist. The initial representation then is not a trivial or automatic process, it can have a major impact on the solution by limiting the search process.

iii) "Humans Change the Problem Representation during Problem Solving." The original cognitive representation may be changed as the search progresses, moving from a general description of the goal and operators to a more specific description. This is demonstrated in the protocol obtained in Duncker's (1945) tumour problem. The representation and the solution process are therefore not distinct phases but interactive, i.e. one affects the other.

iv) "Humans Apply Procedures Rigidly and Inappropriately." Once a set of well-practised procedures has been learnt they may be applicable to many problems, however they are often misapplied, i.e. used when they are inappropriate or when they needed modification, e.g. Luchins' (1946) Water jug problem.

v) "Humans are Intuitive and Insightful and Creative." Often a solver is presented with a novel problem which requires them to generate a novel solution. Where this creative solution comes from is unclear; Behaviourist theories argue that the same processes are used for solving both novel and routine problems and that the solution is generalised from previous similar problems. Gestalt theories argue that different thinking is required to that used in routine problem solving and that 'insight' into the problem is required i.e. the solver must fit the parts of the problem together in new ways (Kohler 1925; Wertheimer 1959); however they do not give a clear definition of 'insight'.

vi) "Humans Let Their Beliefs Guide Their Approach to Problem Solving." The solver has, what Schoenfeld (1985a; 1985b) calls, "control" of the solution process. A person's beliefs will affect the control of the process; as previous experience will influence the way a person attempts to solve a problem, the amount of time they allow before admitting defeat, etc. For example Schoenfeld (1985b) lists as one belief of many of his students: "Mathematics problems are always solved in less than 10 minutes, if they are solved at all. Corollary: Give up after 10 minutes." This suggests that problem solving involves more than purely cognitive events.

This section has provided a brief introduction to the subjects of 'problems' and 'problem solving' and provided some definitions which will be useful when reading this thesis. It also demonstrates that the straightforward Information Processing approach, widely adopted today, is not sufficient to account for all problem solving, especially complex problems and therefore more research is needed.

2.2.2. Problem Solving and Decision Making

In the following sections problem solving theories are applied to real world situations. The approaches are reviewed in the literature on organisational decision making, and some alternative models of decision making are discussed. Before reviewing the literature it is appropriate to pause and consider what, if any, differences there are between problem solving and decision making.

Section 2.2.1.1 discussed the definition of problem solving, demonstrating that many definitions exist. Attention was drawn to the view of Reitman (1965) that all problems consist of three parts; a start state, a goal state and the intermediate actions taken to transform the starting state into the desired goal. Many views and definitions also exist on decision making. These can be categorised in two ways:

i) Definitions which view decision making as a stage in the problem solving process. For example Ackoff (1981) views decision making as, "Making a selection from various courses of action."

ii) Definitions which view decision making as synonymous to problem solving. Hicks (1991) for example demonstrates that the stages identified in problem solving and decision making are very similar. He goes on to say that "people tend to find it difficult to make decisions because they have a problem 'generating alternatives' .... 'determining evaluation criteria' .... and sometimes 'identifying the objectives of the decision'." From this perspective it is clear that the two processes are interlinked.

The former definition views decision making as a simple choice between alternatives. However, the later definition demonstrates that decision making is often more complicated. This allows two basic types of decision making situations to be identified; the straightforward choice and those that require problem solving. Earlier discussions have already highlighted that the focus of this thesis is on complex problems, therefore the wider definition is used in the following review, and throughout the thesis.

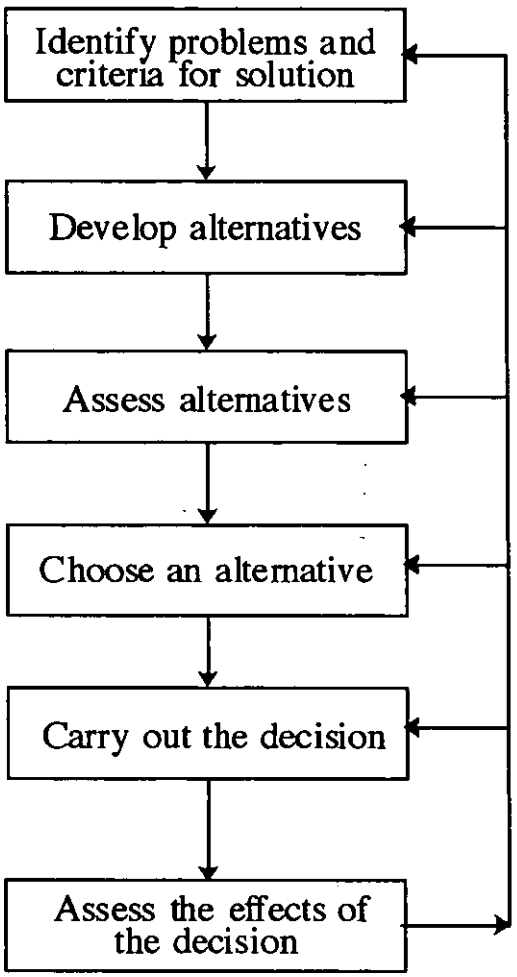
2.2.3. Organisational Decision Making

Organisational Decision Making is concerned with the processes and methods used to reach decisions within an organisation; previously this concentrated on managers, as decision making is their basic function, however with the introduction of new technology, different styles of management, e.g. self-managed teams, and the recognition of the major impact change has on individuals within an organisation, the focus has been widened to consider other people and issues.

Organisational decision making is defined as consisting of three steps; i) defining the problem ii) creating alternative courses of action and iii) choosing between the alternatives based on a criteria (which may or may not be specified) to reach a goal. Harrison (1975) identifies two types of decision making strategies programmed and unprogrammed which have a number of related dimensions dependent on the type of decision to be made. The programmed strategy is used for routine, recurring and predictable decisions, i.e. using existing rules and well known criteria applied to a uniform decision; the unprogrammed strategy is used for non-routine, non-recurring and unpredictable decisions, i.e. for novel problems. The predictability of the decision introduces the concept of risk in decision making, that is how certain the solver can be of the decision.

Harrison (1975) describes the decision making process as consisting of a number of general processes which are interrelated within a dynamic process, shown in Fig 2.1, a diagram adapted by Champoux (1996).

Figure 2.1: A Generic Model of the Decision Making Process.



The problem to be solved and the criteria for recognising a solution are first identified. Next a number of alternatives are developed and information about each of the alternatives is gathered to allow the solver to decide which are feasible, against the set criteria. These are compared and assessed to discover the results, both good and bad, and the risk associated with each alternative, to enable a decision to be made. This is not usually a linear process and the decision maker will often revisit and repeat earlier phases throughout the process.

2.2.3.1. Decision Making Models

Within the general process described above there are two general types of solution methods that can be applied, an algorithmic approach or a heuristic approach. "An algorithm is a specific rule or solution procedure, often quite detailed and complex, that is guaranteed to furnish the correct answer if it is followed correctly. A heuristic is a 'rule of thumb' as opposed to a formal, specified rule. It's an informal, 'seat of the

pants' strategy or approach that works under some circumstances, for some of the time, but is not guaranteed to yield the correct answer." (Ashcraft 1994).

i) The 'Rational Model' is an early model which views decision making as a linear process with an identified goal. It assumes full information for all the alternatives, a known function to decide the priority of the alternatives, and leads to a solution which maximises the goal. However the majority of real world decision making we encounter will contain incomplete information, and judgements about the likelihood of events and outcomes have to be made. When the decision to be made is more complex then it becomes a problem. Theories which can be applied to complex problems therefore have to account for these judgements.

Much research has been conducted into peoples' use of probability to solve problems which contain uncertainty and risk. Studies have been conducted using simple gambles such as the outcome of a toss of a fair coin; given that the probability of each outcome is known (P{HEAD}= .5 and P{Tail}= .5) and the value of each outcome is known, then the value of the gamble can be calculated using the following formula:-

$$E\{V\} = P1\ V1 + P2\ V2 + \ldots\ldots$$

Where E{V} is the expected value, probability = (P) and monetary value = (V).

For example if a person bet 20 pence on the coin coming down heads then the expected value of the gamble is:-

$$= P\{HEAD\}*(+20p) + P\{TAIL\}*(-20p)$$
$$= 0.5*20p + 0.5*(-20p)$$
$$= 0p$$

Expected Utility Theory assumes that this formula can be applied to a real life decision and that by choosing the option with the highest expected value the best decision will be made. This is based on a number of axioms the validity of which are debated by many researchers (see Wright 1984 for a discussion of the criticisms). Various studies have shown that people vary from the theory when making decisions and this is influenced by two major factors. Peoples' probability assessments are often subjective, e.g. influenced by recent events (see Davidson, Suppes & Siegel 1957); and utility for an outcome is also subjective, for example the usefulness of an amount of money depends on how much money a person already has. The theory was re-formulated to maximise the Subjective Expected Utility, however even early studies have demonstrated that subjects do not follow the rule (see Edwards 1956).

There is increasing evidence that people employ short-cuts and biases and do not perform the complex calculations which expected or subjective expected utility theory demand, especially when faced with complex real world problems.

ii) The 'Bounded Rationality Theory' developed from work conducted by Herbert Simon and James March (see for example Cyert and March 1963; Simon 1957; Simon 1955). It recognises that there are limitations on the decision making process and that it is constrained by the solvers keyhole view of the problem space. Rarely do people have complete knowledge of the problem and all possible alternatives, or the cognitive ability to consider all possibilities. People therefore reduce the cognitive strain (Bruner, Goodnow & Austin 1956) by limiting the number of options considered and settling for a good, as opposed to an optimum, solution. This is known as 'satisficing'.

Figure 2.2 shows an example cited by Hunt (1982). This demonstrates the need for people to use short-cuts in problem solving. The problem involves assigning digits to letters.

Figure 2.2: Problem of Assigning Letters.

```
        DONALD
        GERALD +
        ----------
        ROBERT
where D = 5
```

The 9 digits can be assigned in a possible 362,880 ways
(362,879 are wrong and will not work).

Computers are capable of working through all the possibilities by performing a serial search; according to Simon (1970) a computer programmed in 1969 would have taken 10 hours to solve this, today's computers would of course be faster, however it should be noted that the problem can be solved by a person, whose mental processing is much slower than even the 1969 computer (in respect of serial searching) in half an hour. This example demonstrates that an exhaustive search will rarely be possible. One technique to reduce mental workload is that, as Green (1988) notes, "we simplify reality and act according to these simplifications. Our rationality is 'bounded' (Simon 1957)." This has been demonstrated in organisational decision making by Cyert and March (1963), where planners compromise their goal selection and minimise the outcomes.

Other organisational decision making models recognise the use of 'satisficing' behaviour and the use of heuristics but account for them in various ways depending on the decision to be made, the prevailing circumstances and the approach taken.

iii) The 'Unstructured Decision Model' (see Mintzberg, Raisinghani &Theoret 1976) focuses on complex, unstructured and ambiguous problems. Unlike those described in the previous models, these need to be broken down into smaller problems some of which may have more structured solutions. The problem is often vulnerable to other factors such as political issues, discussed below, and requires a number of alternatives to be assessed simultaneously in order to reach a favoured solution. The favoured solution will often be reach during the decision process and the solver then seeks to confirm this. This model again relies on the use of heuristics such as selective perception, etc.

iv) The 'Garbage Can Model', developed by March and Simon (1976), addresses problems in high ambiguity situations where there is no clear goal, possibly with changing people and technology and a changing operating environment. The model views decision making as a time sensitive process consisting of four streams; the problem, the solution, the participant and the choice opportunity streams. The convergence of these streams, at some point, produce the decision. This is a chaotic process where solutions look for problems to solve and decision makers make choices based on what is available at the time.

v) The 'Political Model' recognises that individuals and groups within the organisation pursue their own self-interest and will attempt to reach decisions which maximise these interests. The decision making process is therefore seen as a power or conflict based process, with bargaining and compromise used to reduce the conflict, and resulting in a decision which will not normally satisfy everyone (Pfeffer 1982). The eventual decision will be affected by the organisational structure, management style, participation of various groups, etc. These will vary between organisations and affect the relative strengths of the bargaining power of the people involved in the decision process.

vi) The more recent 'Humble Model' proposed by Etzioni (1989) has been developed to account for the growing amount of information available to today's decision makers aided by electronic information systems. The model views the decision process as dynamic and adaptive with the decision maker, unable to cope with the wealth of

information available, making trial-and-error decisions and checking and revising these decisions as new information becomes available.

These are just some of the models which have been proposed to account for the various types of problem solving encountered in an organisation. The earlier 'Rational' model is suited to well structured problems which can be clearly stated and where all alternatives can be considered. In an organisational setting this will rarely be the case. The bounded rationality model recognises the limitations of the solver and introduces the idea of heuristics and satisficing to account for this.

Alternative models have gone further in addressing specific aspects of the decision making process. These include models which recognise that real world problems are normally complex and unstructured and that there may be no clearly defined or agreed goal. One describes the use of trial and error strategies in knowledge rich situations, while another focuses on the people involved in the decision making process and the negotiation which this involves.

Figure 2.3: Factors Affecting Organisational Decision Making.

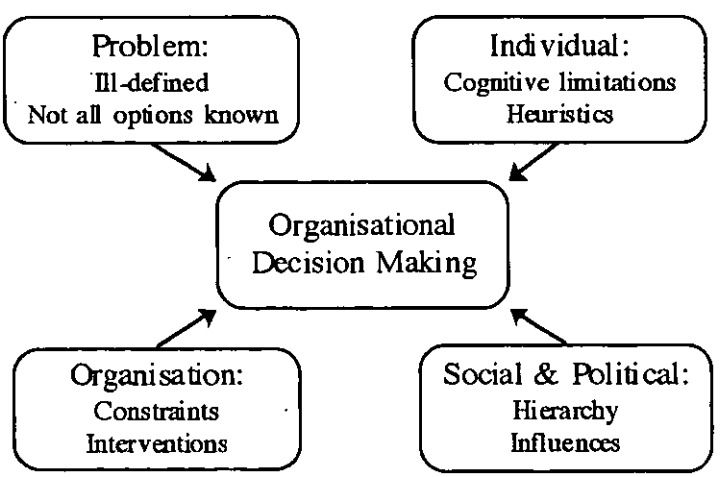


Figure 2.3 demonstrates the main issues drawn out from the models which affect organisational decision making. It demonstrates that there are many different influences, all of which can affect the eventual solution. These include the type of problem under consideration and the problem solver's limitations. The type of organisation may also have an effect, e.g. the constraints imposed and interventions offered. However social and political factors also play a part and these need to be given consideration. The review demonstrates that although many models exist, no

single model accounts for the complexity of issues apparent in organisational problem solving.

2.2.3.2. Improving the Decision Process

As the previous sections have demonstrated the area of real world problem solving is complex. Problems are often incomplete and ill-defined; many more alternative solutions exist than can be considered by a human problem solver; and confounding issues such as political conflicts affect the solution. In light of this a number of areas have developed, proposing methods and techniques to improve the decision process. These can be split into two main areas; i) methods to improve the human decision making processes, using methods such as brainstorming which improves the number and range of options considered, and ii) technical interventions to aid the decision makers, e.g. Management Information Systems and Decision Support Systems.

The above review established that there are still many unresolved issues in the problem solving literature and, that these issues become even more complex when real world problem solving is being considered. The two other major issues which complicate the research and need considering are; i) being able to study the problem in its own setting, and ii) identifying a problem for exploration. These are discussed in the following sections.

2.3. AN APPROPRIATE METHODOLOGY

There has been much debate regarding the question of scientific vs. ecological validity (see for example Davies and Logie 1991; Neisser 1976) and in most cases researchers have opted for rigour and control over ecological considerations. However, in order to achieve an understanding of the organisational context there is a need to steer away from the traditional scientific laboratory approach to research. By their very nature, laboratory experiments are at best only rough and approximate models of any real life situation. Firstly, due to the need to extract only a few of the features of the problem to be brought into the laboratory (O'Reilly 1983), hidden or unexpected interactions in real life may easily nullify, or even reverse conclusions arrived at in the laboratory. Secondly, the effect of controlling extraneous or irrelevant variables in the laboratory in order to increase the precision of an experiment, mean that the complexity of the situation is reduced. As a result Suchman (1987) argues that this leads to decontextualisation and therefore renders it qualitatively different from the real world problem. Furthermore the criteria used to select the issues focused on may bias the

results. Finally, bringing a real world problem into a laboratory situation will mean having to use different methods for presentation, etc. and these again can affect the results (for a more detailed discussion see Chapanis 1967). As Chapanis (1967) says, "The safest and most honest conclusion to draw from all these considerations is that one should generalize with extreme caution the results of a laboratory experiment to the solution of practical problems."

Having decided that the strict scientific approach and the use of a laboratory setting is inappropriate for the type of work to be undertaken here, a review of approaches follows. The starting point for this review is to look at ethnomethodology, a method used by others conducting real world research. Ethnomethodology is a method first used in sociological research by Harold Garfinkel (see for example Garfinkel 1967). It refers to the way people view themselves in social action, i.e. their structuring (methodology) of their ways (ethno-). It is related to other theories which view people as being continuously engaged in creating and reaffirming social order. The method is concerned with peoples' practices, i.e. how things get done from moment to moment. These practices provide the background in which actions are situated (Suchman 1987), recognising that "human action is driven by the concrete situation that exists at any given moment and is constantly changing" (Bannon 1991). This means that researchers who aim to explore human action, i.e. problem solving, should be aware of the background in which the actions occur, including the situation, culture, management styles, work processes etc. which represent the ordinary behaviour.

Bannon (1991) takes this idea further to suggest that much research, reported in the Human Computer Interaction (HCI) literature, has been based on views which have developed with the technology, starting from the early concentration on developing computers which could perform the tasks required, with very little focus on people. It was then realised that if the technology did not fit with the people there could be major problems in its use, and the focus was switched to issues of usability. The current focus is that technology has a major effect not only on how work is performed, but also on the work environment by way of organisational structure, social relationships, etc. Bannon (1991) argues that these views have influenced which issues have been explored and tested, and that these theories are addressing issues which are only minor, when compared to real issues arising in work situations. The recognition of how important the situation is has been echoed in many areas of research and therefore for this study to be conducted within the RM, an understanding of the situation is vital.

There are many problems associated with the need to gain an understanding of the processes people undertake to solve a problem, and these are further complicated when the aim is also to capture the organisational context in which this occurs. As Suchman (1987) notes, "While we can always construct rational accounts of situated action before and after the fact, when action is proceeding smoothly it is essentially transparent to us." Therefore if methods were used which *only* asked people to account for their actions then these would be insufficient. In other words, their reports would only reflect what they could recollect and were aware of doing, not necessarily what they actually did. Ethnomethodology addresses this problem through the use of observation in the real world situation.

The ethnomethodological approach is the overall guiding factor in the research undertaken throughout this project. The philosophy is to conduct 'real world' research through a number of case studies (using many different data collection methods). This will enable an investigation of their aspirations, models and methods to be conducted, and to observe what they actually do. The methods employed were chosen on the basis of their success in the study of other real world problem solving research. Their use was felt to be appropriate due to the limited theory which exists. Case studies have been used in many studies to allow existing theory to be built on and enhanced (see for example Anderson 1983; Pinfield 1986). There has been, and still is, debate on the applicability of case study work to wider situations. For example Allport (1942) argues that the findings can only apply to the particular situation being reported. A more contemporary view (Denzin 1989), and the view adopted here, is that issues which apply universally may be discovered through case study work. Much of the work reported throughout this thesis is also conducted through the use of interviews (Mintzberg et al. 1976) and document analysis (Chaffee 1981). Finally action research methods (Mansell 1991) are used to engage in meetings and discussions with the RM in order to allow issues and the direction of further work to be developed.

2.3.1. Problem Identification And Definition

It is only with an awareness of the organisation and an understanding of the complex issues that are involved in the work processes that real world problem solving can be considered within the Royal Mail. The first stage of this research then is to understand how the organisation is structured and to look at the processes involved in the delivery of mail and the issues that arise, this will then allow areas to be identified

which exhibit complex problem solving. To enable this understanding an exploratory approach was taken, following the principles of ethnomethodology.

2.4. THE ROYAL MAIL

2.4.1. Methodology

In order to conduct in-depth case studies a number of different data gathering methods are necessary. As described in Section 2.3, this is to ensure the data gathered reflects the procedures which are *actually* employed during the revision process, not just what people report to have occurred.

Documents of the procedures will be gathered wherever possible, and it is anticipated that these will reflect the explicit procedures employed by the RM. However, the ethnomethodological view suggests that these documents will not necessarily reflect the procedures which are *actually* undertaken. In order to address this a number of other data gathering methods will be employed wherever possible. Key players will be interviewed to establish a view of the processes from their perspective. Observations will be conducted of the process in action. It would be next to impossible to observe the whole process, due to the length of time over which decisions are made, instead parts of the process will be selected for study. Other documentation will also be collected, for example internal reports relating to the decision being undertaken, minutes of meetings relating to the decision and any final documentation.

It is not expected that the data sources will present the same picture of the processes, there will undoubtedly be differences in the information obtained from different sources. That is not to say there will be a conflict between correct and incorrect accounts of the procedures, but instead the differences are likely to reflect different perspectives of the decision making process which will together provide the rich picture. For example, the documentation is likely to reflect the formal / prescriptive view of the processes which should be undertaken, while the observations are likely to reflect the *real* problems involved in applying the formal methods in situ. Part of the theoretical work is to identify any inconsistencies and to understand why these might exist. The variation in methods used will allow two types of summaries to be drawn; i) the RM's findings on the processes which exist and the results obtained using the formal descriptions and, ii) the research findings using the informal information

gained through the observations and interviews. This format will be used in all of the case study work reported in this thesis.

The investigation commenced with meetings and interviews with managers at various levels of the organisation, within the Midlands. These included the Director of Deliveries, Processing Manager and Delivery Area Manager (DAM) for Leicester and background reading on the history of the Royal Mail[1]. Following the initial understanding of the structure and processes involved in the mail circulation system, more detailed interviews were conducted with the Delivery Area Manager (Leicester) and the Delivery Office Manager (DOM) at Loughborough. Visits were made to two DOs, to observe the delivery activities and to interview employees, enabling an understanding of the delivery process. A number of meetings were attended, organised by the DAM as part of his normal work, and led to introductions to members of the Delivery Revision team and later the Delivery Revision Manager (Midlands). The revision team holds regular meetings to which an invitation to attend was offered and accepted. These meetings and interviews are listed in Appendix A.1.

The findings of these initial studies are presented as the history of the RM, the delivery process and the revision process.

2.4.2. Royal Mail's History

The RM is a large national organisational which pioneered the modern postal service. The forerunner of today's Royal Mail was a service established in 1516 to carry King Henry VIII mail and was for his exclusive use. In 1635 the service was widened to cover the cost of carrying the royal mail with the postage paid by the receiver and in 1660 an Act of Parliament established the General Post Office. In 1840 Rowland Hill introduced reforms to calculate the cost of carriage according to weight and shift the burden of payment to the sender with the introduction of the stamp (the Penny Black) as proof of payment. Within the next 15 years post-boxes were installed at roadsides and householders were urged to provide slits in their front doors to save time having to knock. In the following years the service grew and the methods for transporting mail were enhanced, with the introduction of the Post Offices own fleet of vehicles[2] and an air mail service. In 1969 the Post Office changed status from a Government

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[1] For a more detailed account of the history and development of the RM see (Daunton 1985).

[2] 48 in 1919 compared to 30,000 today

Department to a Nationalised Industry. In 1981 the British Telecom Bill split the corporation into two Nationalised Industries the Post Office and British Telecom. In 1986 the Post Office Board restructured the corporation into four businesses; Letters, Parcels, Counters and Girobank.[3]

2.4.3. The Royal Mail Today

Today the RM is a public corporation owned, but not managed, by the British Government. It receives no subsidy but the funding method limits the amount of reinvestment and therefore restricts its modernisation and future growth. Today's RM has an annual turnover of over £5,000 million (to year end 30th March 1997)[4] delivering 67 million items of mail a day to the door of the UK's 25 million addresses and employs approximately 190,000 people throughout the UK.

RM faces increasing pressure from both new technology, including telephones, faxes and electronic mail, and increased competition from other postal services especially from abroad. This was particularly relevant during disputes with the union in the summer of 1996 with the Government threatening to take away its monopoly. These threats mean that the RM has to concentrate more to keep its competitive edge, to safe guard its services and look for new opportunities. Any loss in the amount of mail handled could lead to a great reduction in staff, for every 1% volume lost 1500 jobs are at risk.

The RM deals with the vast majority of letters distributed in the UK, delivering mail from post-boxes around the country to their destinations in the UK and abroad. The diagram below (Figure 2.4) depicts the mail circulation system which shows the route a letter takes from being posted to its final destination. The mail is taken from the collection points, e.g. post boxes, to the local sorting office where it is sorted according to its destination. The bags of mail for each destination are then transported using a complex national transportation system, including aeroplanes, trains and lorries, to the delivery office local to the address. The delivery office is then responsible for ensuring the mail is sorted and delivered to the customer's front door. This stage is known as the delivery process or inward function.

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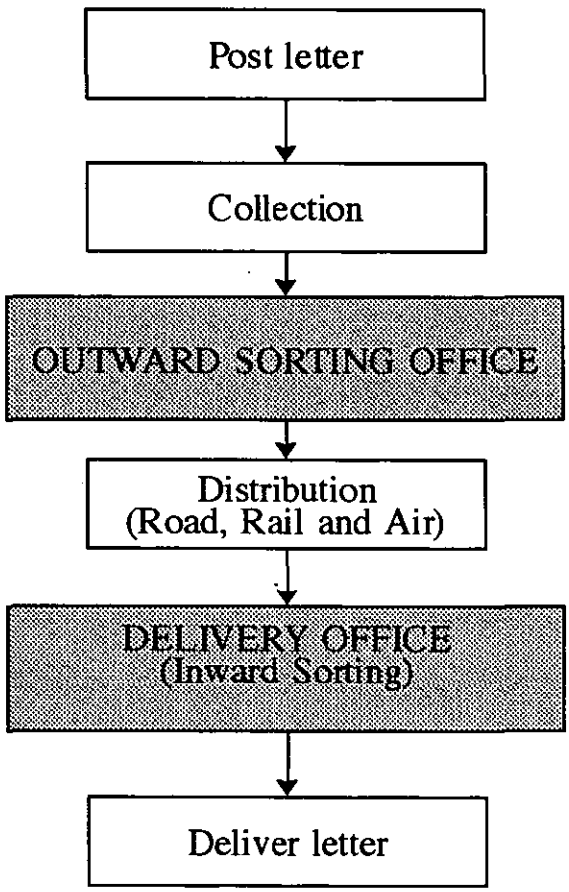
[3]Background information can be accessed on the internet at "www.royalmail.co.uk/". The Royal Mail also has its own museum in London.

[4]Figures taken from "The Post Office Report and Accounts".

Figure 2.4: The Letter Delivery System.

THE ROYAL MAIL LETTER DELIVERY SYSTEM



It is within the Delivery Function that this research was established. The following sections therefore consider the processes associated with the delivery in further detail.

2.5. THE DELIVERY PROCESS / INWARD FUNCTION:

The delivery process is at the end of a long chain of processes and events, part of the large distributed system described above and is therefore reactionary, having to meet legislated standards despite events which are beyond its control. The delivery office has partnership agreements which state the agreed times that mail will arrive from sorting offices around the country. However there are sometimes delays in the arrival of mail. Any blips in the system are compounded at the delivery office and must be coped with in order to meet set standards of service and quality, e.g. to deliver 90% of first class items by the first working day following collection, and to deliver a set % of 1st class mail before 9.30 am.

The business is organised into 9 Divisions with its Strategic Head Quarters (SHQ) based in London. Each division is divided into three main functions: delivery, distribution and processing. Within the delivery function (in which this project is primarily interested), the management structure is headed by a Director of delivery. Beneath the Director are several Area Operations Managers (having responsibilities within the delivery function, as well as for distribution and processing functions). Each main delivery area (based on county boundaries) within the Division has a Delivery Area Manager (DAM), who is responsible for all delivery offices within their area.

Each delivery office is headed by a Delivery Office Manager (DOM) and in all but the smallest offices the DOM is assisted by one or more Operations Managers or Postmen Higher Grade (PHG). Offices vary considerably in size, from several hundred staff in city or town centre offices to just two or three in remote rural districts, and each is responsible for a given geographical area. The office is divided into delivery routes (walks) which are known by a number, each of which is assigned to a delivery officer. Delivery officers can be full or part time staff, if they are part time they will normally work only the first of the two daily deliveries. They have settled attendances, i.e. a fixed duty which they sign for, which details their walk and other responsibilities.

The inward function is concerned with the mail from the time it arrives at the delivery office until it reaches the customer's front door. It consists of two main phases; processes inside the office and the delivery itself. Figure 2.5 below sets out a typical duty for a full time postal officer (PO).

Figure 2.5: A Typical Postal Delivery Officer's Duty.

-	05.40	IPS	
-	06.10	PREP	
-	06.20	IPS	
-	07.00	PREP	& Travel to Delivery
-	09.30	DELIVERY	& Back to Office
-	10.15	BREAK	
-	10.45	IPS	
-	11.00	PREP	& Travel to Delivery
-	12.15	DELIVERY	& Back to Office

The internal phase consists of two phases:

i) IPS - Inward Process Sortation

The mail arrives at the office in sacks, is turned out and sorted into the delivery walk numbers and deposited in the appropriate slots of a sorting frame.

ii) PREP- Walk Preparation

Each postal officer (PO) takes the mail from their IPS slot and sorts it first into streets and then into house number within street; this is then banded and pouched (bagged). Pouches are weighed, to ensure they are in accordance with the regulated weight limits[5].

The second phase starts with the delivery officer travelling from the office to the first delivery point. This maybe on foot, bicycle, bus or van depending on the distance that has to be travelled. They then walk or cycle around the route delivering the mail to each address. The delivery will often include having to knock at addresses to get signatures for registered mail and to deliver large packages. If the amount of mail to be delivered on a particular walk is more than one pouch (dependent on the weight) then a second and even a third pouch may be required. These are deposited at strategic points on the walk by a van driver, for the delivery officer to collect. Some walks may also include collections from post boxes; these will have a designated collection time and cannot be collected before this time.

Having delivered all the mail and collected any where necessary the postal officer returns to the office. If the officer is employed on a full time contract they will have a meal break before the process begins again for the second delivery.

There have been no recent changes to the process or methods of delivery. Certain constraints exist which mean that some options for change will not be considered, for example the 09.30 delivery standard for first delivery determines that there must be two deliveries a day. Other constraints affect the problem, for example currently there is no account taken of the amount of mail that will be arriving at the delivery office each day.

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[5] The amount that any postal officer can carry is stated in the company's health and safety standards.

An overwhelming view expressed throughout this stage of the investigation was that the delivery process involved a lot of decision making and that the revision process for amending walks was a big problem. Therefore, given the objectives of the research, the processes involved in Delivery Revisions were examined.

2.6. DELIVERY REVISION

Each delivery office is divided into a number of walks that border each other to cover the whole geographical area. They remain fixed, covering the same roads and addresses, until a change occurs in the office. Changes may occur for a number of reasons. These include the addition or subtraction of addresses through building or demolition, increases in the amount of mail to a particular area, leading to an inability to meet prescribed standards, or changes to the RM working practices. When a change occurs the walks need to be adjusted. Small changes such as a new building are incorporated into an existing walk but larger changes, a new housing estate for example, may need to be allocated across a number of walks to ensure the deliveries still meet the standards required. There are three nationally agreed forms of revisions which are outlined below and will be discussed in more detail in the sections that follow.

2.6.1. Table Top

This method is used where only small adjustments are necessary. The revision will normally be conducted by the DOM and delivery office staff and results in a few small adjustments to balance the workloads of the delivery officers. For example if a new estate were built the increase in deliveries may be too large for the walk they naturally fall on and will, therefore, need to be absorbed by a number of surrounding walks. This method is also used to enable a quick solution to be reached for larger changes. For example the DOM may come to an agreement with the union regarding a reduction in office hours. The agreement may be lower than the DOM would actually like, but this allows the changes to be put in place without the need for a revision team and its associated costs. There would be an additional gain as the union would offer little or no opposition.

2.6.2. Manual Walk Testing (Manual-W)

When more major changes are necessary the DOM can choose to use the revision team. The team will then manually test the walks in the area and make alterations where necessary. This is a lengthy process which involves testing every walk in the

delivery office area, monitoring the amount of mail through the office and collating various other information before alterations are suggested, agreed and then implemented. This process is explained further in Chapter 3.

2.6.3. Computer Aided Delivery Revision (CADR)

This is the alternative method for major changes. The revision is performed by the revision team and involves the complete re-plotting of walks. It involves measuring the length of roads from a map of the area and collating other data from the office. This information is then input into the CADR system. The team plots potential routes and the computer calculates the preparation and delivery times that each route requires. This method and the processes associated with it are discussed further in Chapter 3.

2.7. DELIVERY REVISION IN THE MIDLANDS

Royal Mail Midlands covers an area of 9,500 square miles and has its headquarters in Birmingham. It handles more than 80 million letters each week and employs approximately 20,000 staff to collect, sort and deliver this mail (approximately 11,000 of these staff are delivery staff). The area contains 125 delivery offices and serves 7.6 million social and 55,000 business customers[6].

The Delivery team in the Midlands is headed by the Director of Deliveries. Working for him is the Delivery Revision Manager (DRM). This position has recently been created to improve the perception of the delivery revision team and to provide a more thorough and standardised approach to revisions performed across the Midlands. Previously delivery revisions were seen purely as a cost cutting exercise, requested at the end of the financial year when budgets were being over-run; instead of a process for optimising the office. Beneath the DRM are the team leaders, responsible for their own area within the Midlands. Each of the areas has its own revision team of two people. The other parties involved are the Delivery Area Manager (DAM) and the DOM (See Figure 2.6 below).

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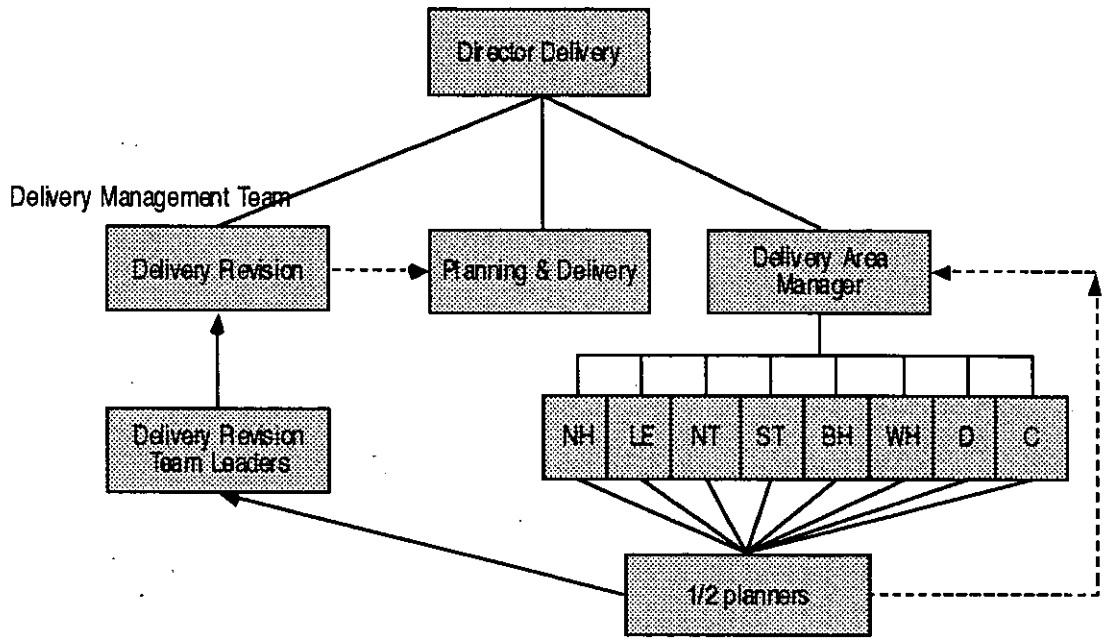
[6]Figures from the "Royal Mail Midlands Business Plan (1996-1999).

Figure 2.6: The Midlands Delivery Revision Team.



KEY:

_____> = Direct Reporting ---------> = Indirect Reporting

NH	=	Northampton	LE	=	Leicester	NT	=	Nottingham
ST	=	Stoke	BH	=	Birmingham	WH	=	Wolverhampton
D	=	Derby	C	=	Coventry			

The revision process is complex and there are many issues and constraints, reported throughout the interviews, which need to be considered and adhered to. There is no national standard for conducting revisions, although many of the RM standards and agreements determine some of the processes necessary. The following sections outline a typical process for revisions, within the Midlands.

2.8. THE REVISION PROCESS

When a major revision is required the choice of method will normally be decided by the DOM and the union representative. The CADR system has been in place for 5-6 years and has only been used twice in the Midlands, both times at the Union's request and both with limited success. The system has been used by other divisions and in a survey of recent methods used by each Division, it was revealed London had conducted all theirs with CADR, the South East and Scotland & Northern Ireland divisions had conducted only Manual revisions and the remaining divisions had used a combination of methods. The overwhelming feeling expressed by DOMs interviewed in the Midlands was that they view the system unfavourably with a

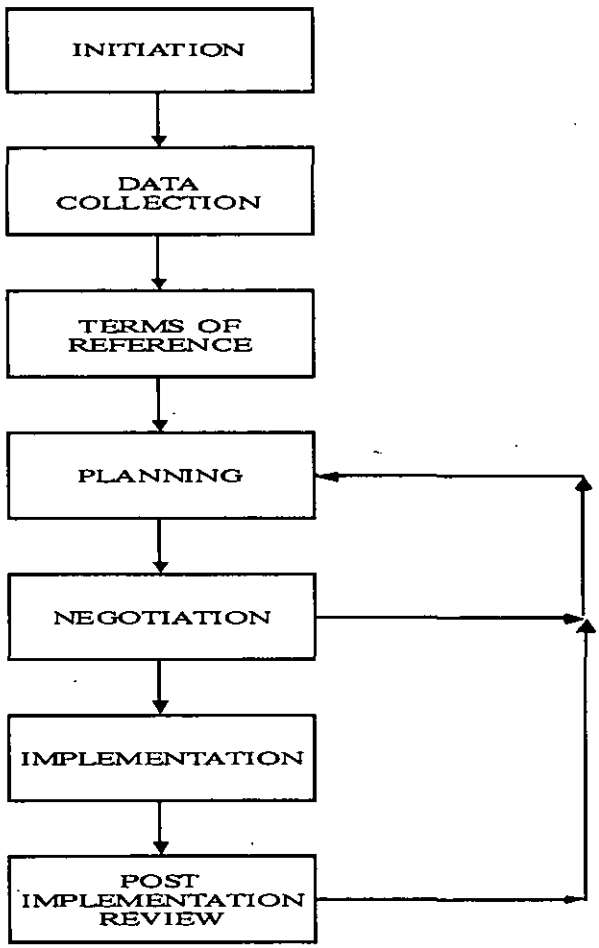
general feeling that its use leads to the creation of jobs, which increases the cost of running the office. The Manual-W is therefore the usual and preferred method of the DOMs.

Figure 2.7 below shows the revision process used in the Midlands; this is a simplified version of the process and is discussed further in the next chapter. The process starts with the initiation of the project and will be agreed by the DAM. Next is the data collection for each individual walk and for the office as a whole. The terms of reference are agreed, which will include standard references and also the specific requirements of the office. Once the terms are agreed the planning phase begins. New walks are plotted by the planning team and presented to the DOM and CWU for negotiation. The new walks are then implemented and a short time later these are reviewed[7].

[7] It should be noted that the Midlands Area were at this stage of the research reconsidering the role of the planning team and the newly appointed Delivery Revisions Manager had begun introducing new methods and standards into the process.

Figure 2.7: The Delivery Revision Process

THE DELIVERY REVISION PROCESS



2.9. DECISION MAKING AND THE DELIVERY PROCESS

This chapter has set the scene for the following chapters, providing background to the theory and the organisational setting. The review shows that the area of problem solving still contains many unanswered questions. This is even more evident when the area of real world complex problem solving is considered, with real doubts raised about the transferability of the theories relating to simple problems. Research in this area is made more complex by the need to consider the situation in which problem solving occurs. The literature demonstrates that most important decisions facing an organisation may be described as being closer to non-programmed than programmed, and have a considerable degree of ambiguity. Information concerning such problems is usually incomplete and a number of individuals and groups are likely to influence the decision which may extend over a considerable time period.

The exploratory study in the RM demonstrates it is a large organisation facing many complex problems. Changes are taking place in its operating environment; new competition is emerging and there is a growing threat from new technology. There is also additional pressure being exerted from within the RM itself, for example the improved national network of mail distribution has altered the postal patterns. All these factors mean that the RM has to look for new opportunities to enhance the organisation and the service it provides to customers, within an organisation facing changes. This is in line with the Garbage Can Model describing the decision process as time sensitive and consisting of streams which provide solutions when they converge.

Various issues have arisen from these initial meetings, interviews and observations; the delivery function and the revision process in particular are both complex. Poor walk design costs the RM in many direct and indirect ways. Failure to meet delivery deadlines and increased overtime payments are two examples. Inability to respond to new business opportunities is another. Given the size of the RM, small inefficiencies in this respect represent large costs over the country. Therefore, relatively small investments can pay themselves back many fold if they produce even modest improvements in performance. The RM invests substantial sums of money in the area, both in the allocation of staff to revisions and in initiatives such as the Computer Aided Delivery Revision system (CADR). The system has cost a great deal of money to develop and, on the basis of initial studies, has not been widely used and therefore it is doubtful if the investment has been re-paid. In comparison to the high tech. innovations which have been / are being introduced in the sorting phase such as Integrated Mail Processing (IMP) which will lead to the automatic handling of 90% of all mail by the year 2000, there has been very little change in the delivery function which remains a highly labour intensive, manual process using the basic methods developed decades ago.

When problems are encountered the goal for solution will often be ill-defined, the amount of information that is available is immense and it would be impossible to consider all of the options available as the rational model above proposes. This is due to the time scales involved and because of the limited cognitive processing capabilities. This is acknowledged in the literature on problem solving and the Bounded Rationality model recognises that people must therefore use some short cuts in their decision making.

The delivery and revision processes also consist of many issues and constraints; in many cases these are unquantifiable and, therefore, balancing them is even more complicated. Some of the constraints are real constraints, they are part of the problem itself. Others are imposed by the system or the techniques adopted for solution. Recognising which of the real constraints must be adhered to and which are flexible is an important part of the solution of complex problems. Section 2.2.1.4 describes a number of challenges to the IP Model and the biases that people often introduce. Given that not all the options and constraints may be considered the problem solver will be attempting to satisfice not optimise and although the constraints that the solver imposes by this may aid the decision making by easing the cognitive strain it may also introduce additional biases.

Another major influence on the decision making processes within the RM are the people involved. The delivery and revision processes consist of, or are influenced by, many different people, in many different roles. These people will all have their own goals and priorities, as described in the Political Model, and their ability to achieve their objectives will affect the eventual outcome. The RM has a history of operating a bureaucratic, hierarchical structure. Decisions are often made by managers, far removed from the shop floor, and people expect to be told what to do. The opposition to these decisions comes from the Communication Workers Union (CWU) which is well established within the RM and still has a lot of influence.

This initial phase has demonstrated that the RM can provide a very rich setting for real world complex problem solving and that the delivery function, and the revision process in particular, show promise of containing such complex problems. They are therefore worthy of being a vehicle for further study. The next phase is to explore the revision process in more detail. Chapter 3 explores the process through a number of case studies. These aim to enable the process to be understood and to establish if existing theories can be applied or whether new theories might be necessary to understand this real world problem solving.

CHAPTER THREE:

AN INVESTIGATION OF THE DELIVERY REVISION PROCESSES

CHAPTER 3: AN INVESTIGATION OF THE DELIVERY REVISION PROCESSES

3.1. INTRODUCTION

The previous chapter considered some of the existing theories of problem solving and organisational decision making and considered how these might apply to the RM. It was established that the RM provides a rich setting in which to study complex real world problems and that the revision process appears to be a good vehicle for further exploration. This chapter concentrates on the revision process and aims to further investigate the processes involved and the problems encountered. The first section outlines the methods used to obtain the data described in this chapter. This is followed by two case studies. The first describes a Manual-W revision conducted at Hinckley, Leicestershire; the second describes the process and problems associated with the use of the CADR system. These processes are then reviewed in light of the theories described in Chapter 2. The final section discusses the issues that are raised by the case studies.

3.2. HINCKLEY CASE STUDY

3.2.1. Methodology

The methods used throughout this case study are in line with the ethnomethodological methods described earlier (see Section 2.4.1) and a number of data collection methods were employed.

Following a number of interviews and meetings, an opportunity arose for a case study to be undertaken of a revision being conducted at the Hinckley Delivery Office. Agreement was obtained from the Revision team and Delivery Office Manager to conduct a study. The formal documentation of the procedures was limited, particularly in the early stages, but a manual was being developed by the division and became available during the revision. Even then some aspects of the process received limited attention and little guidance was provided, this was particularly true of the plotting stage.

Initially a number of meetings were attended at the Delivery Office with the DOM and Planner, explaining the background to the revision and the reasons it had been requested. The researcher then spent a day shadowing one of the data gatherers. This

included attending the Delivery Office at 6am in order to observe the internal office procedures, before being assigned a bicycle and following a walk tester, as he followed the postman on delivery. Meetings were attended (e.g. to establish the terms of reference) and any documentation produced by the revision team was collated. Throughout the process the revision team was visited at the DO, where the revision team had set up office on the pool table in the staff room. This enabled the procedures employed to be observed and also allowed questioning of the team. Regular contact was maintained with the planner, via the telephone, to check on the team's progress and to establish when new stages of the revision had been reached and enabled the subsequent visits to be planned (see Appendix A.1 for a list of visits).

3.2.2. Background To The Revision

The last revision to take place at Hinckley was approximately 3 years prior to this one. This is a relatively short period between revisions, as they can often be more than a decade apart. The appointment of a new Delivery Office Manager (DOM), with prior revision experience, has been influential in this process and he had highlighted areas which could lead to improvements in the office's performance.

Since the last revision there had been a number of amendments within the office to create and adjust walks, due to changes in the area mainly new housing developments. These had been table-top revisions implemented by the Delivery Office Manager and staff within the office. The outcome of all of these minor changes was the existence of many messy walks which cross each other[8] and were now full to capacity. Any further changes were impossible to absorb.

There were a number of factors which highlighted the need for a revision. The office was having difficulty meeting the 09.30 delivery time. This was considered to be a result of internal office problems i.e. the time taken to prepare the mail and not because of the actual time taken to deliver. There had been a fall in the quality of service given to industrial areas, attributable to the early morning van deliveries, and a number of complaints had arisen. The final major factor, and one which is being experienced throughout the RM, concerned the 2nd delivery. With more efficient means of transferring mail around the country and an increasing amount of

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[8] There is a general feeling that walks which cross each other are not optimal. They call for extra time on the delivery and they look untidy.

automation within the system, the mail was arriving at the Delivery Office earlier. These changes had led to a drastic reduction in the amount of mail for second delivery (See Figures 3.1 and 3.2 below) and a staff imbalance had resulted. The office as a whole therefore needed to be considered, i.e. both internal and external procedures and both 1st and 2nd deliveries.

The Delivery Office is a medium/large office consisting of 60 staff and 41 delivery rounds, 5 of which are part-time duties. The area it covers is mainly town centre walks, with only two walks being classified as rural. This is slightly unusual for the Midlands where the ratio of town centre : rural walks is usually lower.

3.2.3. Initiation

An annual meeting takes place between the Director of Deliveries (DD), the Major Project Productivity Manager (MPPM) and the Delivery Area Managers (DAM) to decide which offices in the Division will be revised throughout the coming financial year. Prior to the meeting the offices will have been assessed by the DAM, using figures supplied by the DOM through the daily and weekly reporting procedures. For example, the DOM submits a daily report of late deliveries detailing when a postal officer has left or returned to the office later than the specified time. Other information details the weekly and monthly performance of the office, e.g. the amount of overtime, volume of mail, etc.. These figures are then fed into the office's Effective Performance (EP[9]) measure which is available to the DOM, DAM and Director. Any offices which are not meeting the specified budgetary or customer satisfaction requirements are highlighted.

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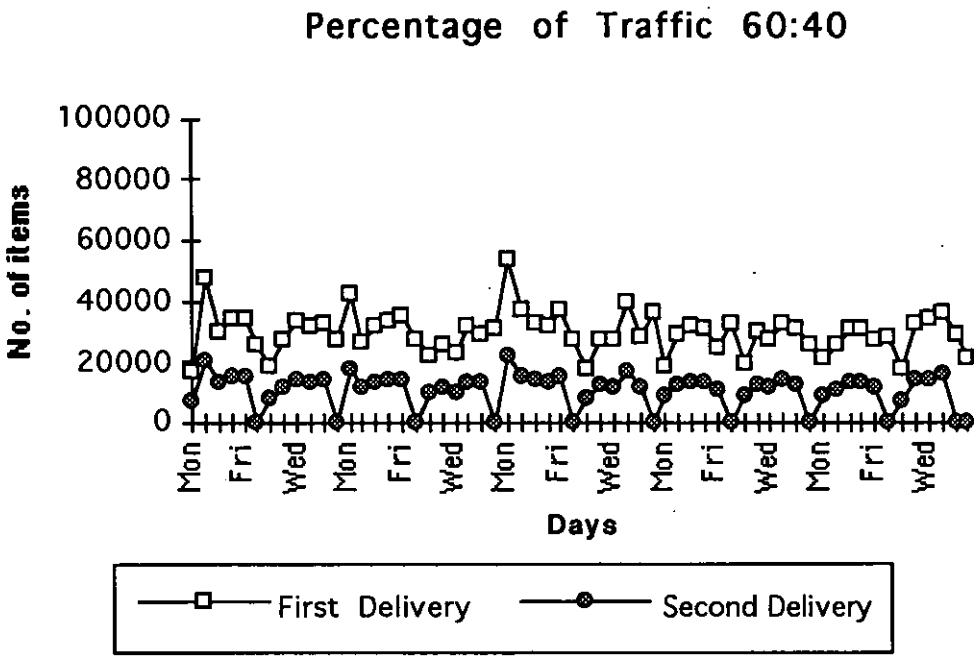
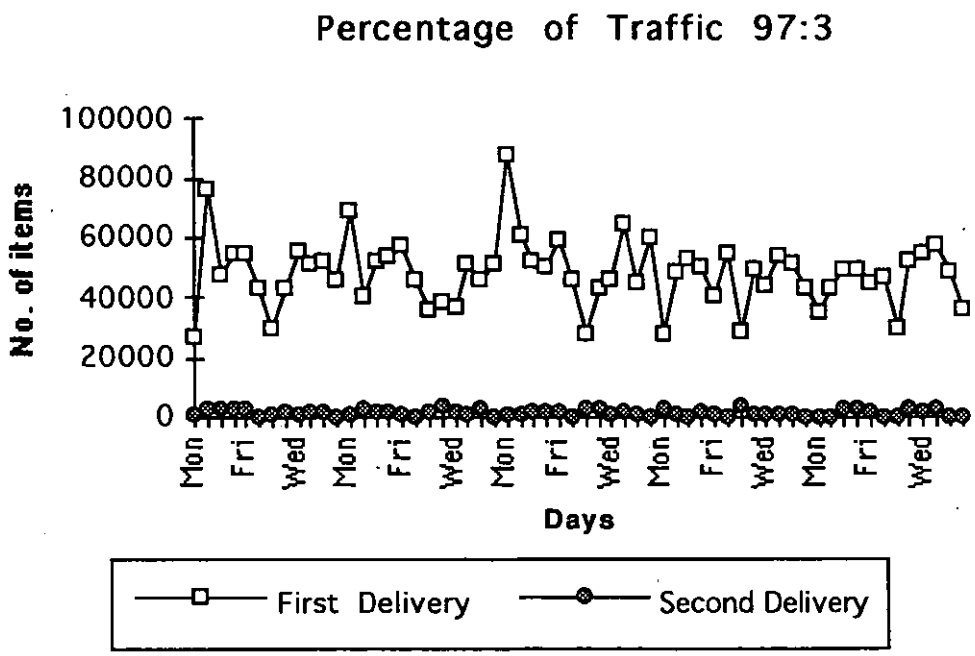
[9]A Delivery Productivity Measurement System (DPMS) was introduced into the RM in 1990. It aimed to produce office statistics which could be used to measure performance and allow offices to be compared. Two figures are calculated for each office 1) The Optimum Performance (OP) which represents the best rate at which the office could perform, i.e. based on best practice standards. 2) The Effective Performance (EP) calculation allows for the peculiarities of each office and is lower than the OP. The aim of each office should be to minimise the gap between the two figures.

Figure 3.1: Previous Split of Mail.



Previously mail arriving at a Delivery Office during any particular day had been split with a ratio of 60% for first delivery and 40 % for second delivery.

Figure 3.2: Current Split of Mail



With more efficient transportation and processing methods the percentage of mail for first and second deliveries was now 97 % for first deliveries and 3% for second deliveries.

The DAM then considers the Area as a whole, identifying offices which are performing poorly. These are the offices that will be highlighted at the annual meeting and given priority when assessing measures for improving performance.

A business plan is then drawn up by the DAM and the Director of Deliveries for the entire Division for the following year. Previously the business plan aimed at making a percentage saving in offices but this has been altered to consider the offices' EP figures, aiming to have all offices operating at their optimal levels.

The business plan is then presented to the DOM by the DAM, and the effects on the particular office will be discussed. The DOM and DAM can debate the need for a revision, although in theory they should have no differences of opinion as the process is data driven. The decision is based on figures which are available to him/her and which are used throughout the Area and are comparable between offices. In practice there may be situations where there are differences of opinion. For example a DOM may request a revision when he/she can see additional savings might be made in their office; however the DAM will take a view on which offices are a priority and if the office's budget and the 09.30 target performance are acceptable the DAM may oppose the request, because there is an overall limited budget. Alternatively a DAM may view an office as performing below its optimum and may see it as a top priority for the Area, but the DOM may oppose a revision. This situation could arise where the DOM knows that the staff will not support a revision and it could make the day to day running of the office very difficult. In the extreme this could result in industrial action. The threat of industrial action may also influence decisions taken at higher levels, although eventually the balance between costs and benefits will be such that a revision has to be performed. There may, of course, be a situation where DOMs raise opposition because they do not want their office procedures to come under scrutiny. DOMs will have to agree to a revision before the process can move on and will rarely stand in the way of a revision as they would be putting their job in jeopardy.

3.2.3.1. Initiation at Hinckley

The initiation process at Hinckley did not follow the usual procedure and was proposed by the new DOM. The DOM felt that the office could be improved and this feeling was reflected by the staff in the office. A number of areas were in need of improvement, described above, and this meant that a full revision was necessary to consider the office as a whole.

The DOM highlighted the problems of low EP figures and unsatisfactory budgetary performance to the DAM, and the need for a revision was agreed. The DAM then presented the case for Hinckley to the Director Delivery (Midlands). Once it was agreed at this level it followed the usual procedure for a revision, and was presented to the Major Project Productivity Manager (MPPM) who is responsible for the Divisional Planning and Revision team and delegates work to the appropriate Area Delivery Revisions Manager (ADRM).

The MPPM sent a representative to the Hinckley DO (the Delivery Revisions Manager for Leicester) to conduct a preliminary assessment. The outcome supported the DOM's view that a revision was necessary and the Union (at Area representative level) was informed that the revision would be taking place.

3.2.3.2. Budget For Revision

The funding for a revision comes from the Area budget. The figures are passed onto the DO, but as a recognised and accepted cost and should not be detrimental to the offices performance for the year.

3.2.3.3. The Revision Method To Be Used

Once the need for a revision is identified and agreed, the next step is to decide the method to be used. As major changes were identified by the DRM and the MPPM across the DO a full revision was necessary, as opposed to the Table-top method used for minor adjustments. The method to be employed is normally decided by the DOM, the MPPM and the Union. In the Midlands the preferred method is the Manual-W. The CADR system has only been used twice in the past and was not considered a success by the team, and is therefore no longer considered an option.

3.2.3.4. Composition Of The Revision Team

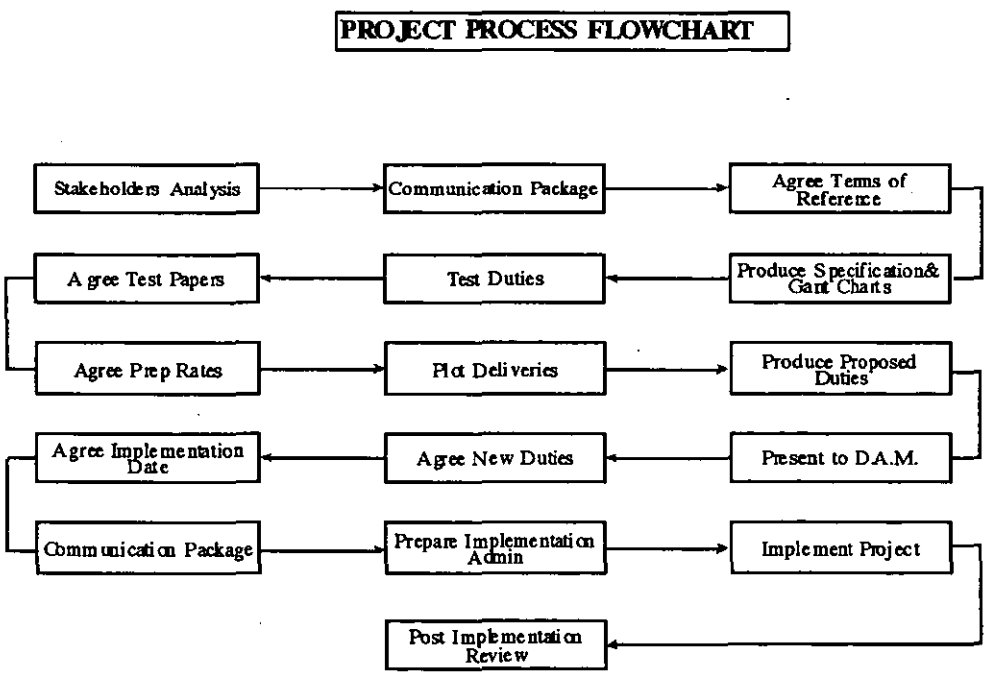
The revision team at Hinckley consisted of the Delivery Revision Manager (DRM) from the revision team at Leicester, provided by and reporting to the MPPM, through the team leader. The revisions manager oversees the process and often multi-tasks across several revisions. The remainder of the team was decided by the MPPM, DAM, DOM and DRM. At Hinckley the other team member was the assistant DOM at Hinckley, chosen for his local knowledge. He had fourteen years experience in the Hinckley office and was involved from the planning and plotting phase.

The team worked closely with the DOM, and at his request they operated an open-door policy to the revision. Access to the revision room was allowed to all members of the Delivery Office and the team were willing to answer any questions that the staff had. There was also a weekly progress meeting of the revision team, DOM, the Union representative and five other staff members, representing a cross section of the Delivery Office.

3.2.4. The Project Process

Once the revision team has been decided the project process can begin. The flowchart below (see Figure 3.3) shows the processes involved in the revision. Each of the processes are explained in the following sections along with their specific application at Hinckley[10].

Figure 3.3: The Revision Project Process Flowchart.



[10]The order in which the stages were conducted at Hinckley, varied from that proposed in the flowchart as the planning manager (a new position created in the Midlands 12 months prior to this revision) was undertaking a review of procedures. The aim was to standardise the processes and introduce best practice for the team. The changes were still ongoing and new forms and procedures were introduced throughout the revision.

3.2.4.1. Stakeholders Analysis

The first stage requires the revision team and DOM to consider which other people and systems may be affected by changes in the DO. The people and the reasons why they may need to be contacted are listed on a Stakeholders Analysis Form (see Appendix B.1). The team must decide who should be contacted and at what stage of the revision.

3.2.4.2. Communication Package

Once the appropriate people and timings have been established consideration is given to the method of communication, i.e. a letter to / or a meeting with an appropriate representative of the stakeholder group. The communication contains the reasons for the revision, the envisaged time scales and also states that stakeholders opinions are welcomed.

3.2.5. Manual Walk Testing

The next phase, at Hinckley, was to collect the necessary data pertaining to the current office performance. The whole of the Delivery Office was tested over a 3 week period. This involved every PO being monitored for a day, whilst carrying out their normal duties. The testing was conducted by a team of testers under the DRM's supervision. The walk testers were from offices within the Leicestershire Area but from outside the Hinckley DO[11], to ensure they had no preconceived ideas of what the problems/solutions were.

3.2.5.1. Testing A Duty

During the week in which the PO is tested, they are required to complete a 'self-analysis sheet' every day, excluding the actual day of the test. These sheets contain information about the amount of items to be delivered each day; the time taken to prepare the mail; the actual time they left the office, the time they arrived at the first and last call, and the time they returned to office (See Appendix B.2: "Walk Analysis and Traffic Form").

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[11] The positions were secondments, some of which meant temporary promotion and could indicate the chance of future promotion. This should ensure their performance is good.

The day before their duty is tested the PO is given notification of the test. The document includes the phrase "Please attend as per P318". This is the duty sheet which lists the tasks each officer is to perform and the times for each (See Appendix B.3: Form "P318"). It also requires the PO to abide by the RM rules which specify, among others things, that they must not take short cuts.

3.2.5.2. Testing Inside The Office

The tester observes the PO for a whole day. This begins by monitoring the tasks conducted inside the office. They record the time taken on each task, including IPS sortation and Preparation of mail (described in Section 2.4). The mail is then put into pouches, again in the order it will be delivered, weighed and any extra pouches required (in excess of the weight limits) are left at the office. These are referred to as 2nd pouches and will be collected by the PO once they have completed their first pouch, either from the DO if the walk is close to the office, or alternatively a van will deliver the pouch to a predetermined collection point on the route[12]. Prior to departing the tester records the names of streets, from the sorting frame, the house numbers in each section and the number of letters to be delivered to each section is counted (See Appendix B.4).

3.2.5.3. Testing Outside The Office

The tester records the time the PO leaves the office and follows them on their delivery. They record the time the first letter is delivered, the order in which the sections are visited and how each section was walked. There are a number of recognised methods for walking a section. These depend on the layout of the buildings and the type of road. For example on a road with little motor traffic and terrace houses the preferred method is to 'zig-zag' the road, whereas a main road, with lots of traffic, would be walked 'up and back' (See Figure 3.4).

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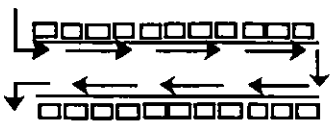
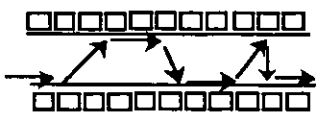
[12] 2nd pouch drops are traditionally at an appropriate shop or residence, the owner being paid a fee for their service. Occasionally more informal procedures are in place and a pouch is left behind a suitable hedge where no secure premises are available at a suitable location. Royal Mail has now introduced a number of 2nd pouch boxes which overcome this problem, which are either attached to existing post-boxes or can be standalone boxes.

Figure 3.4: Two Methods for Walking a Street.



UP & BACK
This is used when there is a lot of traffic and crossing the road would be dangerous



ZIG-ZAG
This is the quickest method crossing back and forth to allow the PO to start at one end of the road and exit at the opposite end.

The number of calls made and the time spans for each section are recorded. An additional note is made of the number of houses with only mailsort3[13] items. Any other activities are noted and timed. These might include the collection of an additional pouch and/or the collection of mail from a post-box.

The 'Additional notes' section is used to record information which will be useful for the later plotting phase. Examples include whether there might be a better means of travel to the start of the walk and whether the method of walking the section is appropriate; e.g. zig-zagging a road which has a lot of traffic should obviously be avoided for the safety of the PO. Geographical information is also entered concerning the length of paths and any roads with steep gradients. Any calls the PO had to make to deliver an item which will not fit through a letter box, to obtain a signature for a recorded delivery item, or to leave a card informing the customer that a package awaits their collection if no one is at home are all noted. Once all the mail has been delivered and any collections made, the Tester notes the time of the last letter and their time of arrival back at the DO.

The tester can warn the PO, during the test, if they consider the PO is walking or cycling too slowly and, can abort the test if they feel the PO is still, after a warning, not working at a normal / acceptable pace[14].

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[13] Mailsort3 items do not have to be delivered on a specific day, there is a span during which they have to be delivered and the items are fed into the walks on lighter days.

[14] Note there are no agreed standard walk times. This is judged by the tester.

3.2.5.4. After The Test

The information collected is transferred to the test forms P302: Examination of Preparation for Delivery (Appendix B.5) and P947: Test of Delivery and Collection (Appendix B.6).

The P302 highlights the differences between scheduled and actual time taken to prepare the mail. A break down is given of tasks performed, time taken and time spent on other tasks. The preparation rate is then calculated:

$$\text{Prep rate} = \frac{\text{Total items}}{\text{Total minutes}} = \text{X items per minute}$$

The P947 highlights differences between scheduled and actual times taken for the delivery and breaks down the delivery route into the sections in which it was delivered. The time taken, number of letters delivered and additional remarks are recorded.

The final task of the tester is to colour in, on a large scale map, the roads which were on the walk tested. The walks, in different colours, eventually build up to ensure that no roads have been overlooked and provide a comprehensive picture of the existing walks.

This process is carried out for every duty, for both first and second deliveries.

3.2.5.5. Agree Test Papers

When the test papers have been completed they are shown to the respective PO who has the opportunity to make comments on the information recorded on the sheets, and signs to say that the test was fair. Notes will be made of exceptional circumstances, for example, the person on the walk was not the normal PO through illness.

3.2.6. Terms Of Reference

Once all the walks had been tested, and the information collated, the next phase of the revision was to agree the 'Terms of Reference'. These represent the major objectives of the revision and how they will be achieved. They are drawn up by the DOM and the DRM after discussion, and are then presented to the Union for agreement.

The Terms of Reference include fixed terms which apply to all DOs (Appendix B.7), for example first deliveries to be completed by 09.30, and also terms which are specific to the DO under revision (Appendix B.8), for example future building developments in the area or changing procedures in the office.

One of the most important of the fixed terms is the Prep rates[15]. At Hinckley rates of 7.75 items per minute for residential walks and 9.00 items per minute for firms and shops were agreed[16]. There is a push in the Midlands to have rates which vary according to the ratio of residential : firms mail on each walk; however this was not considered appropriate at Hinckley as the walks were mainly residential OR firms not a combination of the two. It was felt that giving a few of the duties different preparation rates might cause conflict among the staff. See Appendix B.9 for the terms agreed at Hinckley.

Also included in the Hinckley revision is the Automated Processing Centre (APC) Agreement[17]. This allows for an eventual loss of 117 hours due to the new automated sorting procedures. The agreement allows for a gradual decline in the amount of hours needed to sort in line with the predicted increase in APC sorting. Temporary measures will be put in place if the APC is not operating as predicted.

3.2.6.1. Time Tabling

Once the preparation rates and terms of reference had been agreed a schedule was drawn up for the remainder of the revision process. Figure 3.5 below is the agreed timetable for the revision at Hinckley.

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[15] There are industrial standards for preparation rates that vary according to the type of preparation fittings that are used, these are not however used as a national standard and each revision agrees its own rates.

[16] The actual rates at Hinckley ranged from 6 to 11 with an average of 9 items per minute.

[17] Signed in 1994.

Figure 3.5: Timetable For Hinckley.

• Planning and Plotting - approx. 12 weeks
• Produce P318, P760 proposals - approx. 4 weeks
• Agree proposals with the DOM, DAM and CWU - approx. 6 weeks
• Produce labels etc. for sorting the new routes - approx. 4 weeks
• Planned to end September 1995

The project specification and Gantt chart are then drawn up (Appendix B.10). These are used to highlight the major stages involved in the project. The forms force the planner to consider the time scales for each of the stages involved and the staffing that will be required, in order to meet the desired dates. The Gantt chart also enables the planner to consider which of the stages are able to run in parallel and which are prerequisites for later stages. The forms are then be used to monitor the projects progress.

3.2.7. Collation Of Information

The Manual-W testing provides information about the specific walks in an office. Additional information concerning the Delivery Office as a whole is also needed. Current base data is collated from various systems and reports within the office with regard to:-

- Staffing levels - identifying the number of each grade of staff in the office, whether the duties are full or part time, and the type of duties. All of this information is available from Professional Delivery Information System (PRODIS) or from the P318s.
- Hours - the total hours for the office are available from 3 different systems. In theory these systems should contain the same values, however often this is not the case. Where the figures conflict, the project manager checks the systems are up to date.
- Average pressure for last six months - these are the overtime figures for the office.
- Traffic Averages for last 6 months.
- Quality of Service Score.
- Average Effective Performance.

3.2.8. Planning And Plotting

The methods to be used during this stage of the revision process are not specified. The only advice given to the planner is to walk the existing routes in their head, using the test sheet data, and to then plot the walks with the aid of a member of staff with local knowledge, i.e. at Hinckley the Assistant DOM.

3.2.8.1. Calculations From The Test Sheets:-

The team calculates the total time taken for each delivery, i.e. from the time of leaving the office to the time of return. These times, for each walk, are compared to the scheduled times (detailed on form '318') to determine the amount over / under the delivery time (see Appendix B.11).

For each street, times are calculated to deliver the 1st and 2nd deliveries. The amount of items per street is then calculated for 1st and 2nd deliveries. A list is drawn up of the postcodes for each street, and streets which contain postcode splits[18] are highlighted. Postcode information has become increasingly important due to the introduction of new technology. For example the APCs sort and distribute mail for the DOs according to pre-programmed postcode information. The revision must therefore ensure that postcodes are not split across walks, as the sorting machines cannot accommodate this.

3.2.8.2. Plotting

In order to plot the walks the process was split into first, second and van deliveries, and then into two areas Hinckley and Burbage (see Appendix B.12), which are geographically separated by a railway line. The case study concentrates on the routes which are walked or cycled, not van deliveries.

First Deliveries: First Attempt

The revision team was aiming for 140 - 150 minutes maximum delivery time, with the aim that all staff would leave the Delivery Office by 06.45 and finish their first

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[18] In general a postcode relates to one entire street, larger streets do sometimes, however, contain more than one postcode.

deliveries by 09.30[19]. This included an extra time allowance for travelling to and from the first and last delivery points.

The new walks were then plotted and marked onto a map. There were many constraints and considerations which affected the outcome of the plotting phase. The main constraints were time, keeping postcodes together and avoiding routes crossing each other. Other considerations were to incorporate an allowance for the growth of two on-going developments in the Hinckley area. The walks incorporating the new developments were devised as part-time duties which could expand as the houses were built and occupied. Also all internal office work, such as bag emptying was to be incorporated into the new duties. A final consideration was to re-allocate van drivers' duties, to take walks off the drivers and instead re-assign them to support walks.

The revision team's first attempt was a blind attempt at plotting walks using only a map. Areas thought to be a suitable size for a delivery were marked in different colours, working from the Delivery Office outward to the edge of the town. A street is used as the basic unit for the devising of walks except where there are postcode splits, and then the postcodes become the base unit.

Once all the new walks were plotted on the map, the following calculations were performed:

- For each of the new walks plotted on the map the delivery times for each road, taken from the test papers (Form P947), were summed to produce the total delivery time for each route. The number of items for each road was also totalled to give the total for each route (Figure 3.6).

[19] These are in accordance with organisational standards.

Figure 3.6: Example of Calculations of Time and Items Per Route.

ROAD NAME	TIME	ITEMS
Apple Road	a1	b1
Orange Crescent	a2	b2
Pear Road	a3	b3
etc.	etc.	etc.
etc.	etc.	etc.
TOTAL	A	B

- From the total number of items, the IPS time was calculated using the agreed Prep. rates.

Figure 3.7: Example of the Calculation of IPS Time.

Prep time	= No. items/ Prep rate
	= 246/7.75
	= 31.74

- These calculations allow the revision team to work backwards from the 09.30 finish time to the time the officer would have to leave the office. They then determined the time the PO would have to begin preparation in order to leave the office at 06.45[20] (see Figure 3.8).

[20] All of the calculations regarding these timings are performed using pen and paper and are altered by hand when further attempts are made to alter the walks.

Figure 3.8: Example of the Calculation of Timings to Start Prep. and Leave the Delivery Office.

Finish time =	09.30
Less delivery time =	135 minutes
Less travelling time =	30 minutes
= LEAVE OFFICE AT	06.45
Less preparation time =	32 minutes
= BEGIN PREP AT	06.13

Second Attempt

The walks resulting from the first attempt were used as the basis for the second attempt. The walks were adjusted according to the time taken; where the walks were below the 140-150 minutes delivery span, other roads were added. Where they were above the required delivery time, roads were taken off and allocated to other duties. The times for each delivery were recalculated, including the IPS times, to ensure that the new walks were capable of being prepared in time for a 06.45 departure. This fine tuning continued until all the walks were acceptable. The resulting routes meant an increase of 5 duties for 1st deliveries.

Second Deliveries: First Attempt

Plotting of the second delivery walks began with the town centre walks, these walks were plotted as they were for the first delivery. They included many banks and shops which have to be delivered after 09.30, i.e. when they are open. The times for these second deliveries were therefore similar to those of the first. The remaining walks were initially plotted using the same method and resulted in the plotting of 24 duties.

This first solution was quickly deemed unacceptable for a number of reasons. Firstly it would result in a ratio of 3:1 (1st : 2nd deliveries) and require that 17 duties become part-time. This would be unacceptable to the Unions as there is a 'no compulsory redundancy' policy throughout RM, and also an agreement that jobs cannot be reduced from full to part time. Secondly, although the calculated delivery times were acceptable, the actual distances that each Delivery Officer would have to travel would be unacceptable. Finally should the mail arrive late into the Delivery Office on any particular day, with the reduction in staffing levels the office would be unable to cope.

Second Deliveries: Second Attempt

The results of the first attempt were abandoned and a new approach was adopted with the aim of increasing the number of duties to a workable level[21]. The walks were then re-plotted geographically, with the aim of making the deliveries plotted on the map rectangular.

This resulted in 30 walks for the second delivery. This meant a surplus of 4 staff for second delivery who could be employed on tasks inside the office. Eventually these would be eliminated through natural wastage and the staff replaced by Associate Grades (part-time positions).

3.2.8.3. The Effects Of The Changes

The major changes resulting from the revision were to increase the number of first deliveries and decrease the number of second deliveries. The number of full time duties were reduced (however the 'no compulsory redundancy' policy meant that no one would actually lose their job), and the overall result was an increase in the total hours in the office. It also adjusted walks to incorporate hours that had previously been worked as overtime into normal duties, and most of the duties started earlier each morning (See Appendix B.13: Changes at Hinckley).

A comparison was prepared showing the predicted weekly figures, in both hours and cash terms for pre- and post-revision (see Appendix B.14: Hours and Cash Costings). These show a predicted weekly cash saving of approximately £1,500 and a saving in hours of approximately 100. The forecast cash saving to the office was approximately £75,000 p.a., although costs such as carrying the surplus four full time staff needed to be deducted (approx. £48,000 p.a.).

One further, and important effect the revision process had, was on the DPMS system. The DRM, as part of the communication package, had agreed lines of communication for notifying the DPMS team of any changes in the office. As part of this agreement the team is contacted and a "what if " scenario is run, using the new figures to see the effects on the Effective Performance for the office.

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[21] This point was raised with, and the solution was agreed by, the DAM.

The DPMS team, after conducting the "what if " trial, did not predict any significant changes in the office EP as the revision teams main intention was to change the office overtime into normal duty hours. These hours are still going into the office, therefore operationally they do not effect the EP.

3.2.8.4. Final Product

The final products were two maps plotting all the walks (and driving duties), for first and second deliveries respectively. The details of each duty were entered on the P318 forms, including starting time, time on prep, time on delivery, meal breaks and any additional duties. For each walk an individual map was also produced highlighting all the roads on the duty, these maps were cut out and marked with highlighter pens.

The preliminary proposal of the effects on the duties was also compiled along with the projected figures for the office, discussed above.

3.2.9. Agreement and Negotiation

3.2.9.1. Acceptance By The DOM

Once the final version of walks for all deliveries had been formalised the proposals were presented to and agreed by the DOM. This presentation includes a brief background to the office, the reasons for the revision, a summary of the costs and savings (in hours and cash terms) and a summary of the benefits and drawbacks. At Hinckley the close relationship between the DOM and revision team meant this was a mere formality as he had been aware of the proposed changes throughout the revision.

3.2.9.2. Presentation To The DAM

The next step was to gain the consent of the DAM for the proposed changes. The process involved a presentation given to the DAM by the team leader and the DOM, using a similar format to that described above. There is a strong move towards the DOM taking ownership of the revision results and for this reason they are involved in the presentation. Again at Hinckley the DAM was aware of the progress of the revision, with the presentation containing no surprises the acceptance was again a formality.

3.2.9.3. Presentation To The Union

The proposals were presented to the DO staff by the DOM and the DRM. This resulted in a list of questions being compiled by the staff, addressing their major concerns (see Appendix B.15). These were promptly responded to by the revision team. The proposals were then formally presented to the local Union representative, who took them away to the Delivery Office staff for consideration.

3.2.9.4. Negotiation With Union

There is an organisational wide agreement, The Industrial Relations Framework (IR Framework), stipulating the time frame allowed for negotiation. Specific time scales for the Hinckley revision are also detailed in Appendix A of the Terms of Reference (see Appendix B.9). The DOM allowed one week for the Union to either approve the proposals or to present counter proposals.

At Hinckley all the members were balloted anonymously on a basic acceptance of the proposals using a "YES/NO" vote. This is not the usual method[22]. The result was:

35	YES
13	NO
3	ABSTAINED
1	SPOILT PAPER

The Union representative formally accepted the proposals and the revision agreement was signed (See Appendix B.16).

The process at Hinckley was considered to be a lot smoother than many revisions. The reason for this was generally felt to be because of the open door policy operated, allowing the staff access to all processes and progress throughout the revision. This allowed members of staff to raise objections and put forward suggestions as problems became apparent, giving them the feeling of involvement in the process.

Had the staff rejected the proposals they would have been required to present their own counter proposals. Negotiations would then have been entered into at Delivery

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[22] Normally the staff would hold discussions among themselves, and their only response would be via the local CWU representative.

Office level, i.e. between the DOM (with the DRM supporting) and the local Union representative. The IR Framework allows four weeks for the negotiations to be resolved at local level and if there is still no agreement at the end of this time the negotiations move up to Area level. The DAM and Area CWU representative then enter into negotiations until an agreement is reached. The Delivery Director may have some input at this level in order to resolve any dispute as quickly as possible.

3.2.10. Implementation

3.2.10.1. Re-Sign

Once the revision had been agreed the preparations for implementation began. This started with a 're-sign'. The office was given two lists, one containing the names of the POs in order of seniority, i.e. length of service, and a list of the new duty codes. The POs then chose and signed for the duty they wished to undertake, in order of seniority. Arrangements were made so that any PO who was sick or on leave could choose their preferred duty in the correct order. The 're-sign' took four days to complete.

The POs were then given a form laid out in accordance with the Prep fittings, and asked to fill in the boxes in the order in which the duty would be walked. This was decided by the POs own familiarity with the roads on the walk, or through speaking to another PO who had the familiarity necessary. From the information provided the revision team determined the start and finish of the route and the direction it would be walked. The POs also advised on a suitable position for a second pouch drop; wherever possible existing drops were used, because of the cost of new boxes and the problem of obtaining council planning permission for street furniture.

Once the re-sign had taken place the implementation was planned for 20/11/95, two months behind schedule. This was however extremely close to Christmas, the busiest time of year, which has a vast impact of the amount of traffic through the office, and it was recognised that any delay would mean postponing implementation until January.

3.2.10.2. Prerequisites For Implementation:

The effect of the revision on the PO's walks is the final consequence of the revision but the changes affect a number of other processes and systems, and there are therefore a number of prerequisites to the implementation. The RM always strives to

keep its customers happy and therefore aims to keep to a minimum the effect of a revision on customers delivery times. Any large users who would be adversely affected by the new routes were notified. Where there were objections the DO either altered the walks, if this was thought to be appropriate, or the customer was advised of the 'Timed Delivery' service; for a fee the customer can have their mail delivered at a designated time each day.

The effects on other processes need to be considered and people in other departments need to be informed of changes to walks. For example the Automated Processing Centre (APC) which sorts mail by postcode needed to be updated. Other systems also use information about hours in the office and time spent on various procedures to calculate the office performance figures and again these needed amending.

The internal office procedures also need to be considered. At Hinckley additional duties were created and therefore additional frames were needed for sorting these new walks. The Hinckley office was already short on space and the sorting problems were overcome by having reversible strips on the frames, enabling them to be used for different sorting purposes. New strips had to be produced for all the frames showing the new sorting sequences.

Additional transportation needs were identified. At Hinckley this meant an extra 8 bicycles needed to be ordered. New staff had to be recruited and these and existing staff had to be trained for redeployment.

3.2.10.3. Problems

The implementation was delayed due to problems in recruiting staff and problems obtaining bicycles and fittings in time for the November implementation. As this was the peak Christmas time the date for implementation was put back until 15/01/96.

3.2.10.4. Change-Over

The DOM, revision team and staff changed the rods with the sorting labels, re-direction cards[23] and the Postman Higher Grade (PHG) locker[24] between the end of the Saturday delivery and the arrival of mail on Monday. The office was therefore ready to operate according to the new duties and walks on Monday morning.

3.2.11. Post-Implementation Review

The post-implementation review was conducted for 12 weeks following implementation. The first two weeks were considered a settling in period. The DOM and DRM assisted the staff in adjusting to the changes, monitoring the sorting and deliveries, staff performance and the office as a whole. The major impact of any revision is on the sorting procedures, the POs have to learn which roads are associated with which walks and also the order the roads are within their walk. At Hinckley the walks were previously known by a number and a name (the main road associated with the walk) and POs had asked for the names to be put on the sorting frames as well as the numbers. However, this led to an increase in the amount of mis-sorts where the new walk names were the same as an old walk. The POs were sorting to the old order.

The monitoring was affected by an unusually high volume of mail with Thursday of the first week containing the highest volume of traffic for a year, including a high level of bills and Mailsort3 items. The settling in period was therefore extended to five weeks. There were also ongoing problems with the dispatch of mail from the APC, the mail was arriving at the DO late and having knock on effects on the remainder of the days operations.

The major factor used to monitor the new walks was the time that POs took to complete their delivery, particularly those who were late finishing. Where walks were consistently late the revision team were called in to test the PO on delivery and where it was felt necessary, the walks were altered. There were however a few walks which

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[23] These cards are placed on the sorting frames and contain information about changes in address. These will have been notified by the customer with a request for mail to be forwarded.

[24] The locker is used for valuable and recorded items.

were arriving back late, and when tested proved the PO was exceptionally slow at sorting. It was felt they were not working at an acceptable rate and were told this informally. POs were also encouraged to comment on their walks and a number of small changes were made where problems were reported. Customer complaints also indicate where there are problems but in this case there were few instances of complaint.

The DO's Effective Performance was relatively unaffected by the revision (See Appendix B.17: DPMS Summaries) and remained fairly low. This should have been one of the areas the revision team aimed to improve. However, the results were as predicted by the DPMS team due to the reasoning described in Section 3.2.8.3.

3.2.12. Summary Of Research Findings

As expected the different sources used for data collection have provided a rich picture of the decision making processes undertaken. The formal documentation gathered provides only part of the picture of what occurs during the revision process, other sources tell a different story. The interviews and observations employed to collect data at Hinckley allowed the researcher to draw a number of conclusions about the revision process and the constraints and issues which are present. A summary of the issues is presented below:

- The initiation phase is reached in a number of ways and the method by which it is reached could influence the commitment and opposition that is experienced throughout the process. For example if the revision is requested by the DOM because the walks are too long, then the DOM and CWU will be more in favour of a revision being conducted than if it were forced on them from above.
- The decision of team composition and the revision method chosen also sets boundaries on the solutions which can be reached.
- The testing phase of the revision is a long and costly process. Each time a revision is undertaken the manual walk testing is carried out, walk test data from previous revision is completely disregarded. This is a very costly exercise.
- More importantly, the fact that the figures are considered to be irrelevant (when the last revision was as recent as 2-3 years ago) implies that changes in the delivery office and walks must have been rapid. If this is true the revision process is missing the opportunity to plan for these future changes, as only the current traffic figures are use. The revision team was aware of the increasing traffic figures. They were monitored throughout the revision. However, the aim of this

appears to be to ensure that the traffic figures are still accurate at the time of implementation, and not to allow for consideration of a future increase in the duties devised.

- There is a major change occurring in the split of mail which arrives at the office, with up to 97% of mail now arriving for first delivery. However, the current working practice of no compulsory redundancy and the opposition by the union to part time staff makes optimal walk plotting impossible.

- The figures used in the revision can be obtained from a number of systems. However these figures often conflict, causing speculation as to their accuracy.

- The data collected during walk testing is also open to question due to the POs ability to choose which pace they walk at and the specific instruction not to use short cuts.

- The terms of reference impose a number of constraints on the eventual solution. Some of these are nationally imposed and cannot be ignored, 09.30 for example. Others are however agreed at the office, the reasons for the revision will be influential in the terms of reference and these are very often budgetary.

- The preparation rate is a particularly contentious issue, with no agreed national rates the office rate is agreed between the DOM and CWU. A further problem associated with these rates is that, although they are agreed, there is no way they can be enforced after walks have been devised. In other words, the walks may be possible at the agreed rates, but this does not mean people will work at the agreed speed and the walks may be late.

- The plotting phase relied on the information contained on the test sheets and the value of the information depended on the training and experience of the data collection team. Some areas on the sheets were felt to be irrelevant by some walk testers and left blank. Other areas were completed according to individual discretion, such as additional information. This data eventually had to be used by the planners. They felt there might be some oversights, as the data had not been collected personally and also felt uneasy relying on other people's information. For this reason much of the information recorded was never used.

- During the plotting phase the first delivery was reported to be a blind attempt at devising walks. This is questionable however, as the resulting walks were remarkably similar to the existing ones. This may be because the walks were the best possible, but it is more likely that knowledge of the existing walks possessed by the team has had an influence. The walks were known by a number and the

main road on the walk, and it appears that the main roads may have acted as anchoring points for the new walks.

- The walks were plotted from the DO outwards and this caused some problems when the edge of the town was reached. Odd streets were left that would not constitute a full duty. Once the walks had been marked on the map the team were reluctant to alter them, especially when the timings were acceptable. This of course constrained the remaining options available.

- Another factor that caused problems was the use of streets as the basic unit of measure. Some streets were very long and difficult to allocate to a walk. This was overcome when the postcode split in the street was recognised and the street was then divided between two walks according to the postcodes.

- The revision team's initial attempt at the 1st delivery was made without using the street times, but guessing at appropriately sized deliveries. This implies that the team can tell by looking at the map how long an area will take to deliver. The number and type of houses, flats, path lengths and gradients should have had an effect on the delivery time and therefore, one might expect that this method would be inappropriate. It may be that the team were once again using their local knowledge. This issue arises again during the second attempt at the 2nd deliveries. The method of devising equally sized rectangular areas indicates an implied correlation between distance on the map and delivery times.

- Only one attempt at plotting walks was made, the results of this were then adjusted rather than having a second fresh attempt at plotting walks.

- The fact that second deliveries could not be plotted according to the rules of time taken meant that the final walks were improvisations based on the amount of staff available, and an acceptable staffing level. This resulted in walks which were no longer optimal.

- The negotiation stage is potentially a lengthy process, although this seems to have been overcome through the use of an open-door policy at Hinckley. This phase also goes against the goal of optimising walks as the walks are negotiated with the DOM, DAM and CWU in order to reach an acceptable solution.

- The decision is not reached by the planner alone. From the recognition of the problem until the final, implemented solution there are many other people involved in the decision process. These include the DAM, DOM and the union, each of whom have their own agenda, introduce new constraints and have their own view of an acceptable solution.

Table 3.1: The Problem and Solution Viewed from Various Stakeholders Perspectives.

	DAM	DOM	CWU	TO PLANNER
IDENTIFY PROBLEM	• £ • Quality • Changes in work patterns	• £ (DAM) • Quality • Problems in DO (PO)	• Too much mail	• Walks not working
SOLUTION	• Savings reduce overtime • Quality (within allowances) • No disputes	• Opt walks • Achieve standard • Reduce overtime • Balance workload • Happy staff • Increased efficiency (EP)	• More staff • Reduction in workload	• Optimise walks • Criteria Terms of reference

- Table 3.1 above summarises the problem as it might be viewed by various people involved in the revision process. It presents the benefits a good solution could bring and therefore potential areas of conflict can be seen. The planner is removed from the normal delivery operation and the problem that they are addressing is therefore, one which is represented to them by the people involved. The power bases of the individual and groups will influence the goals and constraints focused on.

- It should be noted that although there are a number of different people involved, they are not all involved throughout the process and therefore the problem presented to the CWU is not the same as that faced by the DAM. The problem will have already been defined and decisions will have been made ruling out unacceptable alternatives. The CWU has only to decide whether the one solution presented is acceptable.

- Finally the results were not as beneficial as predicted.

3.2.13. Application Of The Decision Making Models.

The case study and interviews have provided a detailed account of the manual revision process and revealed a number of issues relating to it. At this stage it is appropriate to reconsider the revision problem in terms of the models of

organisational decision making discussed in the previous chapter to determine which, if any, of the models account for the processes involved.

Table 3.2 below presents the revision process within the framework identified, in Chapter 2, to describe the generic decision making model. The headings describe the main stages of the generic model. The first column provides keywords which highlight how each of the three main models view the stage under consideration. The second column compares the processes observed in the revision process to those described in the three main models and also draws attention to features of the other models which apply (see Decision Making Models in Chapter 2).

The table demonstrates that there are many theories that can be applied to each of the stages of decision making. The theories are often contradictory in the methods they propose for solution. When applied to the Royal Mail's revision process the table demonstrates that at each stage of the decision making process different models can be applied to different aspects of the activities observed. It also demonstrates that no ONE model can account for all of the activities apparent in the revision making process.

The case study shows that there are many issues and constraints involved in the revision process. The findings discussed here highlight many factors which affected the revision's outcome and why the resulting walks were not in fact optimal. Application of the organisational decision making models show that there are a number of general issues which apply to the problem. These are in line with the generic problem solving model and apply whichever decision making model is applied. It is clear from the case study that the RM's approach to the revision of walks is based on a rational model of decision making. However the comparison demonstrates that the process does in fact contain many of the elements of bounded decision making and some elements of humble decision making. It is also highly political with the decision spread across many stakeholders. However, none of the models is sufficient to account for the revision process in its entirety, and a pluralistic model is needed.

The next section investigates the Computer Aided Delivery Revision (CADR) system and the processes involved in its use. The system was introduced some years ago to overcome some of the shortfalls noted above, and also to standardise the approach taken to revisions across the country.

Table 3.2: Comparison of the Case Study Findings and the Organisational Decision Making Models.

IDENTIFY PROBLEM AND CRITERIA FOR SOLUTION	
Rational - One identified goal Bounded - Goal changes Political - Not agreed	People within the RM, i.e. those managing the revision process, view the process from a rational decision making perspective. They aim to optimise walks, however there is no definition of what constitutes an optimal walk and no pre-set criteria by which to assess the solution. Observations show that the real aims are much more diverse and change throughout the process. The optimising behaviour soon changes to 'satisficing', and devising workable walks is the goal. The goal itself will be different for the various people involved in the process, e.g. it is doubtful that the CWU and DAM would agree on a problem definition and solution criteria, even if the problem could be defined.
DEVELOP ALTERNATIVES	
Rational - Complete information Bounded - Not all info. known Political - Info. seen as power	The amount of issues, constraints and information relating to the revision of walks is immense. Issues such as time and cost alone would limit the amount of information considered. This is compounded by the inability to collect and use ALL relevant data, due to weaknesses in the collection and plotting methods, and because of the cognitive limitations of the planner. The development of alternatives is also influenced by people outside the planning team, for example the POs can influence the timings used by slowing down when tested. In other words the information available gives the parties varying powers for developing alternatives.
ASSESS ALTERNATIVES	
Rational - Simultaneously Bounded - Sequentially Political - Only small number considered	The rational approach cannot be applied here as it calls for complete knowledge of all the alternatives and their simultaneous assessment. The above stage shows this is not the case. The case study shows that only one attempt at solution was made and then amended. This is accounted for uniquely in the Humble Model using a trial-and-error strategy. The walks undergo further assessments when presented to the other parties for agreement. The evaluation will be affected by the parties relative influence, e.g. the DAM has most power and his decision determines which solution is presented to the CWU.
CHOOSE AN ALTERNATIVE	
Rational - Maximise organisational gain Bounded - First satisfactory solution Political - acceptable to all parties	The alternative is not chosen purely to maximise the organisational gains, although this undoubtedly is a major influence. The walks devised by the planner, were the first satisfactory fit based on the timings recorded, in the context of the terms of reference. Once a set of workable walks is reached no further alternatives are considered. Other parties also influence the final solution by commenting on the walks presented.
CARRY OUT THE DECISION	
Rational - Optimal Bounded - Satisfactory Political - Bargaining	The revision process described produces walks which are workable, not optimal. The final decision is reached through a negotiation process, with parties bargaining to reach an acceptable solution.
ASSESS EFFECTS	
Rational - Optimal Bounded - Workable Political - Acceptable	The effects are assessed by the RM in terms of the financial and time saving benefits, again viewing the process from a rational perspective. However these organisational gains will not be maximised, due to the factors already discussed, instead they are acceptable gains which provide a workable solution. These factors were also monitored to ensure standards were met.

3.3. COMPUTER AIDED DELIVERY REVISION

3.3.1. Methodology

The second case study involved attending a 3 day RM residential course. It is an ongoing course aimed at teaching DOMs and planners from around the country about the CADR system and its use. As the system is no longer used in the Midlands, interviews were conducted with people who had been involved in past revisions (in the Midlands) and with people currently using the system in other Divisions.

3.3.2. Background to CADR

The CADR system was first introduced into the RM in the 1980s and is reported to be the standard method for delivery revisions. However the use of the system has been sporadic. Some divisions have used CADR extensively whilst others have only used the system once or twice and then reverted to the Manual-W revision.

CADR was developed as a tool to aid the planners, providing an alternative to manually testing walks and assisting in the necessary calculations. Measurements are taken from maps and these are input into the system, this information can then be stored for use in future revisions. The measurements form the basis for calculating walk times and distributing the workload across the office. The following sections describe how the system is intended to be used, along with views gained from people who have used the system.

3.3.3. The Revision Process

The processes for conducting a full revision using CADR are not set out as a standard approach. The initiation and set-up of the project are similar to those described for the Manual-W revision, above. The differences begin with the choice of conducting a CADR revision. Figure 3.9 below shows the CADR revision process as it is described on the RM course, this outlines only the processes involved in using the system and does not address the wider issues of initiation and implementation. The following sections describe the main processes and the methods used to obtain data and plot walks.

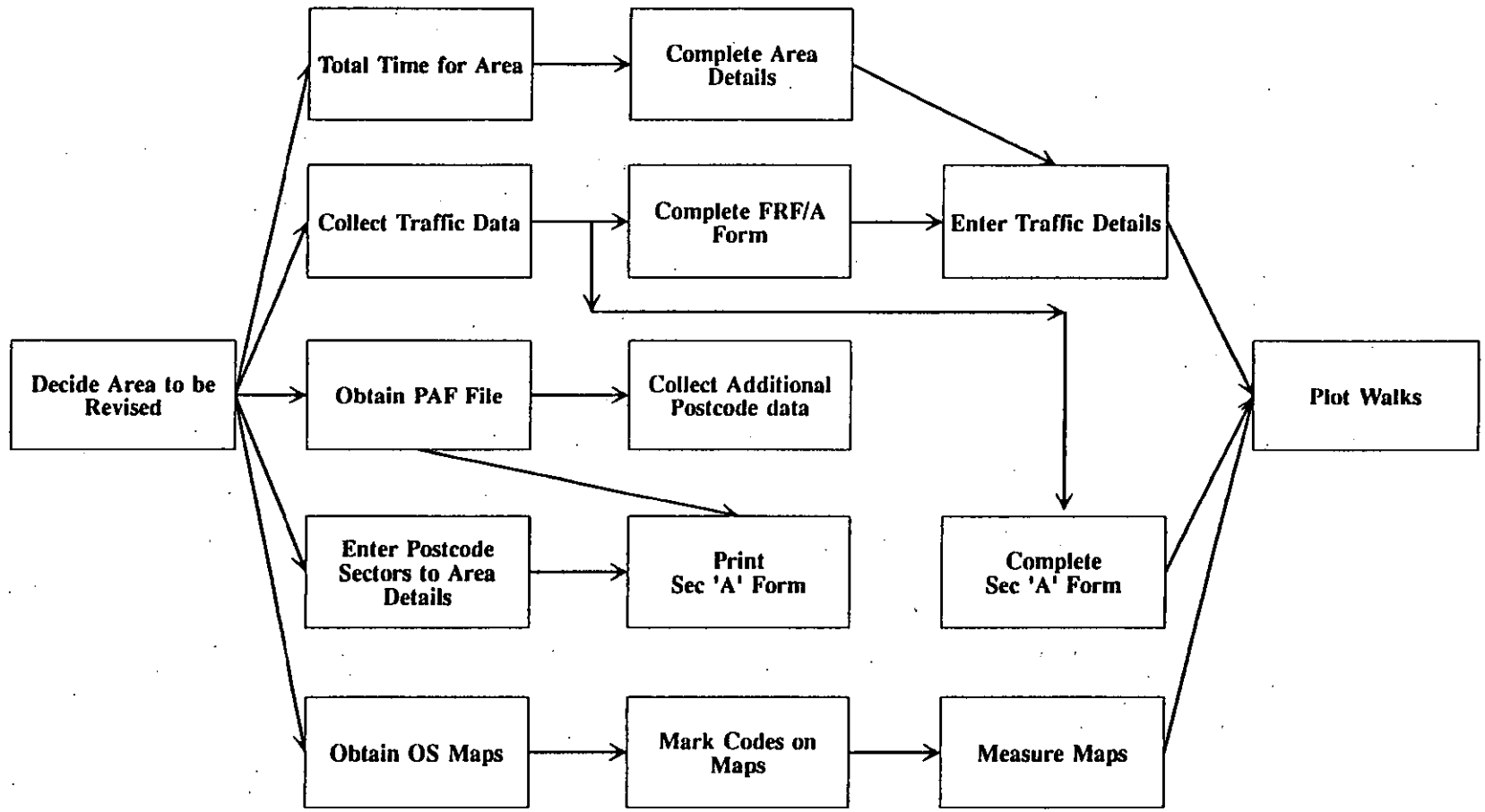

Figure 3.9: The CADR Revision Process.

3.3.4. Data Collection

3.3.4.1. Area Details

The most important piece of data is the Total Delivery Time for the Area under revision. This is the total time, from first to last call, for all deliveries in the area excluding any time spent on non-delivery activities, e.g. collections. It is obtained by either:-

- Using the current hours for the office, if the total time is approximately correct.
- Where deliveries are overrunning and reliable figures exist for additional hours, time required is estimated.
- Exceptionally, where there is doubt or disagreement, a limited form of testing can be performed.

The figure to be used is agreed locally, between the DOM and the DO staff. This occurs before the revision starts, as per the RML and UCW[25] Agreement (Appendix C.1). This figure determines the eventual walks and is input into CADR.

3.3.4.2. Traffic

The average traffic figures are necessary, but there are no set procedures for collecting this information. It can be obtained by asking the PO, or a tester, to count the amount of mail for each delivery. This is performed over a set period and the average is then calculated.

3.3.4.3. Postcode Data

The postcodes covered by the revision need to be entered into the system. This information is available on disk from the Postcode Address File (PAF) office and can be loaded directly into CADR.

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[25] The union has since changed name from the UCW to the CWU.

3.3.4.4. Forms

Once the postcode information has been loaded a Sec 'A' form (see Appendix C.2) can be printed from CADR. The form details the postcodes, addresses, number of delivery points, etc. obtained from the PAF file. The form also has a column for entering additional information which needs to be gathered and input into the system .

3.3.4.5. Maps

Maps are needed in order to obtain measurements and to plot the new walks. These have to be requested from Ordnance Survey. A scale of 1:1250 is recommended as this allows for accurate measurements.

Marking

The postcodes are marked on the map using information from the RM's Postcode Directory, listing road names, house numbers and their associated postcodes (See Appendix C.3 and C.4). Where necessary artificial codes are created to distinguish large users[26], or a postcode split by a thoroughfare. For example postcode CO3.3BG becomes CO3.3BG1 and CO3.3BG2.

Measuring

Measurements are taken directly from the maps for street and path lengths. Street lengths are measured using a ruler and / or distameter and recorded on the Sec 'A' form, to the nearest 1/4 of an inch. The garden path lengths are measured and an average is calculated for each postcode. This figure is recorded in 1/16 of an inch. Cul-de-Sacs have to be recorded separately, as they are walked differently from other roads (see below).

Other Information And Checks

Additional information is also recorded from the maps onto the Sec 'A' forms. These include whether a postcode is on one side of the street or both and the amount of traffic for large users.

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[26] Defined as a customer with an average traffic figure of 30 items per day.

The number of delivery points and flats per postcode is then checked manually, i.e. the number of houses per postcode are counted on the map. Finally the Sec 'A' form is checked to ensure that all the postcodes listed are to be included in the revision, and that any postcodes not listed are added.

3.3.5. Entering Information

3.3.5.1. Area Details

The following information needs to be collated and entered:-

- Sector under revision
- Map scale
- Prep rate (agreed locally)
- % of cycle deliveries
- Total No. of hours

3.3.5.2. Traffic Input

For each existing walk the traffic figure is entered, this is given by the total mail prepared, less any prepared but not delivered.

3.3.5.3. Sec 'A' Form

The information from the Sec 'A' form is then input into CADR, adding, deleting and updating the PAF information where necessary.

3.3.5.4. Checks

The information which has been entered is then printed, listed by postcode, and checked for accuracy, see Appendix C.5.

3.3.6. Plotting

Once the above information is entered and verified the plotting phase begins. The walks are plotted sequentially and each walk details :-

- Time allocated for the walk (normally 150 minutes)
- Finish time
- Time to start prep
- Travelling time
- Mode of travel

Referring to the map, with postcodes marked, the walks are plotted by inputting the postcodes in the order they will be walked. The method of delivery is also entered, using the abbreviation shown in Table 3.3.

Table 3.3: Methods of Delivery.

1S	For a code that is on one side of a street only.
Z	For zig zagging down a code which is the same on both sides of the street.
Z2	For zig zagging codes which are different from one side of the street to the other.
U	For plotting up and back where the code is the same on both sides of the street.
U2	For plotting up and back where the codes are different from one side of the street to the other.
D	For inserting dead time, half an inch or more on the map, which has to be walked but contains no delivery points.

Walks are plotted by postcode, i.e. the user inputs the postcodes against a walk number. CADR then uses the information previously entered, about road and path lengths, and the method used to walk the postcode, to calculate the time that the postcode would take to walk[27]. Postcodes are added until the delivery time equals or is approximately equal to, the delivery span required (see Table 3.4 below). This procedure is repeated until all the walks are plotted, the total hours for the office are then calculated by the system.

[27] This is based on BSI = 100.

Table 3.4: Plotting the New Walks.

Walk No.	Postcode	CADR - time taken
WALK 1	EC1 3BD	15 MINS
	EC1 3BE	12 MINS
	" "	" "
	" "	" "
	TOTAL	X MINS
WALK 2	EC1 3QY	08 MINS
	EC1 3QZ	19 MINS
	" "	" "
	" "	" "
	TOTAL	Y MINS
TOTAL HOURS FOR THE OFFICE		147 HOURS

A menu option lists all codes not yet plotted, to ensure that all the postcodes are allocated to a walk. Once all postcodes have been allocated a summary of the walks can be viewed, and alterations can be made by adding and deleting postcodes.

3.3.7. Adjusting Walks To Fit The Agreed Total Delivery Time

A further menu option is then used to adjust the Total Delivery Time across all the walks. The system calculates a workload value for each postcode, using the times calculated above and allocates each a weighting. For example EC1 3BE might have a weighting of 1, and EC1 3BD 1.1. CADR then calculates the difference between the agreed hours and the hours plotted. For example if the agreed hours were 149 and the hours plotted were 147 there would be a difference of two hours. The system then performs an adjustment across all the walks by allocating the difference, e.g. two hours, across all of the postcodes (see Table 3.5 below).

Table 3.5: The Adjustment of New Walks.

Walk No.	Postcode	CADR - time taken
WALK 1	EC1 3BD	17 MINS
	EC1 3BE	14 MINS
	" "	" "
	" "	" "
	TOTAL	X MINS
TOTAL HOURS FOR THE OFFICE		149 HOURS

The Total Delivery Time now equals the agreed hours. This adjustment will however have altered the total times of individual walks, therefore the delivery time for each walk needs to be re-checked and altered, re-adjusted, re-checked, etc., etc. until the total time for the office and the individual walks is acceptable.

The system allows four versions of a revision to be attempted and stored, and a further option allows the delivery mode to be altered for the walk, i.e. foot --> cycle and vice versa, to see the effect on the delivery times (see Appendix C.6). These allow the solutions to be assessed.

When the walks are completed a summary form can be printed (see Appendix C.7: The New Walk Summary), and the negotiation processes begin.

3.3.8. CADR Clerical

The CADR system allows a number of reports and forms to be produced. These are aimed at assisting; i) the revision team - throughout the revision and particularly in the implementation phase, ii) the DOM - for day-to-day planning and control of the office, and iii) the Delivery Office staff - as an aide memoire, training tool or reference guide.

3.3.9. Views of CADR

From the interviews conducted with the Planning Team at Stoke, a number of issues were revealed about the system and about its use. These include the fact that CADR is expensive, e.g. in terms of maps (£45 each), and that it was not suitable for all types

of walks. The system has inbuilt allowances for residential areas only, and cannot therefore be used for rural deliveries. Another issue highlighted was that the inbuilt allowances were not specified. This often led to the team adding in extra time, just in case the allowances were not sufficient. It was also felt that the system still required many trial-and-error decisions. With the walks plotted manually the last one, like a crossword solution, could be difficult or impossible to fit in.

The team felt the three day course had not provided enough guidance on data collection methods, and no encouragement had been given to planners to go out and find extra data that might assist the process. The major problem encountered at Stoke was the traffic figures. Firstly these were obtained by mail counts, by the POs themselves, for a four week period; the figures were subsequently found to be grossly inaccurate and caused major problems. Secondly, the figures were collated and averaged over a 6 day week, which again caused problems as the heaviest day of the week could not be coped with.

3.3.10. Summary Of Research Findings

The CADR system does provide solutions to some of the issues raised in association with the Manual-W revisions, e.g. there is no longer a need for walk testing, and the data that is compiled for a revision can now be stored and re-used. Other problems remained unaddressed, for example the initiation process, and more importantly new areas of concern are introduced.

Overall the system has only been partially successful in achieving its aim of standardising the process. The system has not been adopted throughout the country. A good example of this is the Midlands where CADR has only been used twice and both times the resulting walks were then revised using Manual-W. This appears to be because of a lack of strategy and guidance for the systems deployment and ongoing use.

The main issues concern the data and calculations used in CADR and these are summarised below:

- The Total Delivery Time guides the entire revision process and this figure is reached through negotiation. The system does not aim to determine the actual time the walks should/do take, but instead performs calculations to allocate the Total Delivery Time across the walks.

- There is no agreed method for collecting office data. The traffic figures were shown to be of major importance to the revision at Stoke.
- The internal calculations and allowances are not specified and the planners do not know if the figures reflect the area under consideration and could lead to an extra allowance being allocated manually.
- The methods used are lengthy and depend on a high level of accuracy, using measurements in 1/16th inch.
- The measuring is performed by planners who do not have local knowledge. They will therefore, be unaware of the fine details of the area, e.g. where the letterbox is located at the house, which means the measurements may not be accurate.
- CADR does allow four potential solutions to be considered, an improvement on the manual method, but there is still a problem of the final walk.
- The solution reached using the system is still open to alterations through the ensuing negotiation process.

3.3.11. Application of the Decision Making Models.

The above case study and interviews have described the CADR revision process. This section considers the revision problem in terms of the models of organisational decision making, discussed in the previous chapter, to determine which, if any, of the models account for the CADR processes.

The table below presents the revision process within the framework identified, in Chapter 2, to describe the generic decision making model. It follows the same procedure as described in section 3.2.13.

The case study demonstrates that the overall revision process is not altered significantly by the introduction of the CADR system. Many of the issues remain the same, with the differences mainly affecting the collection and use of data. The comparison to the organisational decision making models reaffirms this view and demonstrates once again that there is no single model to account for the complexity of the processes involved in revising walks.

Table 3.6: Comparison of the Case Study Findings and the Organisational Decision Making Models.

IDENTIFY PROBLEM AND CRITERIA FOR SOLUTION	
Rational - One identified goal Bounded - Goal changes Political - Not agreed	The overall goal definition is the same as in the Manual-W process, reviewed above. The RM's stated aim is to optimise but there is no definition of an optimal solution, the goal changes throughout the revision process and needs the agreement of other parties. The actual CADR system goal is to plot the best walks, again this is not the optimal solution but instead seeks to allocate the agreed hours across the walks.
DEVELOP ALTERNATIVES	
Rational - Complete information Bounded - Not all info. known Political - Info. seen as power	More information is considered using CADR than in the manual process and this information is not as open to the collector and PO biases. The information is still not complete though, therefore not all of the alternatives can be developed by the planner. The system will only allow a maximum of four alternatives to be developed and stored. Information, particularly local knowledge is an important factor in the development of the new walks. The more accurate the information, the better the walks. This again gives other parties, i.e. those providing the information, some power in the process.
ASSESS ALTERNATIVES	
Rational - Simultaneously Bounded - Sequentially Political - Only small number considered	Again not all the alternatives will be known. Of the four solutions which could be generated the assessment will be mostly sequential although some aspects will be directly and simultaneously compared. All the solutions generated will meet the time agreed, by virtue of the calculations, the assessment is therefore how the planner views the walks and particularly how the final walk is fitted. Other parties will again be involved in the assessment of the one solution presented.
CHOOSE AN ALTERNATIVE	
Rational - Maximise organisational gain Bounded - First satisfactory solution Political - acceptable to all parties	The CADR revision does not seek to maximise the organisational gains, although this will be a major issue throughout the revision. All of the alternatives generated are considered. This does not stop when a satisfactory solution is reached, all are satisfactory in terms of timing. The chosen alternative will be an acceptable solution driven by the pre-agreed total hours.
CARRY OUT THE DECISION	
Rational - Optimal Bounded - Satisfactory Political - Bargaining	As in the Manual revision, the process described produces walks which are workable, not optimal. The final decision is reached through a negotiation process, with parties bargaining to reach an acceptable solution.
ASSESS EFFECTS	
Rational - Optimal Bounded - Workable Political - Acceptable	The effects are assessed as they are for the Manual process, above. The RM focuses on financial and time saving benefits although there are other factors considered to ensure it is a workable and acceptable solution.

3.4. SUMMARY

This chapter has reported case study work conducted within the RM to establish a more detailed understanding of the revision process. The studies examined the stages involved in a Manual-W and CADR delivery revision, highlighting issues which affect the decision making process and the eventual solution. It reinforces the initial view that the type of decision being made is extremely complex, with multiple criteria to be considered and many constraints being imposed.

The revision process was then examined in the light of the organisational decision making models, described in the previous chapter. The findings exhibit many of the issues raised in the earlier literature reviews. The problem is ill-defined and the amount and diversity of information affecting the process of designing new delivery routes is tremendous.

The issues and constraints are often unquantifiable and therefore cannot be fitted into the neat formula for solution described in the rational model, although this appears to be the approach taken by the RM. Following the prescribed process would be difficult for a number of reasons, e.g. defining objectives that are specific enough. Also the revision solution does not develop along a steady and undisturbed path, instead problems are encountered along the way that have to be explored and, if possible, overcome. The model does however provide a structure for the sequencing of activities by an organisation and highlights the issues of problem identification, solution development and selection.

The philosophy behind both the revision methods is rational decision making. The Manual-W concentrates attention on the collection of information and its processing, in order to reach a good solution. The CADR system recognises that there are difficulties with this process and aims to address some of these. However, this is again approached from a rational perspective. The system concentrates on the data collection and calculations and neglects to address the limitations and complications which exist, due to other parties being involved in the decision making process.

Both of the revision methods demonstrate that organisational goals and objectives do not necessarily form the basis of the decision making process, nor do they necessarily guide the search process. In both case studies one, or only a few, alternatives are developed. These are limited by the cognitive capacity of the planner and the amount

of information that can be considered. This points to the use of a reduced search for solution, as described in Simon's (1975) Bounded Rationality Model. The studies also suggest that heuristics are used to focus on certain aspects of the problem as described in the Unstructured Decision Model, for example the decision to view Hinckley and Burbage as two distinct areas. The result of all these factors is to produce a solution which is workable, but will rarely be optimal.

The process also displays the trial-and-error decisions which are uniquely described in the Humble Model of decision making. For example the planners have an initial attempt at plotting the first deliveries and then assess the decision for errors, and seek information to confirm their decision.

Throughout this process organisational and social factors have also been shown to influence the decision. This is described in the Political model. The eventual decision takes place within the context of the RM, and involves a number of individuals and groups. Each of these may differ in their perception of the problem and will be pursuing their own self-interest. This is likely to result in conflicts which are resolved through negotiation. The solution is therefore a compromise and not the optimum solution. This again goes against the RM's stated aim, to optimise, and their use of costs and benefits to assess the eventual outcome.

From the interviews and case studies conducted, a number of issues have been identified that affect the process and outcomes of delivery revision. These issues are diverse and concern not only the immediate problem solving strategies adopted by the revision team and other parties involved in the negotiations, but also organisational and social issues. By applying the decision making models it can be seen that each model can account for aspects of the revision process but no single model can account for the entire process. A pluralistic model is therefore required.

The next chapter, informed by the findings reported here, reviews a number of opportunities for further research before focusing on the role of technological intervention.

CHAPTER FOUR:

THE ROLE OF TECHNOLOGY IN ORGANISATIONAL DECISION MAKING

CHAPTER 4: THE ROLE OF TECHNOLOGY IN ORGANISATIONAL DECISION MAKING

4.1. INTRODUCTION

The previous two chapters have explored the issues associated with complex problem solving and how these complex problems are resolved within an organisation. The literature from individual and organisational decision making shows a progression from prescriptive theories[28], of how things ought to be done, to more descriptive theories which attempt to account for the complexity that is apparent in real world situations.

There are numerous models which account for different aspects of problem solving and Chapter 3 reports a number of interviews and case studies to evaluate the appropriateness of the models for the particular problem of delivery revision within the RM. These investigations showed that different models accounted for different aspects of the revision process, but no one model was sufficient to account for the methods used within RM. A pluralistic model is therefore required.

This chapter takes the revision problem and uses it as a vehicle to further explore the issues associated with complex real world problem solving. A review of the opportunities available to further the research in collaboration with the RM concluded that the role of technology in organisational decision making was a promising avenue. Further discussions with the RM revealed their interest in introducing a new computer system to improve the revision process. This provided the opportunity for investigating how a new system could aid the revision process.

This chapter reviews the systems design literature which demonstrates that systems design is itself a complex real world problem. The approaches used are then compared to those models used in organisational decision making. The next section discusses the methods which are actually used by designers and why user centred methods are not incorporated more widely. Finally the RM problem is discussed in

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[28]These theories are not to be discarded but are used in other disciplines where these methods are more appropriate, for example in the solution of mathematical problems.

the light of the review and a number of predictions are formulated about the methods which they will use, and the results which might be expected.

4.2. OPPORTUNITIES TO EXPLORE DECISION MAKING

There are a number of ways in which the conceptual framework about the design methods, developed in Chapter 3, could be progressed. A review was undertaken to establish the most fruitful and viable way of carrying the research forward. The following sections provide a brief view of the opportunities considered.

4.2.1. Individual Decision Making

The initial findings indicate that the outcome of the revision process is likely to be inefficient. This is due to the amount of data that needs to be considered and the number of options that are available, being beyond the human cognitive capabilities. One option would be to continue work with the RM to investigate which areas of the revision process are the most difficult and/or time consuming. A possibility was to develop testable hypotheses about the methodologies and heuristics employed by the planners, which could then be modelled and evaluated. This work would eventually have to move from the field to the laboratory to be able to control variables. In such a transition the complexity of the Royal Mail, e.g. culture, politics, etc. would be lost because the richness of the situation could not be simulated.

4.2.2. Organisational Decision Making

The previous chapters demonstrated that there is no single model to account for the diversity of problem solving activities encountered by the people involved in the revision process within the RM. Various models can be applied to aspects of the problem solving but there is a need for an integrated model to fully account for all the activities involved. Such an approach would further explore the less well understood aspects of decision making, i.e. the internal structure and culture within the RM, to see where the power and influence lie and to develop a model to better match the decision making process.

4.2.3. Social Issues

As the case study demonstrated the revision process has effects on, and is effected by, various people within the Delivery Office, in other departments within the organisation, and also the customers. Further research could explore the effects that the revision process has on various people, the effects that they themselves have on the revision process, and the methods for communicating and distributing information.

4.2.4. Active Intervention

A further option would be to develop an intervention to improve the revision process. This could be by improving the problem solving processes used by different people throughout the revision, as in the individual problem solving section above, but with the aim of providing techniques to aid the individual or organisational decision making strategies, as discussed in Chapter 2. These interventions could look at the revision process as a whole. For example, an alternative model of decision making could be introduced within the RM, to enhance the revision process. This could, for example, include the views of all the people affected by the revision at the outset; or concentrate on a particular aspect of the revision process such as better collection and use of data.

4.2.5. Studying Internal RM Technical Intervention

Another approach would be to concentrate on technical interventions, as discussed in Chapter 2. The case studies in the previous chapter demonstrate that the current computer system is not widely used, and only goes a small way to aid the decision making processes which the Planner undertakes. The tasks involved could be further explored, and the software further evaluated, to see which areas are addressed by the current system and where the shortfalls are. The results of this would then need to be formalised to show where there is an opportunity for the use of new tools to aid the decision making. A tool could then be designed and developed, possibly as a prototype, to allow for evaluation.

4.2.6. The RM Decision Making Models

The models of decision making used internally by the management of the RM emphasise rational / technical decision making. Yet the decision making process in practice has many political and social influences. Another avenue for exploration is

the differences between the decision making models used by organisational planners and the reality of organisational decision making.

4.3. THE WAY FORWARD

There are three major areas which emerge as ways forward for this research: i) concentrating on individual decision making. To investigate in more detail the processes involved in revision decision making, by developing and testing models and hypotheses. This would eventually lead to experiments in a laboratory based setting. ii) concentrating on the social interaction and communication of people involved in the process; iii) concentrating on technology, to look at the shortfalls in the current CADR system and then designing a more effective and efficient system.

The central issue in a real world setting seems to be that organisations have a rational decision making model and target, yet the reality also includes social and political processes. The use of a technical intervention would provide a useful vehicle to investigate this further.

There are two perspectives which can be applied; i) the rational which concentrates attention on the need for complete information. This leads to the view that bigger computers could be introduced to allow more information and alternatives to be considered; ii) the political perspective which could provide a process which allows each party to process information for its own purposes and recognises that decision making is a negotiation process.

4.3.1. Approach 1

From the studies already conducted it is apparent that the delivery revision process is viewed, by the RM managers, as a rational decision making process. This is in line with their aim to optimise the delivery revision walks and the revision process itself. The current CADR system also sought to make the process more rational by increasing the amount of data and walks that could be considered. Continuing with a rational approach would mean increasing the amount of technology applied to the problem. It could enable even more data and options to be considered, thereby increasing the possibility of reaching a rational, optimal solution.

4.3.2. Approach 2

It is apparent from the studies that the eventual outcomes of the revision process are in fact the result of a much more complex situation than the rational model can address, and that a pluralistic model of organisational decision making is needed. The current methods only recognise the other stakeholders late in the revision process, after the walks have been plotted. The negotiation that follows serves to reduce the optimality, which has been sought throughout the process using the rational approach. The revision process needs to take into account the complexity of issues and constraints involved in the problem. It needs to consider the various people that participate in or are affected by the process, the social interaction and the politics involved. Introducing a political approach would mean introducing methods to support the various groups and individuals who have a stake in the revision process, recognising their different perspectives and using technology to generate options to better suit all parties involved.

Introducing new technology is a popular option for organisations wishing to improve their processes. However, the way technology is viewed and the purpose for which it is introduced can have very different consequences.

4.3.3. Hypothesis 1

On the basis of the research reported in Chapters 2 and 3, Approach 1 is likely to be the preferred method of intervention for the RM. Using a rational approach attention would remain focused on the collection and use of data, in order to produce an optimal solution.

4.3.4. Hypothesis 2

Using Approach 2, above, all stakeholders involved in and affected by the revision process would be empowered. The technology would focus on enabling different perspectives to be generated leading to a larger shared decision space.

4.4. THE NEW WALK OPTIMISATION SYSTEM

Having decided the direction for the remainder of the project, a number of interviews were conducted with the DAM at Leicester and members of the planning team at Birmingham and Nottingham. These aimed to establish if there were any current

initiatives, within the RM, to improve the process. The interviews revealed that a new 'Walk Optimisation' system was currently being considered by the RM. This was obviously an opportunity not to be overlooked and contact was established with the project team. The project was managed by Royal Mail Consulting (RMC), based at SHQ in London, and agreement to proceed in this direction was obtained.

4.5. SYSTEMS DESIGN

The process of design has been well researched and before studying it in the RM setting, a review of the literature is necessary. This will be used to propose a hypothesis for the system development and outcome expected.

The term 'systems design' has two main uses in systems development; i) it is used to describe the overall process of developing a system, i.e. from the need being recognised to the implementation and maintenance of the system; ii) it is also used in a narrower sense to refer to a stage in the process of systems development, following from and independent of the analysis stage, where the details for implementation are added to the description of the system[29]. The wider definition is used in the following review.

4.5.1. Elements of Current Technical Systems Design

4.5.1.1. The Waterfall Approach

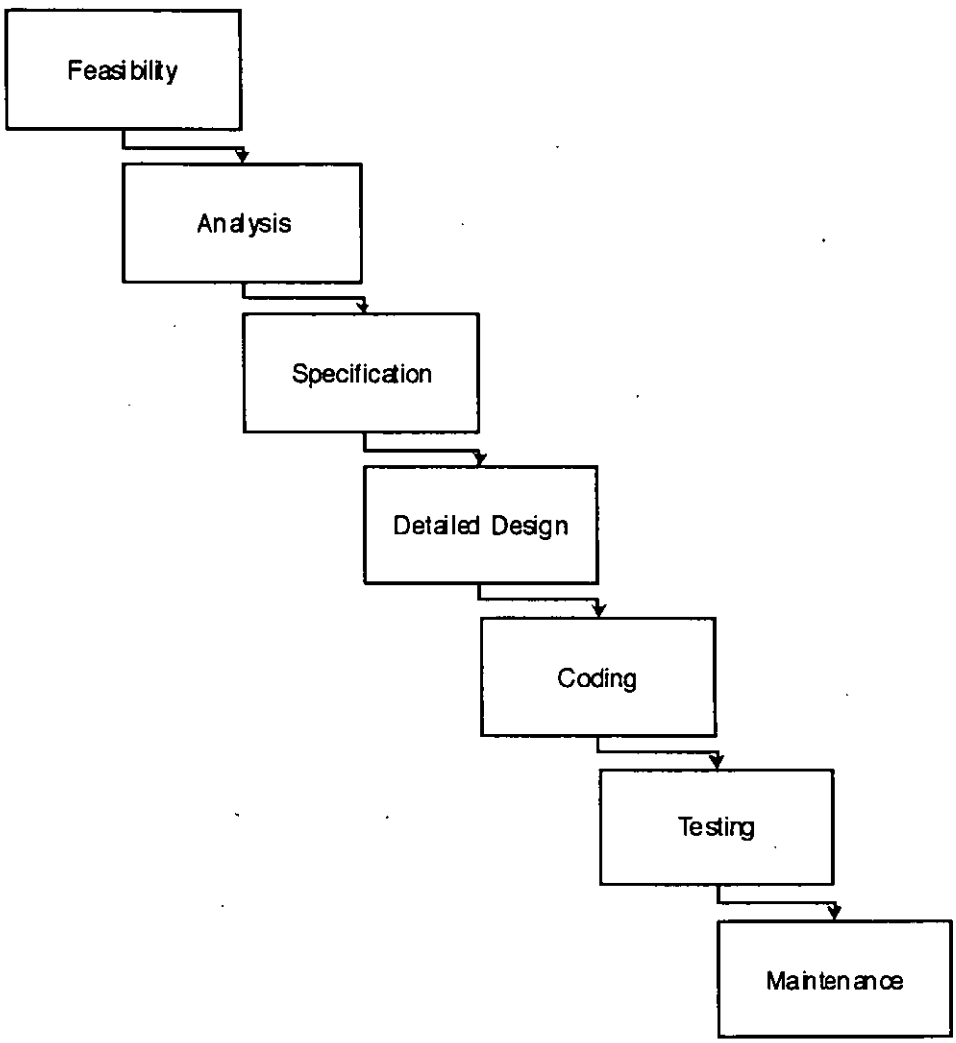
Early methods for system design were developed from a rational and scientific perspective (see Langefors 1973) viewing the process as an engineering discipline with a strict structured approach. This is typified in the software life cycle which attempts to identify and order activities. The Waterfall Model below (see Royce 1970) illustrates this.

The waterfall model is a prescriptive model which views the design process as linear, consisting on a number of phases. Once a project has been identified a feasibility study is undertaken to assess the costs and benefits. If the project is seen as acceptable an analysis of the problem is undertaken and the system is specified. The

[29] For a more detailed description see Coad & Yourdon (1991b).

detailed design is then produced and coded, before testing, implementation and maintenance.

Figure 4.1: The Waterfall Model



This approach is described by Checkland (1981) as a 'hard systems' approach where all the objectives of the intended system can be determined in advance. The problem is then to choose between a number of possible alternatives to achieve a desired objective. This reflects a stage of computer system development when systems were used by computer experts and were used for data, and normally batch, processing. The goals of the system and the process to fulfil these goals could be fairly well defined at the outset. However, as computer systems have developed, in particular with the advent of the personal computer and real time processing, customers and users have become more demanding in their requirements. In practice today the real world problems encountered, as highlighted in Chapter 2, are rarely as easily determined. Methods have had to adapt to address these ill-defined problems.

4.5.1.2. An ill-defined problem

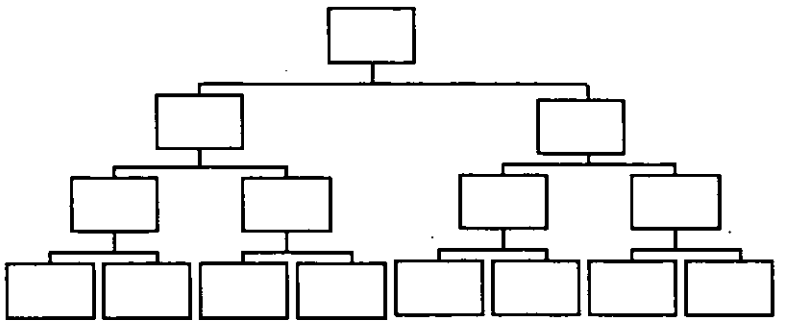
Modern system design problems are far different from the well-defined problems used in most studies of problem solving, e.g. Tower of Hanoi, Cannibals and Missionaries, etc. Design problems are usually novel, ill-defined (Simon 1973) and ill-structured (Reitman 1965). They require creative problem solving in a knowledge rich domain. Jones (1970), and Rittel & Webber (1972) describe them as 'wicked' problems, indicating the elusive and complex nature of design problems.

Simon (1973) identifies three features of ill-defined problems; i) incomplete and ambiguous statement of goals, i.e. the requirements received will rarely be a complete and coherent description of the problem being faced (e.g. see Meyer, 1985; Parnas & Clements 1986) and the solution will often be described only in terms of a number of required properties and limiting factors with no clearly specified way of evaluating solutions (Simon 1973); ii) no predetermined solution path (Newell 1969; Nii 1986; Rittel 1972); and iii) the need for integration of multiple knowledge domains. The analysts must therefore define and structure the problem as they proceed and as Simon (1973 p.187) notes, "There is much merit to the claim that much problem solving effort is directed at structuring problems, and only a fraction of it at solving problems once they are structured."

A Top-Down, Breadth-First Approach

Traditionally design has been considered a top-down, breadth-first process, and it has been proposed that this is the method designers should use, e.g. Jefferies et al. (1981), to ensure that the solution progresses in a systematic and balanced manner (Adelson & Soloway 1984;1985). In other words, each component is defined as the system develops in equal detail and at the same level of abstraction. The methods available to aid analysis have reflected this, e.g. the waterfall model.

Figure 4.2: A Hierarchical Model Of The Design Process Demonstrating A Top-Down, Breath-First Approach.



The designer starts from the initial problem, at the top of the diagram and, through a process of decomposition, this is broken down into sub problems, i.e. the two below it. The sub problems are then broken down further until they are at the lowest level of abstraction and a solution is apparent.

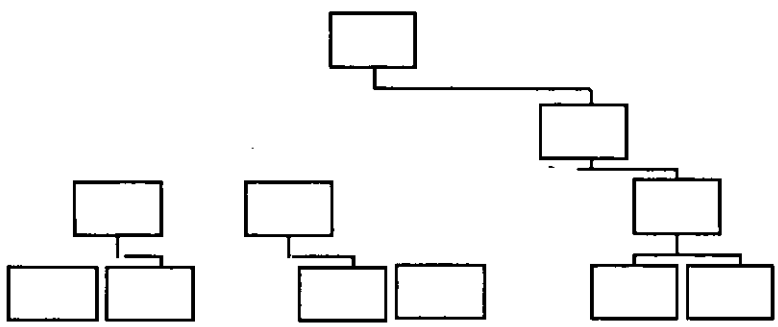
The prescribed hierarchical process, Figure 4.2 above, relies on decomposition; breaking the initial problem down into sub problems. This is normally achieved through an iterative process (Sacerdoti 1975) the solution becoming more detailed at lower levels of abstraction until a complete solution model is formed. As Simon (1973 p.190) states through decomposition "..the architect will find himself working on a problem which, perhaps being in an ill-structured state, soon converts itself through evocation from memory into a well-structured problem." Jefferies et al. (1981) emphasise that work on problem solving in other semantically rich domains (e.g. see Bhaskar & Simon, 1977 work in thermodynamics; Larkin, 1977 work in physics) is not comparable because these other areas do not rely on decomposition.

Opportunistic Design

Curtis (1989) notes that one of three mistakes made in the analysis of software development is that of "confusing project stages with development processes". Other studies, including that of Jefferies et al. (1981), have demonstrated that deviations from the top-down approach do occur and that often a more opportunistic decomposition is apparent. As Guindon (1990 p.312) points out the deviations normally occurred "(a) when the artefact presented novelty to the designer; (b) when the problem required the integration of multiple knowledge sources; and (c) when a sub problem appeared critical, very difficult, or had an immediately known solution." These deviations are not special cases due to bad design habits or breakdowns in the process but are the consequence of the intrinsic design process.

Opportunistic[30] design is "design in which interim decisions can lead to subsequent decisions at various levels of abstraction in the solution decomposition. A decision at a given level of abstraction may influence subsequent decisions at higher or lower levels of abstraction, specifying actions to be taken at different times during the process." Guindon, (1990 p. 336). Figure 4.3. shows an example of how opportunistic design may look at a particular time during decomposition (to achieve the same solution as in Figure 4.2 above).

Figure 4.3. A Model Of The Design Process Demonstrating Opportunistic Decomposition.



The designer starts from the initial problem, at the top of the diagram and this is broken down into sub problems until they are at the lowest level of abstraction and a solution is apparent. The methods used include insight of partial solutions at various levels of abstraction and decomposition. This demonstrates that planning and evaluation are influenced by the features that appear critical, or to the incorporation of recognisable solutions to problems and not a rigid adherence to a strict plan, i.e. top-down decomposition.

Psychological mechanisms play a part in deviations from the top-down approach and "the role of data-driven processing by experts, the associative nature of human memory and spreading activation, working memory limitations" (Guindon 1990 p.327) should be recognised. The main causes Guindon (1990) found for deviations included the recognition of partial solutions triggered by semantic associations, based on analogy. These are insights which occur at any level of abstraction not necessarily the one presently being addressed. These partial solutions aid the design process by increasing the constraints on the problem and therefore reducing its size. The application of data-driven processing has been noted in other studies (e.g. Newell 1969; Nii 1986) and expertise in many domains has been attributed to its use (Anderson 1982; Larkin 1981).

The approach adopted in the early stages of the design process will therefore depend on the novelty of the problem; the degree of completeness and structuring of the

[30] A term borrowed from Hayes-Roth & Hayes-Roth (1979) and now widely adopted.

problem; and the ability to integrate knowledge from multiple domains and, according to Guindon (1990 p.336), "can be best characterised as opportunistic, interspersed with top-down decomposition."

The design process is therefore more complex than the traditional waterfall model recognises. The system requirements will not always be known in advance but instead the problem needs to be understood and structured. The methods used for decomposition and structuring will vary depending on the complexity of the problem and will include opportunistic methods because of human cognitive limitations. The process is further complicated by the recognition that this happens, not just at the start of the project but throughout the design process and therefore there is a need for iteration.

Many methods have been developed to account for these design processes, in fact (Jayaratna 1994) estimated that there may be in excess of 1000 published methods. Most of these methods still view the process as rational, ordered and systematic. But in reality, because of the world in which the system is being developed and in which it will operate, the complexities of the problem need to be considered. The next sections concentrate on two broad areas, iterative methods and soft system methods which demonstrate alternative views of the development process.

4.5.1.3. Iterative Methods

The realisation that systems could rarely be developed correctly first time led to the development of iterative methods. These methods recognise the complexity of defining ill-structured complex problems, e.g. interactive systems, and allow the designer to revisit earlier stages of the design process as they become more familiar with the problem. Many methods are based on the Waterfall Model and introduce an iteration loop to the previous stage. Others extend the model to include additional verification and validation processes, as well as additional stages.

An example of an alternative method is Boehm's Spiral Model (Boehm 1988). This aims to address some of the difficulties of methods based on the traditional Waterfall Model. It particularly considers human-computer interface design, by incorporating iteration and prototyping, but its author argues that the model can be adapted and developed to fit other design problems.

The model contains a radial dimension which represents the cumulative cost of the project to date, and an angular dimension representing the progress made as each cycle of the spiral is completed. Each cycle involves the same sequence of steps. These steps identify the objectives, alternatives and constraints of the cycle and allow alternatives to be assessed in relation to these. The evaluation will frequently identify uncertainty and this introduces the element of risk. As risks are identified they will need to be resolved, using risk-resolution techniques such as simulation and prototyping. Each cycle of the model concludes with a review by the people concerned with the system. This involves consideration of the products produced from the previous cycle, and plans and commitment to the next phase.

The method re-emphasises the importance of software functionality; that it is of key importance to recognise the organisational environment in which a system will be used and the constraints and opportunities that the environment will allow. Often in HCI literature attention is focused on design only after the functionality has been decided. It introduces risk assessment at each stage and accommodates iteration to earlier stages as new alternatives are identified. It also allows a project to be abandoned if it is no longer feasible.

4.5.1.4. Soft Systems Approach

Another approach to the problem of design focuses attention on social, organisational and psychological aspects related to the introduction of new technology. The problem context is a major issue which the above approaches have not addressed. Early theories (for example Trist and Bamforth 1951) concentrated on variations in the social structure of organisations and amending the structure to be compatible with the new technology. However people have questioned for some time whether an organisational model can exist as an independent reality which can be modelled beforehand (Boland 1979). Boland (1979) also notes the importance of the interpretation various people involved place on the situation. Robey and Marcus (1984) argue that although some phases of development can be understood in terms of the 'rational motives', they can also be interpreted as 'political rituals', recognising that people will aim to protect their own interests by way of negotiation. The social and organisational issues which this political process introduces are unaccounted for in many design methods (Bostrom and Heinen 1977; Floyd 1987). Blackler and Brown (1986) describe a model which aims to make people aware of the complex organisational, social, economic and political environments in which systems are developed and implemented. They do not propose their general model will achieve

the articulation of options for matching people and technology in the pursuit of organisational goals, but call for the development of methods to recognise and address issues of conflicting interests.

The development of soft-system approaches (Checkland 1984; Wood-Harper et al. 1985) allows consideration to be given to the social aspects of the design process and these methods are more applicable to the ill-defined problems which are encountered in the real world.

In Checkland's (1981) 'Soft System Methodology' the situation in which the perceived problem lies is expressed, as opposed to defining the problem in advance. A model of the human activity system is then developed. The root definitions are intended to make explicit to the customer; i) the actors in the system, ii) the transformational processes, iii) the organisational assumptions, iv) the owners of the system and v) the environmental constraints. Conceptual models are then developed and tested. These describe what must be done in order to achieve the human activity system. By comparing the conceptual model with formal methods and other system thinking, inadequacies may be revealed and potential changes can be identified. The conceptual model is then compared to the real problem situation to determine changes which are both feasible and desirable. Finally action is taken for the changes to be implemented.

Checkland (1986) notes that the political issues are, by nature, never explicit and can be elusive which often means they are ignored. His method recognises the political issues in the analysis stage and produces a list of possible changes but the implementation of any changes, if the solution is to be a technical one, must still be developed.

The Checkland (1981) methodology allows the problem to be considered in the setting in which it occurs and reflects the socio-technical implications. Clegg et al. (1997) takes the idea of social implications further and suggests that they are in fact two-fold, firstly the social and organisational dynamics of the original problem, discussed above, but also the socio-technical dynamics of the development process itself. To implement successful systems the development process has to incorporate "a wide range of different forms of knowledge, skills and expertise over a period of time. It can only produce a satisfactory outcome if these are successfully integrated and co-ordinated." (Clegg et al. 1997). Many other methodologies exist which focus on how to include the stakeholder throughout the development process (see for

example Hirschheim 1985; Mumford & Henshall 1979) and these and other methods will be discussed in more detail in the next chapter.

4.6. SYSTEMS DEVELOPMENT IN PRACTICE

The literature review shows that there are many different methods which have been developed to enable good systems design. It demonstrates that people have long recognised that the traditional Waterfall method is not sufficient to account for the complexity of problems being faced today. Methods such as Boehm's (1988) Spiral Model attempt to get away from the linear approach and other methods (e.g. Checkland 1981; Mumford & Henshall 1979) propose more radical approaches to capture the 'rich picture' of interaction, and to include users in participative design methods. These methods should enable more usable systems to be developed as they allow for organisational and social factors to be taken into consideration. A number of surveys, conducted over the past two decades (Standish 1994), show that this is not in fact the case. They illustrate that there was, and still is, a high proportion of systems which either fail to meet their objectives or are abandoned by their users. In the survey conducted by Standish (1994) only 16% of information systems applications were considered a success, and of those which failed 25% were due to incomplete requirements or lack of user involvement.

The reason for this very low success rate appears to be the reluctance of organisations to adopt the more radical participative methods. Instead companies continue to use more formalised methods (Damodaran 1991), for example, Structured Systems Analysis and Design Methodology (SSADM). This is a mature methodology and the UK market leader (Fitzgerald 1994). The current trend of structured methods is still attempting to make the systems development process more formalised and bring greater discipline to the area. This does not easily allow for the uncertainty of real world complex problems, it stifles creativity (DeMarco and Lister 1987), and does not allow for the added complication of including users.

The development and introduction of computer systems remains technology centred (Blackler & Brown 1986) with the majority of resources being directed at the technical design and implementation, and the effects on people and the organisation only being considered after the computer system has been developed (Clegg 1988). As Lim et al. (1992) and others have noted, human aspects are considered 'too little too late'. Heinbokel et al. (1996) decompose 'user-centred' into two components; i) user orientation, and ii) user participation. User orientation they describe as

focusing on developing a product to meet the user's requirements and match user characteristics. This does not necessarily include the users but instead is a design philosophy to consider the user. Even this approach is not widely adopted. Of 400 software professionals questioned, (Gould and Lewis 1985) less that a quarter identified user-centred methods which they used in their approach.

The second definition used by Heinbokel et al. (1996), 'User participation', is more often thought of as a user centred approach where the stakeholders are involved in the development. There are many approaches which attempt to improve the user-centredness of systems by including users. These range from strong user involvement in all processes of the development to brief, ad hoc testing and evaluation of products produced (Eason and Harker 1991). They either use integrated methodologies (Lim et al. 1992), or 'tool kit' approaches (Galer et al. 1992) which can be 'bolted on' to existing methods. However, even with the amount of methods available, the design community are still reluctant to use them. The following sections give some examples of why this reluctance may occur, but it is a subject which will be revisited in subsequent chapters.

- A major factor which influences the design of systems is that the people driving the process are normally dominated by financial, business and economic considerations. Their views are often influenced by the historical perspective of using technology to reduce labour costs and to control the work process as described by Taylor (1967). Because of this dominant view some other issues, particularly those affecting users, are only ever considered late in the process. This can lead to problems because, as Dunn (1984) points out, any errors made during the earlier stages in the development will be the most expensive errors to correct. The prohibitive cost of these fixes will often mean that problems are recognised but not amended.

- By continuing to use the formalised methods as the industry standard to control large projects the views of stakeholders continue to be ignored. These methods do not allow human factors to be easily integrated.

- Even when social and organisational issues are recognised at the start of the design process they may be lost or ignored throughout the project. The technical requirements may still be viewed as the dominant issue and, even if they were not, there are no methods which allow the views to be recorded and carried through the project.

- The system designers are normally separate from the organisational context in which the system is to be introduced, they therefore need to rely on others for an explanation of what the problem is.
- The designers will normally be experts in a particular systems development method. This might be the organisation's own preferred method, or one they have used successfully in the past. This often leads to the same method being applied regardless of what the actual problem is, and the methods applicability.
- The fact that so many different approaches exist may in itself be the reason the methods are not taken up. In other words, with so many methods available how can an organisation or developer know which is the best and most appropriate method to use?

4.7. SUMMARY OF APPROACHES

The previous sections have demonstrated some of the complexities that are intrinsic to the ill-defined, creative problems of design. The discussion highlights that traditionally research and development has centred on the view that design solutions are achieved in a linear fashion, and not on the actual processes used in development. Researchers have begun to recognise that psychological factors play a part in the process of design, and studies have demonstrated that more opportunistic strategies are used by designers to understand the problem. More recently, recognition has been given to the political issues involved and the fact that stakeholders, and social and organisational issues need to be considered.

The review shows there are a number of approaches which can be taken to the development of a system, each of the perspectives focuses on different aspects of the problem of design, and proposes different methods to develop good systems. The traditional waterfall model is a prescriptive model of how systems development should be undertaken. Boehm's (1988) Spiral Model, in contrast, recognises that not all the requirements can be captured at the start of the development process and in answer to this includes iteration throughout the development cycle. This differs from other models which only allow the previous stage to be revisited. It recognises that there are constraints and limitations which exist as part of the system being considered due to human cognitive limitations and the organisational setting. The Spiral Model recognises too that the problem is so complex not all aspects can be considered at once. It introduces the risk-resolution techniques to assess alternatives at different levels, until a workable solution is reached. The solution will only be

abandoned if it presents too high a risk at another stage, and / or a lower risk alternative is considered more desirable.

The Soft Systems Method proposed by Checkland (1981) takes the development process to another level. It is well recognised that although system development is described as a very rational process, i.e. first the analysis is undertaken, then the evidence is gathered and sifted into a set of requirements which are fulfilled with technical tools, in reality it is very different. One of the main reasons why practice is very different from the rational model is because of the political aspects. Various people, and their perception of the problem, need to be considered in the development process and the focus here is on developing a system which takes account of the organisational and social needs of the people involved, rather than attempting to fit the people to the technology. The method aims to consider the stakeholders at the analysis stage of the problem to enable systematically desirable and culturally feasible changes. It does not address the issue of how debates over what constitutes desirable and feasible changes are agreed or implemented.

4.8. COMPARISON TO ORGANISATIONAL DECISION MAKING

The approaches discussed throughout this chapter demonstrate remarkable similarities to the models of organisational decision making described in Chapter 2. The traditional method can be compared to the rational model in organisational decision making, defining the stages that must be followed. Like the Rational Model it assumes the problem can be well defined in advance, and that there will be full knowledge of alternatives.

There is now a realisation, as in the organisational decision making literature, that not all requirements can be known in advance. Therefore one of the major issues is understanding and structuring the complex problem being faced. Boehm's (1988) model addresses this by the introduction of iteration to any prior stage. It recognises the constraints and limitations and is similar to the Bounded Rationality model of decision making.

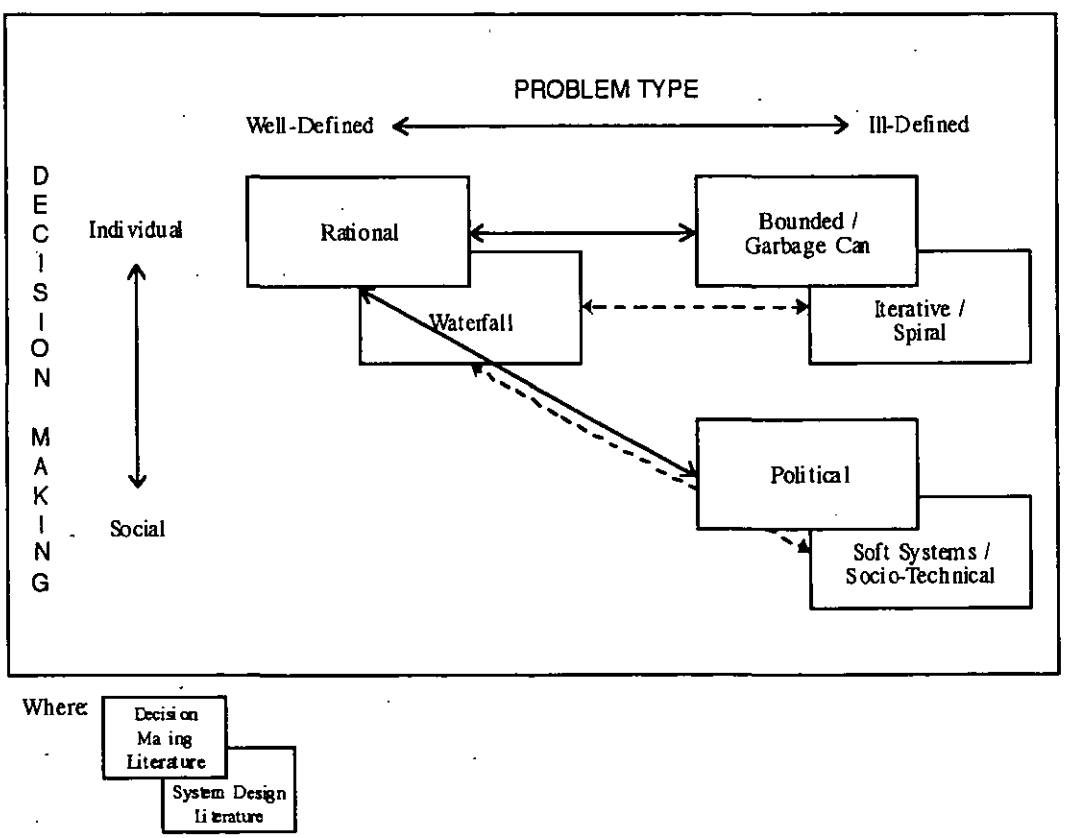
The Soft System Methodology recognises the importance of political and social influences. Different stakeholders will have different agendas and the decision making process, as discussed in Chapter 2, is then about negotiation and compromise within the social and organisational setting to establish workable options. Many

participative methods have been developed to include stakeholder opinions in the development process and the stage at which they are used and their effectiveness vary. This approach is similar to the political model, recognising that stakeholders can have a major impact on the success of a decision.

4.8.1. An integrated model

The review highlights that system design is itself a real world complex problem solving task. It demonstrates that, as with the literature on organisational decision making, there are numerous models which can be applied, each of which take a different view of the problem faced and suggest how the particular issues can be overcome. Figure 4.4 attempts to bring together the various models of systems development and views them in the framework developed from the organisational decision making literature. It highlights the similarities (and differences) between the methods considered and demonstrates that a combined approach is needed to account for the political, social and organisational issues apparent throughout the development process.

Figure 4.4: Diagram of Systems Development Models Within the Decision Making Framework.



The diagram shows the models from decision making and systems development literature, and places them in the context of the type of problem addressed and the type of decision making needed. It demonstrates that an integrated model is needed to account for complex real world problems.

4.9. SUMMARY AND SYSTEMS DESIGN IN THE ROYAL MAIL

This chapter has discussed a number of opportunities to explore the decision making process further. It identified opportunities in individual decision making, organisational decision making, social issues, active intervention, internal RM intervention and the RM decision making models. The central issue in the real world setting, particularly for the RM, appears to be that they have a traditional / rational approach to the problem and yet it has been shown that there are other social processes involved. The opportunity to follow a technological intervention, through their decision to introduce a new computer system, provided an excellent vehicle to investigate this further.

Based on the prior work two hypotheses were proposed: i) that the RM would continue to pursue a rational approach and concentrate on using technology as a tool for the planners and ii) that a pluralistic method would be used enabling a new system to consider the social processes involved.

The remainder of the chapter considered the problem of design. The literature on the complexity of the systems design problem, and models which have been proposed to address this were reviewed. This demonstrated the similarities between models developed in systems design and those in the area of complex problem solving and organisational decision making. It shows that there are various models which account for parts of the design process but there is no single model to account for all of the complexities. The review also highlighted that industry continues to adopt the more rational models as acceptable and standard methods. This leads to a twofold problem a) that the linear methods do not work and b) that social and organisational issues are overlooked.

From the reviews and comparisons undertaken it can be inferred that the RM is likely to continue with the rational / traditional approach as described in Hypothesis 1, above. The RM will attempt to find a technical solution based on the economic costs and benefits. Focusing on those areas which increase the processing capabilities, e.g.

the time savings and ability to consider more alternatives. This is likely to lead to a dysfunctional system as the political, social and organisational issues are given a low priority in the development process. There is an opportunity within the RM to pursue an investigation of the design of a technological intervention. The following chapter investigates the approach taken by the RM in the design process.

CHAPTER FIVE:

WALK OPTIMISATION CASE STUDIES

CHAPTER 5: WALK OPTIMISATION CASE STUDIES

5.1. INTRODUCTION

The previous chapter established that the RM was investigating the possibility of introducing a technical intervention to improve the revision process. This chapter details work conducted with the RM, through interviews with the WO Project Team, meetings attended and case studies conducted. It provides an evaluation of the approach adopted and the methods used to develop a workable system.

The chapter begins by reviewing PRINCE, the project management tool used throughout the development, before looking at the development itself. The initial interviews and the feasibility studies revealed that the RM had decided to investigate the possibility of procuring a computer system to meet their needs. This approach does not easily fit with the systems development methods, discussed in Chapter 4, which emphasise the need to understand the current system. Only then can designers explore the problems and opportunities to improve the existing processes. In the RM's case the system had been designed and developed for another set of people, in another organisation, and in another country. This is becoming a more popular method for companies in their adoption of new technology, but one that has received very little attention in the literature. A review of existing literature allows a hypothesis to be developed for the future systems development and its consequences.

Further case study work charts the development process through a second phase of evaluation and finally through a phase of design and development. The chapter concludes by considering the findings of the case studies in light of the literature reviewed in earlier chapters.

5.2. BACKGROUND

The delivery revision process is key to the RM in maintaining its drive for greater efficiency and improved quality of service. There has, and will continue to be, a need to undertake revisions due to the ever changing delivery environment. Manual walk testing is one method for achieving new walks, but it is very time consuming and requires intensive and continuing efforts. The introduction of CADR was an attempt

to improve the performance of various tasks within the revision process, and has had varying degrees of success.

A Walk Optimisation System was seen by one of the RM Directors on a visit abroad. This was the initiator of the RM project. The system, Postcards was originally developed for, and is now used by Canada Post. It was developed by the Canada Post Corporation (CPC) in collaboration with Montreal University. GIRO Enterprises was established to further develop and market the system and they now have customers throughout the world. The system has been adopted by other postal delivery services but has also been adapted for customers in public transport, street cleansing and snow clearance.

Following a demonstration of the system a project team was established. The project was set up using the RM standard project management tool, PRINCE. An overview of the tool is provided below, with particular reference to its application to the Walk Optimisation Project.

5.3. PROJECTS IN CONTROLLED ENVIRONMENTS (PRINCE)

The RM realises that in order to operate at the forefront of competition they must constantly implement change, therefore a project management methodology has been introduced. This aims to improve the way projects are managed and to ensure a standard and consistent approach. PRINCE is deemed to be suitable for ALL projects, providing "a structured set of principles and techniques designed for managing projects in a controlled and considered manner"[31] which can be fine tuned to the project type.

The focus throughout the methodology is on the business case, describing the rationale and justification for the project. The main features are:

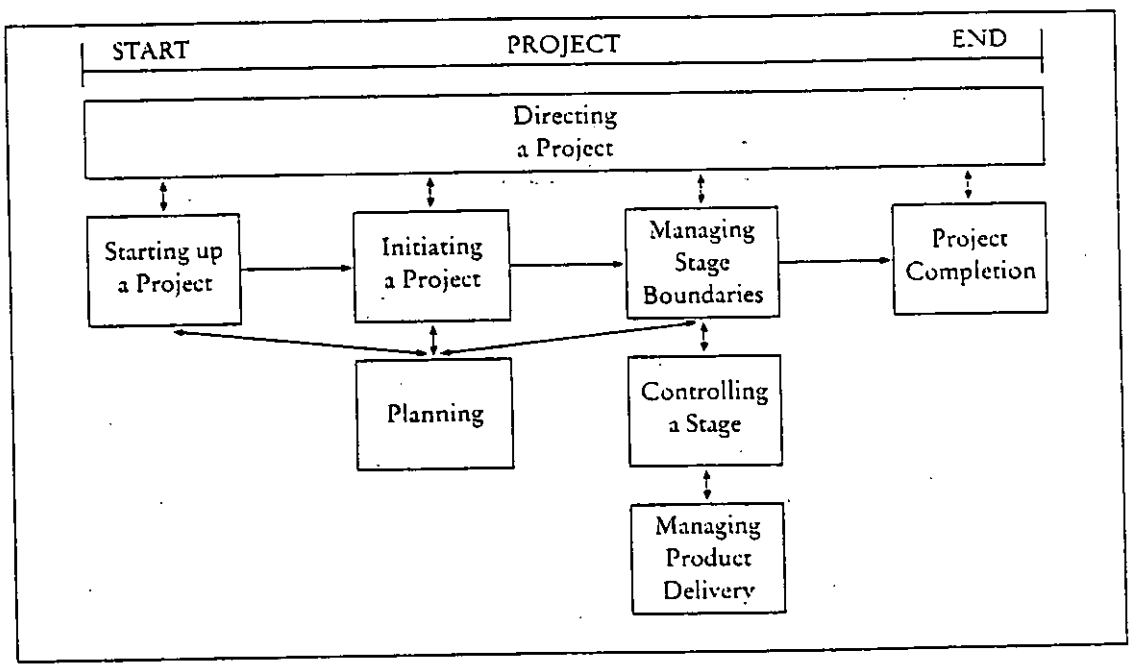
- "Its focus on business justification
- A defined organisation structure for the project management teams
- Its product-based planning approach

[31]From the RM manual "PRINCE Overview: Open Learning."

- Its emphasis on dividing the project into manageable and controllable stages
- Its flexibility to be applied at a level appropriate to the project."[32]

5.3.1. The PRINCE Process Model

Figure 5.1: The PRINCE Process Model.



The model defines the activities to be carried out during the project.

PRINCE aims to involve people from different areas of the business. These people represent the three business functions; Operational, Technical and Financial and are represented in PRINCE as three areas of interest (shown in Figure 5.2 below). Each individual, group or groups will have different priorities and different interests to protect. Concurrence from all parties is therefore needed.

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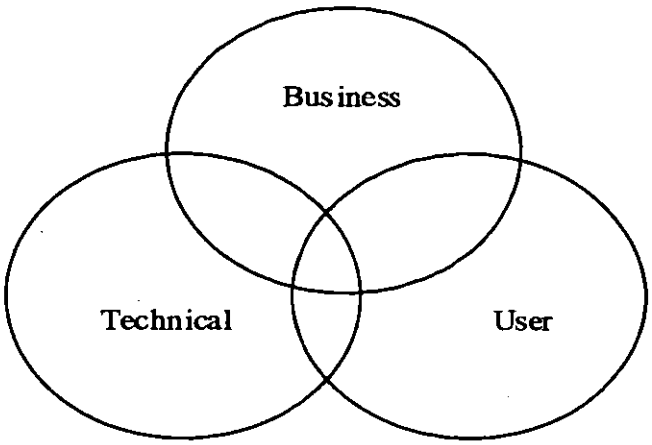
[32]From the RM manual "PRINCE Overview: Open Learning."

Figure 5.2: The PRINCE Three Way Partnership.



The three interests represented in PRINCE ensure the project is; i) for the user, ii) delivered by the technical and, iii) for the benefit of the business.

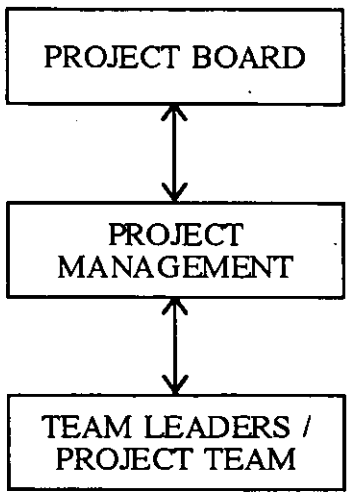
5.3.2. Customers

The project is based on a customer / supplier relationship and these are defined at the start of the project. In the WO Project the customers were; The Head of Pipeline Design (on behalf of the Operations Design Director RM SHQ), the Royal Mail Project Executive Committee (RoMPEC) and the Director Employee Agenda.

5.3.3. Project Management Organisation

The project team was established in line with PRINCE, suitably scaled to the size of the project. The diagram below shows the roles and responsibilities involved in, and required by, the project.

Figure 5.3: The PRINCE Project Management Structure.



The main people involved in the project are detailed below. Within the PRINCE guidelines each of the roles within the project are described along with their responsibilities (see Appendix D.1), these will only be discussed in detail where appropriate. Figure 5.4 , below, shows the project structure for the WO Project.

5.3.3.1. Project Board

The Project Board is the most senior level of the project. It initiates each phase, monitors progress and provides strategic guidance. The board takes overall responsibility for the delivery of the project and makes the key decisions within the project. The board consists of five people[33]:

- The Senior Executive and Chair (from RM SHQ). "Responsible for the integrity of the Business Case and completion of the project within the timescales and budget approved by the Approval Authority".
- Two Senior Users (Directors from two of the Divisions). Their job overview was to, "Represent all users affected by the project. Monitor progress against User Management Requirements."
- Two Senior Technical (one from RM IS SHQ and the other from RM OR&S). Their job overview was to "Represent the interests of those designing and implementing the project products. Monitor progress against the technical management and operation requirements."

[33]Extracts taken From RM Consulting PID, Version 1.1, February 1996. Defined by the original Project Board..

5.3.3.2. Project Manager

This role is appointed by, and reports directly to, the Project Board. The project manager co-ordinates the project and, after approval by the Board, prepares the business case for RoMPEC. They are charged with the day-to-day running of the project, ensuring the project creates the correct products and achieves the required quality standards.

5.3.3.3. Team / Stage Managers

One person is identified and given responsibility for each of the elements identified in the project. For the WO project there were four stage managers. They are responsible for ensuring that the products, for their stage, are completed in the timescale and at the agreed cost.

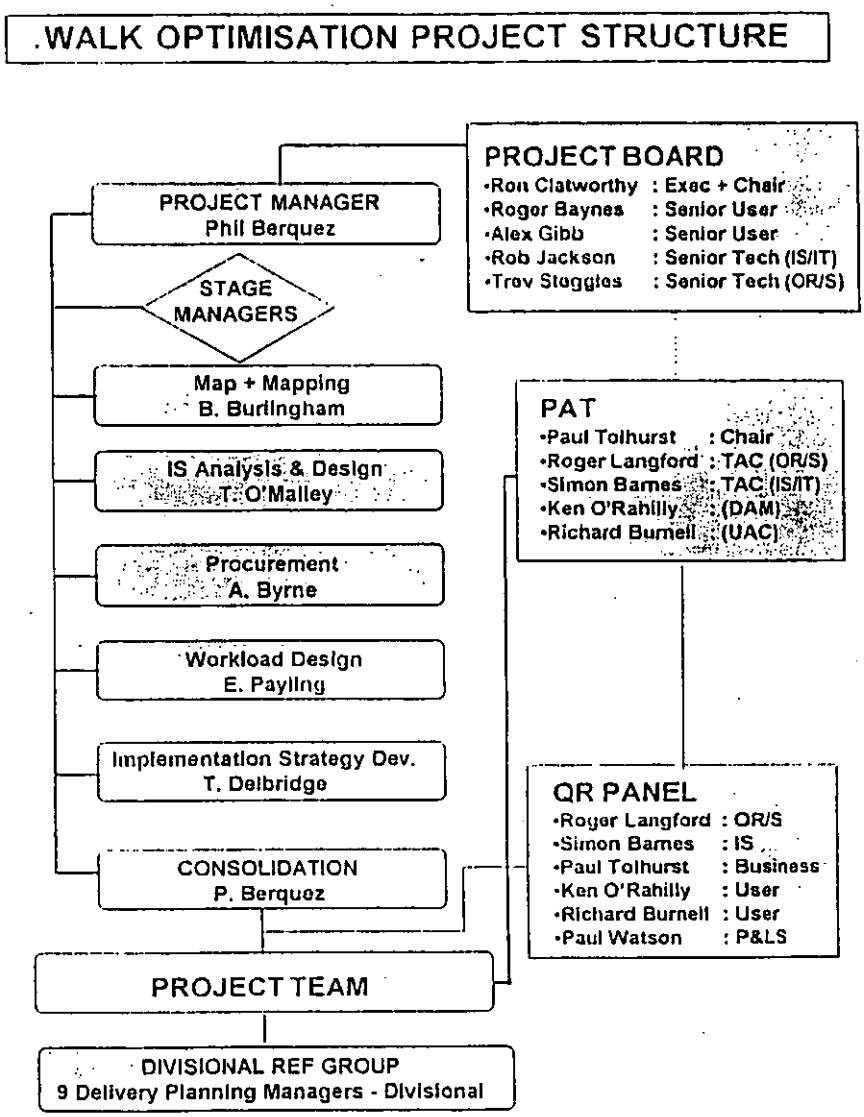
5.3.3.4. Project Assurance Team (PAT)

PRINCE projects require assurance, i.e. checks and balances to ensure that the correct approach is being taken. For the WO project a team was established. The PAT consisted of nine people, some of whom were already fulfilling other responsibilities on the project. They included the Project Manager and the four Stage Managers. The remainder represented system processes that are on the peripheral of the project, e.g. Training and Development Group (T&DG).

5.3.3.5. Quality Review and Assurance

The Quality Review (QR) Forum was also established according to the PRINCE methodology, for quality review and integrity / assurance of deliverables. For the WO project it included two User Representatives, Operation Research and Statistics (OR&S) and Information Systems (IS) experts. It is responsible for signing off all deliverables and administering and co-ordinating the Quality Review, including an audit trail.

Figure 5.4: Project Structure for the WO Project.



5.3.4. Project Stages

PRINCE suggests all projects are broken down into manageable stages. These stages identify the major decision and control points. The tool suggests that each of these stages end with an 'AutoStop' point where authorisation from the Project Board must be obtained before the next stage can commence. This decision is made on the progress to date and an assessment of the continued viability of the project.

5.3.5. Project Plan

An initial project plan is drawn to confirm the project's objectives are clear, achievable and realistic. These have to be approved by all members of the Project Management Team and have to be formally approved by the Project Board. This initial plan will contain the high level objectives of the project. The objectives will be defined in further detail as the project progresses.

The plans relating to the project are detailed at many different levels within PRINCE, and these are aimed at specific people within the process. All plans do however need to contain the same basic information and these are specified in Table 5.1 below[34].

Table 5.1: Components Of A Plan.

Components	
What	- products to be produced
How	- activities needed to create product
Quality	- criteria and method of measure
Who	- the resource required
When	- activities occur and the time needed
Dependencies	- relationship between activities and other external dependencies
Controls	- when progress will be monitored
Risks	- and measures to address these

The project is broken down into its key components and these are known as products. The plans, described above, are based around these products and are represented in three distinct but interrelated ways within the project; i) Product Breakdown Structure, ii) Product Flowchart and, iii) Product Description (see Appendices D.2 to D.4 for examples).

There are three types of products produced throughout the project; i) the Management Products are used to control and monitor the project, ii) the Technical Products which are produced as the result of the project and, iii) the Quality Products used to set the

[34]From the RM manual "PRINCE Overview: Open Learning."

level of quality required for each of the products and to ensure that it is met. One of the main Management Products is the initiation document described below.

5.3.5.1. Project Initiation Document (PID)

A Project Initiation Document is drawn up for each project stage and defines the terms of reference for the project. It details the purpose of the project, the resources and responsibilities to achieve the plan, including time scales of deliverables and costing.

5.3.6. Project Control

There are many controls built into the PRINCE methodology and most are planned before the project starts. They include regular and formal reviews of the progress made, monitoring the timeliness, cost and quality against the plans. The controls begin with the PID, described above, and continue at various stages during the project, until the last stage, the Project Completion is reached. Throughout the project's life regular meetings are held which allow the current progress to be monitored against the planned targets. These reviews provide checkpoints along the way, and their results are reported back to the Project Board.

5.3.7. Other Features of PRINCE

There are many other features of PRINCE which enable a project to be managed effectively. These include risk and configuration management methods. Also included are a number of standards for change control and appropriate processes are identified to provide a formal mechanism for handling change.

5.4. THE WALK OPTIMISATION PROJECT

5.4.1. Methodology

A variety of data collection methods were employed during the following case study these are in line with the ethnomethodological approach outlined in section 2.4.1. The methods allowed a number of views to be elicited on the processes involved; i) the formal project documentation, in PRINCE, set out the processes to be undertaken, ii) attendance and participation at meetings enabled observations of what actually happened and, iii) the formal documentation produced after meetings and project stages provided the RM's account of what had happened. These methods were used to

capture the different perspectives on the decision making and to identify areas where the formal and informal accounts differed. Throughout the case study work reported in this chapter, these combination of methods will be employed.

The investigation began with exploratory interviews to establish an understanding of how the Walk Optimisation Project Team was undertaking its work. A number of phone calls were made to find out who was managing the project in London, and to establish contact. Following from the initial conversations an interview was conducted with the Project Manager. It was established that the team were willing to allow case study work to be conducted within the WO Project.

A number of meetings were attended in London, with the Project Manager and the Project Team, both as a whole and individually (detailed in Appendix A.1). Interviews were also conducted in the Midlands, with various members of the project team supporting the initial trials. These provided a basic understanding of the project management tool used for the project, the system itself and the processes the RM were currently, and planning to engage in. Each of these areas was complex. The detailed understanding of the processes and issues was developed through involvement with the project team, aided by the knowledge already gained of the RM and the delivery and revision process. Internal reports were also gathered on the PRINCE methodology[35]; the project documentation[36]; and the results of the feasibility trials.

5.4.2. Overall Project Objectives

The PRINCE methodology was followed and the project began with a statement of the project's objectives:

- "1. To improve the way in which we revise our delivery procedures within the revisions process in order to optimise the cost of delivery and safe routing (within existing delivery specification and standards).

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[35]From the RM manual "PRINCE Overview: Open Learning."

[36]A number of reports exist within the RM detailing processes and products. Included in the informative reports are the Feasibility Process Trial Reports for Aireborough and Southampton.

- To minimise the cycle time taken for revising and implementing changes within laid down standards.
- To minimise the cost of revising and implementing changes.
- To be able to plan and implement revisions with the minimum level of resource (both for initial set up and on-going revisions).
- To test whether the delivery routing savings are achievable and whether postmen will be able to replicate the routes identified (including zig-zags), i.e. the practicality of it - will it work?
- To give us the ability to model changes of type, time and method of delivery both at strategic and local level.
- To provide employees with useful information.
- To be capable of integration with other Business Systems and fit with emerging strategy (e.g., GIS, PAF etc..)."[37]

This demonstrates the business, organisational and technical goals of the WO system.

5.4.3. PHASE 1: Feasibility Studies

As described above, PRINCE determines that a project is broken down into phases. The individual phases have their own objectives. The initial studies were conducted in 1994 - 1995 and aimed, "To test the opportunities and benefits offered by the Postcards system." In particular there were "eight key evaluation points :

- To compare results against current walks in terms of staff hours used.
- To compare results against CADR revision of current walks.
- To evaluate the benefits of global optimisation and interactive planning using the Postcards system.
- To establish time scales for a revision using Postcards.
- To assess the quality of service implications of using Postcards.
- To assess Postcard's ability to facilitate 'what if' planning.

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[37]From RM Consulting PID, Version 1.1, February 1996. Defined by the original Project Board.

- To look at possibilities for mode optimisation such as use of cycles, public transport or van accelerations.
- To evaluate 2nd delivery workloads."[38]

The Walk Optimisation system was intended to improve the revision process. It was intended that the system would achieve this by minimising the time taken to conduct revisions, to minimise the time between revisions and by balancing walks.

The Walk Optimisation System produces optimised walks by considering the geographical information, e.g. street locations, lengths, etc. and the workloads associated with the streets. This information is combined in order to produce walks which minimise dead walking time, meet the required delivery span, and are evenly balanced. The trials employed three distinct systems which needed consolidating. These systems were a Geographical Information System (GIS), Computer Aided Delivery Revision (CADR) system and Postcards, the trial system (see Figure 5.5).

The GIS was used to build up a digitised network showing each road as a link on the map (see Appendix E.1: GIS Data Requirements). The links had various data associated with them. These included the street name, whether the street could be zig-zagged, whether it could be cycled, whether it was one-way and/ or a cul-de-sac and the postcode for both the left and right hand side of the street. All of this information needed to be recorded and then street lengths were automatically calculated by the GIS.

The CADR system, described in Chapter 3, was used to produce the workloads required. This was achieved by the data being exported from the GIS system, converted into CADR format, and being manually entered into CADR. The current walk sequence was produced on Supercalc, including method of delivery and number of delivery points. This was combined with the CADR information (see Appendix E.2: CADR Data Requirements) in a spreadsheet, to produce the workload evaluations for first and second delivery, and for all delivery methods. These workloads were then input to Postcards.

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[38]From RM internal document "Northeast Division - Postcards trial Aireborough DO. April 1995.

Postcards is based on a street network database and allows automatic plotting of optimised walks. It uses information from the GIS and CADR files, and some additional information, e.g. current walk sequence (see Appendix E.3: Postcards Data Requirements). The system respects the constraints on maximum workload while minimising travel time and dead walking. It can generate a global optimisation across the whole Delivery Office. It generates the start and finish points, as well as the route and direction in which the walk should be conducted (see Appendix E.4).

The system does allow some manual intervention. For example, it allows the acceptable walks to be frozen and the remainder of the DO to be re-optimised automatically. It also incorporates a manual mode for changes to be made by the operator where necessary. This may be due to a number of situations, e.g. the optimiser does not recognise steep hills. Here the operator will know where the hills are and alter the walks to ensure they do not start at the bottom of a steep hill[39]. The graphics screens allow the walks to be easily viewed and adjusted. The system is also able to produce maps and various detailed and summary statistics.

Two trials were conducted at offices in Aireborough and Southampton, reported below, they attempt to bring the three systems together and evaluate the resulting revisions.

[39]At the start of the walk the pouch is heaviest and the PO would therefore want to avoid a steep hill.

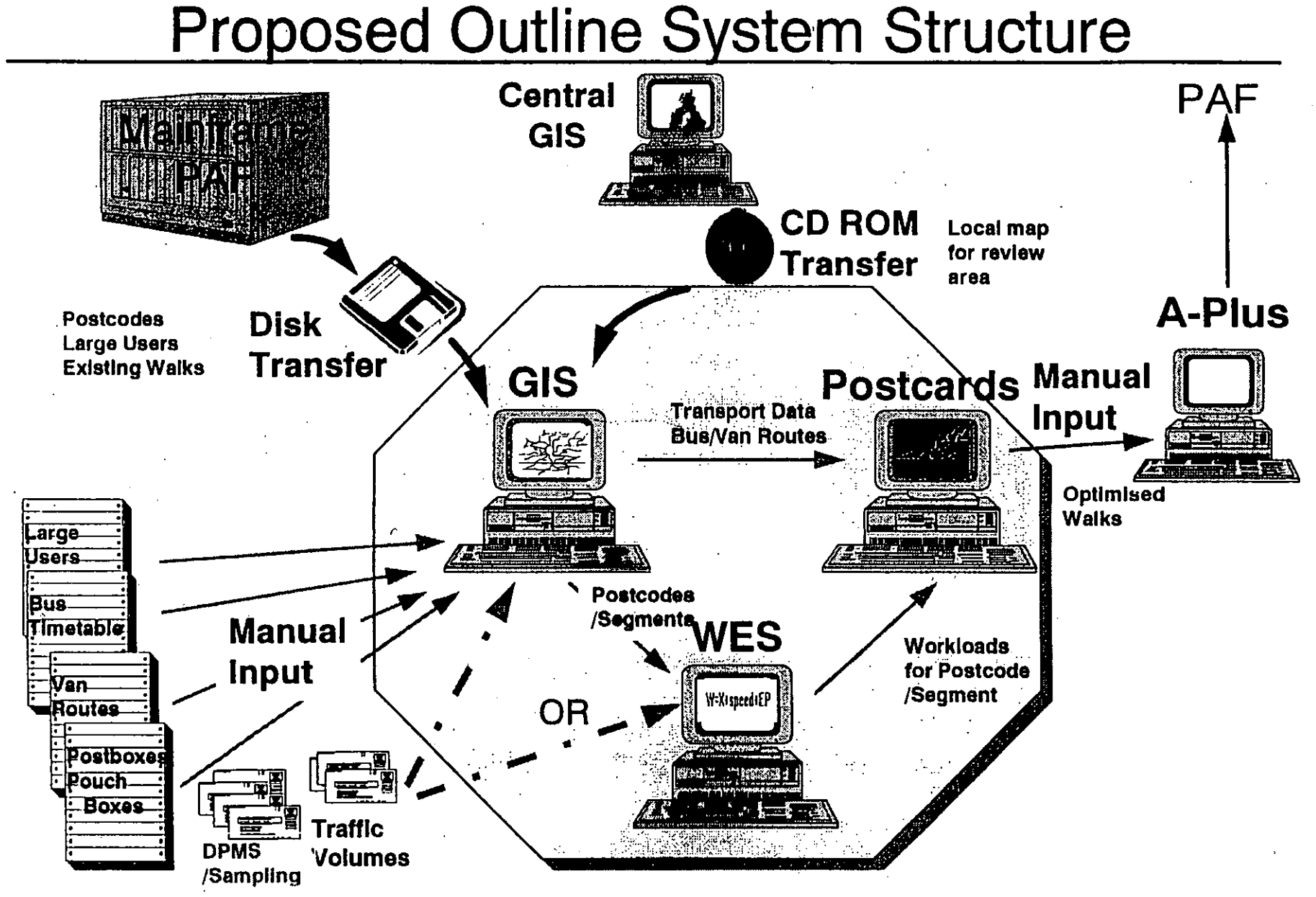

Figure 5.5: The Walk Optimisation System.

5.4.3.1. Aireborough

The Aireborough Delivery Office was last revised 7 years prior to the trial. The DO was split into 4 geographical areas, covered by the trial. They consisted of 52 walks on first delivery. The delivery times ranged from 146 to 215 minutes, with an average of 169 minutes. Some walks failed to meet the 09.30 cut-off time. Staff used cycles, van acceleration or their own transport to get to the start of their walk. Second delivery walks consisted of 22 cycling routes of 150 minutes delivery span. The normal revision method employed within the Northeast Division is the Manual-W and not CADR.

The trial was conducted by a planner from the Northeast Division, assisted by the DOM. Additional support was provided by the WO Project Team, particularly in respect of the use of systems. The CADR revision was undertaken first, with slight variations on the usual procedures as 1:1250 scale maps were not available. Data was gathered using 1:10000 scale maps. This level of detail was inadequate for measuring path lengths, houses were not shown in their true geographical position, there were no house numbers shown and footpaths were difficult to spot. This meant an A-Z of the area and the local postcode book were necessary to establish the data needed for input. The process required a great deal of local knowledge, e.g. to identify the end points of the individual postcodes which the system required. Path lengths were also necessary and as they could not be taken directly from the maps they had to be gathered by physical measurement. All of this data was input to CADR. Walks were plotted in the usual way, adding the walks onto the map by postcode. The total revision time was 30 man weeks.

The Postcard revision (see Appendix E.5: Aireborough Process Chart) began with data gathering. The POs verified the household delivery sheet, including sequencing. Traffic counts were undertaken, and GIS street lengths were validated using measuring wheels. The network was then digitised, adding the necessary information for each street, and validated. The network, workload figures (created by OR&S on CADR principles), and the sequence file were imported into Postcards and the system was then used to create the full network of optimised walks. A number of different scenarios were plotted to determine the best fit. A map was then produced for each of the walks (see Appendix E.6) and the system also provided individual walk details (see Appendix E.7). The total revision time was 25 man weeks.

5.4.3.2. Southampton

The trial was initially to be conducted using two postcode sectors but this was recognised as being too large and was reduced to SO18 only. At the start of the project a CADR revision was already underway. However, prior to this the walks had not been revised for over 20 years. The Postcards revision was conducted alongside the CADR revision to produce a comparison. The office consisted of 36 walks for both first and second delivery. The walks were unbalanced and this meant walks were not meeting the 09.30 cut off.

The process used for the CADR revision was the generally recognised method using normal data gathering techniques, PAF data, and 1:1250 scale maps. The plotting process was the same as described for the Aireborough trial, above. The total time for the revision was 29 man weeks.

The Postcard process was the same as for the Aireborough trial. The total time taken was 23 man weeks.

The trials were conducted as management exercises and the resulting walks were not implemented. The outcomes were, therefore, not tested in the actual setting, but were evaluated as a desk top analysis.

5.4.3.3. Overall results

There were a number of benefits reported from the trials and these are shown in respect of the eight key evaluation points, set out in the aims:

- To compare results against current walks in terms of staff hours used. This showed savings of:

Aireborough	Southampton
4.94%	8%

- To compare results against CADR revision of current walks. This showed savings of:

Aireborough	Southampton
2.3%	3%

- To evaluate the benefits of global optimisation and interactive planning using the Postcards system.

  The results showed that the first attempt at optimisation was good (e.g. 20 of the 34 walks at Southampton were acceptable). However, there was a need to adjust walks manually. Also if they were optimised more than twice, then the resulting walks were fragmented (as they only used the codes which had not been used in the first and second attempts).

- To establish time scales for a revision using Postcards.

  The time scales in the trials were less than those for the CADR revisions. It was also felt that once the methods had been established, these could be improved.

- To assess the quality of service implications of using Postcards.

  The shortened delivery span led to more effective walks, therefore improving quality of service. The system also allowed changes to be acted on more easily.

- To assess Postcard's ability to facilitate 'what if' planning.

  The initial trials reported a number of uses of the 'what if' scenario, e.g. to compare the times for cycling and walking. The process was considered straightforward and allowed the results to be easily compared.

- To look at possibilities for mode optimisation such as use of cycles, public transport or van accelerations.

  This facility was difficult to assess due to limiting factors at both trial sites. Cycling was not considered viable because of the terrain, and public transport was infrequent.

- To evaluate 2nd delivery workloads.

  Concern was raised at both sites over the reliability of the model used for second deliveries. The model assumes that every street is walked but this is not considered to reflect the actual walks.

There were also a number of problems encountered throughout the trials. Many of the problems were associated with the GIS system. Postcards itself had a number of enhancements and alterations made to it during the trial. However, at the end of the

trials there were still issues which needed addressing, second deliveries for example. There were also a number of issues arising because of the separate systems. A number of transformations had to be performed on data before it could be manually entered into the next system. This allowed opportunities for the data to be corrupted.

Overall the system was felt to have demonstrated real potential to produce savings and the major "benefits identified were:-

- Potential savings of c.3% against current operations in these two offices at that stage;
- A database for future revision;
- Balanced walks with methods identified and walk plots for training;
- Reduced planning times for subsequent revisions;
- Scenario planning capability for changes to core RM specifications."[40].

These results were presented to the Project Board.

5.4.4. Summary of Research Findings

The initial interviews and meetings highlighted the RM's intention to buy-in a system, rather than developing one internally. The initial stage of the walk optimisation project did not follow any of the methods described in the literature of systems design, reviewed in Chapter 4. The RM was not concerned with the development of a new system, but instead had seen a system that they believed would be an asset to their business. They aimed to explore the potential costs and benefits a walk optimisation system could bring to delivery revisions. This draws attention to a number of issues raised in the systems development literature. One of the main concerns, of all the methods, is the problem definition. Although there are debates as to how well a problem can be defined and at what stage, the overwhelming view is that the current situation needs to be considered and understood before attempts are made at determining the problem and potential opportunities. This leads to the question, "What problem is the RM trying to resolve?"

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[40]From RM Consulting PID, Version 1.1, February 1996

Although the terms of reference for the WO Project contained business, organisational and technical aims, the approach taken by RM is a rational / technical one and the technical aims are given priority. The new system is seen as the answer without considering what the actual problem is. The approach supports Hypothesis 1, Chapter 4. The team aimed, "To test the opportunities and benefits offered by the Postcard system" concentrating on technical ability and the functionality available. The comparisons were made in respect of benefits to be gained in time and cost savings. They therefore intend to introduce a new system as a tool to aid the revision process by applying greater processing power, allowing more data and options to be considered. This is in line with their attempts to obtain optimal walks. At this early phase no mention is made of the other stakeholders involved in, or affected by the revision process. No attempts were made to include them in the initial problem definition (as this phase has been bypassed). As these stakeholders have not been included it is questionable whether the eventual system will fit with the organisational and social needs. The RM are only looking at part of the process and what it should be.

There has increasingly been a move, in industry, to buy rather than build new systems. However, there is little evidence of this in the literature. There are many models of how systems design should be conducted but, when a system is bought in, the development models are no longer applicable. When a system is purchased the design process is divorced from the real setting. The purchased system will have been developed by a designer who has a generic model / target, in the case of the RM this was a system built for another postal delivery service. The approach the RM has adopted is to purchase a new system and integrate this with its existing technical systems. The emphasis has therefore been on enabling the systems to work together, i.e. gluing the GIS, CADR and WO together to achieve a system for optimising walks. This detracts attention from the organisational context in which the system will be used, and the wider issues which need to be considered. Furthermore, the WO system, because it was designed for another organisation needs to be adapted to the RM setting, e.g. the Canadian Postal Service does not have a second delivery and this concept had to be communicated and incorporated into the systems model of delivery. Again the focus was on the technical capabilities.

The studies have established that the methods used by the RM are not as described in the development literature, but instead focus on the procurement and customisation of the system. Through the use of case studies, interviews and meetings the rest of the trial process is explored below, to establish which methods are used.

The preliminary observations, from the initial phase of the project supported Hypothesis 1. Based on the trials and interviews, Hypothesis 3 suggests the approach the RM is likely to adopt for the next phase of the project.

5.4.5. Hypothesis 3

Based on the findings of the feasibility trials, the RM will continue with an overall rational / traditional approach, aiming to optimise the process. However, due to the complexity of the problem only a limited number of options will be considered.

5.5. PHASE 2: PROCESS TRIALS

5.5.1. Background

The results of the initial feasibility studies were presented to RoMPEC. On the basis of the results, the next phase of the project was authorised. Phase 2 was established to conduct process trials of the walk optimisation functionality, in one office per division. The aim was to "gain a greater appreciation of the technical and operational enablers needed to facilitate any future roll out. In addition, the trial will also be used to assist with the compilation of a robust technical specification to underpin any potential procurement activity."[41]

Due to the complex nature of the system an in-house developed system was not considered to be an option. Also due to the uniqueness of the Royal Mail business requirements, it was not possible to purchase a fully compliant off-the-shelf system. The remaining option was to select a suitable system from those already existing and to tailor it to RM's needs. Because of the size of the project invitations had to be put out to GATT[42]. The initial investigations found a very limited global market of existing packages, but Postcards was identified as suitable to provide the basic building blocks for a scoping trial. A version of the system was leased from the development company to enable scoping trials to be conducted.

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[41]RM internal document "Walk Optimisation Process Trial - Project Report on Southampton (SO18)"

[42]General Agreement on Tariffs and Trade (GATT) rules and regulations had to be adhered to, as well as complying with the EC Directives relating to GATT, compliance and competition Law.

5.5.2. Methodology

The methods employed in this following case study follow those described in section 5.4.1, with a variety of data collection methods being used. Having established contact with the project members during the initial phase, an invitation was accepted to join the Project Team. As part of the Project Team all of their meetings were attended, in London (see Appendix A.1). This allowed the development process to be understood in detail, and followed throughout the project's stages. This was an important step as it meant being included in the circulation of all documents related to the project. This enabled the project's progress to be monitored and issues to be acted on as they arose (this would have been virtually impossible otherwise).

Contact was established with the planner assigned to conduct the second phase trial in the Midlands. The planner had been interviewed on several previous occasions and gave consent to conduct a case study of the trial. A number of visits were made over the duration of the trial and regular telephone contact was maintained, in order to be kept up-to-date on the project's progress and to decide on appropriate times to visit the revision team. The researcher was also included in the circulation of documents and was provided with copies of all the reports produced by the team.

A number of additional visits and interviews were conducted to understand the systems and processes, including a training session on the WO system. The processes and results of the other trials were gained through the project meetings, and through the process trial report[43]. The Process trials are focused on below, to enable Hypothesis 3 to be investigated. For the purposes of this research one of the trials, Longton, was followed and is presented as a case study below. A summary of the results of the remaining trials is also presented (see Appendix F.1: Product Description for the Trial Offices (PT8).

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[43]RM Process Trials Consolidated Report. Walk Optimisation Product PT17. July 1996.

5.5.3. Phase 2 Aims

This phase aims to conduct full feasibility and process trials across all divisions to confirm the results across a wider sample of offices.

The phase concentrated on five areas (See Appendix F.2: Consolidation Product Flow) :-

- Process trial - The trials were to be conducted in one office per Division, the revisions were to be undertaken to the stage of 'Implementation Readiness' with the main objective of establishing whether or not the process worked. Appendix F.3 shows the Process Trials Product Flow and Gantt. This is the element that will be focused on, drawing on findings from other elements as necessary.
- Desk top analysis - to evaluate revision methods statistically and to evaluate the realisable benefits.
- Procurement preparation - in line with GATT requirements and preparing for a procurement exercise.
- Information Systems (IS) strategic fit - specification for the optimisation tools to ensure any proposal will reside on existing hardware and be capable of future development.
- Wokingham trial - evaluation of various Ordnance Survey products to identify the preferred methodology for interfacing the mapping system and the user.

5.5.4. Process Trials

The "WO software is intended to enhance the established revision software .... with the capability to design and plot routes - initially with the basic algorithms, and then supported by staff interactively. This technical capability will in turn be the catalyst to improve all the associated processes involved in the delivery revisions per se." The aim of this element was to establish the viability of the process, "to identify the benefits available, develop the building blocks for a robust implementation methodology and gain a greater appreciation of the technical requirements."[44].

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[44]From RM Consulting PID, Version 1.1, February 1996.

There were a number of elements involved in the Process Trials (see Appendix F.4: Product Listings). The main aim was to gain a greater understanding of the technical and operational enablers necessary to facilitate a future roll out. The WO software was deployed (along with a number of other IS systems) simulating a future integrated approach. This was used to test the processes associated with WO revisions in one office per Division.

Divisions were asked to nominate a range of offices. From these a selection was made to cover all the necessary scenarios. It was anticipated that five of the offices chosen would be likely to need additional first delivery to restore 09.30. One was selected so that a comparison could be made with a recently introduced revision, one was chosen to look at the issues of city centre revisions and the remainder were unknown quantities.

5.5.4.1. Method For Conducting Trials

The trials were conducted as full participative delivery revisions and conducted as individual projects. All the planning teams attempted to communicate with the CWU but were prevented from involving local staff, due to the CWU Executive's policy of non-cooperation. In practice, most trials were conducted without local cooperation and were conducted as a desk top management exercise. The projects reflected three types of offices, i) with CADR, ii) with 1250 maps and, iii) with neither. The trials were carried out by the local planning team, with a User Group providing guidance on software problems, best practice and training. There was additional support provided from one of the three Field Support Managers, supplied by the project team. Project staff received training on all three systems involved in the trials.

5.5.4.2. Process

The trials were conducted using similar methods to those used in the original feasibility trials. The methods used for the collection of data depended on the information and maps available at each office. The divisions were allowed the flexibility to establish their own methods in order to determine Best Practice.

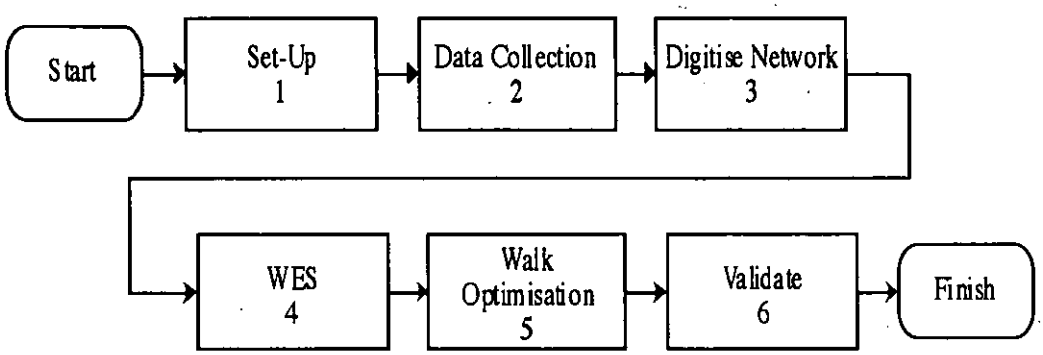
In the majority of offices the existing walks were plotted as well as the optimised walks, for comparison purposes. It was not possible to implement the new walks nor to divert mail to check the walks because of the CWU non-cooperation policy. The resulting walks were therefore validated using a number of alternative methods,

e.g. walking the routes. Staff in three offices did however become involved in checking the routes.

5.5.5. The Longton Trial

Longton was the Delivery Office selected in the Midlands Division. The date the last revision was conducted was unknown. The office is mainly urban, with town deliveries and one suburban area. For the purposes of the trial postcode areas ST3.1-7 and ST11.9 were selected, these were all town walks.

Figure 5.6: The Longton Trial Stages - Process Map.



The diagram shows the major stages involved in the process trial at Longton, these are discussed below.

5.5.5.1. Set Up

The revision process began with a team consisting of the Project Manager (a planner from the Midlands) and an Implementor / Planner from the local office. The team was supported by one of the Project Support Consultants and the Workload Evaluation System was supported by a member of OR&S. Industrial relations in the office were considered poor and the office representatives declined the invitation to be involved in the project.

The equipment was provided by the project, e.g. the computer system and software. The WO System was similar to that used in the feasibility trials, with some alterations and enhancements. However, there were still three distinct systems, GIS, Workload Evaluation System (WES) and Postcards. In order to perform a revision, it was necessary to produce data to be interfaced between the component systems. There

were, therefore, a number of validation and transformation processes required, see Figure 5.7 below.

5.5.5.2. Data Collection

Office Data

At the start of the trial the office statistics showed the walks for 1st deliveries were unbalanced. They were taking between 95-225 minutes, with an average span of 160 minutes. Over 50% were failing to meet the 09.30 Quality of Service (Q of S) target (See Appendix G.1).

The average daily traffic figure was 43,229 items. The office had a number of existing difficulties concerning the IPS. There were 25 fittings within the office suitable for IPS, but 64 staff employed. There were 71 walks on first delivery; 64 town delivery walks, 4 rural official motor vehicle delivery walks and 3 van deliveries to firms. Of the 64 walks only 7 met the 07.00 delivery start time. 60 of the walks were accelerated by van and one by public transport, the remaining three were cycled. The second deliveries were in the ratio 1:1 (1st : 2nd deliveries) and covered by 56 foot deliveries, 54 town and 2 rural. Second delivery walks had an average span of 92 minutes. The data was obtained from a number of sources; Delivery Productivity Measurement System (DPMS), hand drawn local maps (see Appendix G.2), Manual-W test papers and Postal Address File (PAF) based walk reports. This information was considered by the team to be poor and required substantial amendments and updating.

Data Gathering

CADR maps were not available for the office. The only existing data relating to the walks was from a one day Manual-W test conducted in April 1995. Data therefore had to be collected manually. This was a long and complicated procedure and had to be undertaken without local knowledge. A two man team collected data by travelling around the roads, noting the start and end points of each postcode. The average path lengths were measured along with the dead walking, and the delivery points were counted. The time taken to complete this stage was 34 days.

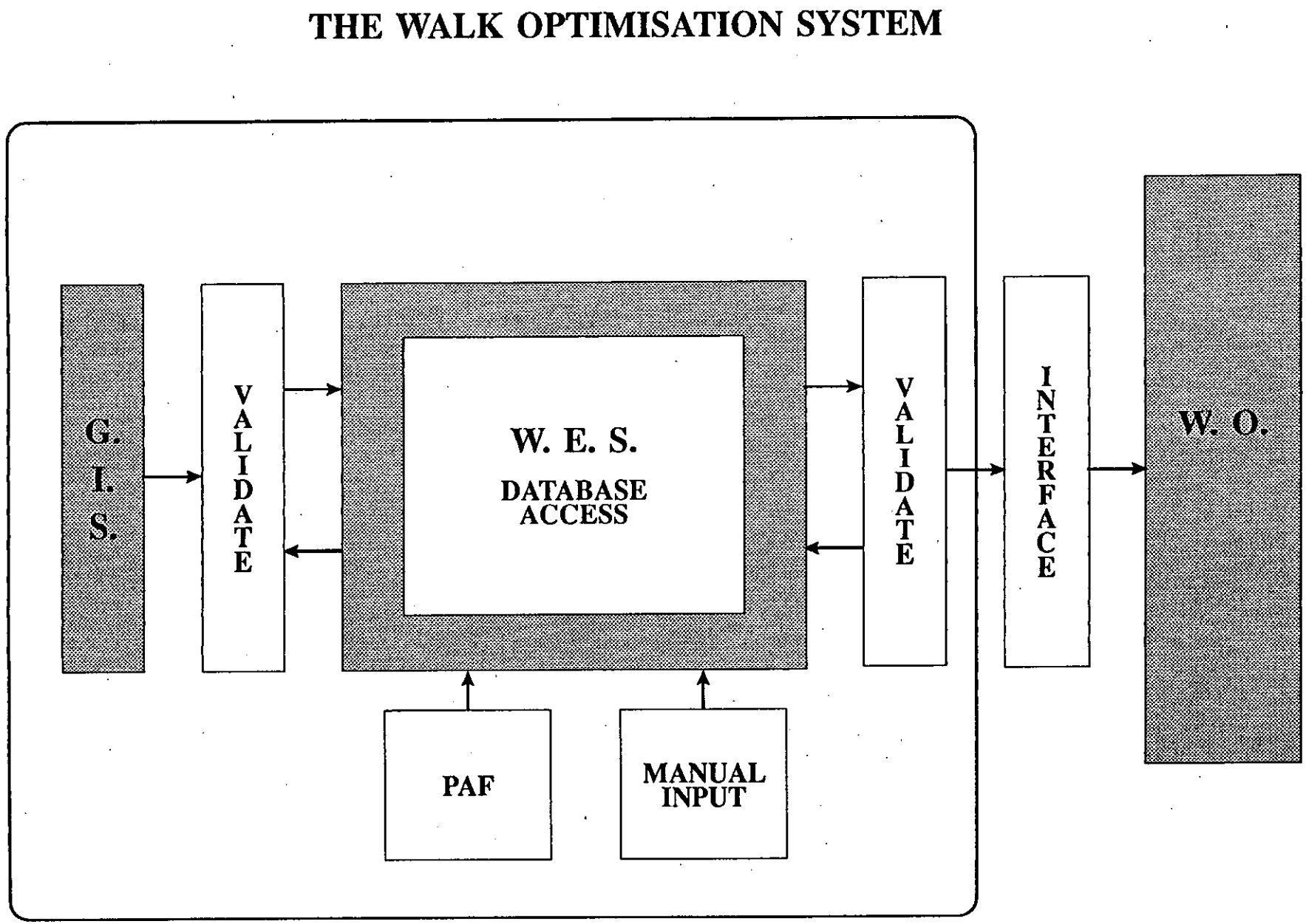


Figure 5.7: The Walk Optimisation System - Validation and Interfacing.

5.5.5.3. Digitise Network

The information was entered into the GIS and the digitising process commenced. The current walks were digitised, entering all the streets, dead walking and footpaths using information from the hand drawn maps. Details for each were entered, as described in the feasibility trials above. A number of validation processes followed. These checked the GIS file, and the links and postcode positions. Any errors were corrected and the process was re-run. The total time taken for this stage was 5 weeks, more than 2 of which were lost to hardware problems.

5.5.5.4. Workload Evaluation System

The Workload Evaluation System (WES) was developed by the RM specifically to support the trials and was based on CADR.

The first process was to import the file from the GIS and validate the information against the PAF file. This resulted in the identification of 34 serious errors and over 1000 warning errors. The serious errors had to be corrected before the revision could progress. 28 were corrected within the GIS system, the remaining 6 were found to be PAF file errors and this file had to be edited. The warnings were investigated and decisions were made on whether to correct them from within GIS or to ignore them. The GIS file then had to be re-imported and the validation checks re-run, until there were no remaining serious errors. The time taken to complete this was 4 days.

The workload data was obtainable from a number of sources. Comparisons of the figures highlighted major discrepancies. It was finally decided that the local information was inaccurate and the DPMS figures were used.

Once all the relevant data was entered into the system the workloads were calculated by WES. The file was then exported ready for the WO system. There were again a number of problems encountered at this stage. These were due to bugs and calculation errors in WES. A number of new releases were required to overcome these problems and several weeks were lost as new problems were identified and fixed.

5.5.5.5. Walk Optimiser

Existing Walks Comparison

The GIS and Workload files were input into the WO system, for the purposes of the trial Postcards[45]was used. Problems were again encountered as the DO was not placed correctly on the network and there were additional problems calculating costs. Due to the time limitations, it was decided that only 10% of the current walks would be entered, not all as originally intended. This highlighted further problems in conducting the like-for-like comparisons, due to road changes since the Manual-W. The process of comparison was eventually deemed unreliable. The time taken was 2 days.

Plotting First Deliveries

The system was used to plot the 1st deliveries using a delivery span of 150 minutes, i.e. starting at 07.00 and finishing at 09.30. This created 66 walks, all of which met the Q of S standards. This was an increase of 2 walks. See Appendix G.3 for a listing of the walks.

A second set of 1st delivery walks were attempted with manual intervention to allow for the Longton specifics. This again produced 66 walks, (see Appendix G.4: Proposed Walks).

Plotting Second Deliveries

The 2nd deliveries were plotted using a delivery span of 90 minutes. These were plotted with manual intervention to merge the 1st deliveries. 31 walks were created.

5.5.5.6. Validation

Six of the walks were selected to be validated. As the walks could not be implemented they were assessed by testing traffic and walking the routes.

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[45]The Postcards system was obtained under a short term licence for the purpose of the trials. This did not constitute a commitment to this particular product. A full procurement of a WO package was being undertaken concurrently, subject to GATT regulations.

5.5.5.7. Results Of Longton

- There was an increase of 2 walks for the 1st delivery. All of the walks plotted were better balanced and met the 09.30 deadline, (see Appendix G.5)
- The second deliveries plotted created 32 new walks, a major decrease on the existing 54. However, the second deliveries only constituted approximately 2% of the daily traffic. The walks were still felt to be generous considering the volume of mail. There was also an additional problem that the new walks would need to be cycled due to the distances involved.
- The comparisons of current to new walks was inconclusive.
- Savings made by the WO system were unspecified.

5.5.6. Consolidated Trial Results

A Trial Report was produced for each office (PT8) and an overview report[46] (PT17) was produced recommending the way forward.

Table 5.2 details the walk results for each of the trials. One of the trials (London) was not reported as it was found to be significantly different from the other trials. The table shows the current number of walks, the number which the system plotted using 150 delivery span and, the number of proposed walks. The variation between the WO walks and the final proposed walks are due to the specific office circumstances. For example, the time the mail arrives at the office.

[46]Process Trials Consolidated Report - Walk Optimisation Product PT17, July 1996.

Table 5.2: Results From The Process Trials[47].

Division	Current Walks	150 Minute Delivery Span	Proposed Walks
Musselborough	20	22	23
Bishopbriggs	21	17	22
Eccles	36	28	34
Dewsbury	43	42	45
Longton	64	66	66
Sudbury	22	23	22
Plymstock	30	26	29
Wokingham	57	57	59
TOTAL	293	281	300

5.5.6.1. Benefits

A number of benefits were reported based on the 150 minute scenarios:

- A potential saving of 4% of walks on 1st delivery.
- A potential saving of 11% on 2nd delivery.
- The average Q of S to meet the 09.30 improved by 87%.
- Walks were better balanced, with a 50% improvement in the standard deviation.
- Savings in transport costs by better selection of methods to and from the routes.
- Better evaluation of methods of delivery
- Reduced times for revisions. A second revision had been conducted at Southampton, originally conducted the previous year. The office data was updated along with the GIS, WES and WO systems, and new walks were plotted. This took 2 weeks in total.
- "What if.." scenarios could be conducted to see the effects of changes.

[47]See note 15.

A number of recommendations were also made for the project and business at large. The overall feeling was that the trials were a success, that a WO system could bring major benefits to the business, and that development of the project should be endorsed.

5.5.7. Summary of Research Findings

The previous sections have reported the processes which were involved in the revision trial. Throughout the trial the DO was attended a number of times to observe the processes which were being undertaken, and to discuss the methods which had been used during interim periods. The methods allowed a number of findings to be drawn from the trials, some of these were reported by the RM in their own reports, however a number of other issues are highlighted by the trials:

- There were obviously many problems with the revisions due to software problems, which would be addressed before implementation. However, the more important issues of the reliability of data being collected and used still existed. The case study demonstrated, once again, that there was conflicting data available from the RM's internal systems. The optimisation's success was highly dependent on the accuracy of the data used.

- The system was shown to be unsuitable for second deliveries. This was due to the low levels of mail to be delivered. Even if the system was able to produce walks which reflected the traffic levels, there would still be a problem achieving the walks. The reasons for this are twofold. Firstly the distances required would be immense. This was discussed in the Hinckley case study. Secondly, again discussed in Hinckley, the reduction in POs required would mean a surplus of staff due to the 'no compulsory redundancy' policy.

- A number of benefits were presented as a result of the trials, but these were not tested. The 'non-compliance' meant that no walks were actually implemented so the effects could not be properly assessed. There may also have been implications other than walk times that were not evaluated. For example, the Longton office was already short of sorting frames and the creation of more walks would have compounded this.

- The benefits reported in the consolidated report were based on the 150 minute delivery span. However, the individual trial results demonstrated that the optimal 150 minutes was unlikely to be achievable due to the specific circumstances of the office.

The trials demonstrate that there are potential benefits to the system, but that the system also brings with it some additional problems. As the walks were never implemented there is also a very real danger that further implications may have been overlooked.

The approach taken by the RM supports Hypothesis 3. The development has focused on the improvement of data processing capabilities, aiming to optimise walks. This is in line with the rational methods described in organisational decision making, (Chapter 3), and the traditional methods in systems design literature, (Chapter 4). The major problem with this approach is that the methods assume that complete knowledge and information exists about the problem and solution. This is clearly not the case as the problem is so complex. The RM addresses this by considering a limited number of alternatives, in line with the Bounded Rationality Model. The overall focus in all of the alternatives considered remains on the technical capabilities and financial gains.

Even when the trial results demonstrated that the optimal walks would not be practical on the ground, the focus remained fixed on optimising the deliveries. By continuing with this rational approach other issues have been minimised. The RM is of course aware that other people will be involved in the delivery revision process, particularly the CWU. The approach they have adopted sets the issues surrounding other stakeholders to one side. The results of each of the stages were presented to the QR, PAT and Project Board, which included user representatives. The issues presented to the groups were those the phases had concentrated on and, therefore, the issues of other stakeholders were not bought into the discussions. The IR issue was being considered by another group, developing an overall approach for the future of the RM Business processes and the Project Team was kept up-to-date on their progress. It was intended that a strategy would be developed along with the Business line. The User Group had been informally established during the process trials, from the planners conducting them. The group provided feedback, and a comments sheet was included at the back of each of the trial reports. However, this feedback focused on the technical problems and capabilities, particularly of the GIS. The Best Practice discussions also focused on the technical system and how data should be gathered and collated to ensure ease of use.

5.5.8. Hypothesis 4

The traditional / rational perspective adopted by the RM is likely to continue throughout the development process, and this will lead to the other stakeholders only being involved in the later stages of the project's development, if at all.

5.6. PHASE 3: ANALYSIS AND DESIGN PHASE

5.6.1. Background

The previous stage was completed and the results of the process trials, Desk Top Analysis, Procurement and IT / IS Infrastructure were presented to the Project Board for approval. At the meeting authority was given for the Analysis and Design Phase to be undertaken.

5.6.2. Methodology

A number of areas were considered by the RM during this phase of the WO project. Most continued to focus on the technical implications and procurement. However, a User Reference Group (URG) was established at this stage to consider the implementation strategy. For the purposes of this research attention is focused on the implementation strategy development to see how the representatives were engaged and the issues considered. The URG was divided into three sub-groups to consider the specific implementational issues relating to the process, the strategy and the system. The strategy group is focused on here, as it is the group most likely to consider the organisational and social implications which are of interest to this research, and will allow Hypothesis 4 to be tested. The final stage of the project is described here.

A variety of data collection methods were employed during the following case study in line with the ethnomethodological methods described earlier. During this phase an invitation was extended to join the User Reference Group. A number of meetings were attended for the whole group, as well as meetings of the sub-group assigned to develop a strategy for the people involved in using the system.

Again interviews were conducted with various people involved in this stage, including the user representatives. All documentation was received from the Project Team and

User Reference Groups. The following section details the findings from the Analysis and Design Phase.

5.6.3. Phase 3 Aims

The Analysis and Design Phase aims, " to focus on scoping, and costing the IS / IT solution, then plan and cost the development, pilot and roll-out phases."

The phase concentrated on six areas (see Appendix H.1: Consolidation Product Flow):-

- Workload Design - the workload system needs to be enhanced, specifically looking at issues such as 2nd deliveries and town centre walks.
- Maps and Mapping - a detailed statement of requirements in terms of maps and mapping needed for WO. To include no. of maps, scale, etc.
- IS Analysis and Design - a process and data model of the WO functionality. Its links, dependencies and relationship with other systems within the RM.
- Implementation Strategy Development - developing a comprehensive strategy to underpin the future implementation strategy, through liaison with the User Reference Group, (see Appendix H.2: Product Flow and Product Breakdown). This is the element that will be focused on, drawing on findings from other elements as necessary.
- Procurement - developing a procurement strategy for the WO software, drawing together elements from the OR&S, IS and Implementation stages.
- Consolidation and Management - Bringing together the other elements of this phase and considering other factors in order to reach the "build" stage of the project.

5.6.4. Implementation Strategy Development

The Implementation Strategy Development Stage aims to develop a series of plans for the implementation of the WO system, along with their relative strengths and weaknesses. When considered with the IS analysis work it should help inform the Project Board's decision of a suitable approach to the WO system deployment. This includes all stages, from the initial pilot site to a full national roll-out. A further issue, viz. systems maintenance, arises from the project's aim to be able to react quickly to

organisational, structural or service specification improvements. This is an area of weakness in the organisation's culture.

In order to develop the strategies a User Reference Group was established (see below). The group held regular meetings and also broke into smaller groups to consider the issues involved, discussed below.

5.6.4.1. User Reference Group

The User Reference Group was established as part of this stage. It consisted of representatives from each division who were experienced Delivery Planning Managers and Delivery Revision Managers. These are people high up in the Divisional hierarchy and not normally involved in the actual revision processes. The aim was to ensure that "the project is taken on board from a broad cross section of managers.... The group's role will be to steer the project team and assist with the development of the future implementation strategy."

5.6.4.2. User Groups

The User Reference Group was divided into three sub-groups, detailed below. These groups were to meet off-line to discuss the particular area to which they had been assigned. The developments and outcomes of the sub-groups were reported back to the whole group at the User Group Representative meetings, also attended by the WO Project Team.

The Strategy Group.

The aims of the group were:

- to design the strategy for implementation, e.g. how, where, when.
- to consider the people involved in using the system, in respect of training, skills profile, resources and organisation.
- to develop a communication strategy, both local and national.
- to consider the Industrial Relations, both local and national.
- to develop a re-revision policy.

This is the group focused on for the remainder of the stage, drawing on others where necessary. All meetings of the group were attended, but for the purpose of reporting only the issues of the design strategy, consideration of the people and a re-revision policy are concentrated on.

The Process Group

The aims of the group were:

- to develop the process design, considering the key systems re-engineering.
- to develop methods for data capture.

The Systems Group

The aims of the group were:

- to consider the IS plan, including GIS, WES and WO dependencies.
- to consider the hardware requirements
- to develop support plan, for maintenance, help and upgrading.
- to consider the systems needs for re-revisions.

5.6.5. Strategy Group

The strategy group met a number of times throughout this phase (see Appendix A). Issues were discussed in relation to a number of key concepts; location of the system, costs, staffing required and training needs. These were considered for the initial roll-out phase and for the on-going re-revisions, once the system had been deployed. The major issues were defined by the group as Location Vs Cost.

5.6.5.1. Organisational Ownership

Much discussion focused on the location of the new system. Managers from different Divisions had opposing views depending on the way the planning team currently operated in their area. One of the initial views was to define the DOs by size. A planning resource would then be allocated to the larger, e.g. Top 200 offices. The remaining offices would use a central team, based at either Area or Delivery Area level and might be assisted by the other planners. The option to have a fully centralised task force was rejected as impractical.

The eventual options were based on using the existing divisional planning resource and having the resource either:

i) centralised to each Division

ii) sited at each Area level

iii) sited at each Sector level[48]

iv) sited at the Delivery Office level.

Each of these options has associated implications. The number of staff and amount of hardware and software varies according to where the system is based. For example, if each Division only has 1 computer system, only 9 would be needed in all. If each DO is to have 1 computer system 1451 would be required. There was also an issue of training, for the people who would be using the system. Using the above example again, the difference between the costs and management of training 9 or 1451 people is immense.

Table 5.3: Cost Evaluation For Each Location Option.[49]

LOCATION	Hardware £K	Software £K	Software Maintenance £K	Implementation Task Force
DIVISIONAL	1319	600	135	105 Full Time
AREA	1319	600	135	150 Full Time
SECTOR	1510	621	138	200 Part Time
DO	4896	1429	257	1450 Part Time

Table 5.3 shows the estimated costs associated with each of the choices for locating the system.

[48]The use of sectors had recently been introduced into some Divisions as part of another National initiative. Sectors are an area within the Delivery Area and can be large DOs (and could be in line with the Top 200 offices discussed). This was to be introduced into all the remaining Divisions.

[49]From RM Walk Optimisation Implementation Strategy Document - Location Vs Cost Options (Jan. 1997)

5.6.5.2. Number of Walk Optimisation Applications

A survey was undertaken to assess the number of walks covered by each of the existing 1451 delivery offices, shown in Figure 5.8 below. The results from the trials had shown that an area of 50 walks was the maximum which could be undertaken per revision process. The larger offices would therefore require a number of revisions in order to optimise the whole DO. The total number of Walk Optimisation Applications necessary is therefore 1926.

5.6.5.3. A Phased Implementation

It was recognised that the system would need to be implemented over a number of phases, to allow the changes to be managed effectively. Three phases were distinguished and times were estimated for revision under each phase. It was assumed that the times for revisions would decrease through the phases, due to the initial learning curve, system improvements and the smaller offices being considered last.

Phase 1 - Successful implementation (time estimated 6 months per revision).

Offices would be chosen where it would be possible to gain commitment from the staff and management, with a good IR climate. This would allow the success to be communicated through the business in order to form a good basis for the second phase. It would also allow the training and skills to be developed by Divisional Champions who could then carry this through into the next phases. It would also allow the software to undergo final testing.

Phase 2 - Benefits driven (time estimated 3 months per revision).

Targeting offices where benefits could be achieved, in terms of quality improvements and cost reductions. For example restoring 09.30, improving budgets and EP. This phase would also include the introduction of maintenance to offices already using WO.

Phase 3 - Smaller offices (time estimated 2 months per revision).

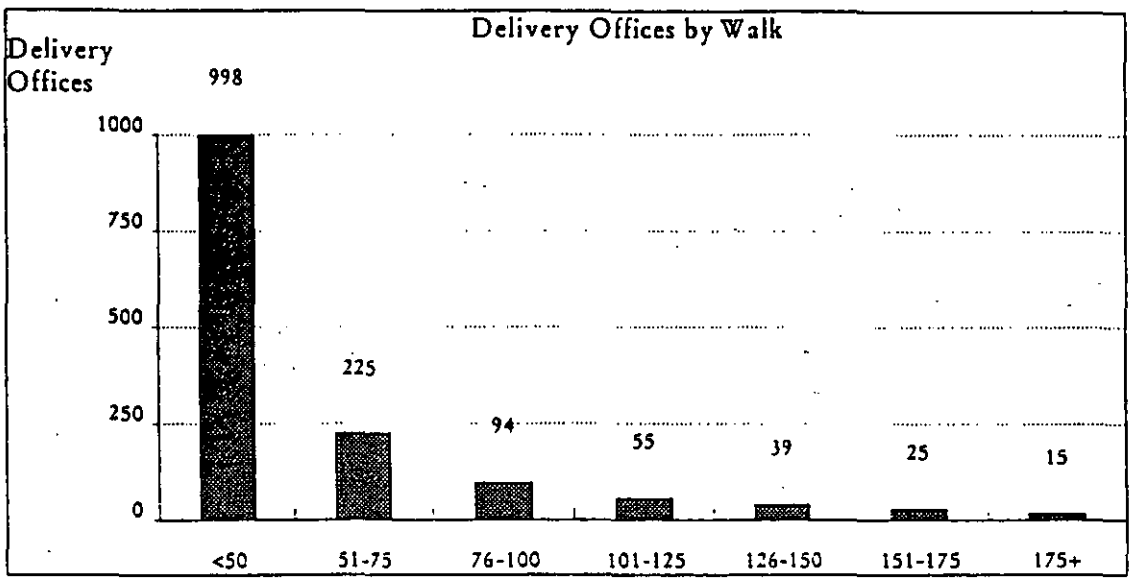
Finally the smaller offices and those with known IR difficulties would be included. All earlier offices would be included in the maintenance program.

Based on these assumptions, it was calculated that the full national roll-out would take 4.5 years (see Appendix H.3).

Figure 5.8: Number of Delivery Offices by Size (No. of Walks).

Walk Optimisation Implementation Strategy : Location Vs Cost Options

Nos. Of Delivery Office by Size (No. Of Walks)



Total Number of Applications

No. Walks	Do's	Factor	Applications
< 50	998	1	998
51 - 75	225	1.5	337
76 - 100	94	2	188
101 - 125	55	2.5	138
126 - 150	39	3	117
151 - 175	25	3.5	88
175 +	15	4	60
	1451		1926

This shows the majority of offices consist of 50 walks or less. However, some of the offices contain over 175 walks.

5.6.5.4. Maintenance

One of the key benefits for the optimisation system is the ability to have planned and controlled revision cycles. In order to achieve this, the RM felt it was necessary to introduce a maintenance culture to minimise costs and provide a high level of quality. In order to address this the option for an annual audit was discussed and outlined. These would review and update the offices.

There was a major discussion as to how much on-going maintenance there would be, in respect of the amount of changes likely to occur, and how large the changes were likely to be. This obviously has an impact on the amount of staff needed to maintain the system. An annual audit was estimated to take 3 days. The revisions which would result were defined as minor, requiring 2 weeks to complete and major, requiring 4 weeks. Tables were drawn up to show the effects on maintenance staff depending on the percentage of offices which required major, minor or no revision (see Appendix H.4).

5.6.6. Results

The results from the Implementation Stage were presented to the Project Board as a list of alternatives. All of the options discussed in section 5.6.5.1 were included, along with some conclusions drawn. These included:

- The planning resource should be located at either Divisional or Area level, as these are the most economical options.
- Locating planners at the Delivery Office was most expensive option.
- It would be expensive in terms of the people, hardware, software and providing support to deploy the system at sector or Delivery Office level.
- If the option to deploy the system at Divisional or Area level is chosen there is likely to be sufficient planning resource within the Divisions already.

The results of the other areas of the Analysis and Design Phase were also presented to the Project Board.

5.7. SUMMARY OF RESEARCH FINDINGS

The Implementation Strategy Development, within the Analysis and Design Stage, aimed to develop a comprehensive strategy for the future implementation of the WO system. The previous sections have detailed the processes and procedures which the RM has employed in the WO development project and a number of conclusions were drawn by the RM's Project Team. This section draws some further research findings based on the observations made as part of the Project Team, by participation in the User Reference Group meetings, and through the documentation produced throughout this stage.

- The Implementation strategy stage was the first stage in which users had been represented. These were representatives though, and not the actual people who will use the WO system. They were Divisional Managers and therefore fairly high in the organisations hierarchy. Whether their opinions would be in line with the actual users is debatable. This is considered further in the next chapter.

- The User Reference Group was set up with a dual purpose; i) to get Divisional buy-in to the WO system and ii) to steer the project. The first objective was achieved and the Divisional Representatives were all in favour of the system being deployed nationally, and as soon as possible. The second objective was also achieved in so much as the URG provided suggestions and comments on the system. However, the URG were given an agenda by the project team and the areas and options they commented on were therefore restricted. This was compounded by the fact that the rational approach had been adopted throughout the earlier phases and, that the system was already designed and built. This again limited the options for consideration, with the system already determined the only option was to try and fit the people, i.e. the organisational and social processes, to it.

- A number of what would appear to be fundamental issues were only now bought into the debate, and were still only assumptions. For example how many changes there would be in any given office in a year, and how big these changes were likely to be. These will determine how often the system will be used once implemented.

- The location of the system will have a major implication on who the users will be. If the system is located at DO level, the users are likely to be the DOMs or their assistants. If the system is placed at Divisional level the users are likely to be planning managers. These staff will vary greatly in their abilities and experience. The WO system is fairly complex and there were lengthy discussions as to

whether or not even the existing *Planners* would be capable of learning and using the system.

- Although the Implementation was discussed there were still many organisational and social issues which were unaddressed or remained undecided at the end of the stage. The main issue was the CWU's attitude to the system.

The Implementation Stage shows that the RM's methods remain focused on a rational approach, i.e. to optimise walks and achieve maximum financial benefits. Elements of the Bounded Rationality Model are also present, e.g. by developing and assessing a small number of alternative solutions. By introducing a User Reference Group the RM has also introduced elements of the Political Model into the process. This supports Hypothesis 4.

Their input is, however, restricted by the approach taken at earlier phases, the pre-determined agenda, and the continuing focus on a rational approach. Instead of including people as part of development process they are used as a review process, to confirm options and best practice. Their views are given on predetermined solutions, i.e. those of the Project Team. This is also late in the development process after the systems functionality has been determined.

5.8. SUMMARY

This chapter has demonstrated the complexities involved in the decision to introduce a technological intervention into the delivery revision process. The major finding of the investigations, conducted through case study work, interviews and RM documentation, was the RM's intention to procure, and not develop, a new system. The RM had seen a working system which they felt would be beneficial to their operations, and they decided to trial the system they had seen.

The aims of the project, and the evaluations undertaken during the first phase, demonstrate that the RM is approaching the problem from a rational perspective. The focus is on the technical capabilities of the system, aiming to optimise walks, and the financial benefits this could bring. This supports Hypothesis 2, defined in Chapter 4.

Because the aim is to buy an existing system, it is difficult to fit the process with the development methods discussed in Chapter 4. The system development methods all highlight the importance of understanding the problem to be addressed, although the

extent of the problem definition and how it is reached varies. Although there is a growing trend to buy-in systems and adapt them to the organisation's needs, there is surprisingly little written about how this is, or should be, done. The process of purchasing an existing technological system could have many potential consequences for the success and uptake of the resulting system, and it could introduce additional complications to an already complicated process. There was no analysis of the problem and issues involved in the revision process, let alone the organisational setting in which the processes occur. This is further complicated because the development can no longer be iterative. In other words, if the existing system is used as the basis for development, the problem cannot be revisited. Many assumptions are already built into the model formulated without any knowledge of the RM setting.

The trials in the second phase of the WO trials showed there were a number of potential benefits. Gains through savings in walks, improved Q of S and having the ability to consider other scenarios were the system benefits. There are however additional problems introduced. For example the reliability of data became a much more important issue. Furthermore, the trials were considered a success and the benefits were reported on the optimal walks despite the fact that the trials demonstrated that local differences would mean these were unachievable. More important still is the fact that the walks were never implemented. This highlights two important areas, firstly there could have been a number of further issues which relate to the optimised walks, e.g. the issue of office space, but were not discovered. Secondly, the fact that the CWU executive had imposed a non-compliance policy gives a very clear indication that they objected to the system. This in turn means that any attempts to introduce the WO system is bound to be complicated by the union, if no prior agreement is reached.

The process again shows the traditional / rational approach is the overall driver for the RM. However the methods used do encompass those of the bounded rationality model, as complete knowledge is not possible. Instead of evaluating all alternatives a workable solution is selected and amended to fit with the new information and requirements, generated by the trials. The information focused on is again technical, i.e. assessing the capabilities of the system and the financial gains. These findings support Hypothesis 3, section 5.4.6. The stage ended with a number of options presented to the Project Board to allow them to assess the way forward.

There still remain many issues to be decided. Some may be determined by the Project Board based on the information provided. Others have not yet been raised or

discussed. From the view of successful implementation of the system, the organisational and social issues must remain a prime concern. The RM is aware of the stakeholders involved in the revision process, or at least some of them, particularly the CWU, but the issues this raises are set aside through the Feasibility and Process Trials. The Analysis and Design Phase aimed to develop the implementation strategy for the system, but again remained focused on costings and not on the effects the system will have on the stakeholders who will use or be affected by the system.

If a socio-technical approach had been taken from the start of the project the stakeholders would have already been identified. The approach taken by the RM has meant that the system has already been built, and the processes for its use have been decided on. Yet they do not know who the user will be. As the system has already been determined the options for deployment are limited. The User Reference Group has considered some of the options, mainly based on costs. It has not considered the wider socio-technical issues associated with the system's deployment. The following chapters aims to assist the RM in understanding what the wider implications are and what methods are available to address them.

CHAPTER SIX:

STAKEHOLDER ENGAGEMENT: A REVIEW OF METHODS, AND A CONSIDERATION OF THEIR APPLICATION TO THE WO PROJECT

CHAPTER 6: STAKEHOLDER ENGAGEMENT: A REVIEW OF METHODS, AND A CONSIDERATION OF THEIR APPLICATION TO THE WO PROJECT

6.1. INTRODUCTION

The previous chapter discussed the RM's aim to evaluate a new computerised system for the revision of deliveries. It showed that the RM is not following a normal system development methodology, but is instead intending to procure and adapt a WO system. A review of the literature on system development highlighted the importance of understanding the problem being considered. It demonstrated that the complex design problems faced today are often not clearly defined, but are only understood through a process of engagement. The other major issue which the literature highlights is the political aspect; people involved with the revision process will have their own perspective on the problem, will have their own agenda, and their own interpretation of what is an acceptable solution. These views influence the eventual outcomes.

The studies conducted within the RM demonstrate that they are following a design process focusing on the rational decision making model, and on the technical delivery based on it. From the literature reviews and the studies of the RM, it is clear that there will be many organisational implications associated with the introduction of the new system. The RM has considered some of the issues relating to its implementation. However, by adopting a rational approach, their work has remained focused on improving the processing capabilities and on the financial benefits. They have not yet considered many of the organisational issues nor the various agendas of the other social actors within the organisation. For example the issue of location has different organisational implications depending on the solution chosen.

The RM may have chosen to approach the decision making process rationally, but when the WO system is implemented there will be other stakeholders affected. For example, there will be consequences for the local management, the people walking the routes and the other RM systems impacted by the revisions. If the system is introduced without considering these issues the RM is likely to encounter some major problems. As Greenbaum & Kyng (1991 p.2) note, "Conflicts are inherent in the process. If they are pushed to the side or ignored in the rush to come up with an

immediately workable solution, that system may be dramatically less useful and continue to create problems."

The opportunity exists to explore ways of widening the agenda being considered. Whilst it would have been useful to look at these issues earlier in the WO project, as many of the theories in decision making and systems design suggest, there is still value to be gained at this stage. Prior to the actual implementation the RM still have an array of possible ways to proceed. Some of the methods and issues have already been discussed in earlier chapters. The literature review here considers some of these issues in more detail.

A starting point for much of the literature is that an understanding of organisational implications can only be gained by involving stakeholders in the design process. This review begins by considering what participative design is. The focus is then directed to the four main issues associated with participative methods; i) why stakeholder participation is so important, ii) who the stakeholders should be, iii) where in the process stakeholders should be included and, iv) how the stakeholders should be involved.

This review aims to establish an appropriate method to enable the stakeholders' views to be considered, within the RM's WO project. Each of these issues is therefore discussed with particular reference to the RM, giving consideration to the organisational context and the stage the project has reached.

6.2. WHAT IS PARTICIPATIVE DESIGN?

Previous chapters have considered the development of the computer system and how, along with this, the understanding of systems design methods and their potential effects has grown. These reviews show that theory has progressed from the deterministic approach. Research has shown that the impact a technology has, is determined by the approach taken and the issues considered during its development.

Meanwhile, there is plenty of evidence that organisations proceed as though they are dealing with a closed system, and that they design for this. They are then surprised by the impacts that are encountered when the system is introduced into the real world setting in which other stakeholders exist. The London Ambulance Service (HMSO 1993) provides an example of this. The system was implemented with a series of disastrous consequences and was finally abandoned. In this case the problems were

identified as being due to the design strategy. Examples of problems noted in the investigation report include the fact that the cheapest tender was taken up, there was no clear identification of who the lead vendor was, schedules were tight, there had been no live testing or training of staff and the system had being introduced using a big-bang introduction with no manual back-up. Other examples from the impact research demonstrate that far from the technology being deterministic, as Jenkins and Sherman (1979) predicted, the impact is determined by the way the technology is designed and implemented. Bannon & Schmidt (1989) argue that, "to an extent, any software application project involves the design not just of a technical system, but it also embodies - implicitly if not explicitly - assumptions about how this system will be used within organisations." Therefore, for the technology to be effective the social and organisational consequences need to be addressed.

The discussions here, and in earlier chapters, demonstrate that although there is a general consensus in the literature, and possibly even in industry, that social and organisational issues should be considered; there is still little consensus on how this should happen (see Allen 1992). Most designers still use tried and tested rational methods, and fail to include stakeholder information. Much debate has taken place in the theoretical world, and much research conducted into methods for participation. From this a plethora of new methods have been proposed. However, as Carroll (1987) concludes there is a lack of application of these methods to real world design situation.

Academics have argued strongly for user participation at all levels of systems design but there are still major questions which need to be addressed, for example how to involve the users, who the users should be, where in the development they should be involved and what the users role should be within the process. With such major issues still to be addressed, and with so many methods available, it is not surprising that organisations are slow to take up new methods. So despite the academic emphasis in recent years on user-centred design (Norman & Draper 1986), users have had little opportunity to participate in the design process (Eason 1988).

Participative design has developed from the recognition that a purely technical approach to decision making is not sufficient when dealing with real world complex problems, e.g. systems development. There is also a need to understand the social actors and their agendas. In response participative design aims to enable stakeholders to influence the design and implementation of a system (for e.g. Bjerknes, Ehn & Kyng 1987), in order to permit user requirements to be met, encouraging user

commitment and avoiding resistance (see Ives & Olson 1984 for a review). Kensing (1983 p.223) describes the basic requirements for participation thus, "The employees must have access to relevant information, they must have the possibility for taking an independent position on the problems and they must in some way participate in the process of decision-making."

There are many arguments for including the stakeholders in the development process (see for example Mumford 1981). The overriding impetus is, "Because of the intimate relation between work and technology, the development of artefacts with which people work and the development of their work practices go hand in hand." (Suchman & Trigg 1991). This, and evidence from earlier chapters has demonstrated the adverse consequences that can occur if stakeholders' views are not considered. However, as Cavaye (1995) notes there is no causal relationship between user participation and system success; cases reported in the literature show mixed outcomes both with and without the participation of users. Knowing that participation itself does not guarantee success it is necessary to look more closely at what factors impact on the participation.

One certainty is that engaging users in the development process is extremely difficult (Grudin 1991). There are many basic factors which must exist in order to facilitate participative design, e.g. there must be management commitment to the methods and financial resources must be available. Once these top level requirements are in place there are still many questions to be answered before participative methods are employed. Firstly an understanding of the reasons for stakeholder participation is needed.

6.3. WHY SHOULD STAKEHOLDERS PARTICIPATE?

There are three main drivers for the inclusion of stakeholders in the development process; i) to develop users commitment and avoid, or reduce, resistance to change (Markus 1981), ii) to provide an arena for bargaining and conflict resolution (Hales 1992) and iii) to elicit knowledge. Due to the size of the WO project and the organisational setting for the system, there was no opportunity to include stakeholders' views to develop commitment. This would have required all the stakeholders participate. The circumstances also limited the options for bargaining, as the RM were still not convinced of the need to consider stakeholders' views. However, there is an opportunity to elicit knowledge, which could aid the implementation strategy and might allow areas of conflict to be avoided. The study which follows (Chapter 7),

focuses on illuminating issues relating to the revision process, and the impact of the WO system on stakeholders.

Enabling stakeholders to influence the implementation design is important as not only do the organisational processes influence cognition, e.g. division of labour (hierarchical and lateral), job description, etc., but cognition also influences organisational processes (Clegg 1994 p469). For example, people decide which methods will be used and how processes will be managed, and individuals decide their own levels of commitment and whether they will adopt or resist the organisational system. These are at both individual and social levels and in the construction of the on-going organisation of work. Therefore organisational and cognitive structures are entwined. Cognition is only partly individual, it is also social, distributed among people within the organisation. The relationships between individuals and groups therefore need to be considered along with the organisation's history and culture. This is best achieved by allowing stakeholders to participate in the development process (Greenbaum & Kyng 1991).

The work the RM had already undertaken has included some user representation. In the first two stages this was at Project Board level to approve the direction of the project. During the third stage a User Reference Group was established to assist in the development of an implementation strategy. The major gains from this appear to have been obtaining the Divisional Manager's commitment to the WO system and considering the costs associated with different groups having ownership of the system. The group were commenting on a limited agenda, which meant that the wider implications, i.e. social and organisational, were not given consideration. The literature demonstrates that if the implementation is conducted without these other issues being considered then there is potential for dysfunction and failure. These issues do, therefore, still need to be considered in the WO project. An opportunity exists for these issues to be considered prior to implementation, but a method is needed for engaging stakeholders. This leads to the question of who these stakeholders should be.

6.4. WHO SHOULD THE STAKEHOLDERS BE?

When a new system is developed and deployed there are a number of different stakeholders who can be identified (Land & Hirschheim 1983). The amount of different stakeholders and their potential roles will be affected by factors such as the size of the organisation and the size of the project. Using the RM example some of

these differences can be demonstrated; senior management control the budget for the project; middle management (in RM Consultancy) oversee the development process; divisional management oversee the work affected by the system; the planners work directly with the new technology and the POs, although they do not work directly with the technology, will still be affected by it. By employing participative design methods during the development of a system, different groups may be able to express their views although they may be involved at different stages and different levels (Ehn & Kyng 1987).

In order to understand which stakeholders should be engaged it is necessary to understand the influences that are in operation. These include organisational, social and individual issues, for example the hierarchy which exists within the organisation, communication between individuals and groups, and a person's prior experiences. These will affect the views of stakeholders. Furthermore, these views may be quite far apart both within groups, as well as between groups.

There are many groups and individuals who will be affected by a change in technology, both within the organisation itself and outside, and each needs to be represented. In large systems development, such as the RM's, it would be impossible for all potential stakeholders to participate and express their view of the current problems and potential solutions (Mumford 1979), therefore representatives are often used. Issues, such as who these representatives are, the responsibility and power they possess, and how they participate may affect the system's success.

One approach to incorporating users' views is described by Doorewaard & Knudsen (1992). They describe a development process which uses an 'A-Team' approach, which they see as fairly typical. A 'super user', with knowledge of the technical processes and the work practices, represents the user(s) and provides knowledge to the designer(s). In the case study reported, the system developed experienced difficulties and Doorewaard (1992) suggests that an integrated approach, with users active in the development process, is necessary. This is required in order to attempt to capture the important aspect of coordination and cooperation between work processes (Bannon 1991).

The review demonstrates that there is still no clear guidance on who the representatives should be. This research offered an opportunity to explore some of the issues involved, concentrating on four areas of potential influence:

i) The RM Culture

An organisation can be seen as being more than just an organisational structure, e.g. hierarchy, etc. Bodker & Pedersen (1991 p.122) describe culture as, "A system of meaning that underlies routine and behavior in everyday working life." It includes the values and beliefs, i.e. an organisational culture. The existing culture may influence the user representative and their views.

ii) The RM's History

Attention is drawn to the historical aspect of an organisation by proponents of Activity Theory (see for example Bodker 1990). The knowledge that exists within the organisation is more than individual skills and knowledge, it also consists of peoples' experiences of past events, and the tools and methods used within the organisation. This constitutes more than individual experiences; it is also about the shared experiences of stakeholders.

iii) Knowledge of the Current Revision Processes and Practices

An understanding of the current situation has been shown to be important for two reasons: i) the *true* current processes may only be known to the actual stakeholders. In other words, there may be differences between the idealistic assumptions about work practices and the actual practice. ii) knowledge of the current working practices may either hinder or support the evaluation of future changes. That is, existing knowledge may enable a person to envisage future consequences more easily, or it may blind the person to what it possible.

iv) Knowledge of the New WO System

This is an important issue for the reasons described above, for current knowledge. Knowledge of the future system may effect the evaluation of future changes.

These issues are explored in a study conducted within the RM, see Chapter 7. Based on the literature it was decided that, for the RM project, the stakeholders should represent various roles and levels within the revision process. These are the people directly engaged with or impacted by the system; namely the Delivery Area Manger, the Planner, the Delivery Office Manager and the Postal Officer. The literature proposes that these should be the actual stakeholders, while organisations tend to use representatives. This highlights the issues of stakeholders' knowledge. This research, Chapter 7, provides an opportunity for the effects of prior knowledge to be explored.

In order to achieve this a number of groups of participants were distinguished. Table 6.1 shows the combinations of knowledge of the participants and their roles.

Table 6.1: Variations In Prior Knowledge.

ROLE ASSUMED	EXISTING KNOWLEDGE RM	SYSTEM
IN OWN ROLE	Y	Y
IN OWN ROLE	Y	N
IN ROLE PLAY	Y	Y
IN ROLE PLAY	Y	N
IN ROLE PLAY	N	N

The combinations shown in the table will allow a number of comparisons to be made by engaging different groups of representatives.

i) To investigate the effects of knowledge of the RM (culture and history), RM staff will be compared with people outside the organisation. The external participants will be students who have no prior knowledge of the RM.

ii) To investigate the effects of knowledge of current methods, actual RM stakeholders will be compared with RM staff assuming the same role.

iii) To investigate the effects of knowledge of the future system, RM staff involved in the WO project will be compared with those without WO experience.

From the RM stakeholder groups identified, a limited number of representatives still need to be determined. On the basis of the previous case study work it was decided to include staff from each of the Divisions in order to get a cross section of views. It was therefore decided that at least one person should represent each combination, for each stakeholder role, in each Division. The participants are discussed further in the following chapter. The next question, in the assessment of a suitable method to include the stakeholder views in the WO project, is where the representatives should be involved.

6.5. WHERE IN THE PROCESS SHOULD STAKEHOLDERS BE INVOLVED?

Various methods have been proposed to enable participation. Land (1982) for example, categorises approaches depending on the amount of control the stakeholders have in the process and describes them as either; i) consultative, ii) democratic or iii) responsible. The overall approach will to some extent determine the amount and type of interaction, however the roles may also change throughout the development process. The amount of responsibility participants have (Ives & Olson 1984) and the amount of involvement may also change throughout the phases (Ginzberg 1981). For example, much effort has been focused on methods to include participation at the requirements phase, whereas users are not normally involved in the coding stage. The influence the participants have affects the outcome (Ives & Olson 1984), e.g. if they are acting only as consultants their views and suggestions may be ignored.

Involving users in the development process is often more time-consuming because negotiation may be necessary in order to reach a consensus. The earlier users are integrated into the process, the more issues are open for discussion, and the greater the opportunity for conflict. This may cause problems adhering to time constraints and often leads to the exclusion of stakeholders at the early stages of problem definition. The more usual practice is to include the user after the initial defining stage has been completed and normally involves stakeholders evaluating a model / prototype (for example see Gronbaek 1988) and providing feedback in an iterative process.

The studies conducted within the RM illustrate a reluctance to include stakeholders. At the stage the project has reached, the system is well defined (technically). Yet the actual users have not had an opportunity to consider the system and provide feedback on the effects it will have on the revision process and their roles. The RM's project has excluded all but the senior stakeholders in the early phases of development. Although the early and continuous involvement of users would have been the ideal, there is still value to be gained from considering their views before the implementation strategy is decided. At this phase options still exist, although these are more limited due to the previous RM development stages. By considering these options prior to implementation the eventual strategy can be influenced in order to avoid major problems and maximise the benefits of the new system.

6.5.1. Implementation

There are many issues surrounding the implementation of a system. These include the technical system, i.e. hardware, software and infrastructure, but also include the organisational and social issues. In considering the social and organisational issues, the manner in which a system is implemented is of paramount importance to its success. This has led some people to consider it as a phase in its own right, not just as the final stage of development (see Hirschheim 1985). Although this draws particular attention to the importance of implementation, it may also detract attention from implementation issues earlier in the design process.

The importance of recognising issues early has been reiterated throughout this discussion, along with the fact that problems recognised late in the process are difficult and usually expensive to correct. Ideally therefore implementation issues, i.e. the organisational and social implications not just the technical, should be considered from the outset of a project. Evidence in the literature demonstrates that although this can be achieved it rarely is in practice. The development methods which are widely used in industry do not allow for these issues to be considered and carried through the development process.

Attention is also drawn to the fact that the system's implementation can affect the organisations future decision making (Dubrovsky, Kiesler & Sethna 1991; Lea & Spears 1991). This is another compelling reason for the effects on a proposed implementation to be explored, in order to see and attempt to avoid, any adverse consequences and to realise the advantages. The impact literature reports on the actual results of implementing a system but this does not necessarily mean that the implications can, or will, be seen in advance. If it is possible to foresee the opportunities and problems prior to implementation, how can this be achieved?

6.6. HOW SHOULD STAKEHOLDERS BE INVOLVED?

As has already been discussed, the stage of the RM project limits the options available to incorporate stakeholders' views. With the system already developed, the implementation strategy already being considered, and in the light of the review, many options can be excluded. What is needed is a method to allow the stakeholders (identified above) to comment on the proposed implementation. This raises the next major issue.

6.6.1. How To Enable Stakeholders to Envisage the Future

As a review by Andersen, Kensing, Lundin, Mathiassen, Munk-Madsen, Rasbech & Sorgaard (1990) demonstrates, there has been very little work aimed at helping users and designers to develop future alternatives for a system. Bodker, Greenbaum & Kyng (1991 p.143) suggest that "an effective way of allowing users to employ their knowledge and skills is to simulate future work situations, creating the illusion of actually working with the projected system." This would suggest the use of field trials in the RM situation. If the RM were planning further trials these might have been used, however none were planned. Another approach would be to produce a prototype / simulation, as Bodker & Gronbaek (1991) describe. Unfortunately, there was no opportunity to conduct independent trials (i.e. outside the RM's project), or simulations due to the current IR situation and the lack of access to the resources which would be necessary.

A further approach, developed by Jungk & Mullert (1987) is the use of Future Workshops. Kensing (1987) uses the method in systems development as a three phase process; i) critique, ii) fantasy and iii) implementation. The process leads the user from a review of the current issues, to imagining what the workplace could be, to finally looking at what is necessary to enable the realistic changes. Although this method allows the future to be considered, it starts from a different phase than that of the RM project. The RM has already determined the system and a number of possible implementation strategies, and the situation does not therefore require the generation of ideas, but the evaluation of alternatives. A promising method for allowing the future to be represented is the use of scenarios, discussed below.

6.6.2. Scenarios

Scenarios have long been evident in the informal methods used by systems developers. They are used to enable concepts and ideas to be explored, understood and communicated to others. Their use is now much evident in the systems development literature, and methods for incorporating them are growing. They are used at many levels of the development process, focusing on many different aspects of design. They consider different levels of detail, use different techniques and have different aims. These vary from the micro level, considering the individual computer commands needed to carry out a task (Nielsen 1995), to the macro level, considering the whole tasks and processes in situ (Eason & Olphert 1996). Methods for representing scenarios are also diverse, ranging from text based narratives (Carroll

1997), through storyboards (MacLean & McKerlie 1995) to games and role playing (Ehn & Sjogren 1991). What then is a scenario?

Probably as many definitions of scenario exist as methods for their use. This is clear from Campbell's (1992) discussion, and he and others (e.g. Kyng 1992) have attempted to distinguish different types of scenarios. This has proved difficult because of the diversity of uses. Carroll (1997 p.385) does however provide a description; "The defining properties of a scenario is that it projects a concrete narrative description of activity that the user engages in when performing a specific task, a description sufficiently detailed so that design implications can be inferred and reasoned about ..... it makes use concrete". Given the need to consider issues in the WO project and given the current stage of the system's development, the use of scenarios could be applied to allow stakeholders the opportunity to comment on the future system.

6.6.3. Future Implementation Scenario (FIS)

The proposed method to be used in the RM, is a Future Implementation Scenario (FIS). This is developed from the 'user cost-benefit assessment method' described by Eason & Olphert (1996). The method "serves like Boehm, Bose, Horowitz, & Lee's (1994) model to provide early warning of the winners and losers in any change process whilst there is still the opportunity to develop alternative scenarios which reduce the impact on losers." (Eason 1995 p.1492).

It will define the system, the revision task, and the roles and responsibilities of the stakeholders. This will enable the wider issues and processes people will need to engage in to be considered. Based on the participants' prior knowledge, i.e. of the current revision process, the RM culture and history, and the WO system, they will be asked to comment on the changes which are likely to occur and the consequences of these changes.

The scenario will also enable the consequences of the system to be seen. As Eason (1997) points out a new system can bring many changes and the consequences of this can be far reaching. These consequences may be planned, but there are often additional, unexpected consequences. These may be undesirable, and may affect different groups within the organisation. The reason for these unforeseen consequences is the complexity and dynamics of the organisational settings. With the introduction of a new technology, new methods and processes are necessary and users

will be both proactive and reactive in their responses. This brings about not only immediate effects, but also secondary and tertiary effects, as the wider organisational system adapts and develops (Eason 1997). As Clegg (1994) notes, these consequences cannot be known in advance, but are only evident through the users' engagement with the future system in the organisational environment, i.e. the emergent properties (Norman & Draper 1986).

Aboulafia, Klausen & Jorgensen (1994) note that although scenarios are much used and reported in the literature, there is relatively little research on their use or function in the design process. This leads to a number of issues which need addressing and some, such as who the stakeholders are, etc. have already been discussed. The focus of the following discussion is on the levels of knowledge and information contained in the FIS.

6.6.3.1. Levels Of Knowledge

The definition of scenario provided by Carroll (1997) introduces the idea of a 'concrete narrative'. The issue of concrete and abstract information is very important in the development and use of scenarios. There is a belief that people can only relate to future situations when they are presented through a concrete experience, the scenario must, therefore make the "use concrete" (Carroll 1997). Kensing & Munk-Madsen (1992) provide a discussion of the levels of knowledge which is apparent in user designer communication. These are shown in Table 6.2 below.

Table 6.2: Six Areas of Knowledge in User-Development Communication.
(From Kensing (1992))

	Users Present Work	New System	Technological Options
Abstract Knowledge	Relevant structures on users' present work	Visions and design proposals	Overview of technological approach
Concrete Experience	Concrete experience with users' present work	Concrete experience with the new system	Concrete experience with the technological options.

The FIS will assume the abstract and concrete aspects of the RM's present work will be known to the RM participants and this will be incorporated into the scenario presented to the students. It will also aim to make the abstract information, about the new system and technological options, concrete. However, this is complicated by the accessibility of relevant knowledge.

6.6.3.2. Relevant Knowledge

There are two types of knowledge which relate to a task, implicit (or latent) and explicit. Explicit knowledge is easily available, e.g. the Delivery Standards will be written down and must be adhered to. Implicit knowledge is not as available and is embedded in the stakeholders' tasks. It will include the detailed knowledge used to fulfil the task and may contain the true processes involved in the revision process. The implicit knowledge will often be unobservable, e.g. the RM's culture and history. This information will define certain actions as acceptable and determine the socially shared, unwritten rules.

As this information is not readily available to observation, or to the stakeholders themselves, methods are needed to elicit latent knowledge. "Essential parts of the user's knowledge are embodied in their involved and unreflected performance." (Bodker et al. 1991 p.140). The information needs teasing out of the stakeholders in order to make the implicit explicit. The FIS, therefore, needs to be real enough to enable the RM participants to envisage the actual engagement. As the use of the real or simulated work situation has already been discounted, this will be built into the scenario description. It will need to be detailed enough that stakeholders can see the probable outcomes for their particular role. The influence of implicit knowledge will be explored in the use of the FIS. In designing the study to be reported, it is assumed that the RM participants will be in possession of this knowledge, whilst the students will not. The development of the FIS for use in the RM is discussed further in the following chapter.

6.7. SUMMARY

At the stage that the RM's WO Project has reached the system has already been designed and built, and a number of options for implementation have been considered. However, the rational / technological approach employed by the RM has failed to consider the wider social and organisational issues. The review demonstrates that there are many methods which aim to enable these views to be included in the development process. But there are still many questions which need to be addressed when considering their use.

The review conducted in this chapter focused on the use of participatory design for the inclusion of stakeholders' views. It considered why stakeholders should participate, who the stakeholders should be, where in the process they should be

involved, and how they should be participate. All of these issues were considered in the light of the RM's WO Project, with the limitations imposed by the prior stages of the project and its current position.

The review concludes that it is important to obtain the stakeholders' views. Even though the functionality of the system has already been defined, there are still a number of possible options for the system's implementation and these will affect the stakeholders. The organisational and social implications will be different depending on the strategy chosen and these will also affect the stakeholders. Given that the system is to be deployed nationally, and given the size of the RM, it is not possible for all the stakeholders to participate, so a representative group is needed. There is no clear guidance in the literature on who the representatives should be. The prevailing theoretical view appears to be to include actual users, whilst industry often employs management representatives. This highlights a number of issues in respect of the amount and type of existing knowledge, and its role in assessing future impacts. This research provides an opportunity for the effects of knowledge to be explored, including knowledge of the RM's culture, RM's history, the current revision processes and the WO system. The study reported in Chapter 7 investigates this through the engagement of RM staff and students representing combinations of prior knowledge.

Many of the methods described in the literature are aimed at the early inclusion of stakeholders in the development process and, although this is the ideal, it is impossible given the stage the project has reached. Attention is therefore focused on methods to allow the future system to be envisaged and for the effects to be evaluated. There is little research conducted in this area, and much of what is reported uses prototypes and simulations. These methods were again discounted due to the limitations of the RM setting, i.e. they were not planning any further trials of their own, and resources prohibited simulations to be constructed for this research.

Having established that obtaining views on the systems implications is advisable, and given the stage of the WO project, a method was sought to elicit these views. The method needs to enable potential users to engage with the future system, to be able to understand the processes involved, and the roles and responsibilities entailed. One approach, the use of scenarios, does provide potential for the investigation of future implications. The review considered the uses of scenarios and the methods employed. It demonstrated the wide range of scenarios that have been, and are being employed in the development process. It also highlighted the potential for their use in this research.

The use of scenarios will enable a detailed description of the future processes and procedures to be presented to various groups of people. These people will then be able to comment on the implications of the implementation described. By allowing the potential implications to be identified prior to the implementation the *actual* implementation can be planned to take these into account. Enabling the benefits of the system to be realised and the disadvantageous consequences to be addressed and over come, without users having to experience them in their work situation. Therefore, although this may not be the ideal way to incorporate users in the design process, there is still real value to be gained at this stage, in eliciting views and incorporating the findings in the planning of the implementation strategy and the processes proposed for the systems use.

A Future Implementation Scenario (FIS) will therefore be used to provide guidance for the RM on the user issues associated with the WO system. This will define the future system and the stakeholders' roles and responsibilities, aiming to enable participants to envisage the future and allowing implicit and explicit knowledge to be accessed through a concrete representation. Development of the FIS is described in Chapter 7, along with the methods used to conduct the final stage of this research, the FIS workshops.

CHAPTER SEVEN:

A SCENARIO BASED STUDY OF THE IMPLICATIONS OF THE WALK OPTIMISATION SYSTEM

CHAPTER 7: A SCENARIO BASED STUDY OF THE IMPLICATIONS OF THE WALK OPTIMISATION SYSTEM

7.1. INTRODUCTION

The RM have reached the stage in the development of the WO system at which they are considering the implementation strategy. The work reported throughout this thesis shows that they have approached the problem from a rational / traditional perspective. The focus has remained on producing an optimal revision process, by developing a system and processes which will allow more data and options to be considered. This has resulted in the system being defined and developed using a limited agenda. A review of the literature has shown that the consequences of implementing a new system are diverse. There are many other issues which need to be considered in the real world problem setting, viz. organisational and social implications. As these have not been considered or planned for they are likely to cause surprise, and could impede the success of the system.

Even though the system's functionality has already been designed and built there is still a valuable opportunity to investigate the likely consequences, prior to its implementation and whilst there are still a number of options available. A review of methods for undertaking an investigation of the social and organisational issues was conducted in Chapter 6. This highlighted many methods for the inclusion of stakeholders views, but demonstrated it is not an easy task and that there are still many questions regarding their use. A number of these issues were considered in the light of the RM's WO Project. This led to the decision to employ a scenario based approach.

The use of scenarios is now widely reported in the literature, see Chapter 6. However there is relatively little research on how they should be used or their function in the design process. The use of scenarios is encouraged at many different stages of the development and focuses on many different aspects of the system, but no clear guidance is given on how they should be used. The review does however demonstrate their potential in enabling stakeholders to envisage future situations, an issue not addressed in many of the other methods. An opportunity therefore exists to explore the use of scenarios by way of a Future Implementation Scenario (FIS).

Chapter 6 discussed some of the issues surrounding the use of the FIS, and the discussion is continued here in relation to its development for use in the RM setting. The objectives of this study are threefold; i) to investigate the likely implications for various stakeholders within the RM, ii) to investigate the use of scenarios in enabling likely implications to be envisaged and iii) to investigate the effect of prior knowledge on stakeholders' responses.

In order to fulfil these objectives the research aims; i) to create several Future Implementation Scenarios, representing the options for implementation, i.e. based on the WO system's location within the RM. These will enable representatives to identify the future implications; ii) to test elements of the scenarios and the process of engagement to see which are most fruitful for eliciting information and, iii) to engage participants with different levels of prior knowledge. These will include RM staff in their own role, RM staff in an assumed role, RM staff with and without knowledge of the WO system, and students (with no prior knowledge of the RM, the revision processes or the WO system). All of these aims are, of course, dependent on the RM's cooperation.

This chapter describes the development of the FIS to be employed for this study, and a narrative of the FIS presented. It describes the workshops conducted, including the process of recruiting participants and the methods employed.

7.2. METHODOLOGY

The RM's lack of consideration of the wider implications of the WO system were evident early in the development process. By the third (Analysis and Design) stage it was clear that the RM were unlikely to consider these issues prior to implementation. From the work already conducted, and this realisation, it was decided to investigate the options for including stakeholders' views. At this time (during the 3rd stage of the RM's project) the RM's WO Project Manager was approached, to discuss the idea of engaging stakeholders. An outline of a number of possible future implementations were presented based on the location vs. costs options described in Chapter 5 (these were currently being discussed in the Strategy Group). The manager was also presented with the idea that RM staff would be asked to comment on these alternatives and the likely outcomes the system would have for their role. Approval was gained from the manager, but with some conditions:

i) Due to the IR situation POs were not to be involved in the study.

ii) Any FIS would have to be approved by the Project Team before it was used.

iii) It was to be made clear to participants that any options presented were of the researcher's construction, i.e. they were not the RM's way forward.

iv) That any options presented were similar to the options the RM was considering.

v) That in order to gain access to staff, the User Reference Group would need to approve the study. They would then act as points of contact within each of the Divisions.

The ideas were presented to both the Project Team and the User Reference Group and all accepted the studies in principle. After further discussions with members of the Project Team and the User Reference Group, it became clear that any access which was approved would be limited. The consensus reached was that staff would only be available for a maximum of half a day. Based on this limited access, it was decided that only one FIS would be used, and that it would be presented to staff during a workshop, one to be conducted in each Division. The FIS (described in Section 7.4 below) was presented to the Project Team for approval. Following this, a letter was sent out to all members of the URG (see Appendix I.1), a presentation was given at the next URG meeting, and again permission was granted to proceed.

A number of meetings were conducted with individual members of the URG to decide the actual format of the workshops. They helped to establish the level of detail which should be included in the presentation, the formats to be used (based on the RM's usual methods for easier understanding), and the timings of activities.

The URG members agreed that they would act as coordinators for the workshop to be held in their Division. This included recruiting the participants, matching the groups required (see section 7.6.3 below), arranging a time when all participants were available (including themselves), distributing documentation to participants for pre-reading (see Appendix I.2), and organising the venue and resources needed to conduct the workshops. The final stage was to encourage the URG members (at meetings and via the telephone) to coordinate the workshops. The success of this stage varied. Of the nine Divisions, only 6 took part in the workshops. There were two reasons for this:

i) By this time the results of the Analysis and Design stage had been presented to the RM Project Board. Although they were keen for the project to continue, it was decided that funding could not be made available for the project for the next financial year. The WO project was therefore shelved. This led to a feeling of apathy in some members of the URG.

ii) The RM had also inaugurated a new national initiative (restoring 09.30). This meant that revision processes needed to be conducted in all Divisions, increasing the workloads of the Divisional Managers and the staff required to participate in the FIS workshops[50].

The result of the negotiations with the RM was for a single scenario to be developed, based on the limited time available and using staff from the various levels within the RM, and students.

7.3. DEVELOPMENT OF THE SCENARIO AND STUDY

The eventual scenario was developed from the two views favoured by the RM. It combined the options of locating the WO system at Divisional and Area level. Full revisions, i.e. requiring major changes in the office, would be conducted at the Divisional level; smaller changes would be conducted at Area level. This was also a reflection of an ongoing debate within the user group. There was a feeling that many of the existing Planners would not be sufficiently skilled (or have the potential to learn the skills) to take ownership and responsibility for the WO system. The scenario therefore sought to define two levels of Planner responsibility within the revision process. This was similar to one of the options considered by the URG.

The FIS also included processes for an audit. This was a contentious area within the WO project. The Project Team, URG and the manager in charge of the development of the implementation strategy all felt that maintenance would be the key to the system's ongoing success. This is an area which has proved to be weak within the existing RM systems. It was felt a mechanism should be introduced to ensure the system was kept up-to-date. However, the Project Board was opposed to the notion of an audit, but no other suggestions were proposed to ensure that maintenance occurred.

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[50]Ironically this initiative would have been far easier to implement if the WO system was in place.

The FIS depicts the roles and responsibilities of the Delivery Area Manager, the Delivery Office Manager, and the Divisional and Area Planners. The division of Planners into two levels reflects the levels at which the system would be deployed, and the varying abilities which may exist within the existing Planner population. As inclusion of POs in the trials was prohibited, it was decided that this role would not be represented in the study. There were two reasons for this; i) without the actual stakeholders a comparison of the real and assumed role could not be conducted and, ii) the limited response to the request for RM participants meant it was unlikely that all the participant groups identified could be filled.

The FIS depicted the decision making in several stages, similar to those which are currently evident. This was a decision reached through negotiation; the RM were keen that the scenario should be similar both to the current methods and the likely future implementation strategy. It was represented as flow diagrams (see Figures 7.1 - 7.5 below). These are commonly used within the organisation to represent processes and procedures, therefore no additional explanations were required. The diagrams were accompanied by a textual and oral description of the process involved in the revision, and the roles and responsibilities of the stakeholders. The representation was again a result of the limitations imposed by the RM setting. In other words, although others methods of engagement may be more conducive to providing contextual information and eliciting implicit knowledge, the time allowed prohibited these methods being employed. The scenario assumes the system has already been deployed, and that each office has conducted their initial revision. At this stage the major task of establishing the GIS network would have already taken place. The WO system will be used for all revisions, i.e. it is replacing the Manual-W, CADR and Table-Top revisions.

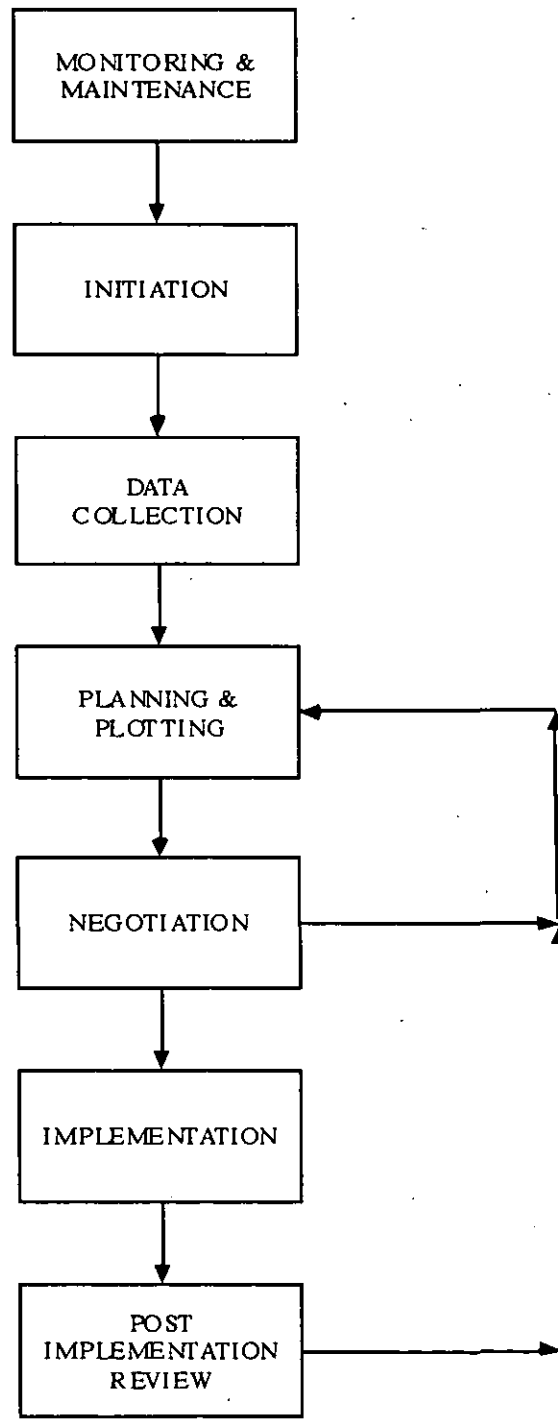
The following sections report the Future Implementation Scenario as presented in the workshops. The study process is then described, beginning with a pilot study conducted with student participants. This aimed to investigate if there *were* likely consequences for the strategy depicted, and if the scenario and the workshop process was adequate to elicit responses. Workshops were then undertaken with the RM participants, one in each of the 6 Divisions and with representatives from different roles. Finally two student workshops were conducted.

7.4. THE FUTURE IMPLEMENTATION SCENARIO

A: The Walk Optimisation Revision Process

Figure 7.1 shows the major stages of the revision process, this is similar to the existing process but with the addition of the monitoring and maintenance stage.

Figure 7.1: The WO Revision Process.



The scenario describes the access that stakeholders have to each part of the system. Table 7.1 shows that the Divisional planning team has access to the system for updating, and the Area planning team has access for maintenance. Other stakeholders have limited access to the system, with the ability either to view the system and / or printouts.

Table 7.1: System Access.

	GIS	WES	WO
NATIONAL			
HELP DESK	S	S	S
DIVISIONAL			
MANAGER			
PLAN. TEAM	U and S	U and S	U and S
AREA			
MANAGER			V
PLAN. TEAM	M and S	M and S	M and S
DELY OFFICE			
MANAGER	V	V	V and P
POSTAL OFFICER			P

KEY:

M = Maintenance, S = Support, U = Update, V = View to verify, P = Printouts

A.1. Maintenance and Update Procedures

There are two types of maintenance and update procedures, either of which may trigger the revision process.

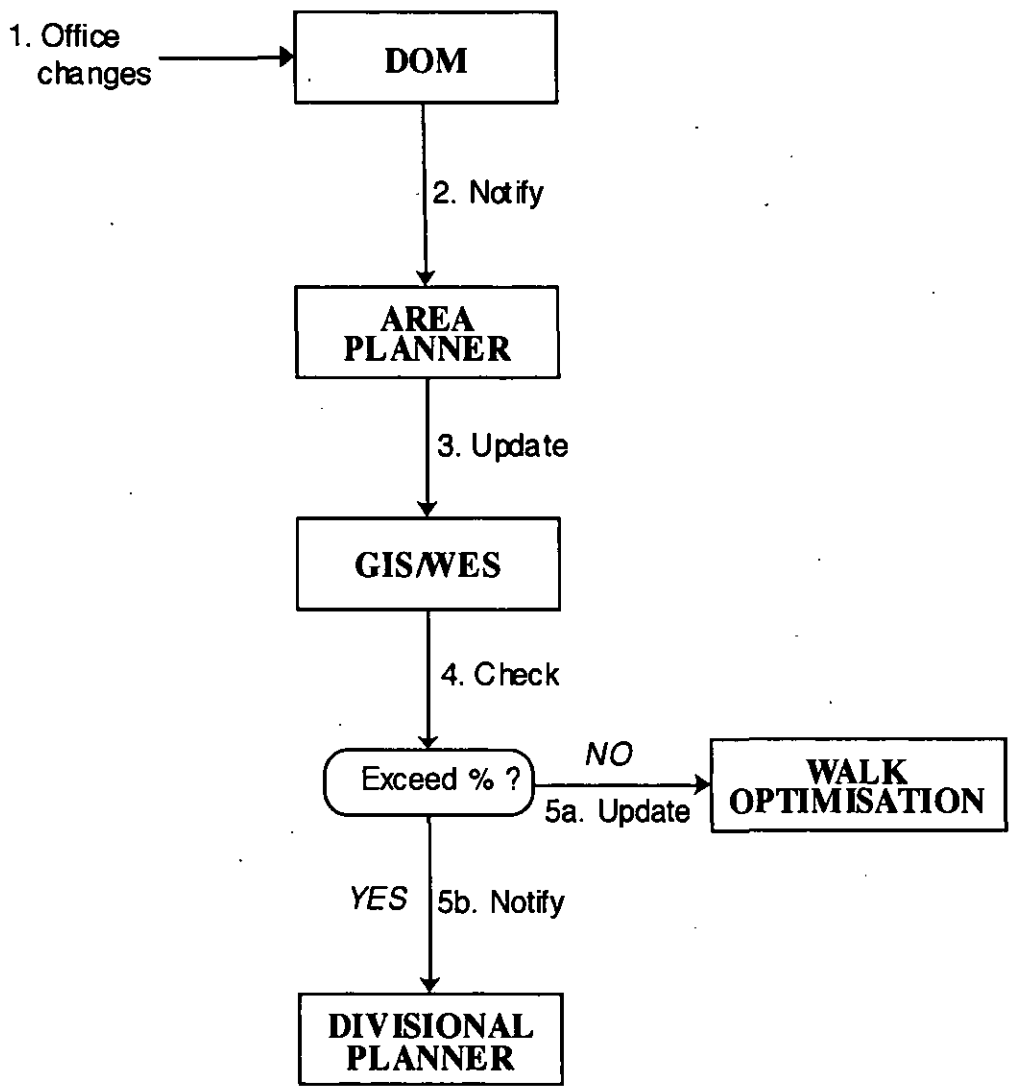
A.1.1. Ad Hoc Changes

The Area Planners (AP) maintain the system throughout the year and update the system with any changes. These are notified to the AP by the Delivery Office Managers. It is the Delivery Office Manager's responsibility to ensure that these changes are notified. These will be due to factors such as new development, growth/decrease in the area, business relocation, etc. All the information associated with the particular change, i.e. the information needed to update the system, is collected by the Delivery Office Manager and passed to the Area Planner. The sequence of events is shown in Figure 7.2 below.

A.1.2. Annual Audit

The Annual Audit will be introduced with the WO system to ensure that all changes which have occurred have been notified to the Area Planner. The monitoring will be performed by the Area Planners. They will visit each of the Delivery Offices, check that the current office details are accurate, and collect any additional data required. The Area Planner will then update the system where changes are necessary (See Figure 7.3). This will take approximately three days.

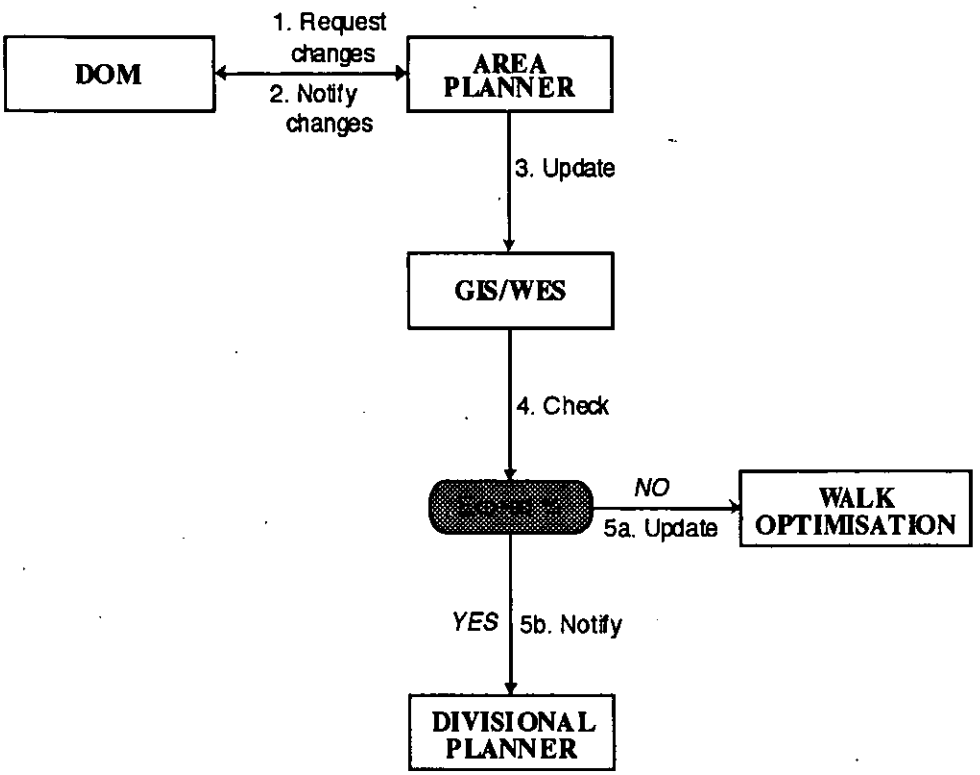
Figure 7.2: Ad Hoc Changes.



A.1.3. Maintenance

Once changes have been notified to the Area Planner, he / she will go to the Delivery Office and update the GIS and WES systems. If the changes are only minor (determined by an acceptable % change[51]), these are processed through to the Walk Optimisation system, for example to add / delete delivery points on an existing walk. The Delivery Office Manager then verifies the amended walk(s). This will take approximately 2 weeks. Figures 7.2 and 7.3 show this for both Ad hoc and changes and annual audit.

Figure 7.3: Annual Audit.



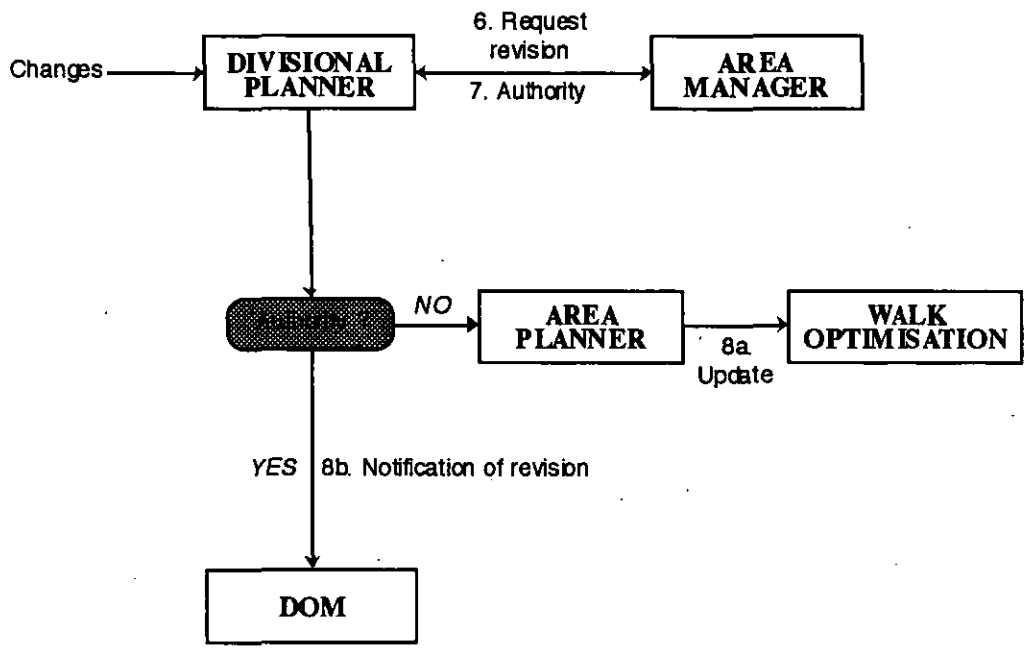
A.2. Initiation

If more major changes are required, i.e. changes exceed the acceptable %, the Area Planner notifies the Divisional Planner. It is the Divisional Planner's responsibility to request authority to conduct a revision from the Delivery Area Manager. If no

[51]The % change is a cumulative figure. The changes since the last Full revision are added and checked against the acceptable level of change. Full details of the % levels were not specified, however, it was indicated that the change level would be based on the number of walks in the office.

authority is granted the Divisional Planner instructs the Area Planner to update the Walk Optimiser with the changes. If authority is granted the Delivery Office Manager is contacted by the Divisional Planner and the full revision begins (See Figure 7.4 below).

Figure 7.4: Authority For A Full Revision.



A.3. A Full WO Revision

A.3.1. Data Collection

The Divisional planning team go to the delivery office and are responsible, with the aid of one or more of the delivery office staff, for gathering the latest office figures and any other relevant data.

A.3.2. Planning

The data is fed into the system and the Walk Optimiser is used to plot the new walks, with the aim of keeping the walks as stable as possible. The Delivery Office Manager provides any local knowledge that is needed.

After the walks have been plotted, using the WO, there is some fine tuning needed to adjust for local factors. These are factors not taken into account by the optimisation system, e.g. steep hills. The time taken for the data collection and planning is approximately four weeks.

A.3.4. Negotiation

The new routes are then presented to the Delivery Office Manager, who has to approve them. They are then presented, by the Delivery Office Manager and Divisional Planner, to the Delivery Area Manager.

Once the Delivery Area Manager has approved the walks, they are presented by the Delivery Office Manager to the union and staff. Printouts of the routes are provided together with descriptions of the duties. When the walks have been agreed by the union, the Divisional Planner prints out the office changes, notifies them to other systems, and prepares the office for implementation.

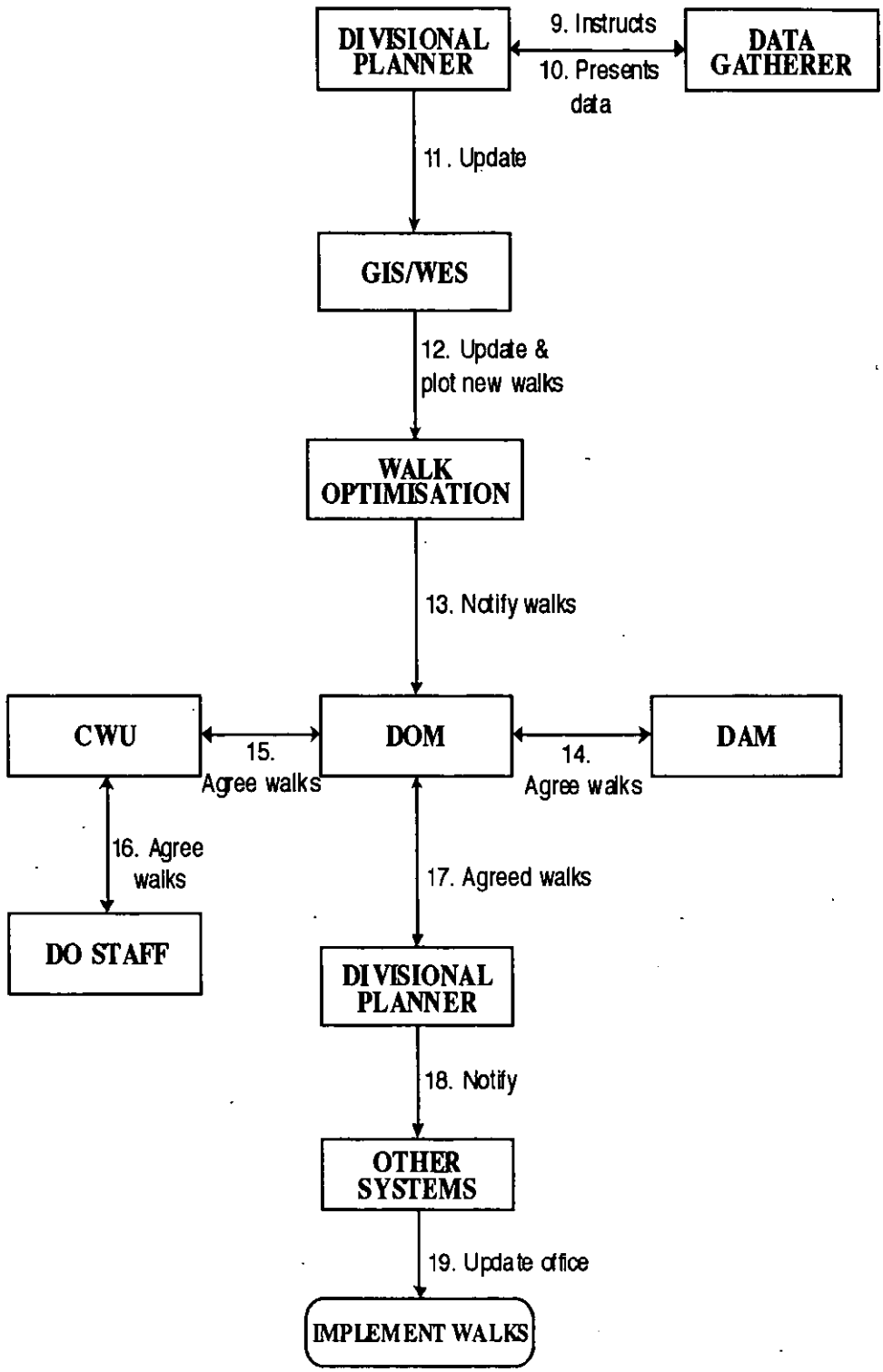
A.3.5. Implementation

The new walks are then implemented. The Divisional Planner is responsible for attending to any problems that arise. After the initial settling in period the Divisional Planner moves on leaving printouts of all the information that is required.

A.3.6. Support

There is a help desk to provide systems support nationally, and the Divisional Planners provide support for the Area Planners.

Figure 7.5: The Full Revision Process.



7.5. THE PILOT STUDY

The first stage of the research was to conduct a pilot study. This aimed to discover if there were likely implications for the roles represented, and also to ensure that the scenario method was satisfactory. The pilot was conducted at the University, both for ease of recruiting participants and so that potential Royal Mail participants were not ruled out from participating in the actual study.

7.5.1. Design

The workshops were designed specifically around the Royal Mail participants, taking into account the amount of time that would be available to conduct a workshop in the Division.

7.5.2. Participants

Students from Loughborough University were recruited from a combined Undergraduate and MSc module "Organisational Issues in Information Technology Systems". They had a background knowledge of system change and were also familiar with the checklists used. The participants were volunteers, paid a nominal fee for their time.

7.5.3. Procedure

The workshop was conducted over two sessions on consecutive days. During the first session the base case was presented (see below). The second session introduced the WO system and the FIS. This was followed by a discussion before feedback was requested, by way of a checklist response sheet. Finally a discussion was initiated to assess the participants' feelings about the workshop and methods used. Handouts were provided with all the overheads used in the sessions.

7.5.3.1. Base Case

The first session started with an overview of the sessions. The base case was then presented. This included background information on the RM, the current delivery and revision processes, and concentrated particular attention on the roles and responsibilities of the stakeholders involved. The base case was developed from the Case studies, interviews and meetings conducted. It outlined the broad organisational

aims of the Royal Mail, how it is structured nationally, how many people it employs and the kind of pressure it faces from both internal and external forces.

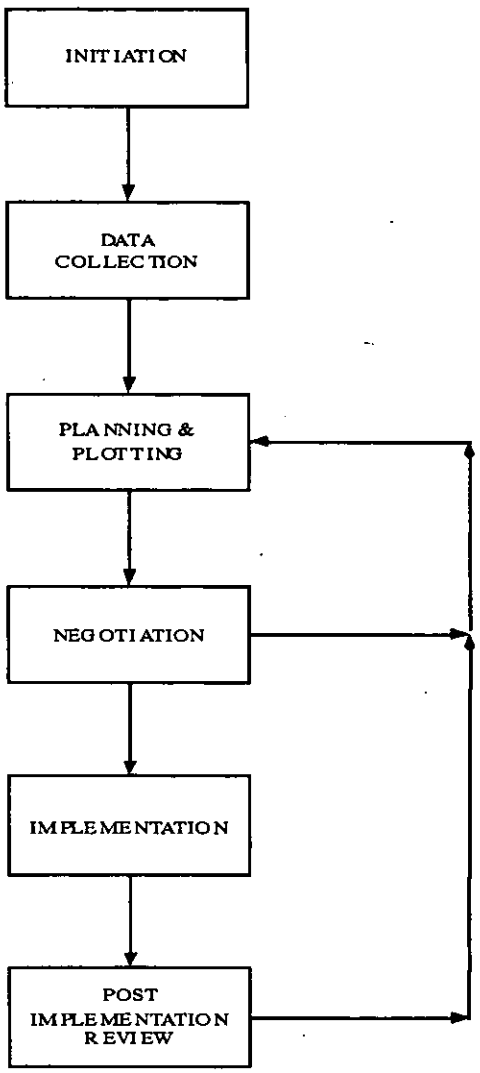
The mail circulation system was outlined, to show where the delivery process resides within the system, before a more detailed account was given of the delivery process itself. A normal delivery walk was explained along with the factors which might result in changes being required, e.g. a new housing development. The three existing revision methods were then introduced along with an explanation of the circumstances in which each would be used, and how a revision would be performed under each method. The Delivery Revision Team was also described, with the Midlands team used as an example to show the hierarchy and the normal reporting methods.

The participants were then assigned to a stakeholder role. These were the Delivery Area Manager, the Planner and Delivery Office Manager in the current system, with the Planners then divided into Divisional and Area Planners in the future scenario. These were the roles they would be asked to assume and asked to comment from. Participants were asked to concentrate on the role they were assigned to, while the revision process for a full revision was described. It was presented in a similar format to the FIS, using flow diagrams and descriptions. The current Revision Process introduced to the students is presented below:

B: The Current Revision Process

Figure 7.6 shows the major stages of the revision process.

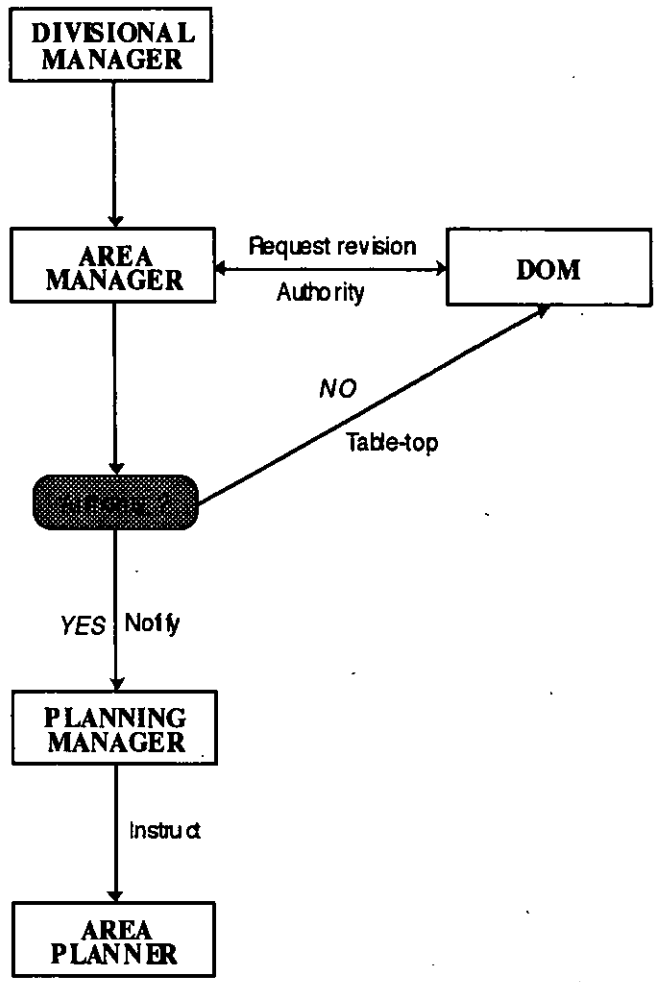
Figure 7.6: Current Full Revision.



B.1 Initiation

If major changes are required the Delivery Office Manager approaches the Delivery Area Manager to get authority for a revision. The revisions for a delivery area are normally agreed at an annual meeting by the Divisional Manager (see Figure 7.7 below). At the meeting all the Delivery Offices will be considered, according to how they are currently performing. They will then be prioritised according to their budgets and compliance to standards and those considered highest priority, within the budget allowed for revisions that year, will receive authority.

Figure 7.7: Current Authority For A Full Revision.



Once a revision has been authorised the Delivery Area Manager notifies the Planning Manager. They contact the Area Planner, who will visit the office to evaluate the problems and agree the aims of the revision with the DOM. The revision process then begins (see Figure 7.8 below).

B.2 Data Collection

The Area Planner works at the Delivery Office for the duration of the revision, and with a group of Postal Officers collects the data for the office. This will involve going out with each Postal worker for a day (Manual-W revision), or marking and measuring maps and entering the information into a computer (CADR revision). Data is also collected from other information sources, e.g. overtime, traffic, etc.

B.3 Plotting / Planning

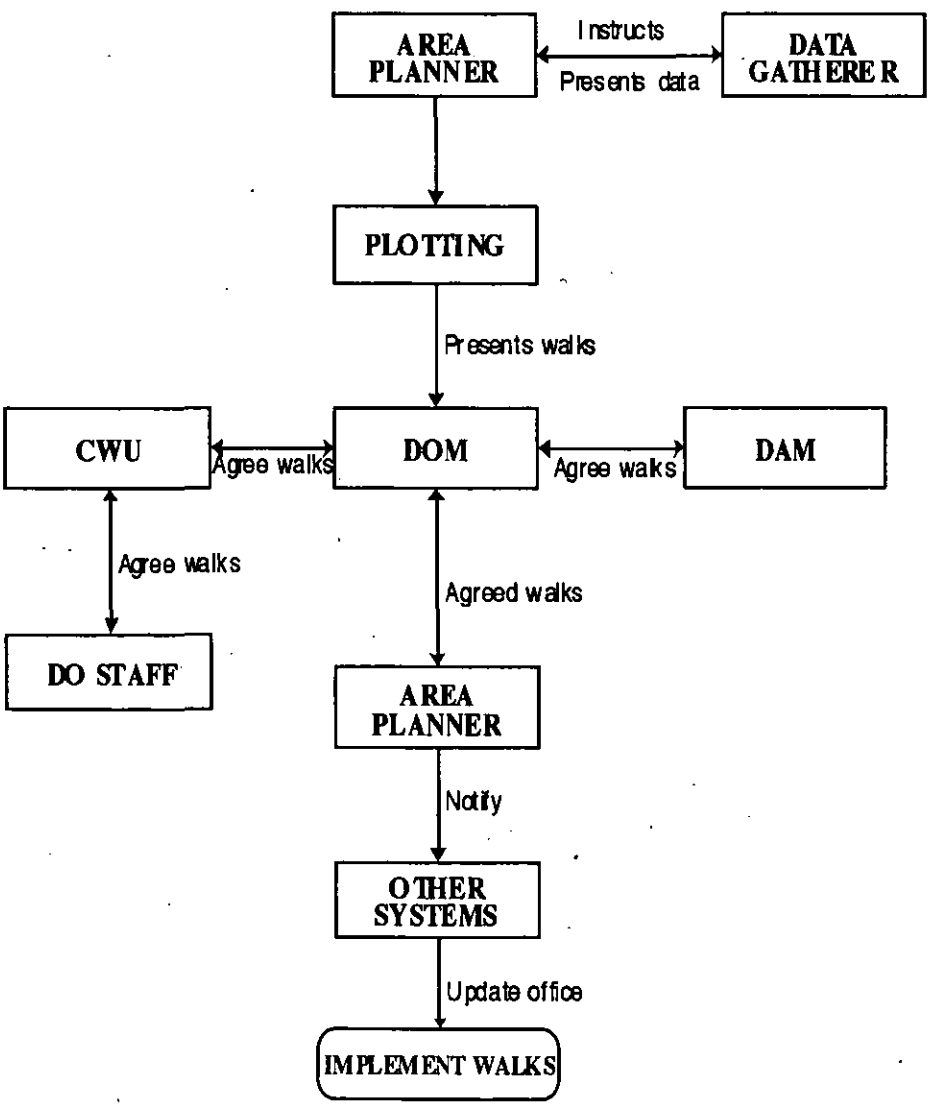
The Area Manager then builds up the walks, either manually or using CADR, until the walks reach the agreed span, i.e. the time from leaving the office to returning. The

walks are then adjusted to ensure they are all acceptable. The resulting walks are presented to the DOM for agreement, then the DAM. Once approval has been given at this level the walks are presented to the CWU and the DO staff. If the walks are felt to be unacceptable a negotiation process is entered into until a set of new walks is agreed. The Area Planner then notifies other systems which will be affected by the changes. Finally the Area Planner prepares the office for implementation, e.g. by labelling the sorting frames, perhaps recruiting new staff or ensuring existing staff are re-trained where necessary.

B.4 Implementation And Review

The new walks are then implemented and the Area Planner is responsible for attending to any problems that arise. After the initial settling in period the Area Planner leaves the office and the printouts of all the information required is handed over to the DOM.

Figure 7.8: Current Full Revision Process.



7.5.3.2. The New System

The second session began with a recap of the role to which each person had been assigned and their responsibilities under the current revision process. An overview of the WO system was presented (see Appendix I.3), outlining the three major components, i.e. GIS, WES and WO. A brief explanation of the kind of data that would be input to each part of the system, the processing the system conducted on the data and finally the output of each system was presented.

The FIS was then introduced, see Section 7.4. The Delivery Revision process was described using the diagrams to show the procedures for Ad hoc changes, an annual audit, gaining authority for a full revision and the revision process. The levels of access were also detailed to reiterate which parts of the system each role had access to. Particular attention was drawn to each of the roles and their associated responsibilities.

7.5.3.3. Discussion

The participants were encouraged to ask questions during the presentation of the base case and the FIS to ensure clarity. They were also asked at the end of the presentation if there were any points they were unsure of, or any questions they wanted to ask about the process and / or their role within the proposed system.

7.5.3.4. Probable Checklist

The participants were presented with the Probable Checklist (see Appendix I.4). The checklist was divided into four main sections (each with four sub-sections) reflecting the major areas which research shows can be affected:

i) Technology - covering the immediate way in which the technology will expect input from, and provide outputs to the stakeholders. This includes the specific parts of the system, e.g. GIS and the walk optimiser.

ii) Specific Tasks - these are the most direct impacts, they examine the way in which the system and data structures may change the specific stakeholder tasks. This includes the skills and effort needed and the workload and pace.

iii) Overall Task - covering the issues raised at job level, e.g. discretion, control and responsibilities.

iv) Personnel Policies - this includes issues such as Industrial Relations and Job Security, which become significant if a system leads to substantial changes in the way people work.

A verbal explanation of the checklist headings was given, along with several examples. An explanation was given on how to complete the forms, i.e. that a brief description should be entered in the first column, next to the key word. This should explain any changes they envisaged as the probable outcomes of the scenario for the role they were assigned.

Participants were instructed to respond from the totally selfish perspective of the user group, and not to concern themselves with the consequences for any other group, whether they were represented in the workshop or were not. They were also asked to comment only on the FIS as it was presented to them. They were asked to decide whether the effect of the changes they listed were a benefit or cost, not just financial costs but in terms of the job i.e. being able to perform better and fulfil more responsibilities. They were asked to give each key word a score of +1 to +5 if it was positive, and -1 to -5 if it was negative. If the participant felt that there would be no change related to a particular key word they were asked to mark it N/A. They were also instructed that an item could be given both a positive and negative score if there were both benefits and costs associated with the change. The Participants were also given additional sheets to expand on any points they felt necessary. They were allowed 25 minutes to complete the checklist.

7.5.3.5. Discussion

The remainder of the workshop was used for a discussion on the workshops. This was aimed at encouraging the participants to discuss any problems or difficulties they had experienced during the workshops, to ensure they had felt confident of the Royal Mail processes discussed and that they were comfortable adopting the stakeholder role.

Generally it was felt that it had not been easy to adopt the roles, but it was felt that by the end of the FIS they had enough detail of the current and future systems to make

informed comments. It was concluded that it was not an easy task, but it was possible with the information provided.

Discussion around the checklists and their use highlighted some apprehensions, but again this was felt to be due to the difficult concepts being considered. The key words on the checklist were discussed, to discover if there had been difficulty understanding the terms used, or if a more detailed definition of the terms would be useful. The consensus was that the ideas and concepts to be commented on were made clearer by the checklists, i.e. by having key words to draw attention to potential issues. Further descriptions were thought on balance to be a disadvantage, as giving a specific definition might limit the responses. The participants felt they might have to adhere to a strict definition rather than encouraging original ideas.

The participants were unclear about the scoring system used. There was no consensus on what -5 to +5 actually represented. A brainstorming session was used to generate words which the scores might represent, these were then grouped according to where they would lie on the scale of cost and benefit. The extreme scores were more easily agreed upon. However, the group was unable to form a consensus on the middle scores and what they represented.

7.5.4. Results

The pilot aimed to assess whether there were implications for the stakeholders resulting from the implementation strategy described, and also to ensure that the methods worked. The results of the pilot study showed that there would be two user groups which would benefit under the proposed system and two which would be disadvantaged. The Delivery Area Manager and the Divisional Planner were thought to benefit overall from the proposed changes. For the DAM the benefits came from:

- increased efficiency.
- better budgetary control.
- less effort having to be exerted.
- greater satisfaction.
- greater management of resources.
- time, previously spent on revision work, available for other tasks.

There were disadvantages in:

- the decrease in discretion and control and the influence they would have, due to a lack of understanding of the system.

The Divisional Planner would have:

- a greater influence on the revision results.
- more input in the negotiation and implementation processes.
- an increase in discretion and control over the revision process and resources.
- increased satisfaction.
- a possible increase in financial rewards.
- better career prospects, due to the additional skills.

The disadvantages for the DP were:

- the increase in responsibility.
- more frequent revisions for a larger area, which could lead to a decrease in performance.

The Delivery Office Manager and the Area Planner were thought to be disadvantaged under the new system. There were no major advantages listed for the DOMs, and they were felt to be the most disadvantaged as they would have:

- no involvement in the revision process.
- responsibility to present and negotiate the results, with no understanding of how they were reached.
- a greater workload.
- increased responsibility for notifying changes to the AP.
- to acquire additional skills to sell the walks to the DAM and the CWU.
- a decrease in satisfaction due to performance being measured through an annual audit.

The AP would, under the proposed system, only be involved in updating the systems and implementing minor revisions. They would have:

- a loss of planning skills.
- a reduction in discretion, control and responsibility.
- to report to more people.
- to hand large revisions over to someone else.

All these changes would result in a major decrease in satisfaction and a reduction in job security as the skilled components of the work were taken away. Benefits were felt to be gained from:

- the reduction in revision time.
- the ability to provide a better and speedier service to Delivery Offices.

7.5.5. Alterations To The Study

The pilot showed that all groups would, potentially, have comments to make about the affect the FIS would have on their roles and responsibilities. It also indicated that, although this was a very small study, there may well be adverse consequences due to the proposed system.

The study demonstrated that the scenario was understandable to people outside the Royal Mail. It highlighted some areas which would need improvement, for example as both the sessions had completely focused on the revision process and the associated roles and responsibilities, there was no sense of what other work each role has to perform and the amount of time / effort each might associate with revisions. The issue of scoring, which arose from the discussion at the end of the second session, led to a new rating system being devised. The scale was reduced from eleven points to seven points, ranging from -3 to +3, and each score was given a description to ensure a common understanding:

+3	Major advantage
+2	Advantage
+1	Minor advantage
0	No change
-1	Minor disadvantage
-2	Disadvantage
-3	Major disadvantage

The checklists were also altered to reflect this new scoring and the 'benefit' and 'cost' columns were replaced with 'advantage' and 'disadvantage' respectively to avoid confusion.

7.6. THE ROYAL MAIL WORKSHOPS

7.6.1. Design

The design of the RM workshops was based on the pilot study, discussed above, taking into account the problems that had been experienced.

7.6.2. Questionnaires

All workshop participants were given a preliminary questionnaire in order that they could be classified with respect to the extent of their knowledge. They also provided background information, e.g. the RM participants' views on the new WO system prior to the workshop. Questionnaires were developed for the RM participants (See Appendices I.5) and concentrated on a number of key issues which were felt to be relevant to the responses given on the checklists. The main areas were:

- Personal information to determine experience within the Royal Mail, and general computer usage.
- Revision information to determine their previous involvement with revisions and the different methods used.
- Walk Optimisation information to determine how much knowledge the participant had of the system, any involvement they had had in the trials, and finally their perception of who might gain or be disadvantaged by the system, based on the knowledge they had before the workshop commenced.

7.6.3. Participants

The User Reference Group were asked to arrange the workshops, and to recruit the appropriate people in their Division. It was requested that each workshop should consist of, at least, the following:

- 1 User Group Representative
- 1 DAM
- 1 DOM who had been involved in the WO trials
- 1 DOM with no WO trial experience
- 1 planner who had been involved in the WO trials
- 2 planners with no WO trial experience

The User Group Representative had already been selected as part of the Walk Optimisation project. The DAM would be chosen from the limited number in each Division (approx. 10 per Division) and was dependent on their availability and willingness to participate. The Planner and DOM with WO experience would again be pre-determined by those involved in the trials. The remainder were selected by the User Group Representatives using their own methods to determine availability and willingness to participate. The majority of participants would comment from their own role. However, the URG would be asked to comment from an assumed role.

Table 7.2: RM Attendees.

	Roles Represented in the Workshop				
Actual Role	DAM	Divisional Planner	Area Planner	DOM	TOTAL
URG (WO)		2	2		4
URG		2			2
DAM (WO)					0
DAM	2				2
Planner (WO)		3	3		6
Planner		1	8		9
DOM (WO)				8	8
DOM				3	3
TOTAL	2	8	13	11	34

Of the 9 Divisions, 6 took part in the workshops. One had to be cancelled at short notice due to unavoidable circumstances and the final two Divisions were never arranged. The number of participants and the roles they represented varied between workshops, these are demonstrated in Table 7.2 above.

7.6.4. Procedure

A timetable was drawn up for the workshops to ensure that enough time remained at the end of the session for the checklists to be completed. The timetable was as follows:

Introductions	-	5	minutes
Questionnaire	-	15	"
Presentation	-	45	"
Discussion	-	15	"
BREAK	-	20	"
Recap roles	-	15	"
Checklist intro.	-	10	"
Probable C/L	-	30	"
THANKS	-	10	"

After brief introductions, the presentation began with an overview of the aims and structure of the workshop. Participants were assured that the views they expressed were anonymous, but would be reported to the Walk Optimisation project team in summary. This would enable their views to be heard and allowed them, potentially, to have an impact on the deployment of the WO system. It was made clear that the FIS was an interpretation, by the researcher, of how the system could be deployed, that there were many other possible structures and systems that could be used, and any of these might eventually be adopted by the RM.

The workshop followed the same format as the second session of the pilot study, and handouts were provided with all the overheads used in the session. The WO system was presented, along with the aims of the system. The FIS was then presented with questions and discussions taking place throughout. Following the presentation a discussion was initiated to promote an understanding of the scenario and to encourage debate about the issues involved. Following a short break, the roles and responsibilities were reiterated and the diagrams showing the processes for an ad hoc revision, an annual audit, request for authority and a full revision were talked through.

In the first workshop there was a very limited number of responses from the participants on the checklists and they had commented strongly on how difficult they found the exercise. In light of this, participants at subsequent workshops were asked to list three advantages and disadvantages they could foresee as a consequence of the

scenario for their particular role. This encouraged people to start thinking about the issues prior to the checklists being presented.

The probable outcome checklists were then introduced and explanations were given on their completion, the meaning of keywords and some examples of changes. People were asked to work alone on their responses and from a totally selfish perspective, i.e. only about the effects on their role. Questions were allowed throughout the completion of the checklists, but discussions were discouraged at this point to avoid influencing other people's responses. The participants were allowed 30 minutes to complete the checklist and were encouraged to consider the major implications first. They were informed when there were only a few minutes left.

Finally the respondents were asked how easy / difficult they had found the workshop, what, if any, problems they had experienced in using the checklists or participating in the session and if they had found it useful. They were then thanked for their time and effort.

7.7. STUDENTS WORKSHOP

7.7.1. Design

The design of the student workshops was based on the RM study above, and also on the base case used during the pilot study.

7.7.2. Questionnaire

A questionnaire was developed for the students (see Appendix I.6), concentrating on a number of key issues felt to be relevant to the responses given on the checklists. The main areas were:

- Personal information to determine experience within the Royal Mail (if any), and general computer usage.
- Background information to establish if they had any experience with the issues surrounding new technology, either through education or work.

7.7.3. Participants

Participants were recruited from various degree courses at Loughborough University. Firstly, by visiting selected lectures, e.g. Human Computer Interaction, to ensure participants would have some understanding of technology. There was a limited response to this request for volunteers, and this led to a second attempt to recruit by emailing selected modules and / or courses. The table below shows the number of participants and their allocation to roles. They were each paid a nominal amount for participating in the workshops.

Table 7.3 Student Attendees.

ROLE	
AREA PLAN	5
DAM	5
DOM	5
DIV PLAN	5
TOTAL	20

7.7.4. Procedure

The participants were arranged into two workshop groups according to the dates on which they were available, and each workshop was conducted over two sessions. The procedure for the scenario presentation was the same as employed with the RM participants. However, there was a major difference in the overall workshop, i.e. an additional session to present the base case information. This was required to allow the current situation to be understood in order to assess potential impacts.

The first session, lasting one hour, began with introductions followed by the completion of a questionnaire. The base case was then presented as it was in the pilot study (see Section 7.5.3.1 above). There were some minor alterations to stress the type of responsibilities and jobs the various roles would perform outside the revision process, but it was otherwise unchanged. The participants were then randomly assigned to stakeholder roles. The current revision process was talked through, having asked people to concentrate on their particular role and responsibilities. Questions and discussions were encouraged throughout.

The second session began with a review of the first session and an explanation of the current revision process. The remainder of the session was conducted in line with the

RM workshops using the same overheads, handouts, checklists and using the same timetable. The Walk Optimisation system and the FIS were presented, followed by a discussion. After a break there was a recap of the revision process and then participants were asked to list three advantages and disadvantages, before the presentation of the probable outcomes checklist. Finally participants were asked for comments on the workshop, before being thanked for their time and effort.

7.8. SUMMARY

This chapter has described the development of the Future Implementation Scenario. It describes the methods used for establishing the workshops within the RM, and the limitations that were imposed. The FIS is described, using flow diagrams and a text and oral description of the roles and responsibilities. A pilot study was conducted to ensure that the base case and FIS were understandable, particularly to participants with no RM experience. This also allowed the methods, checklists and scoring to be reviewed.

The pilot study demonstrated that the methods were acceptable, although some minor alterations were made. It also demonstrated that there were potential implications for all of the stakeholder roles, some of them disadvantages. Based on the pilot study, workshops were conducted in six Divisions of the RM, and with two groups of students. Chapter 8 presents the findings of these workshops and discusses their interpretation and implications.

CHAPTER EIGHT:

RESULTS OF THE FUTURE IMPLEMENTATION SCENARIO WORKSHOPS

CHAPTER 8: RESULTS OF THE FUTURE IMPLEMENTATION SCENARIO WORKSHOPS

8.1. INTRODUCTION

This chapter presents the findings of the Workshops, described in Chapter 7. The aim of the study is threefold; i) to investigate the likely implications for various stakeholders within the RM, ii) to investigate the use of scenarios to enable likely implications to be envisaged, and iii) to investigate the affect of prior knowledge on stakeholders' responses.

The chapter proposes a number of hypotheses (5 to 8 presented below). In summary these are that the Future Implementation Scenario will have consequences, and that the nearer participants are to the target stakeholders, the more they will be able to offer an enriched view of the system implications. The analysis therefore looks at the effects that prior knowledge has on the responses of the participants to see whether being closer to the Royal Mail, the role, and the Walk Optimisation trials has an effect on the responses recorded.

A qualitative analysis was conducted to highlight any differences in the responses of students and RM participants. The three most frequently reported advantages and disadvantages are reported. These are presented in a table format, and compared for each role.

A number of quantitative comparisons were also conducted to highlight differences in the frequency of responses, according to categories. The average number of responses are collated and presented in graphical format. These are analysed for differences in the advantages, disadvantages and no score responses. The data is also presented and analysed to show the differences in the responses which are 'out of role' and 'out of scenario'. The findings are reviewed in respect of both the implications for stakeholders and the theoretical implications of using scenarios in design.

8.2. HYPOTHESES

- Hypothesis 5: There will be organisational implications, both advantages and disadvantages, to the implementation described, with some roles gaining and some losing.

- Hypothesis 6: Participants from within the RM will have a better insight than the non-RM participants into the probable outcomes of the system; as they have prior knowledge of the environment in which the system will be placed.

- Hypothesis 7: The RM participants who comment from their own role will have a better insight into the probable outcomes of the system than those who assume a role for the workshops; as they have a prior, detailed knowledge of the role.

- Hypothesis 8: The RM participants who have been involved in the WO project and/or trials will have a better insight into the probable outcomes of the system than those who have had no involvement; as they have a prior, detailed knowledge of the system and processes.

8.3. DATA ANALYSIS

8.3.1. Questionnaire Summary

The questionnaires completed at the beginning of the workshops provided background information on the participants and a summary of the responses is given below:

8.3.1.1. The RM Participants

- All of the RM participants had worked for the RM for 6 years or more.
- 33 of the 34 participants felt the current revision process could be improved.
- Half of the participants had only a little informal knowledge of the system.
- The knowledge of others varied from none at all to involvement in the WO project.
- The majority of participants felt that the WO system would benefit all levels of the organisation, from the business as a whole, to the delivery offices.

- The majority also felt that the WO system would benefit all levels of people involved with, or affected by, the system. From the Divisional Managers, to the CWU and customers.
- The majority reported that WO would be an advantage, or major advantage, to their own role.
- All participants were frequent users of computers.

8.3.1.2. The Student Participants

- None of the participants had any previous experience of working with, or for, the RM.
- 17 of the 20 participants had some experience of organisational or managerial issues through their studies.
- 15 people had previously worked in full time positions.
- All were frequent users of computers.

8.3.2. Probable Outcomes

The data was categorised and analysed according to the type and number of responses, shown below. The responses was also categorised according to the content of the comments (see Appendix J.1 for an example of the completed checklist).

8.3.2.1. Categorising Data

The responses were categorised into 'advantages', 'disadvantages' and 'no change'. These categories corresponded to the headings used on the checklist; 'no change' had a score of zero described on the score sheet, or left blank. The allocation of responses to categories was undertaken by myself (twice) and by a colleague. Where there was uncertainty the scores were used to reinforce the interpretations, for e.g. "More responsibility" was classified as a disadvantage when it was scored -3. Discrepancies between raters were discussed and either agreed upon, or the responses were excluded where agreement could not be reached.

The responses were also classified into two other categories 'out of role' and 'out of scenario'. 'Out of role' responses were defined as inappropriate to the role the participant had adopted, e.g. a Divisional Planner stated "The system will be a benefit to all delivery office employees." Participants were asked only to comment on the

system from their own perspective and this is therefore out of the Planners remit. 'Out of scenario' responses were defined as responses which were not based on the scenario given, e.g. a DAM stated "Area Managers will be in charge of the deployment of equipment and will therefore need training to cover this." The scenario did not specify who would be in charge of deployment and this statement was therefore based on assumptions which were outside the scenario.

Table 8.1 shows the tally of responses given by the RM participants and Students for each of the questions (RM=34, Stud=20) according to the response categories described above.

Table 8.1: Probable Responses By Group.

	Response	Advantage		Disadvantage		No Change		Out of Role		Out of Scenario	
	No.	RM	Stud	RM	Stud	RM	Stud	RM	Stud	RM	Stud
Technology	1	36	21	5	11	0	3	2	1	3	2
	2	22	17	7	20	5	1	2	1	5	0
	3	34	16	6	16	4	1	1	1	3	0
	4	25	15	1	8	9	1	4	2	0	1
Specific Tasks	5	23	14	14	26	4	1	1	0	5	0
	6	17	9	15	28	6	0	0	0	5	0
	7	21	10	4	22	9	2	1	0	3	0
	8	23	18	14	15	4	0	1	0	3	2
Overall Task	9	20	10	16	22	6	1	2	1	1	0
	10	14	10	11	20	8	3	4	0	3	0
	11	11	12	12	19	12	1	4	0	2	0
	12	24	13	3	19	7	1	4	0	3	0
Personnel Policies	13	15	9	4	13	13	6	2	0	0	0
	14	15	17	0	7	17	3	2	0	1	0
	15	9	12	4	13	21	2	1	0	0	0
	16	20	8	7	14	4	2	5	0	4	0
	TOT	329	211	123	273	129	28	36	6	41	5

Table 8.1 shows that there were many different responses made; the 54 participants provided 1181 statements of probable implications. The overall majority of these were positive outcomes. The students noted more disadvantages than the RM, and

more disadvantages than advantages. Students recorded fewer 'no change' responses and fewer 'out of role' and 'out of scenario' responses.

Table 8.2 below shows the categories on the response sheets. Each received a similar number of comments, although there are variations in the individual response categories. The table shows that the greatest number of comments, for both groups, is for advantages in technology (totalling 186). The greatest number of disadvantages for both groups are for the specific task (138) and overall task categories (122). The greatest number of 'no change' responses were recorded against the personnel category (68).

Table 8.2: RM Vs Students - Responses By Category.

	Advantage		Disadvan.		No Change		Out of Role		Out Scen.		
CAT.	**RM**	**Stud**	**RM**	**Stud**	**RM**	**Stud**	**RM**	**Stud**	**RM**	**Stud**	**TOT**
Technology	117	69	19	55	18	6	9	5	11	3	**312**
Specific Task	84	51	47	91	23	3	3	0	16	2	**320**
Overall Task	69	45	42	80	33	6	14	1	9	0	**299**
Personnel	59	46	15	47	55	13	10	0	5	0	**250**

8.3.2.2. Scores

There were a number of difficulties in the responses participants recorded and these are discussed below. The scoring system made the responses even more complex and again participants appeared to have had difficulty using them uniformly. Table 8.3 below illustrates the diversity of scores. The table shows the total scores given to both the negative and positive responses. For example participant 1 of the RM group representing the DAM, recorded a total negative score of 14 and total positive score of 19. The diversity of scores is due to the number of advantages and disadvantages each participant envisaged. For this reason, and for the purpose of reporting the findings, the values have been collapsed. Responses are reported as either positive or negative with no indication of the severity, whatever score the participants gave as a response.

Table 8.3: Total Scores (Advantages and Disadvantages) per Group, per Role.

PARTICIPANT		1	2	3	4	5								
DAM														
	RM +	14	16											
	RM -	19	9											
	STUD +	4	25	10	19	9								
	STUD -	17	28	11	14	10								
PARTICIPANT		1	2	3	4	5	6	7	8					
DP														
	RM +	21	42	42	24	23	29	28	24					
	RM -	12	13	21	7	12	2	2	2					
	STUD +	35	16	16	39	28								
	STUD -	13	12	7	29	15								
PARTICIPANT		1	2	3	4	5	6	7	8	9	10	11	12	13
AP														
	RM +	30	19	19	34	21	29	23	20	35	14	32	20	18
	RM -	8	3	4	0	0	4	0	7	6	5	0	1	9
	STUD +	32	29	17	21	13								
	STUD -	13	13	30	29	17								
PARTICIPANT		1	2	3	4	5	6	7	8	9	10	11		
DOM														
	RM +	18	15	7	41	18	23	19	7	28	29	9		
	RM -	1	0	0	3	15	12	22	18	7	0	30		
	STUD +	6	8	16	26	0								
	STUD -	24	6	15	31	40								

8.3.2.3. Qualitative Data Analysis

The responses were categorised according to content and the responses most frequently recorded by participants are reported in the following section.

8.4. HYPOTHESIS 5: ORGANISATIONAL IMPLICATIONS

Hypothesis 5 proposes that there will be potential implications which may affect each of the roles, if the system is implemented as described in the scenario.

The following sections present a qualitative analysis of the responses recorded by RM and student participants, according to role. For each role a table presents the three most frequently reported advantages and disadvantages.

8.4.1. The Delivery Area Manager

The DAM is in charge of the delivery function for the whole area, e.g. Leicestershire. They are currently responsible for choosing which DOs will be revised, determined by the office's performance, and the perceived benefits a revision could bring. The

decision is based mainly on budget with the most needy offices being revised, and this is normally decided at an annual meeting.

Currently, once a revision has been approved, the DAM is kept informed of the progress and will be consulted if any major problems are encountered. The DAM will be presented with the final outcomes of the revision process for approval. They may be involved further if a dispute arises with the CWU which cannot be resolved locally, this follows the defined rules to Area level.

Under the new system approval will only be sought in the event of a major revision. This may only be a formality as the proposed system will automatically flag up the offices which need a revision. The DAMs no longer play a part in the revision process itself and the results are presented to them once a revision has been conducted. They have access to all parts of the system but only as a result of the presentation of the new walks.

Table 8.4: Delivery Area Manager - Most Frequent Responses.

ROYAL MAIL	No. Resp	STUDENTS	No. Resp
POSITIVE IMPLICATIONS			
• DATA Automatic updating using standardised measures.	4	• SAVINGS Savings in time and cost through re-use of data and time taken for plotting, therefore more revisions are possible.	8
• REVISIONS WO will lead to less delay in offices being revised.	3	• DATA More accurate and reliable data and results as standard measures are used.	7
• UNION Reduces the CWUs power to obstruct.	2	• REPORTS Standard reports allow better co-ordination of the Division, with easier evaluation of the need for a revision and its outcome.	4
NEGATIVE IMPLICATIONS			
• RESOURCES WO seen as resource hungry, requiring more money and management time.	4	• ACCESS Limited access to the new WO system therefore out of touch with the process and how outcomes are obtained and less skilled than sub-ordinates when have got access to system.	12
• REVISIONS There will be an increase in revision activity leading to a pay off between quality and budget.	2	• REVISIONS More revisions over shorter time frames means there will be tighter deadlines for DAM and more meetings, with the work being less predictable as the system is reacting to changes.	9
• RESULTS The results of the system are fixed with no flexibility.	2	• CONTROL Less control as DAM is now separate from the revision process and people, probably just a rubber stamping role as the computer will be seen as producing good results and DAM will not be able to argue as will not understand system as well.	4

The results show that there are potential issues for this role. The major gain was thought to be through the improved data which would lead to standardised results more quickly and accurately. However there were also concerns. The RM participants were mainly concerned with resources and budgetary implications. However, students were also concerned with the lack of access to the system and the increased pressure, due to the amount and frequency of revisions being outside the DAMs control.

This would indicate that the agenda to be addressed in the development and implementation of the system for the DAM would be to consider the role they play in authorising the revisions and approving the results, and also to consider further the effects on the Area Manager's budget and resources.

8.4.2. The Divisional Planner

The Divisional Planner's (DP) current role is that of Planner. The Planner is given notification that an office needs to be revised and then approaches the DOM to define the aims of the revision, specific to the office. The Planner works from the DO for the duration of the revision and is responsible for the collection of data and plotting of walks, manually or through CADR. This may also include the management of additional staff from the office and / or other offices. Once the walks are plotted the Planner presents the results to the DOM, and then the DAM for approval. Once the walks have been approved by all parties, the Planner is responsible for notifying other systems of the changes and preparing the office for implementation. They are also responsible for the implementation of the new walks, dealing with any problems that arise, and for the post-implementation review.

Under the proposed system they will be responsible for the major revisions. They will have the relevant information fed to them by the Area Planner (AP), through the updated computer system. They are then responsible for obtaining authority from the DAM and, if it is given, contacting the DOM to inform them of the revision. They collect any additional data needed from the DO, with the aid of one or more DO staff, and plot the new walks, verifying these with the DOM. The walks are presented to the DOM and DAM for approval, and relevant printouts are provided for the DO. Once the walks have been approved, the DP prepares the office for implementation and notifies other systems of changes. They are responsible for dealing with any problems that arise during implementation and for conducting a post-implementation review.

They have access to all parts of the system with update facilities and also provide support to the APs for all the systems employed.

Table 8.5: Divisional Planner - Most Frequent Responses.

ROYAL MAIL	No. Resp	STUDENTS	No. Resp
POSITIVE IMPLICATIONS			
• DATA Standardisation seen as major benefit, increasing accuracy and allowing workloads to be balanced.	11	• SAVINGS WO system will bring savings in time and money; not having to walk test, having calculations performed by algorithms and a database which can be re-used therefore more revisions can be performed.	13
• SAVINGS Time and money savings as no more walk testing will mean more offices will be revised and this will lead to increased productivity.	11	• TRAINING Increased skills through additional training in the new computer systems, liaising and organisational skills, all of which will be needed in the new role.	8
• PLOTTING Ease and flexibility to plot walks, view the areas and try out options using the 'what if' scenarios.	9	• POWER Increased power as DP no longer has to perform minor changes but is still informed, have more people working for DP (including APs) and is in charge of the overall revision process.	7
NEGATIVE IMPLICATIONS			
• REVISIONS More work at a faster pace, in addition to current responsibilities, i.e. the introduction of annual audits, will mean a lot more pressure.	10	• TEAMWORK Loss of 'hands on' work, more office based using technology and having less contact with other staff therefore more solitary role and no team morale. Could lead to conflict as DOMs might question the planners commitment to their revision.	13
• DATA Relies on the commitment of others, e.g. DOM and CWU to ensure accuracy and maintenance of data.	7	• TRAINING The large amount of training needed to fulfil new role, both computing and negotiating skills. Would the training be available? Will DPs be capable of learning everything? What if they can't?	10
• TRAINING Training needed on all systems which may need updating as the system develops and may mean DPs are seen as experts.	5	• DATA Concerns about the accuracy of the data and whether the standardised system can account for individual and local differences, e.g. fitness levels and lengths of pathways and the affects of time of year and weather.	10

The results show that there are potential issues for this role. The RM responses reflect the changes brought about by the computer system and the major gains were seen in terms of financial and time savings. The students also reported these, but reported

additional benefits in terms of the additional skills acquired through training, and the increased power brought to their role through the changes in structure and responsibilities. Both groups agreed on the disadvantages of increased training needs and the reliance on others to provide data and the effect this might have on its accuracy. The RM were also concerned about the increased pace and workload. The students were more concerned with the lack of team working and the stresses this might bring to everyday working relationships.

This would indicate that the agenda to be addressed in the development and implementation of the system for the DP would be to consider the increase in the amount of work and systems they are responsible for. This would include their changing needs in terms of support and training for the technology, and the liaising they will now have to do. Further consideration should also be given to the way the DPs conduct their work and interact with other staff.

8.4.3. The Area Planner

The current role of the Area Planner is the same as the Planner described above. Under the future system they will be responsible for the minor changes which are notified by the DOM. They will be passed the relevant information which they then input into the GIS and WES systems. Provided the changes do not exceed the tolerance levels they will amend the WO system and present the results to the DOM for verification. If the changes exceed the set levels the AP passes the information on for the DP to progress. If authorisation is not given to conduct a full revision the changes are passed back to the AP and they will then manually adjust walks. They are also responsible for the newly created annual audits, checking that the DOMs have passed on all changes and that the systems are up to date. They have access to all systems, with the facilities to maintain and update.

Table 8.6: Area Planner - Most Frequent Responses.

ROYAL MAIL	No. Resp	STUDENTS	No. Resp
POSITIVE IMPLICATIONS			
• REVISIONS Easier and speedier revisions with no walk testing and reusable data, easily updated.	19	• REVISIONS Easier and faster revisions for AP, no walk testing and the computer does the calculations.	9
• DATA Standardised measures and system allowing balanced walks to be plotted, fairer to all.	9	• EFFORT Less effort as now only responsible for monitoring and maintenance.	6
• CONTROL More control over own work and better control and support to DOMs and POs, especially through audits.	9	• DATA More information can be considered and stored and it will be more accurate.	3
NEGATIVE IMPLICATIONS			
• CONTROL Lose control and influence as no longer in charge of major revisions. Doing all the work and getting no credit as DAM makes the decisions.	7	• STATUS Status will be reduced. AP now only sees part of the revision process, inputting the information and handing over to the DP; will lose decision making power and be undervalued and lose respect.	14
• WORKLOAD Workload will increase due to more revisions, having to conduct audits and covering a larger area.	6	• TEAMWORK Changing emphasis less 'hands on', more work with computers and therefore more mundane. Lose touch with colleagues and generate tension with DP as they have taken over AP's jobs.	8
• TRAINING Training for new technology has cost and time implications and may lead to a lose in traditional planning skills.	6	• DATA Have to rely on notification of changes and provision of data from DOM.	6

The results show that there are potential issues for this role. The RM and students both agreed on the potential benefits from the improved data, its handling and the easier and speedier revisions. The RM also reported an increase in control due to the audits and a closer working relationship with DOMs and POs. Students also thought less effort would be required as they were no longer involved in major changes.

The reported disadvantages differed according to group. The RM were concerned about the loss of control, the increased workload and the need for more training. The students were concerned with their reduced status and their loss of decision making

powers. They were also concerned about the increased work involving computers, with the resulting loss of team working and potential tensions, especially with the DP to whom they have to hand over the changes.

This indicates that there are a number of issues which need to be addressed in the development and implementation of the system for the DP. The responses show that there are potential gains but these could easily be outweighed by the disadvantages which would affect the daily working of the AP. Specific attention needs to be directed to the issue of status, control and the new working relationships. This is especially true for the AP and DP. These people were previously working in the same role and this could cause major tension in the allocation to new roles.

8.4.4. The Delivery Office Manager

The current role of the Delivery Office Manager in the revision process begins with the recognition that a change is needed in their office. The DOM approaches the DAM to obtain authority, normally at an annual meeting. Once approval is given the Planners contact the DOM and agree the aims of the revision. They are responsible for providing facilities for the revision team, additional staff if necessary and local information, e.g. office statistics, geographical information, etc. The DOM is usually kept informed throughout the revision process and is presented with the walks for approval. They are responsible for presenting these to the DO staff and CWU and for gaining their approval. The Planners then implement the changes.

Under the new system they will be responsible for monitoring all changes in their office and notifying the AP of these changes along with relevant data as they occur. They will also be audited annually, and again need to provide data at this time, to ensure they are updating the planners of all changes. If the changes are minor the DOM verifies the amendments. If the changes are above the tolerance level the DOM will be informed by the DP if a revision is to be conducted. The DOM then provides the DP with the additional data and local knowledge necessary. Once the walks are plotted the DOM presents them to the staff and is responsible for obtaining their agreement. They do not have any access to the systems unless a revision has been conducted. They are then given a facility to view the walks and can request printouts.

Table 8.7: Delivery Office Manager - Most Frequent Responses.

ROYAL MAIL	No. Resp	STUDENTS	No. Resp
POSITIVE IMPLICATIONS			
• DATA More detailed and accurate data with a database created for future revisions.	10	• DATA Accurate, standardised and flexible	8
• REVISIONS Speedier and easier revisions, with more options being considered.	10	• WORKLOAD Decrease in workload as no longer involved in the revision process.	6
• CONTROL More control and influence in the revision process.	7	• REVISIONS Much faster revisions which are automatically triggered rather than having to prove a need.	5
• TRAINING More skills leading to an increase in job satisfaction.	7		
NEGATIVE IMPLICATIONS			
• CONTROL Control passed to planners. Increased responsibility for notifying changes and negotiating with union but no control over changes.	8	• ACCESS No access to the information or the processes used for revising the office and devising new walks.	16
• INPUT No input in the revision process and in negotiating new routes.	6	• INPUT No input to the new walks therefore have to negotiate and defend the planners decisions	11
• ACCESS No access locally to the systems.	4	• CONTROL Loss of control in the decision making processes and the walks in the office.	10

The responses show both groups expressed similar advantages and disadvantages. Both groups agree there are potential benefits to be gained from more detailed and accurate data. They also agreed that the revisions would be much faster. The students thought there would be a decrease in workload, while the RM saw advantages in increased control of the revision process, and increased job satisfaction due to the new skills.

The disadvantages were again very similar. Both groups were concerned about the loss of control to the Planners. Both were concerned that they would not have access to the WO system and the students were also worried by the lack of access to the processes involved. They were also concerned that they would have no input into the resulting walks.

This indicates that for the DOMs further consideration should be given to the levels of access, the amount of input to the revision process and the amount of control they have over the process and its results.

8.4.5. Interpretations And Implications

The tables demonstrate that there are implications for the introduction of the WO system, in the way described in the workshops. A synopsis shows that there are likely to be many more frequent and standardised revisions. The management roles have less input and control over each of the decision making processes, but remain responsible for resources, etc. They also have to convince the staff and CWU of the changes, and live with the consequences. If the potential benefits are to be gained, methods need to be built into the revision process to enable managers to fulfil their responsibilities.

The probable outcomes recorded are different according to the role and the group commenting. There are similar issues raised by both student and Royal Mail groups. There are also issues which are raised by one group and not another. Students, for example, recorded more detailed responses, i.e. they record a change and describe its implications, whereas the RM more frequently record just the change.

Differences to note:

- Some less reported comments could be more insightful, e.g. DDAM1 - highlights accommodation and financial problems and says this will affect management credibility if not addressed prior to implementation. The problem of accommodation was apparent at the Hinckley revision, but not recorded by anyone else.
- Responses relating to career implications were often inaccurate in the student groups, i.e. "DAMs would come under pressure from DOMs, due to their lack of computer skills". In the RM the distance, in the hierarchy, between the DAM and DOM means there would be no threat from a DOM due to additional computing experience.

Both students and RM participants report implications, both positive and negative. However there is some disagreement about the type of implications. Although there is a lot of noise and disagreement, the kind of impacts that people are seeing are the benefits gained through the speed and ease of revisions for each role. The differences

noted are mainly in the disadvantages. The responses show that there are issues, although there may not be agreement on the effects. Despite this each of the roles has apparent areas of concern.

These implications are not inevitable. When a new system is introduced into an organisation there is an opportunity to manipulate its effects by putting people into new roles in relation to the system, but this cannot be achieved if the potential implications are not known. The approach taken by the RM in the development of the new system was a rational and technical one, which did not reveal the implications described above. The workshops allowed a large screening of stakeholders' views and identified a number of issues which the RM may encounter if they continue with the implementation described, and which may make the implementation problematic.

There is much prima facie evidence that there will be organisational implications for all these roles. The RM participants see them as mainly positive but students see many more negative consequences.

Having examined and discussed the contents of the data recorded it is apparent that there are some peculiarities. These call for a more detailed look at the methodological issues and can be addressed by referring to the other hypotheses set out in this chapter. These are discussed below.

8.5. HYPOTHESIS 6: RM VS. STUDENT

Hypothesis 6 proposes that knowledge of the current RM environment will affect the ability to understand the scenario and its consequences. Therefore those closer to, or operating in, the real world setting should be able to produce more of the positive and negative implications and to offer an enriched view of the probable outcomes.

This section compares the responses recorded by the RM and student participants, to identify differences in the type and frequency of responses according to the response categories described above; advantage, disadvantage, no change, out of role and out of scenario.

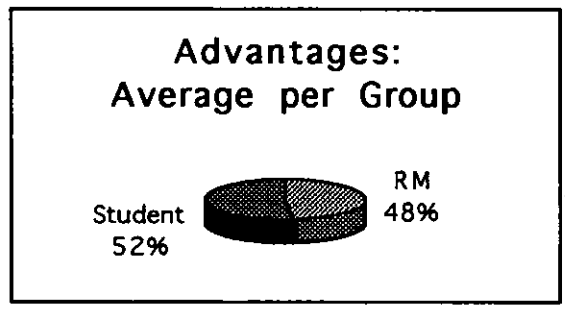
Table 8.8 Total Number of Responses per Group.

	Total no. responses	Average per respondent
RM	658	19.35
Student	523	26.15

Table 8.8 above shows that the average number of responses given by the two groups of participants was similar. However, Table 8.1 above shows that there are differences in the type of responses each group recorded. The following graphs examine the differences in more detail, comparing the average number of scores per group according to roles, categories and individual questions.

8.5.1. Advantages

Figure 8.1: Average Advantages per Group



The total number of advantages recorded was 540. Figure 8.1 shows the average number of advantageous responses was similar in both groups. The responses were further analysed according to roles and the four categories listed on the checklist (Figure 8.2 and 8.3).

Figure 8.2: Average RM Advantages per Category.

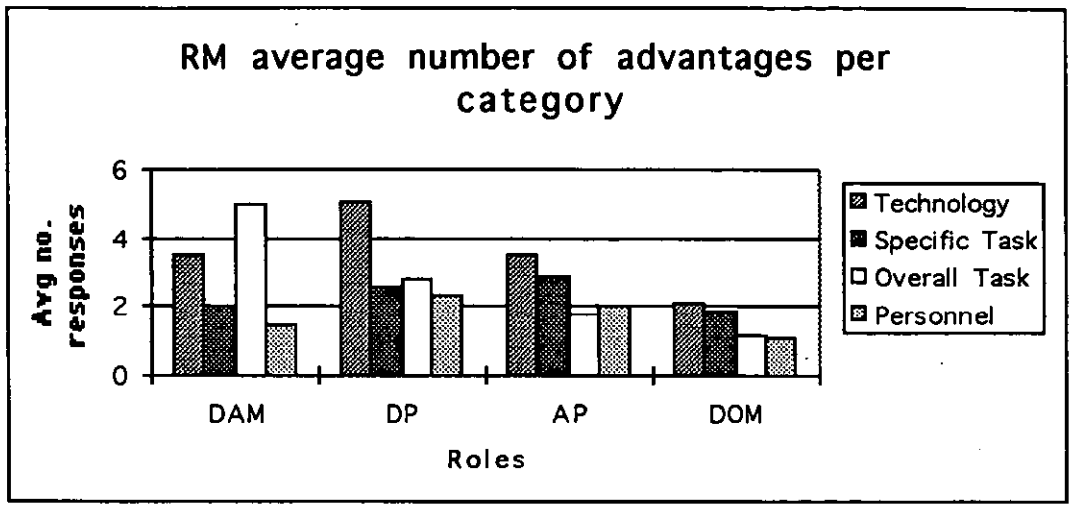
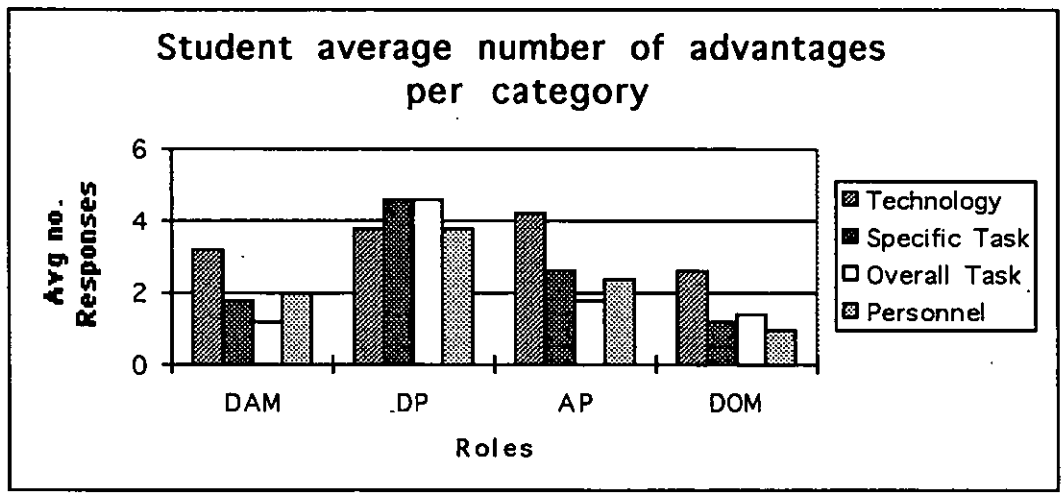


Figure 8.3: Average Student Advantages per Category.



The bar charts show there are similarities at this level in the number of advantages recorded in some of the roles. For example the Area Planners in both the RM and student groups have a similar amount of responses in each of the categories. Other comparisons identify differences, e.g. the average number of advantages recorded by DAMs in the overall task category for RM participants was 5, compared to the student average of 1.2.

The following set of graphs take the comparisons a stage further, comparing groups responses by role and by question. These allow the differences to be examined further and demonstrate whether they are distributed across questions or relate to a particular issue, confirming or negating the previous conclusions.

Figure 8.4: Delivery Area Managers
Average Number of Advantages per Group

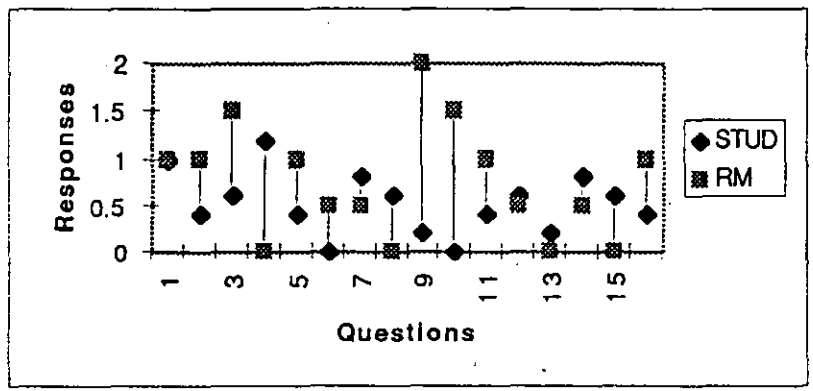


Figure 8.5: Divisional Planners
Average Number of Advantages per Group

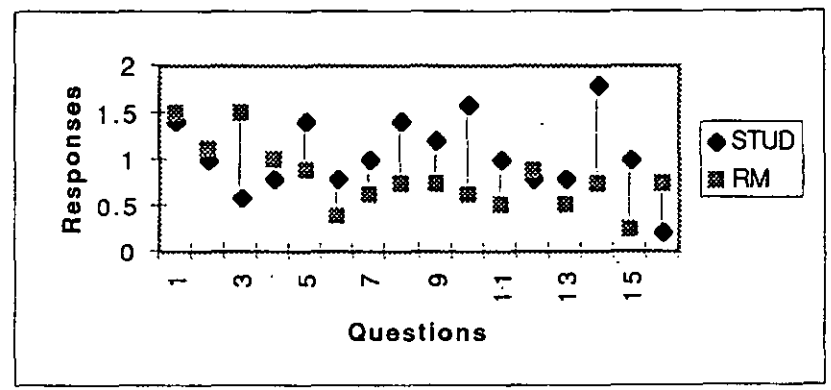


Figure 8.6: Area Planners
Average Number of Advantages per Group

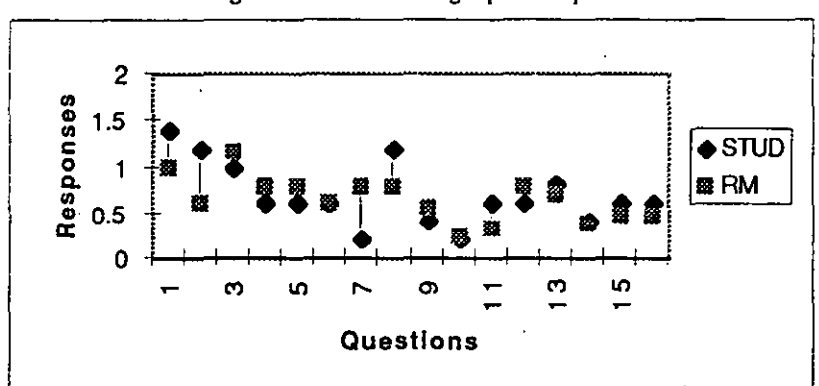
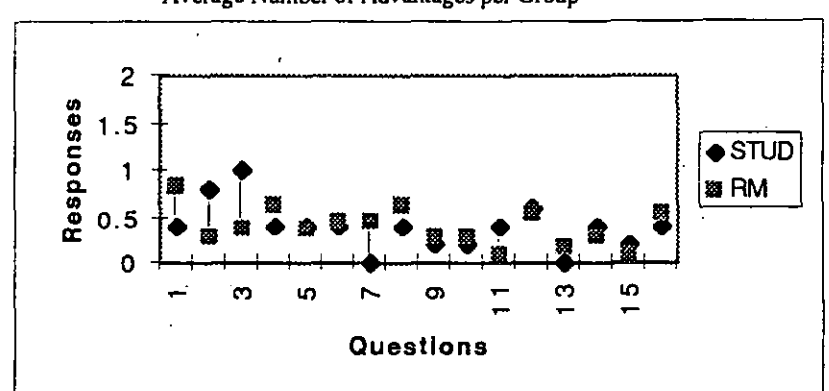


Figure 8.7: Delivery Office Managers
Average Number of Advantages per Group

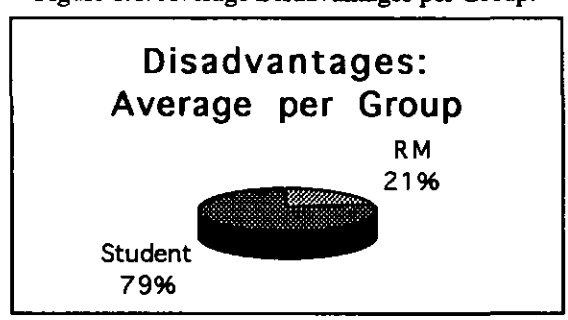


Figures 8.4 to 8.7 demonstrate that there were differences across the entire range of questions in each of the roles; where differences were identified at category level they were shown to be attributable to a number of questions within the category. The graphs also show that even where the analysis at category level demonstrated similarities in the number of RM and student responses, there were still differences at individual question level, although often less marked.

Similar comparisons were conducted for the remaining categories of responses, for reasons of space only the summary graphs are displayed here, along with a discussion of the main differences (see Appendices J.2 and J.3 for more detailed graphs).

8.5.2. Disadvantages

Figure 8.8: Average Disadvantages per Group.



The total number of disadvantages recorded was 396. Figure 8.8 demonstrates that there is a marked difference in the number of disadvantages noted by the two groups, with the students recording, on average, nearly four times as many negative responses.

Figure 8.9: RM Average Disadvantages per Category.

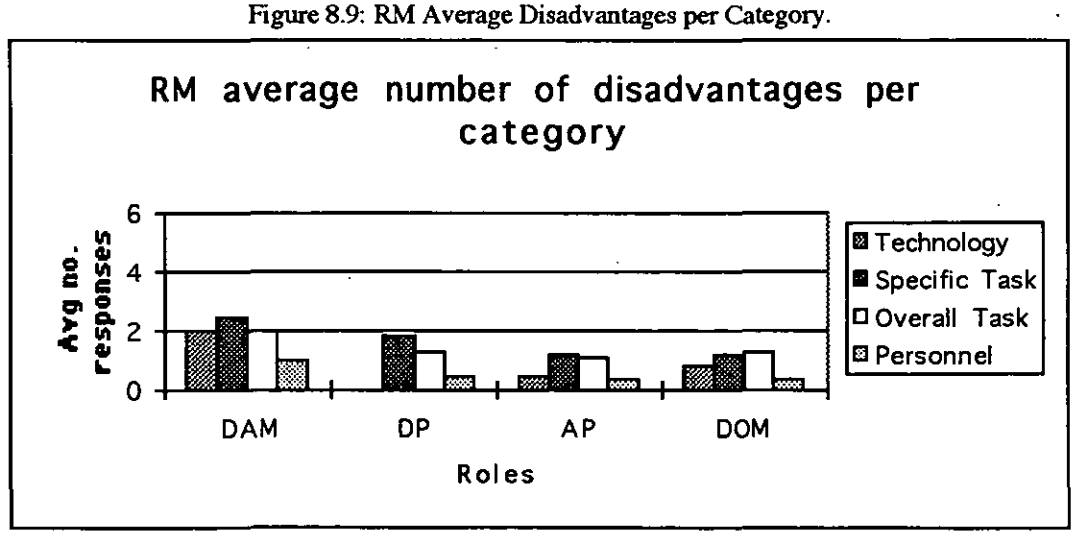
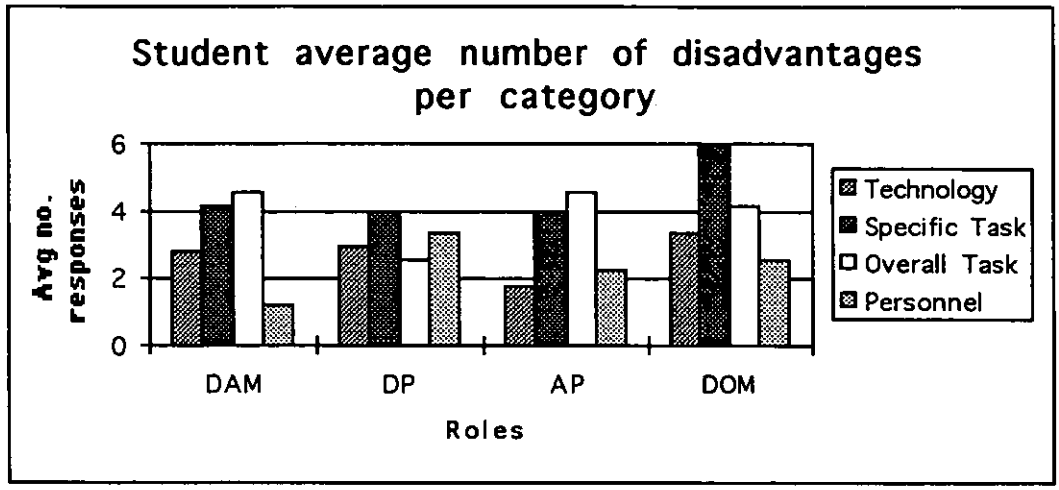


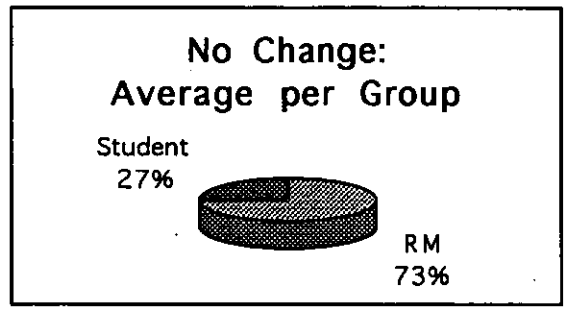
Figure 8.10: Student Average Disadvantages per Category.



The bar charts show that the variation in the number of negative responses is across all the roles and demonstrates that the RM participants noted far fewer negative responses. In other words, the students do not view one particular role being more disadvantaged under the given scenario; they see more disadvantages for each of the roles than the RM participants. They also record disadvantages across each of the categories, but the majority of disadvantages, for RM and students, are recorded against the specific and overall task categories. The analysis by question again confirmed that these differences are across all questions (see Appendix J.2).

8.5.3. No Change

Figure 8.11: Average 'No Change' Responses per Group.



The total number of 'no change' responses recorded was 157. Figure 8.11 shows that there is a marked difference in the number of 'no change' responses recorded by the two groups. The RM participants recorded almost three times as many as the Student group.

Figure 8.12: RM Average 'No Change' Responses per Category.

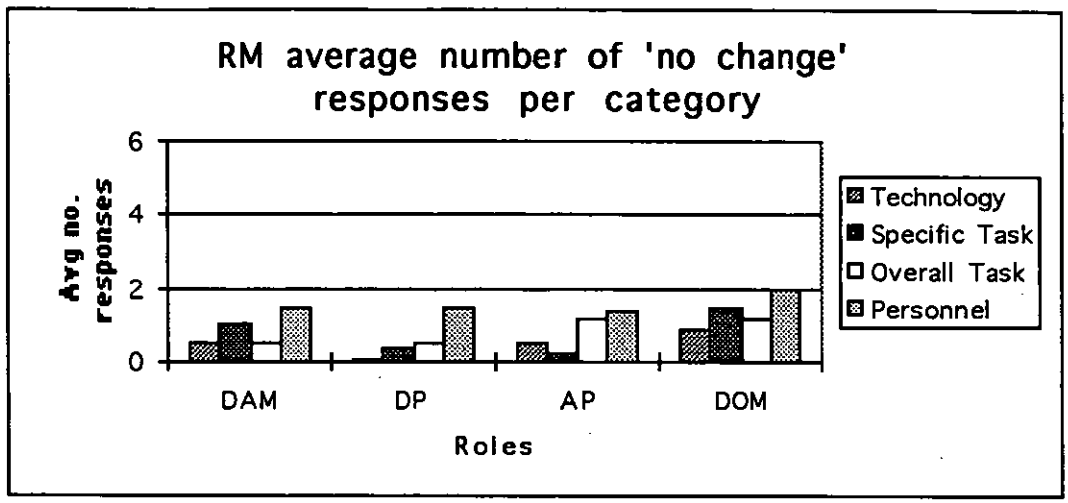
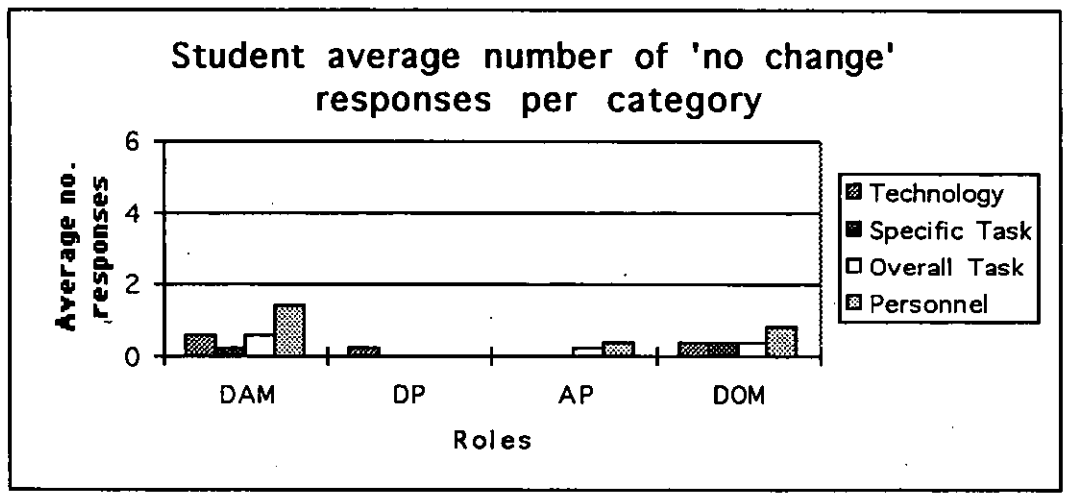


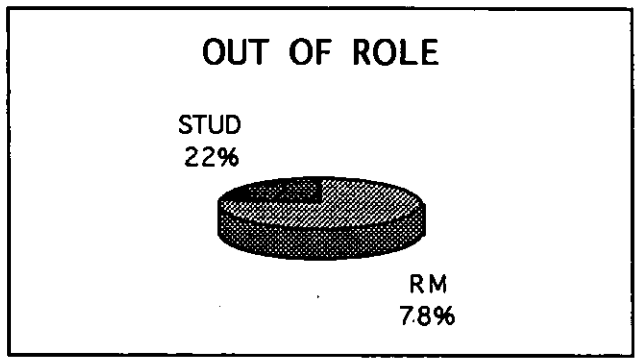
Figure 8.13: Student Average 'No Change' Responses per Category.



The bar charts show that there were differences across all the roles and demonstrates that the students noted fewer 'no change' responses in all categories. The largest differences are in the DP, AP and DOM roles. Comparison of the categories show that the majority of 'no change' comments, for both the RM and students, are recorded against the personnel category. The analysis by question again confirmed that these differences are across all questions (see Appendix J.3).

8.5.4. Out Of Role

Figure 8.14: Average 'Out Of Role' Responses per Group.



The total number of 'out of role' responses recorded was 42. Figure 8.14 shows that there is a marked difference with the RM staff making more 'out of role' statements than the students.

Figure 8.15: RM Average 'Out Of Role' Responses per Category.

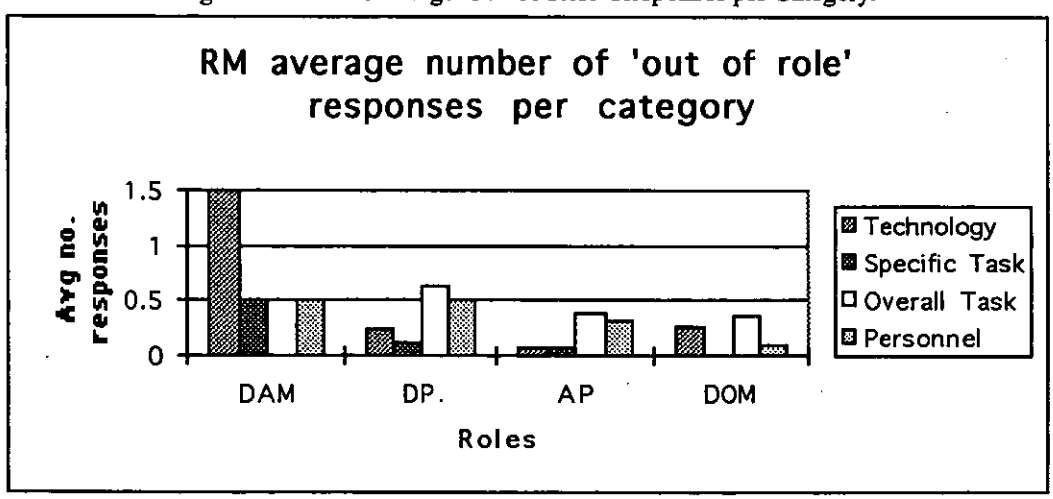
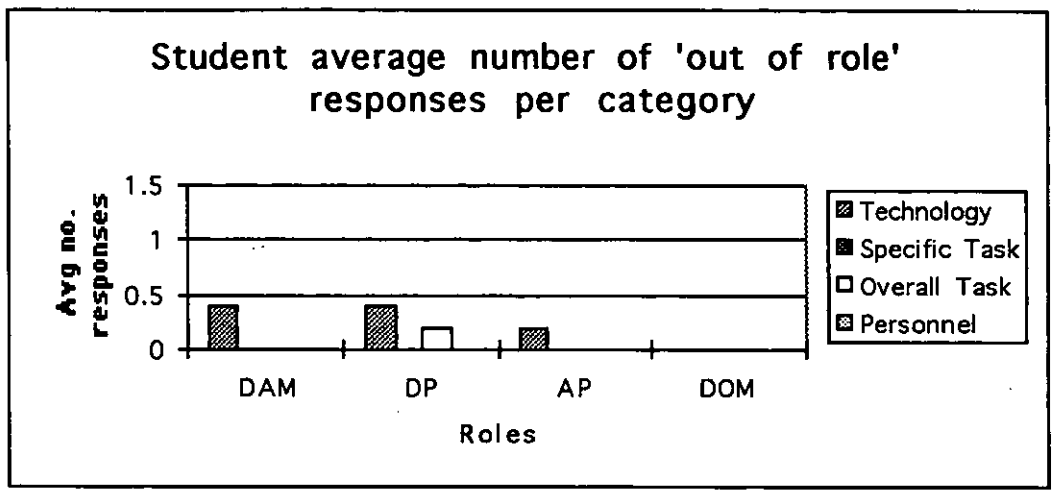


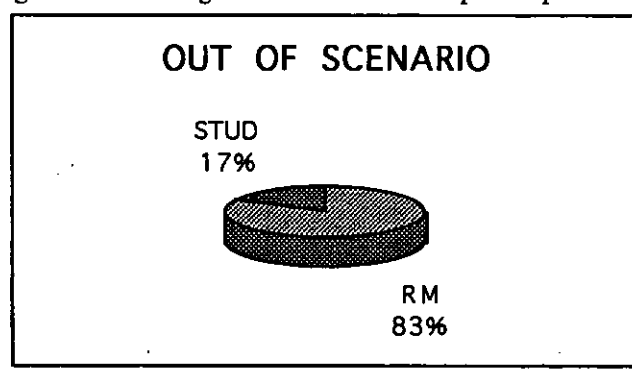
Figure 8.16: Student Average 'Out Of Role' Responses per Category.



The bar charts show that the RM responses were again across all roles and categories. However, there is a noticeable difference in those recorded under technology in the DAM role. The students' responses were mainly in the technology category for the DAM, DP and AP roles. Further analysis demonstrates that these differences are across all questions.

8.5.5. Out Of Scenario

Figure 8.17: Average 'Out Of Scenario' Responses per Group.



The total number of 'out of scenario' responses was 46. Figure 8.17 shows that there is a marked difference with the RM staff making more 'out of role' statements than the students.

Figure 8.18: RM Average 'Out Of Scenario' Responses per Category.

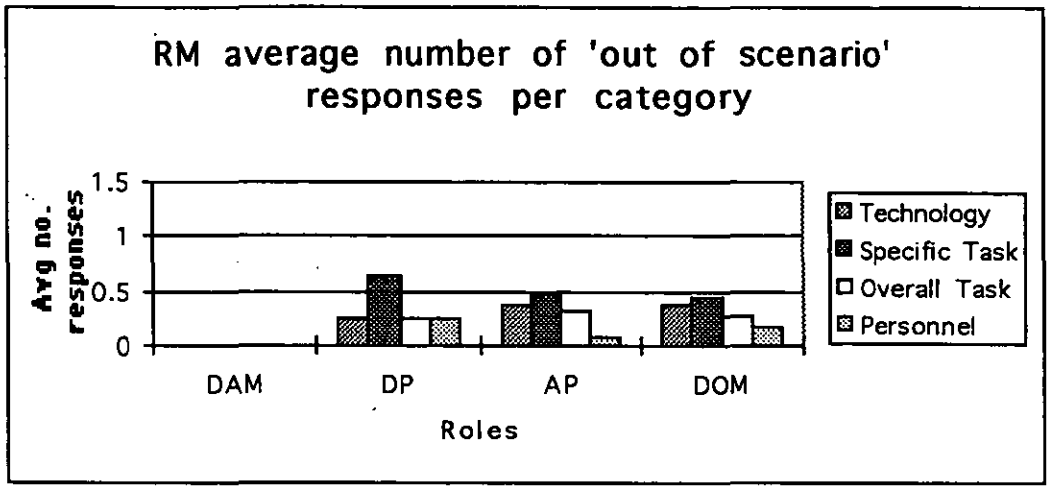
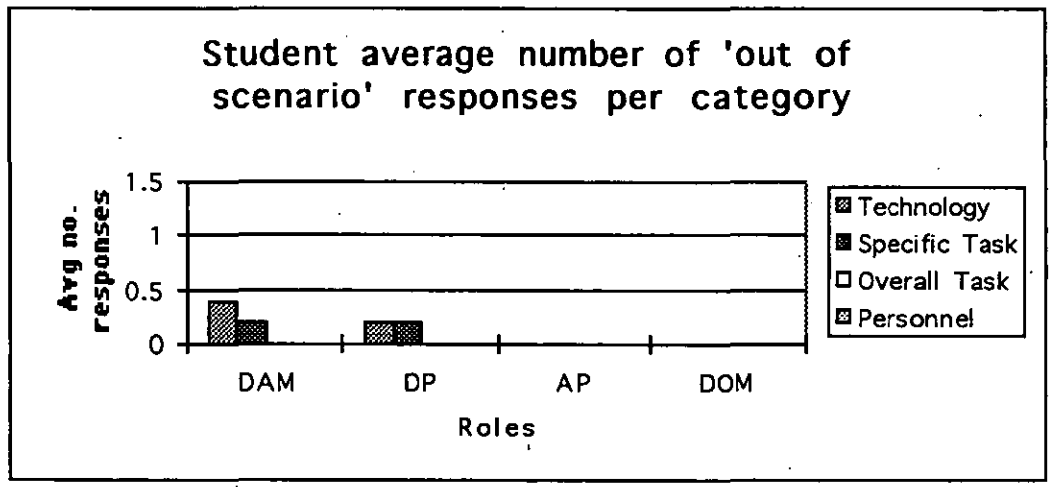


Figure 8.19: Student Average 'Out Of Scenario' Responses per Category.



The bar charts show that the RM recorded 'out of scenario' responses in three of the roles and within these the responses were across categories. Students only responded 'out of scenario' in two of the roles, DAM and DP, and these were only in the technology and specific task categories. Further analysis demonstrates that these differences are across the questions within the categories.

8.5.6. Interpretation and Implications

If Hypothesis 6 were supported the results would show the RM participants recording more implications and in more detail; as they have prior knowledge of the RM's operating environment and the current revision process. The results show the reverse.

There is some variability in the number of advantages the groups reported, but they are not systematic. However, there are major differences in the number of responses

given for other categories of responses when comparing the RM and student workshops. The responses show that on average the students reported more disadvantages in each role and fewer 'no changes' in each role than the RM participants.

There are two alternative explanations for these differences; i) that there are likely to be real problems, and the students were able to see these disadvantages while the RM had difficulty identifying them. This might also account for the high level of 'no change' responses in the RM; or ii) the RM participants are correct and there are not many issues which would result in disadvantages in the RM setting. The only way to test the hypotheses would be to implement the system as it was described in the scenario and observe the results. There was no opportunity to do this, and this is what the scenario workshops seeks to avoid, i.e. by identifying disadvantages prior to implementation changes could be made to avoid the adverse consequences.

An indirect way of making an assessment is to check whether the implications reported had face validity, i.e. were the responses relevant to the RM situation in relation to the technological changes. This was achieved by comparing the responses and the findings of the earlier case study and pilot studies. Examples of these comparisons are shown below:

- The quantitative analysis shows that the student responses were similar to the RM responses in terms of the advantages recorded. This indicates that the students were able to understand the issues involved.

- Both groups recorded negative implications for the DP due to changes affecting the data. The RM sees this as a disadvantage because of the reliance on others to provide notification of the changes and for the data to be accurate. Students note concerns over the accuracy of data but were also concerned about whether the standardised system can account for the individual and local differences, e.g. fitness levels, lengths of pathways and the affects of time of year and weather. These issues are real. Much of the development process was concerned with how well the standardised data fitted different locations, and what figures should be used in the algorithm to account for the different amounts of traffic each day and throughout the year. These concerns are also apparent in the current walk testing methods, as only certain days are allowed to be tested as they are known to have higher traffic.

- One of the issues which students raised but which the RM did not mention is team work. They highlight implications due to the changing nature of the work, for

both the DP and AP, with more work involving the computers and less contact with other members of the revision team and the delivery office staff. Again these are likely outcomes, particularly due to the reduced revision times and the increase in the number of revisions to be performed. They would be responsible for a much larger area and would therefore have much more travelling to do.

The students' responses do therefore have substance and face validity which implies that the RM participants did not follow the same logic and did not see implications which were possible. There are many reasons why this might be the case and some of the more prominent issues are discussed here:

8.5.6.1. Views Of Current Delivery Revisions

- From the questionnaire administered (prior to the workshops) it is apparent that there already existed a general feeling, within the RM participants, that the system was going to be beneficial to everyone concerned. This was regardless of the amount they already knew about the system and was attributed to their own and other people's roles. For example:

i) When asked if the system would benefit the various levels in the RM, at least 25 people felt that each of the levels would benefit from the system, compared to zero 'no' responses.

ii) When asked if the system would benefit the various roles in the RM, over half of the respondents felt that each of the roles would benefit including the Union.

iii) When asked what effect the system was likely to have on the respondents' own role, 25 felt it would be an advantage, compared to two who felt there would be no change and seven who were unsure.

- This may also be a reflection of the views of the current methods for conducting a revision. The questionnaire shows that they are viewed as being time consuming and costly, and they may be viewed so negatively that any new system was seen as an improvement.

8.5.6.2. Historical And Cultural Impact

- Throughout the workshops it was apparent that the RM participants were not as familiar as the students with expressing their views and this was particularly true of expressing negative views. This may have been because they were not used to analysing a situation critically, whereas the student group would have been very familiar with written critical assessments.

- Students also made fewer responses, on average, which were 'out of role' or 'out of scenario' than the RM participants. This would indicate that the RM found the method more difficult to use. The high number of responses out of role from the DAM may also reflect the wider responsibilities of the role than that of revisions and their concerns, as managers, for other members of their staff.

- 'No change' - again the use of this response could reflect the fact that the RM are less used to analysing and criticising, and they therefore responded 'no change' as they could not think through the likely consequences. Alternately, it could have been used as an easy response, so that the problem did not have to be considered.

- A further factor may have been their perception of whether their views would be taken on board and given serious consideration. Comments such as, "We get what we're given and like it" suggest a feeling that their views are not normally asked for or acted on.

- The belief in the scenario may have had an effect. The students appeared more easily convinced that the implementation presented in the scenario might actually happen, than the RM participants. This may be due to the past experience of the RM staff with other computer systems which have been introduced, e.g. CADR, which had little organisational structure or processes in place when implemented.

8.5.6.3. Method

- The method was reported by all groups as being hard and there are a number of issues associated with its use.

- The method called for participants to envisage a future situation. The literature review highlighted that this is very difficult to do, and the method for presentation may not have been the most effective in aiding the process. There is evidence that a more active engagement by participants helps people to understand the future implications. However, time prevented a more active workshop being conducted.

- There may have been problems due to the key words used on the response sheet and an understanding of what they meant. There *were* questions asked in some of the groups. However, the RM staff were clearly reluctant to ask for help when there were parts of the workshop they did not understand, e.g. one group made it very clear they did not understand the headings but were also very clear that they did not want any further explanations.

- The headings may also have been limiting. They were provided in order to help direct thought to various issues and this was noted as useful. However, there was

also a feeling that this might have limited the types of issues which were considered. This is demonstrated when comparing the responses recorded when asked to note the top three advantages and disadvantages, and the responses on the sheets. Some issues were recorded in the top three but did not appear anywhere in the checklist, e.g. the increased office space that would be required with additional walks introduced.

8.5.6.4. Presentation

- The difference in presentations in the workshops may have had an impact on the responses recorded. The student participants were given an introduction to the RM as they needed to understand the current environment and roles. For reasons of time the RM workshops did not include a review of the current situation. It was assumed that they would be familiar with the roles and the revision process. Although this was true, the information may not have been immediately available to the participants, i.e. it was latent knowledge. This may have meant the RM participants had difficulty focusing on their current roles and responsibilities in order to make the comparisons.

- The presentation to the students focused entirely on the delivery revision process and this may well have given a wrong impression of the contribution the revisions make to the overall roles and responsibilities of the RM stakeholders. This was reflected in a number of responses relating to career implications (noted above). These suggest that there was an impact due to their lack of knowledge of the RM, by focusing on the revision process only and also because they lacked an understanding of the pay and reward structure.

8.5.6.5. Individual Differences

- The students reported more personal comments, for example, they commented on their feelings towards new technology and the change in roles, e.g. S1AP3 "AP hates DP." They also recorded more statements expressing the view that the system would bring benefits if their role was happy to use it, if not they could foresee problems. For example, "If AP likes computers then good, if not, bad".

It is difficult to assess the relevant contributions of these various explanations. This research has not set out to try and determine these, but it is likely that a combination of the RM culture and the way the method was used resulted in this particular outcome. As a result of this investigation Hypothesis 6 should not be abandoned but needs to be amended. In other words, it is not that the hypothesis is wrong but there is

a caveat to be entered. People with additional knowledge should be able to make a richer contribution, providing the conditions are conducive for the latent knowledge to be accessed (it should not just be assumed that this will happen). More can be learnt about these implications by looking at Hypotheses 7 and 8.

8.6. HYPOTHESIS 7: RM IN ROLE PLAY VS RM IN REAL ROLE

Having established the differences between the student and RM groups, the RM responses are now analysed to see if there are any differences in the groups responding from their own role and those who assumed a role for the workshops. The only roles which were assumed were the DP and the AP and these are compared below.

8.6.1. Analysis

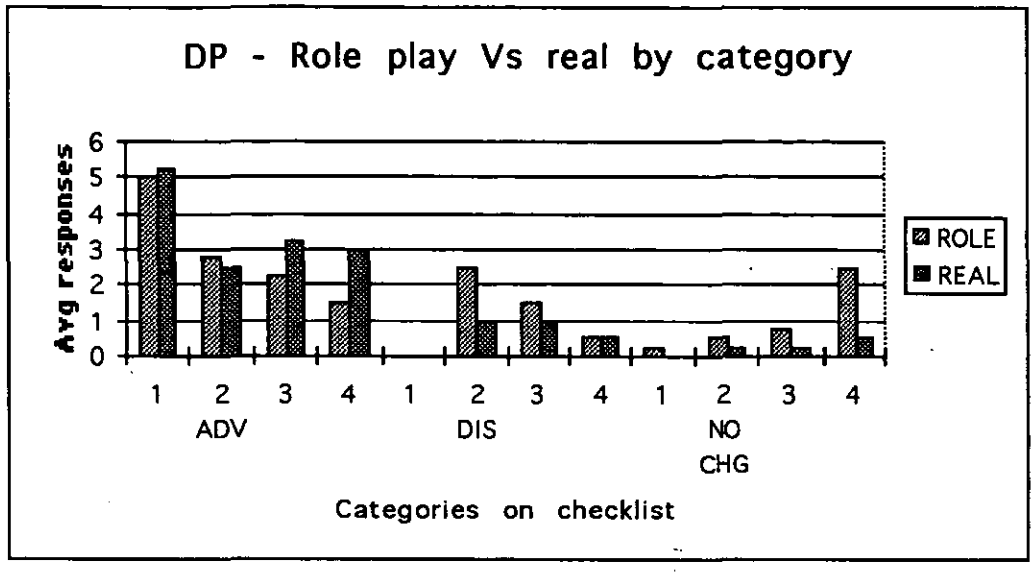
Table 8.9: Role Play Vs Real Role - Responses By Category.

CAT.	Advantage		Disadvan.		No Change		Total
	Role	Real	Role	Real	Role	Real	
Technology	27	60	0	6	2	5	**100**
Specific Task	16	43	12	17	3	2	**93**
Overall Task	13	33	11	13	4	15	**89**
Personnel	11	33	4	5	10	17	**80**
TOTAL	**67**	**169**	**27**	**41**	**19**	**39**	**362**

(role play n = 6, real role n = 15)

Table 8.9 shows the number of responses recorded by each group of participants against each of the checklist's headings. They show that the majority of responses were advantages, and that these were spread across all four categories. There were far fewer disadvantages and 'no change' responses recorded, for both real and assumed roles. Again these were across all categories.

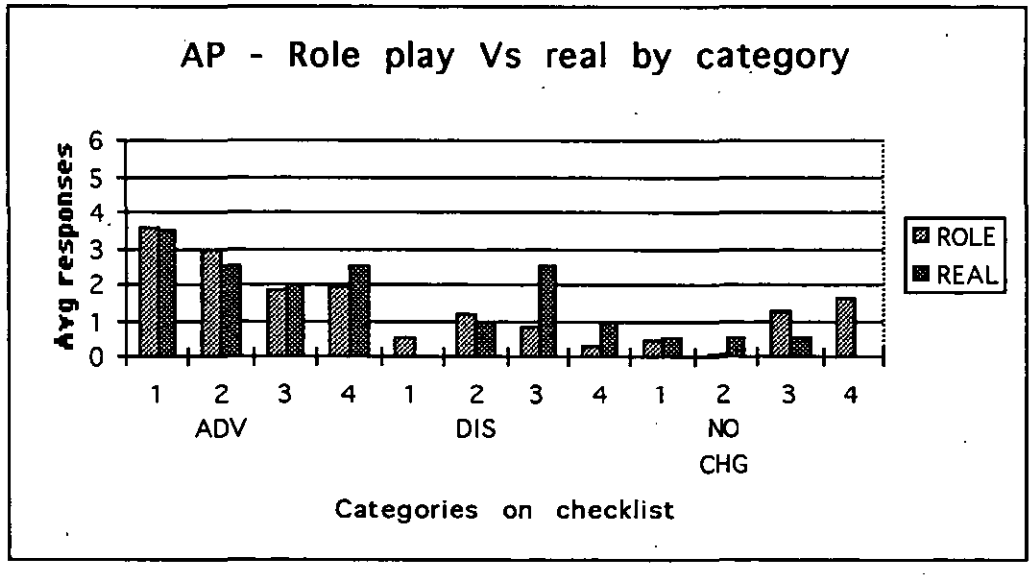
Figure 8.20: Divisional Planner - Role Play Vs Real Role by Category.



DP (assumed role n = 4, real role n = 4)

Figure 8.20 shows a comparison of the two groups who responded from the DP role. It demonstrates that although there are differences, there are no systematic differences in the advantages for each of the four categories. But, it shows that the participants in the role play recorded more disadvantages and 'no change' responses across categories.

Figure 8.21: Area Planner - Role Play Vs Real Role by Category.



AP (assumed role n = 2, real role n = 11)

Figure 8.21 shows a comparison between the two groups who responded from the AP role. It demonstrates some variations but these are not systematic across the categories.

8.6.2. Interpretation and Implications

If Hypothesis 7 were supported, the results would show the participants responding from their own role recording more implications, and in more detail, than those who assumed roles. This would be due to their more detailed prior knowledge of the role, and of the operating environment in which the revision process operates. The results show that this is not the case, with both groups recording similar numbers of advantages. There were differences in the disadvantages and 'no change' categories but these were only minimal.

This indicates that the group assuming a role were as insightful as those in their own role. This may have been affected by some of the issues discussed in section 8.5.6 above. For example, all the RM participants recorded fewer disadvantages than the students and it was suggested that this may be due to specific knowledge which was thought should have aided their ability to see implications, being latent knowledge.

A further consideration is that the participants in assumed roles were the people from the User Group. These are the people who had already been responding as User Representatives. This involvement in the WO project had meant they had already had to consider some of the issues raised during the workshops and had experience of the new system. Hypothesis 8 explores further the importance of this experiences with the WO system and project.

8.7. HYPOTHESIS 8: RM WITH WO VS. RM WITHOUT WO

Within the RM group responses were compared for those with WO experience and knowledge, and those without. Hypothesis 8 proposes that those with knowledge and experience of the system would produce more detailed and relevant responses because of their prior knowledge. Three of the roles contained participants from both groups and these are compared below.

8.7.1. Analysis

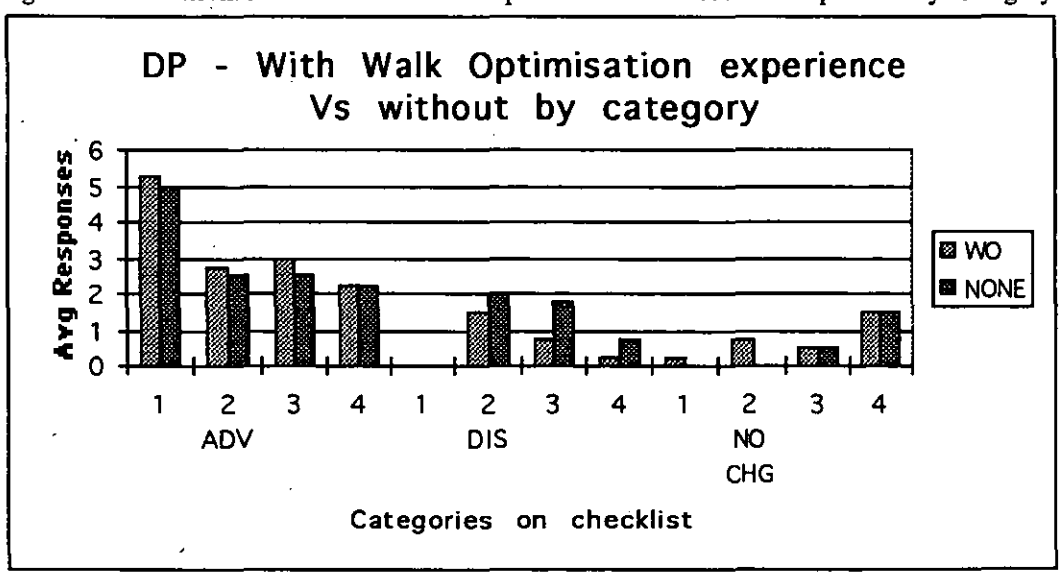
Table 8.10: With WO Experience Vs Without WO Experience - Responses By Category.

CAT.	Advantage		Disadvantage		No Change		TOT
	WO	None	WO	None	WO	None	
Technology	48	62	5	10	5	12	142
Specific Task	31	49	15	27	6	15	143
Overall Task	22	37	13	25	11	21	129
Personnel	22	34	5	8	14	38	121
TOTAL	123	182	38	70	36	86	535

(WO experience n = 11, without WO experience n = 21)

Table 8.10 shows the number of responses recorded by each group of participants against each of the checklist headings. They show that the majority of responses were advantages for both groups, and that these were spread across all four categories. There were far fewer disadvantages and 'no change' responses recorded, for both groups. Again these were across all categories.

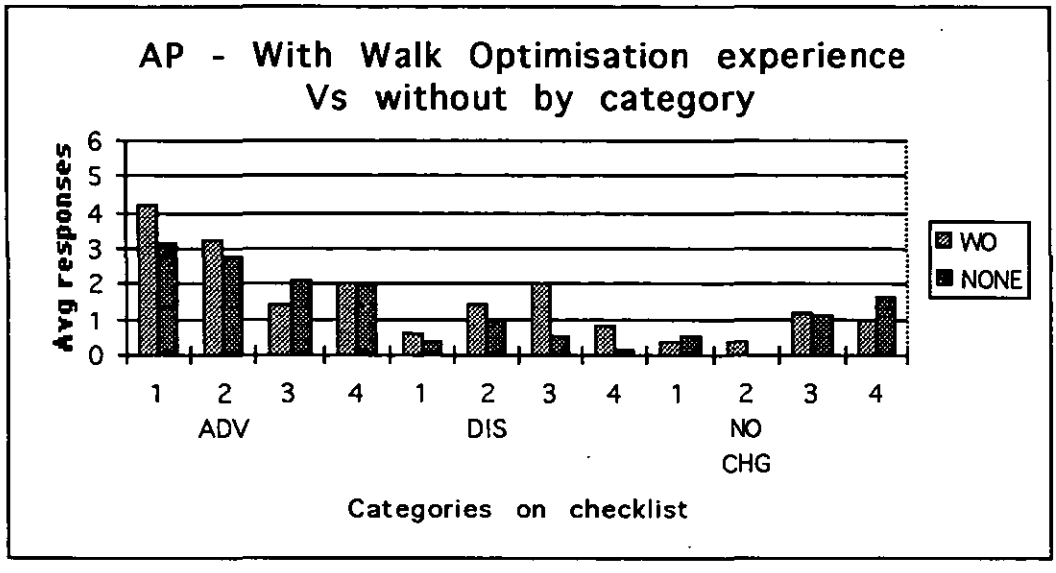
Figure 8.22: Divisional Planner - With WO Experience Vs Without WO Experience by Category.



DP (with WO knowledge n = 4, without n = 4)

Figure 8.22 shows a comparison of the responses recorded by the RM participants in the DP role. It demonstrates some variations but these are not systematic across the categories.

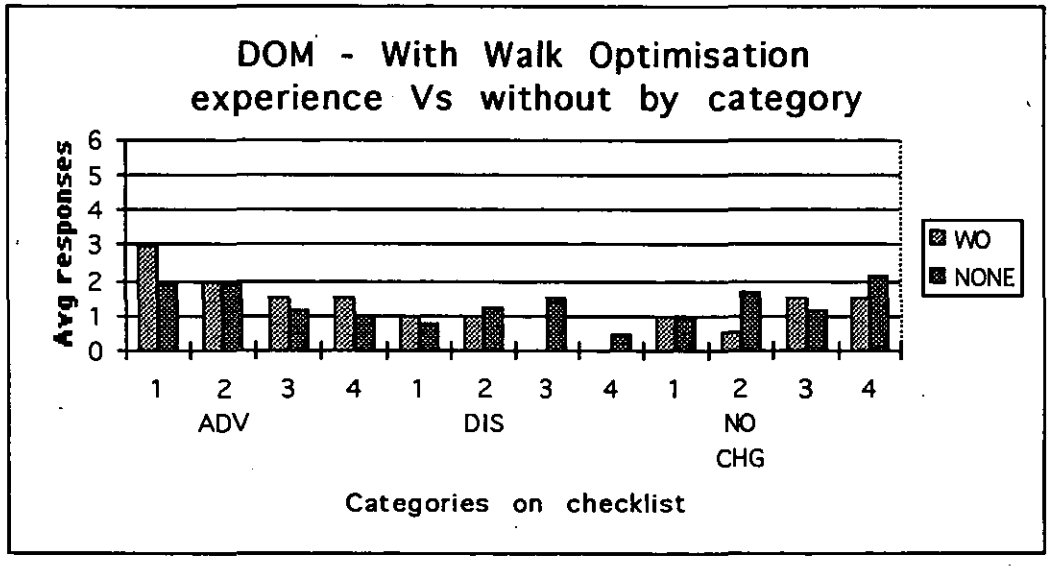
Figure 8.23: Area Planner - With WO Experience Vs Without WO Experience by Category.



AP (with WO knowledge n = 5, without n = 8)

Figure 8.23 shows a comparison of the RM groups responding from the AP role, with and without Walk Optimisation experience. It demonstrates some variations but these are not systematic across the categories.

Figure 8.24: Delivery office Manager - With WO Experience Vs Without WO Experience by Category.



DOM (with WO knowledge n = 2, without n = 9)

Figure 8.24 shows a comparison of the two RM groups responding from the DOM role. It demonstrates some variations but these are not systematic across the categories.

8.7.2. Interpretation and Implications

If Hypothesis 8 were supported, the results would show the participants with WO experience recording more implications, and in more detail, than those without WO experience. They would be expected to have a more detailed knowledge of the new system and therefore understand the implications of its use.

The results show that this is not the case. Both groups recorded similar amounts of advantages and disadvantages across all of the categories.

This indicates that the group without prior knowledge of the system were as insightful as those with WO knowledge. This may have been affected by some of the issues discussed in section 8.5.6 above. For example, all the RM participants responded that the new system would be beneficial, even if they had no knowledge.

It may be that the people with experience of WO, i.e. nearer the development process, were unable to see beyond the positive implications. There are two reasons why this might be the case; i) they may have been blinded by what they do know about the system or, ii) the fact that they were operating as part of the project team may have been masking what they do know about the organisation, i.e. when living within the system they cannot be critical of it.

8.8. SUMMARY AND CONCLUSIONS

The aim of the scenario workshops was not to predict the future, but to alert the people designing the implementation and revision process to potential areas of concern. The results of the workshops highlight issues relating to two areas of implications; i) for the technological approach and, ii) for eliciting organisational implications.

8.8.1. Implications For The Technological Approach

The workshop results show evidence that there are likely to be organisational ramifications associated with the implementation described in the FIS. There is prima facie evidence for a number of potential advantages and disadvantages. The benefits are mainly due to the increased frequency and speed of revisions, and through the standardisation and increased accuracy of data. The disadvantages are mainly due to the changes in the responsibilities and authority of managers, with some roles more

adversely affected than others. The Area Planner is particularly disadvantaged by the loss of control over the full revisions, i.e. having to hand over the changes to the Divisional Planner. The DOM is also disadvantaged due to exclusion from the revision process. They are, however, still responsible for obtaining Union agreement. This means their responsibilities are still the same but they are denied the resources necessary to exercise them.

This investigation has demonstrated that from the FIS given, there are a number of implications for the roles considered. It is important to note that these implications resulted from the use of a single scenario and with a limited number of roles. When the eventual system is implemented it may be using a different scenario and with different implications. Furthermore, there are other stakeholders who have not been considered here. This is, therefore, the smallest set of implications. It is quite possible that there are many more potential dysfunctional issues which have not been discussed.

These potential implications, using the RM's approach to the development process, i.e. a rational / technological approach, would not have been revealed until after implementation. At that stage the opportunity would have been lost to change the strategy. The system would have been likely to encounter adverse reactions from managers and staff, due to the social and organisational issues. The system is, therefore, likely to be dysfunctional.

By identifying these potential issues prior to implementation they can be given further consideration during the development. The fact that the participants did not necessarily agree on the likely consequences is not as important as the fact that there were a number of issues identified as areas of concern. In other words, the FIS workshops identified a number of areas of concern which now need to be investigated further. This will enable decisions to be taken to ensure the potential benefits are realised, and the potential adverse consequences are avoided or minimised.

8.8.2. Methods For Eliciting Organisational Implications

The implications of the technological approach are clearly demonstrated by the FIS workshops. They generated a wealth of data on the potential implications. However, the workshops also highlighted a number of imperfections related to the use of the FIS. There were some weaknesses in the method used due to the limitations of the RM setting in which they were used, viz. time limitations and access to staff. These

affected the method for presentation and engagement, and may have affected the eventual results. For example, alternative approaches have been suggested to be more fruitful, e.g. presenting stakeholders with more than one scenario, and / or allowing participants to act out the roles (Eason, 1997).

The main issue the research sought to address was the question of the effects of prior knowledge. The hypotheses presented in this chapter proposed that the more knowledge and information a person had about the organisation, the working environment and the roles and responsibilities, the more informed and richer their responses would be. The results, however, show the opposite. There are a number of reasons why this may have been the case and these were discussed above, highlighting issues of culture, method, presentation and individual views.

There are a number of methodological implications resulting from the workshop results, especially those drawn from Hypothesis 6. These would indicate that if the reason for engaging people is purely to gain insight into likely consequences and not to avoid resistance, the actual stakeholders may not necessarily provide the most insightful responses. The students were able to see similar advantages as the RM, but seemed more able to identify the adverse consequences. Again there are a number of reasons why this could be the case, the major issues are highlighted below:

- The prior knowledge the RM participants possess may have blinded them from seeing the potential of a new system. In other words they may not have been able to break free from the culture and background in which they have always operated.
- They may also have been affected by the lack of opportunity within the organisation to express opposing views. The students were obviously used to analysing and criticising. This may have been overcome by introducing them to some critical thinking methods, and possibly introducing them to the FIS methods.
- An assumption was made that the RM would be able to use their existing knowledge to allow them to assess potential changes and consequences. While it was true that they possessed additional knowledge, it may have been wrong to assume that they would be able to easily employ the knowledge in the workshops. Much of the information required may not have been 'ready to hand' (Heidegger, 1962), but may have been implicit knowledge. The method for presenting the FIS may not have allowed this knowledge to be made explicit, as it might have been through role playing. The students were given a clear indication of the current

roles and responsibilities and this may have given them the advantage in seeing consequences.

The above discussion also holds true for the comparison of RM participants in their own and assumed roles, Hypothesis 7, and with and without WO experience, Hypothesis 8. Furthermore, the results of the comparison of WO experience may have been affected by the RM's approach to the system's development. In other words, the RM participants did have prior knowledge of the WO experience, but this was directed to the technological aspects. This knowledge may not have been an advantage, and may even have been a hindrance. It may have led to the participants with WO experience continuing with a rational / technological perspective and concentrating attention on these issues, not the social and organisational ones.

The workshops have demonstrated that in some areas the students' responses were inappropriate due to a lack of understanding of the RM, e.g. the career implications. This would suggest that the best type of participant might be from within the organisation, but with specific training methods of critical / analytical thinking skills and the method employed. The method for presenting the scenario may need to be enhanced to enable the current situation to be made explicit, and for further contextual information to be included.

This chapter demonstrates that there are potential organisational implications for the implementation proposed and raises some methodological concerns. The rational approach the RM adopted for solution of the WO problem, and the system development method used, would not have identified these implications until after the system was implemented. These could have resulted in a dysfunctional system and could have affected the take-up and success of the system.

In summary therefore, although there was no evidence to support Hypotheses 6 to 8 it is not appropriate to dismiss them. It remains likely that people in possession of richer, relevant knowledge will be able to make more informed comments about the implications of the technical change. However, with all these hypotheses, we have to enter the caveat that it is necessary to present circumstances which allow the latent knowledge to be utilised effectively in making judgements.

A method is needed to allow these issues to be raised, to avoid the adverse consequences and realise the benefits. The scenario approach has been proposed to include stakeholders views prior to implementation. The results demonstrate that the

FIS workshops were not an easy process to engage in, but they did provide some rich data on the potential implications. The analysis shows that there are still many areas regarding the development and use of scenarios which is not understood. Methods need to be developed to determine which groups and individuals should represent stakeholders. Methods also need to be developed to aid the participants in envisioning the future and in providing rich data. Further work is also needed to make the process more effective and reliable, and to have measures to assess responses.

The next chapter provides a summary of the research project. It reviews the objectives and hypotheses explored, drawing together the themes which have been distinguished in both the theoretical and applied work. The key findings are presented along with their implications, and future research directions are suggested.

CHAPTER NINE:

REVIEW,
DISCUSSION AND CONCLUSIONS

CHAPTER 9: REVIEW, DISCUSSION AND CONCLUSIONS

9.1. INTRODUCTION

This chapter provides a summary and discussion of the theoretical and practical implications of the research project. It summarises the project's progression, through the exploration of relevant literature and its specific application to the Royal Mail. The work becomes more focused as the research progresses. The overall theme demonstrates that in an organisational setting, people faced with complex problems still invariably turn to business processes which attempt to deal with the issues in a traditional / rational way. The application of these rational methods means that time and again, the social and organisational issues are understated or overlooked in the decision making process. Organisations continue to be surprised that predicted outcomes are not fulfilled.

The first section of this chapter reviews the research, the aims, the issues that are considered and the key findings. The next section considers the strengths and weaknesses of the project. A discussion of the implications for both practical and theoretical work is conducted, before outlining some possible future directions for research. The final section draws the final conclusions of the project.

9.2. REVIEW OF RESEARCH

This research was established with the overall aim of exploring the area of real world problem solving within the Royal Mail. The aim from the outset was to investigate the complexities of problem solving within its organisational setting. Extensive reviews of a number of fields of literature have been conducted, each of which shows the traditional theories and their development to the theories prevalent today. The interrelationships between the theories in different fields have been examined. A number of similarities in both the current views and their development are noted. The theories were applied to, and informed by, the work conducted within the RM.

The research has been refined over the three years through a series of progressively more focused objectives. These have enabled the organisation and the issues to be better understood, and available opportunities have been exploited. This thesis has

charted the developing story through a series of objectives which guided each section of the research.

9.2.1. Objective 1: To Review Approaches To Problem Solving, And To Assess Their Applicability To The Royal Mail.

The first objective was to review the literature, in order to inform the initial stage of exploratory work within the RM. Firstly, the field of problem solving in general was considered. The theories proposed to address the more specific area of organisational decision making were then reviewed. Finally the methods for improving decision making processes were discussed. Having established the current theories in these fields, the initial work with the Royal Mail set out to explore the organisation and to identify an area in which complex problem solving was evident.

A review of the literature demonstrated that a number of models have been proposed to account for the organisational decision making process and that many of these are in line with the models proposed in the field of problem solving. It also demonstrated the progression of theories from the simplistic rational model to those which attempt to consider the effects that people have on the process, i.e. the heuristics employed and the political influences. Recognising there are limitations to human problem solving capabilities, a number of research areas have focused on improving processes. These areas consider methods for assisting decision making and for intervention.

Having developed an understanding of the RM as a whole, i.e. its history, culture and its current structure and processes, the theories were applied to the organisational setting to establish whether any were pertinent to the particular RM setting being considered. The exploratory work established that the RM was facing complex decision making in the Delivery Revision Process and this was a potential area for further study. When the theories were applied it became obvious that various models could be appropriate at different levels and different stages of the decision making process. No one model, however, accounted for the complexities of the RM system.

9.2.2. Objective 2: To Investigate The Models Of Organisational Decision Making In Order To Assess Their Pertinence To The Revision Process

The detailed case studies demonstrated a number of issues concerning the efficiency and effectiveness of the revision process. They also highlighted the methods and

constraints which affect the outcomes. Although the revisions were proclaimed to be exercises to optimise walks, it became clear, very early in the studies, that the process was not optimal. Analysis of the case studies established the reasons why this should be so. This included the fact that the driving force for revisions was to cut costs, the data collection methods were open to error, and the amount of data was so immense that the planner was unable to consider every option. Even when the walks had been revised there was still a period of negotiation before the final decision was reached.

The two revision processes were then considered in relation to the models of organisational decision making, previously reviewed. From the case studies conducted it is apparent that there is a model of what the decision making process *should* be within the RM, and that it was based on the notion that a optimal solution could be reached by employing a rational / traditional approach considering all information. However, the actual observation shows that in practice, in order to explain the events and influences on the revisions, many other issues need to be considered and a different model of the decision making is required. The work further confirmed that each of the decision making models could be applied to aspects of the revision process.

The conclusion drawn from the comparison is that no one theory exists to account for the complexity of the decision making task faced by the RM in their Delivery Revision Process. Instead a pluralistic model is required. Furthermore, even if a model were developed to account for the complexity of issues, this would vary greatly from the actual model employed by the organisation.

9.2.3. Objective 3: To Understand The Role Of Technological Intervention In The Decision Making Process, And The Methods Available To Aid Its Effective Design.

A number of opportunities for possible ways forward were considered to address the issues raised through the earlier case studies. Discovering the RM's interest in introducing a new computer system to aid the revision process, provided an opportunity to explore the issues this raised. It also provided a further vehicle through which to explore the complex problem solving strategies employed by the RM. The design of a computer system is in itself a complex problem solving task.

A review of the prevailing theories on the problem of design, and methods available to address them, highlighted a number of models and approaches. These addressed

different aspects of the process and provided a different view of the problem being faced. The review also revealed the similarities between the theories in this field, and those previously considered in the fields of problem solving and organisational decision making. Traditional models view each of the problems as being solvable by rational methods. When recognition was given to the complexity of the problem, new models were produced to incorporate iteration in the systems design methods. These models still do not account for the true complexity of the problem, viz. there are others stakeholders. Once other stakeholders are involved, with their own agendas, there *is* no optimal solution. Instead a negotiated settlement is reached.

Consideration was also given to the current practice of systems development. This demonstrated that although many models and approaches have been proposed, there is still a reliance on the traditional formalised methods. These methods remain technology centred. There are a number of reasons why this is the case. People who commission and control the design process will often be focused on the benefits they can gain as the primary stakeholders. These often focus on increased productivity and profits, and these are the issues given highest priority. This leads to a single set of goals for a technical solution. The designers, often far removed from the operational situation, bring with them methods they know and have used before. They concentrate on the rational delivery of a solution to the technical problem presented. However, in practice, when the system is implemented in the organisational setting, the other issues *have* to be addressed.

The continuing use of rational design methods has consequences for the resulting systems, with many being considered failures due to the human aspects being given little or no consideration. This further demonstrates the chasm between the reality of the problem the organisation is facing, i.e. with all its complexity, and the approach which organisations choose to apply, thereby altering the view of the problem. There are also potential consequences for systems which are implemented using these methods. They provide the tools for the organisation's future decision making processes and might, therefore, bias the organisation's future decisions.

Having explored the general issues in the literature, and their application within the RM setting, a number of possible approaches and hypotheses were examined. Hypothesis 1 proposed that in the development of the new system, the RM would apply a rational perspective to the use of technology. Hypothesis 2 proposed that they would adopt a pluralistic perspective, to empower stakeholders.

9.2.4. Objective 4: To Test The Hypotheses Proposed In The Development Of The Walk Optimisation System.

The Feasibility Phase of the WO project supported Hypothesis 1. The approach focused on the rational, technological answer to the problem of improving the revision process. It also illustrated that the design process was not in line with the methods described in the literature. The RM were not intending to build a new system but instead intended to buy in a system, which would then be customised and used in conjunction with their existing systems. This is contrary to the theories in problem solving, decision making and systems design which highlight the necessity of understanding the problem that is under consideration, i.e. how can you answer a question when you do not know what the question is?

There has been an increasing trend in industry to buy systems and adapt them rather than building from scratch. Yet no models or methods could be found in the literature which addressed the problems this would elicit.

Having found evidence in support of Hypothesis 1, and no evidence in support of the alternative approach, Hypothesis 3 was formulated. This supposed the RM would continue with an overall rational / traditional approach, aiming to optimise the process. But, given the complexity of the problem, only a limited number of options would be considered.

9.2.5. Objective 5: To Test Hypothesis 3 And Explore The Methods Employed To Achieve A New System For WO.

The case study undertaken during the Process Trials supports Hypothesis 3. The development focused on improving the data processing capabilities, aiming to optimise walks. The major problem with this approach was that the methods assume that complete knowledge and information exists about the problem and the solution. This was clearly not the case as the problem was so complex. The RM addressed this by considering a limited number of alternatives in line with the Bounded Rationality Model. The overall focus in all of the alternatives considered, however, remained on the technical capabilities and financial gains. Issues concerning other stakeholders and their agendas, i.e. social and organisational issues, were disregarded. In the light of this Hypothesis 4 was formulated. This proposed the RM would continue with the traditional / rational perspective, with other stakeholders being involved only in the later stages of the project's development, if at all.

9.2.6. Objective 6: To Test Hypothesis 4 And Establish How The Stakeholders Views Are Considered, If At All.

The Analysis and Design Phase of the RM's project revealed that their approach still remained focused on a rational approach. Elements of the Bounded Rationality Model were also present and at this stage a User Reference Group was established to enable the Divisional Representatives to contribute to the implementation strategy. This introduced elements of the Political Model into the process, supporting Hypothesis 4.

However, user input was restricted by the approach taken at earlier phases and the pre-determined agenda, including people only as a review process, to confirm options and best practice. This meant the group did not consider the problem(s), instead it was given solutions to consider. The RM was continuing to consider the technology as an aid to the current process, whereas the literature highlights much greater implications, and the social and organisational solutions now had to fit the developed system.

9.2.7. Objective 7: To Understand The Methods Available To Aid The Consideration Of Social And Organisational Issues, And To Establish A Method To Include Users' Views Prior To Implementation.

Throughout the research the literature has supported the need to consider stakeholders in the solution of complex organisational problems, including systems development. The case studies conducted throughout the RM's WO project demonstrated that the social and organisational issues had remained unaddressed.

A review was undertaken to consider methods for including stakeholders' views. The review focused on the four main issues associated with participative methods; i) why stakeholders' participation is so important, ii) who the stakeholders should be, iii) where in the process stakeholders should be included and iv) how the stakeholders should be involved. Each of these issues was discussed with particular reference to the RM's WO project, giving consideration to the organisational context and the stage the project was at, i.e. pre-implementation.

Due to the size of the WO project and the organisational setting for the system, there was no opportunity to include stakeholders' views in order to develop commitment.

The circumstances also limited the options for bargaining as the RM were still not convinced of the need to consider stakeholders' views. However, there was an opportunity to elicit knowledge which could aid the implementation strategy, and might allow areas of conflict to be avoided.

Having decided that the stakeholders' views need to be considered, and that it is impossible to engage all the stakeholders in this process, a group of representatives was needed. There is little research which considers who the representatives should be or the prior knowledge they should possess. This research provided an opportunity to explore these issues.

The methods available for consideration of stakeholders' views at the pre-implementation stage of the RM's project, were limited. A method was needed to enable the future system to be envisaged. It also required stakeholders to be sufficiently engaged, enabling them to see the changes and their consequences. A scenario-based approach was deemed most suitable. A Future Implementation Scenario (FIS) was developed, describing the revision process, and the stakeholders' roles and responsibilities. The FIS was presented at workshops throughout the RM Divisions and at Loughborough University, with students.

A number of Hypotheses were generated regarding the outcomes of the workshops and the FIS use. Hypothesis 5 proposed that there would be organisational implications, to the implementation described, with some roles gaining and some losing. Hypothesis 6 suggested that RM participants would have a better insight into the probable outcomes of the system due to their prior knowledge of the environment in which the system will be placed. Hypothesis 7 proposed the RM participants commenting from their own role would have better insight into the probable outcomes of the system due to their prior knowledge of the role. Hypothesis 8 suggested the RM participants who had been involved in the WO project and/or trials would have a better insight into the probable outcomes due to their prior knowledge of the system and processes.

9.2.8. Objective 8: Workshops To Test Hypotheses 5 - 8

The Future Implementation Scenario workshops conducted with RM and student participants, allowed the hypotheses to be explored. The respondents provided a rich data set of the potential implications. These demonstrated many implications, both advantages and disadvantages, for each of the roles, in support of Hypothesis 5.

However, contrary to Hypotheses 6-8, the results demonstrated that the RM participants did not provide a richer analysis of the implications. Instead the results showed the RM participants were less able to see the future consequences. A number of reasons were offered for the results of the workshop including the RM's culture, the existing views of the revision process, the method of presentation, etc.

In conclusion, although there was no evidence to support Hypotheses 6 to 8 it is not appropriate to dismiss them. It remains likely that people in possession of richer, relevant knowledge will be able to make more informed comments about the implications of the technical change. However, with all these hypotheses, we have to enter the caveat that it is necessary to present circumstances which allow the latent knowledge to be utilised effectively in making judgements.

9.3. THEORETICAL IMPLICATIONS

This research leads to a number of questions regarding the way in which an organisation establishes the decision it is going to take and what lies within that decision. In this section a theoretical review is undertaken using the RM case as an example of the process by which the organisation establishes which problem to address, and what effect this has on the solution which they then seek.

This research demonstrates the vast impact that social and organisational issues can have on the decision making process, with consequences at various stages and at various levels of the decision making. It also demonstrates the adverse consequences that overlooking these issues can have on the solution. This leads to the potential for dysfunction.

Throughout the thesis it has been shown that many theories can be proposed to account for decision making. The need for all aspects of the problem to be considered can be demonstrated time and again. But the actors in the situation are in the business of constructing the problem they intend to solve, and they achieve this by keeping it as small and manageable as possible. In practice this means there is a tendency to reduce the problem to a rational process, with limited actors.

9.3.1. Influences On The Problem Considered

Figure 9.1: Influences On The Choice Of Problem.

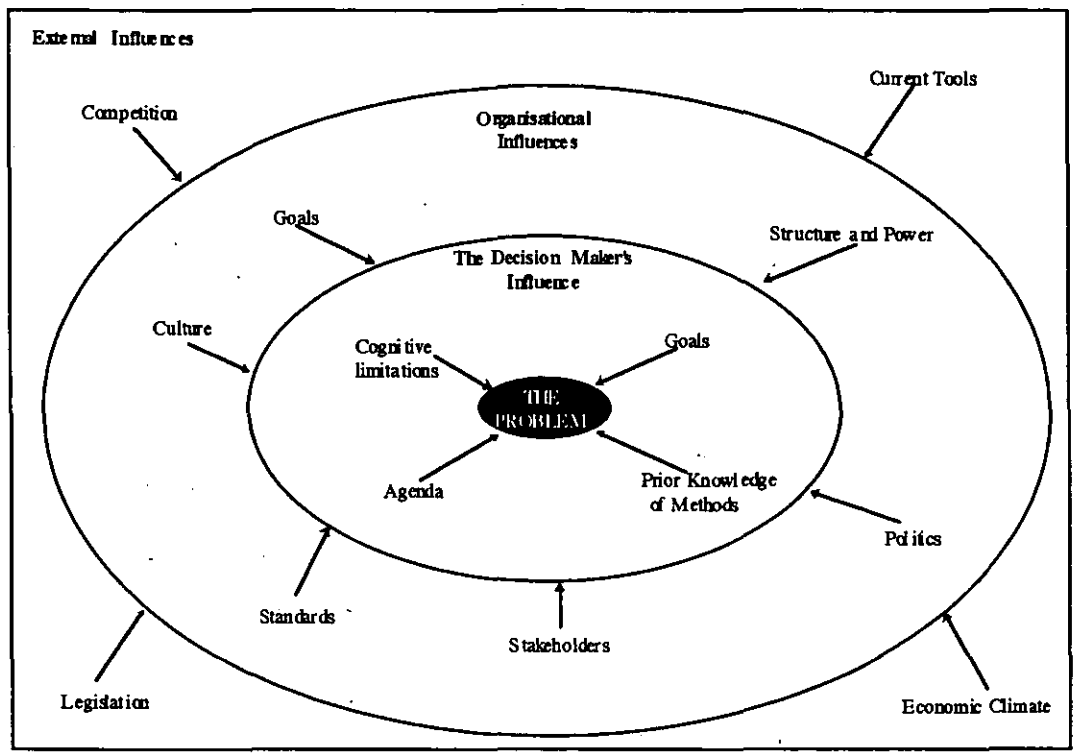
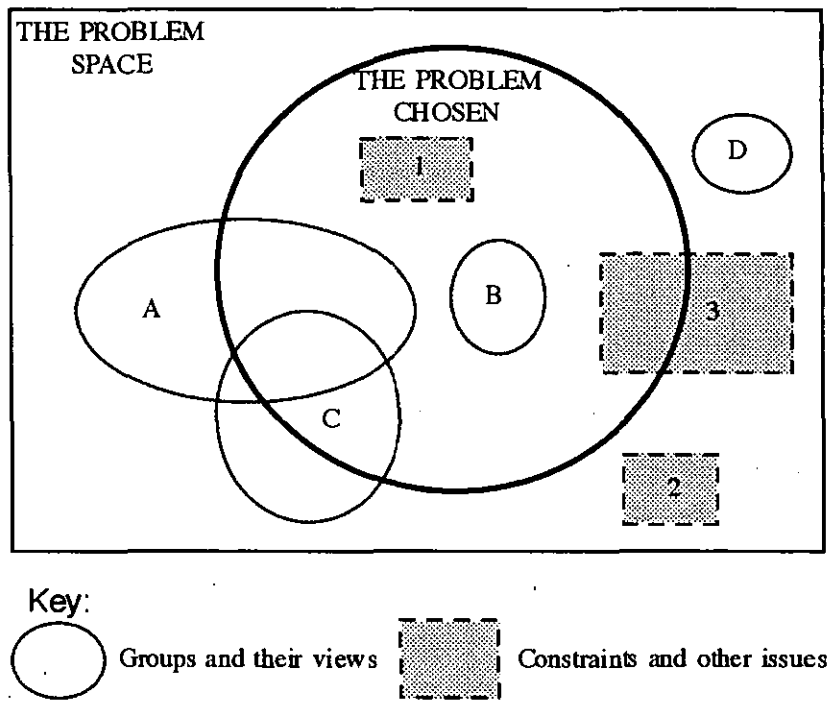


Figure 9.1 summarises the influences on the problem chosen for solution. External factors such as competition and existing methods influence the organisation. These affect, among other things, its culture and goals. The organisational influences affect the decision making through the choice of issues being considered and who is chosen to solve the problem. The decision maker also affects the problem by using heuristics and biases to ensure the problem is manageable. All these factors impact on the problem, which becomes defined in a way which satisfies the conditions, but may not be *the* problem.

9.3.2. The Problem Chosen

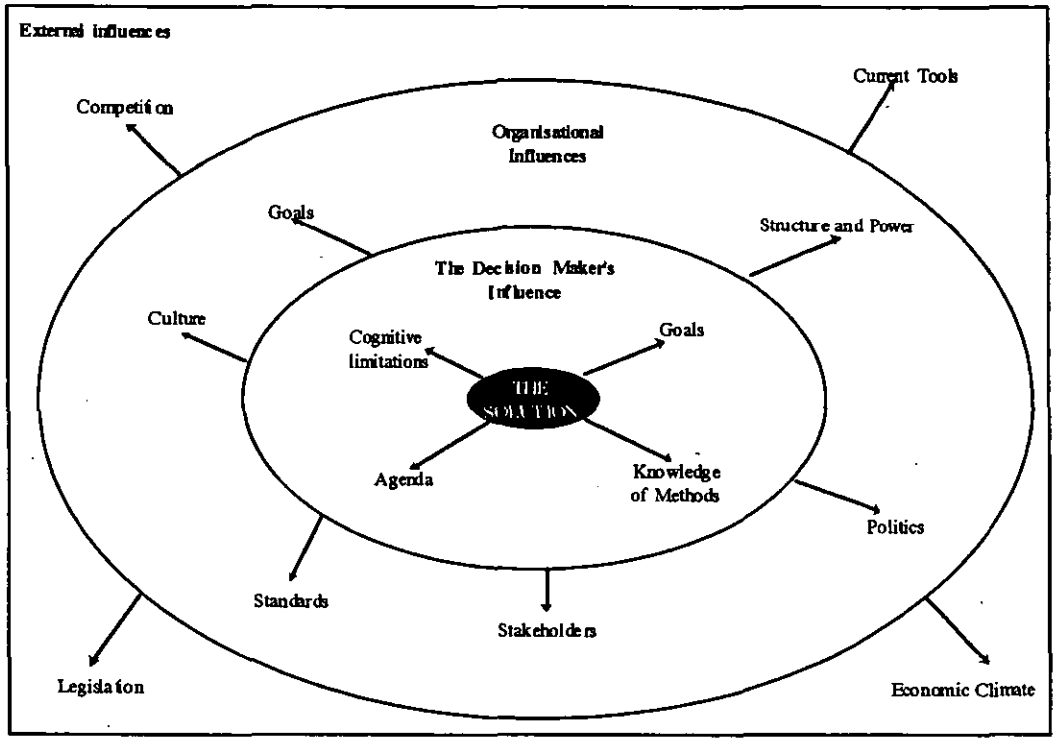
Figure 9.2: The Problem Chosen.



The problem consists of many issues which can be viewed from a number of different perspectives. Some of these views and issues will overlap, and some will be in opposition. The problem also affects many individuals and groups and these people will have different views of an acceptable solution. The view of the problem taken by the decision makers is influenced by external, organisational and individual factors, as described above. They will attempt to include and address some of these issues and views, but many will fall outside the problem *chosen* for consideration. Simon's (1957) theory of 'satisficing' and bounded rationality would predict just such a process; the problem is so complex that it is simplified and only a subsection of the real problem is addressed. This is demonstrated in Figure 9.2.

9.3.3. Influences of the Solution Chosen

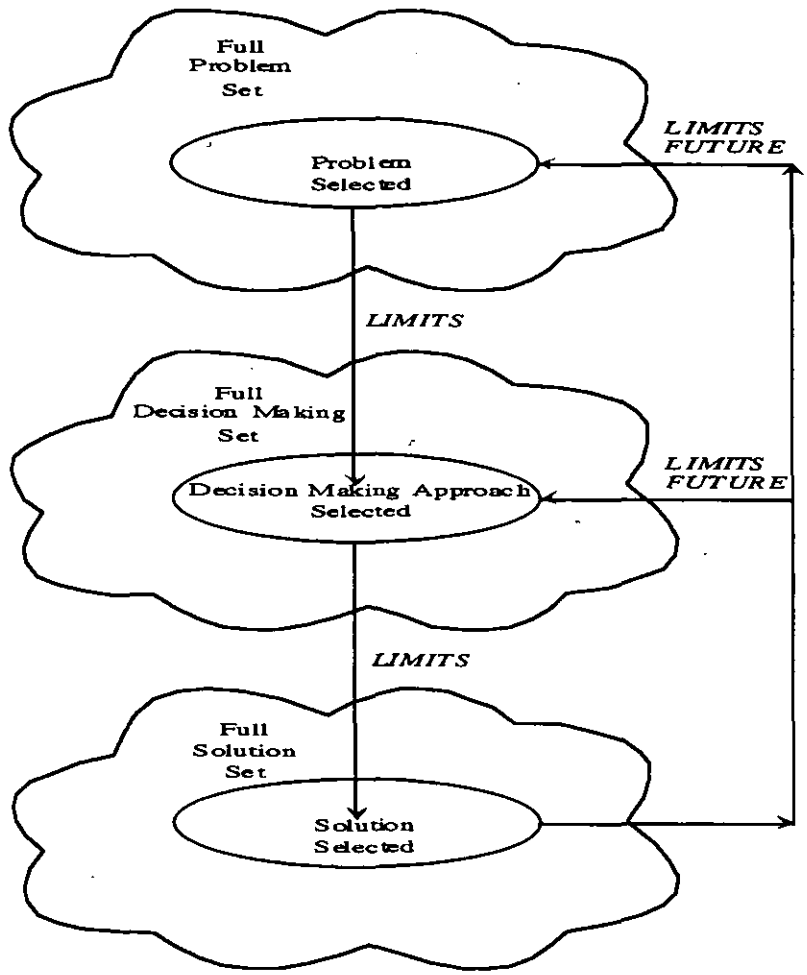
Figure 9.3: Influences Of Solution Chosen.



Finding a solution to the *chosen* problem is often a complex process. Things become even more complicated when the solution to this *chosen* problem is implemented. In the organisational setting the factors which have been ignored once again come into play. The issues which the solution did not seek to address still exist and another agenda has to be created to cope with these, i.e. the *real* problem has to be solved.

Furthermore, the decision which is reached (through the process described above) has many ramifications. The solution will impact on other areas of the organisation, the future operation of the organisation, and the future decision making of the organisation (see Figure 9.3), including the technical systems developed.

Figure 9.4: The Self-Perpetuating Rational / Technological Approach to Decision Making



There is a vast and ever growing literature which demonstrates the adverse consequences of such an approach and many methods have been produced to address the social, organisational and political issues. Yet industry continues to use reductionist methods. Current research remains focused on developing further rational / technological methods and, therefore, avoids the difficult issues of attempting to understand why organisations persist in applying a rational approach, and what the consequences of this approach is for organisations.

Industry continues to employ a rational / technological view of organisational decision making. By using this approach to guide their choice of problem, decision making approach and final solution, the future options are further limited (by the outcomes) and the decision making approach becomes self-perpetuating (Figure 9.4). This is also true of the computer systems developed from the rational / tradition approach, as Wood & Wood-Harper (1993) note "the artefacts of information

technology have both had an effect on, as well as having been affected by, the cultural / organisational issues concerned with the processes of managerial decision making."

9.3.4. Theories In Use

This research highlights the void between the theories which can be applied to explain real world decision making, and the implied theoretical stance which organisations appear to adopt.

Figure 9.5: Theories In Use.

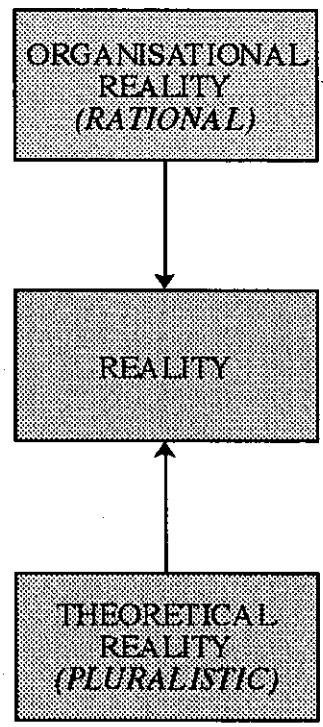


Figure 9.5 demonstrates the views which are placed on reality. *The* reality is the problem as it exists, in its organisational setting, and with the various business, organisational and social issues. The account of reality developed from a theoretical review, explains the problem as consisting of many perspectives and needing a pluralistic approach. In other words, it is a business process dealing with information, but it is also a combination of stakeholders and their views.

The organisational reality is a further view of the problem. The theories which can be implied as being used, are those of rational decision making. Research explores why the organisational view is what it is, and concludes that it is because the people constructing the reality appear to be operating with a set of propositions (not necessarily deliberately) which emphasise some of the models and not others.

Similar findings have been reported in other work (see for example Argyris & Schon 1974) and other researchers have used similar constructs when considering human actors. The observable products can be viewed as consisting, in part, of the assumptions that people constructing reality are operating with. Argyris & Schon (1974) describe the espoused theory as the goals etc., but suggest that only the theory-in-use and the behavioural world can be compared. They say that often these do not map onto the espoused theory. This can be taken further when considering the RM's revision problem. For example, even if the espoused theory does map onto the theory-in-action, i.e. a technical problem which additional processing power is likely to solve, and the espoused theory is put into effect; the espoused theory may not be sufficient to address the actual problem.

Figure 9.5 demonstrates that there are a number of theories which can be applied to the problem faced by the organisation. A theoretical approach suggests that a pluralistic model is needed to address the complexity of issues. However the organisation appears to continue to apply a simplified rational model. There are two models which could be applied to the question of why rational approaches persist:

- That it is an issue of power bases. If stakeholders' views were influential then those in control would have to yield some decision making power, so instead the people in charge make the decisions and others have to abide by them.
- People are only comfortable with things they can understand and the 'people' issues of relations, goals and politics are just too complex. Instead of trying to cope with these complicated issues the problem is instead 'bounded' (Simon 1957) and the social and organisational issues are ignored.

A final implication is that researchers continue to construct new theories of action to suggest what organisations should be doing. They appear to take little heed of the fact that they are having little impact on what actually happens, i.e. their theories are not adopted and used by organisations. A consequence of this discussion for the theoretical direction would be to understand the way actors construct reality and how they solve the constructed problem.

9.4. PRACTICAL IMPLICATIONS

9.4.1. Organisational Decision Making

The research stresses the importance of considering an organisational problem in its entirety. It aims not merely to produce a solution, but to understand the views and potential impacts on the stakeholders affected by change in order to produce a solution which is workable. This would mean moving away from a traditional / rational approach to problems and avoiding methods which simplify the issues for solution, as the hard issues, i.e. social and organisational, will undoubtedly reappear when the solution is implemented.

Issues relating to the social and organisation problems are often overlooked in the decision making process. Where they are recognised they are often ignored by the decision makers. A number of reasons exist for this:

- The organisational culture is normally profit driven and this influences the approach to problem solving. For example, annual budgeting limits the potential and willingness of managers to invest in projects which do not bring immediate and quantifiable financial rewards.
- The power of the different groups of stakeholders influence the decision making. For example, the views of a senior manager controlling the project's budget will have to be adhered to, whereas the views of someone from the shop floor has very little, if any, weight.
- The decision makers may have their own agendas.
- The problem solving methods being used may not allow the issues to be considered and carried through the decision making processes.

Decision making methods need to be employed which acknowledge the roles of stakeholders, and the powers they possess within the organisation. This would enable a solution to be reached which encompasses the stakeholders' views and knowledge of the problem. This would shift the view of decision making from a rational process to a process of negotiation and compromise.

9.4.2. Implications For The Practice Of Introducing Technology

Many of the issues raised in the previous section apply again here, as it has been demonstrated that the development of a new technology is in itself a complex decision making process. Further implications arise from the methods which are adopted by organisations and individuals. More emphasis needs to be given to the adverse consequences which can result from neglect of social and organisational issues. These issues will then become viewed as a necessary consideration for successful implementation, and not as a luxury consideration which they cannot afford.

Further work needs to be conducted into the practice of adapting computer systems purchased from an external supplier, and the development process which this will entail. This should stress the need for an analysis and understanding of the problem in context, to ensure that the technology addresses the organisational problem and not vice versa.

Technology should be viewed as a way to aid people in the work they are doing. This approach should be carried over into the practice of implementing technology, and methods should be employed which support the stakeholder in communicating their views and requirements. Methods are needed which allow latent knowledge to be utilised effectively. If adverse consequences are to be avoided, stakeholders need to be supported in envisaging the future situation, recognising that this is a difficult task. This must enable them to see the potential implications of the new technology on their current working practice.

9.4.3. The Royal Mail

The practical implications for the RM are that they need to consider the implications both for the WO system, and for their future decision making.

For the WO system, the FIS workshops demonstrated that there are many potential implications for the implementation strategy presented. Most of the implications identified were advantages, particularly in the case of RM participants. However many disadvantages were also recorded. Although there were some conflicting views of the consequences of the changes, the more important point to note is that there are issues which need to be considered further.

Stakeholders do, therefore, need to be considered further before the implementation strategy is determined. Focus needs to be directed at who will own the system, and where responsibilities lie. The system then needs to address who will use the system, who will conduct the revisions and who will have access to the system. All these areas need to be geared to enabling the stakeholders to fulfil their responsibilities. This could be achieved through the use of more focused scenarios. Whichever method is adopted, the issues of enabling the future to be envisaged and the stakeholders' views to be understood, must be utmost. This will enable the RM to minimise the adverse consequences and allow the potential benefits to be realised.

The implications for future complex decision making within the RM are in line with those discussed above, section 9.4.1. It is recognised that they function with restrictive Government regulations, however, they need to develop methods for considering longer term goals. They also need to move away from the overwhelming budgetary driven culture which has a large impact on their approach to decision making.

9.5. CRITIQUE OF RESEARCH

9.5.1. Strengths

One of the major strengths of this work is that it has avoided the common trap, demonstrated to often in the literature, of reducing the problem. It has not attempted to compact the problem into a neat and tidy package by ignoring many of the contextual issues involved. Instead, by staying with the real world complex problem with all its richness and awkwardness, it has allowed the issues discussed throughout this work, to be discovered.

By following this approach the problem solving process within the RM has been understood in its context, demonstrating the number of issues and constraints which must be considered and the true complexity of the process. It was then possible to examine the process in light of existing theories drawn from a number of different fields. The case studies have provided opportunities to apply the theoretical models to real situations. They show the strengths and weaknesses of each model and thereby inform these theories. Furthermore, the case study work has allowed the differences between the theoretical and practical approaches to be highlighted.

The workshops allowed a number of issues, neglected in the scenario and participative design literature, to be explored. The workshops highlighted a number of further questions and allowed suggestions to be made as to the future direction of research in this area.

9.5.2. Weaknesses

The converse of the major strength of this research is that in conducting real world studies the ability to control any of the variables disappears. Working within the RM the research has inevitably been constrained by what is possible. In other words there were many options which may have been beneficial to this research, but in practical terms were not feasible. As a result the research was limited by staying with the constraints of the real world setting. This is particularly evident in the FIS workshops. For example, it would have been beneficial to allow the participants to build up an understanding of the future situation and methods used (as these are known to be difficult tasks); the use of several scenarios might have provided richer responses; and other stakeholders (notably the Postal Delivery Officers) could have been involved in the workshops. The time and access limitations, however, prevented these from occurring. Also assumptions were made about the RM's existing knowledge and its accessibility, again due to the time limitations. A number of other issues were raised about the methods used, discussed in Chapter 8.

There are also alternative approaches which could have been taken to the research as a whole. For example, the case study work has informed a lot of the research and observations were used to establish the approach adopted by the RM. An alternative approach would have been to ask the RM what they believed the problem to be, i.e. what issues they considered important and the approach they would take. This may have provided a useful theoretical way forward to explore the relationship between theory and practice and to explore whether people consciously limit the issues to be considered. The time limit for this research was a factor in deciding against this approach. It would also have introduced further complications, due to the question of reliability of subjective responses.

9.6. LESSONS FOR FUTURE RESEARCH IN THIS FIELD

This work has demonstrated how real world situations can be investigated using an ethnomethodological approach. It has provided a vast amount of case study work detailing organisational decision making in situ, this is unusual in the literature. By adhering to the method chosen at the outset, the ecological validity of the thesis has

been maintained, and a number of lessons can be drawn from the research as a whole which could assist future research in this field.

- The project relied heavily on access to various people within the RM, and their willingness to share information, in order to enable ecological validity to be sustained. This access was vital to the approach taken throughout this thesis. Other work attempting to study organisational processes, should strive to achieve a good working relationship with the organisation in order to gain access to staff and their views.

- The use of multiple data sources allowed a rich picture of the organisational decision making to be developed. Having access to all documentation and reports, as they were produced, was invaluable. This allowed the researcher to keep up-to-date with the project which would have been impossible otherwise. Furthermore, by attending meetings the researcher was able to understand the decision making processes as they happened. Throughout the case studies it was clear that what people say they do (or have done) is not necessarily what will be observed. The documentation provided a useful data source, however the real / observed workings of the teams were often different to that recorded. Being able to have access to both the meetings and documentation provided a unique insight into these differences.

- As expected the different sources of data provided a number of different models and perspectives of the processes undertaken. The explicit / formal policies are detailed in the formal methods, guidelines, etc. These have a profound impact on the decision making processes by establishing the starting point, the territory and the boundaries of the problem. The informal methods are then employed by the decision maker(s) in order to cope with the outside factors which affect both the problem and solution. Finally, the formal documentation reporting the results of the decision making process, may retell the process undertaken in line with the original formal methods. This may or may not be what *actually* happened but is a rational account of the processes.

- This research demonstrates that, despite the difficulties encountered and the limiting factors experienced, attempting to do something to draw attention to the organisational and social issues prior to implementation MUST be better than doing nothing at all, otherwise the factors WILL be overlooked.

9.7. THE WAY FORWARD

Future work needs to be directed at real world problems in their true settings. There needs to be a greater understanding of the influences on decision making processes, and how these can be aided in their full complexity, and not by reductionist methods.

It is possible to theorise and produce better explanations for decision making processes, but in order to be involved in the action of decision making there is a need to understand how people produce these constructions. There is also a need for a greater understanding of the decision making processes which create a world in which reductionist methods still prevail. In other words, although an enormous body of evidence exists demonstrating that the neglect of social and organisational issues can result in adverse consequences, organisations continue to employ the same approaches and the loop continues.

Methods which do encompass the socio-technical issues need to be applicable and usable in industry. They need to support both the decision makers and the stakeholders, in order that they can effectively communicate the current and future situation. To this end the final stage of the research considered some of the issues associated with generating a view of the future, and eliciting responses on the consequences of the new technology. Although this may not be the ideal time to consider the views of other stakeholders, it does fit with methods which developers employ. The FIS could, therefore, be a first step to industry recognising the importance of these views and changing future methods to incorporate them. It would not require an excessive amount of resources, and if a better method could be produced the results should speak for themselves. However, this does mean that time needs to be spent understanding what makes a good scenario, and what methods would allow people to imagine the effects of a future situation, a very difficult task. Consideration also needs to be focused on how responses are recorded and interpreted in order to make a difference.

Whichever method(s) prove appropriate for eliciting and encompassing views, a united front needs to be presented to industry. To ensure that they are not only aware of the importance of the issues, but know how to incorporate them in the development process (Doherty & King 1998). At present too many methods proclaim to be THE way. These methods are often cumbersome to use, and do not have substantiated results. This leaves practitioners knowing they need to do something in order to include organisational issues, but not knowing how.

9.8. CONCLUSIONS

This research has demonstrated the growing recognition, throughout the literature, of the importance of people in decision making processes, highlighting the many different ways in which they can affect the process and the successfulness of its outcome. The solvers themselves affect the outcome due to their limitations and the heuristics and biases they apply to the problem. People who will be affected by the decision can influence the successfulness of the solution through negotiation and non-cooperation. The people in control of the decision making process influence it by their insistence that the traditional benefits e.g. of increased profits must be realised. The people developing the tools and methods influence future decisions made by the organisation by applying rational / traditional methods and not considering, or not giving the appropriate weight to the socio-technical implications. However this research demonstrates that in spite of this recognition in various arenas, organisations continue to use rational / traditional methods which do not allow these issues to be included in the decision making process.

In conclusion, the thesis demonstrates that a full understanding of organisational decision making requires the integration of rational, bounded and social / political approaches, and that this also applies to the systems design process. It also concludes that the models and methods used within organisations need to be broadened and recognise the social / organisational agenda but that the methods currently available are difficult to apply. Furthermore, by continuing with a rational / technological approach to decision making, organisations limit their future decision making options and the process is, therefore, self-perpetuating.

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&
GLOSSARY OF TERMS

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GLOSSARY OF TERMS

2nd Pouch	Additional Bag Dropped on route for PO
ADRM	Area Delivery Revisions Manager
APC	Automated Processing Centre
Associate Grade	Part time PO
BPI	Best Practice Indicator / Indices
CADR	Computer Aided Delivery Revision
CPC	Canada Post Corporation
CSG	Consultancy Services Group
CSI	Cuistomer Satisfaction Index
CWU	Communications Workers Union
D	Director
DAM	Delivery Area Manager
DD	Director Delivery
DO	Delivery Office
DOM	Delivery Office Manager
DPMS	Delivery Productivity Measurement System
DRM	Delivery Revisions Manager
EP	Effective Performance
ER	Employee Relations
FIS	Future Implementation Scenario
GATT	General Agreement on Tariffs and Trade
GIS	Geographical Information System
IMP	Integrated Mail Processor
IPS	Inward Process Sortation
IR	Industrial Relations
IS	Information Systems
LO-SHAPE	Local Office Staff Hours and Performance Evaluation
Manual-W	Manual Revision
MaPEC	Major Products Expenditure Committee
MPPM	Major Project Productivity Manager
OP	Optimum Performance
OPAL	Overhead Postal Address List
OR&S	Operational Research and statistics
P&SM	Planning and Services Manager
P302	Examination of preparation for delivery

P318	Duty Sheet
P947	Test of Delievry and Collection
PAF	Postal Address File
PAT	Project Assurance Team
PDO	Postal Delivery Officer
PHG	Postman Higher Grade
PiD	Project Initiation Document
PO	Postal Officer
Postcards	Post Computer Assisted Route Design System
Pouch	Additional bags of mail for delivery (above weight allowance)
Prep. rates	Preparation Rates
Pressure	Overtime
PRINCE	Project in a Controlled Environment
PRODIS	Professional Delivery Information System
Q of S	Quality of Service
QR	Quality Review
RM	Royal Mail
RMEC	Royal Mail Executive Committee
RoMPEC	Royal Mail Project Executive Committee
SHQ	Strategic Headquarters
Table-top	Revision method for small changes
T&DG	Training and Development Group
Traffic	Amount of mail for delivery
TRANDOS	Transport Disk Operating System
UCW	Union of Communications Workers
URG	User Reference Group
Walk	Postman's Delivery
WES	Workload Evaluation System
WLA	Work load Assessment
WO	Walk Optimisation

APPENDICES

APPENDIX A: ROYAL MAIL

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APPENDIX A: ROYAL MAIL

Appendix A.1: Royal Mail Meetings

Appendix A.2: Letter of Introduction

APPENDIX A.1:

ROYAL MAIL MEETINGS

ROYAL MAIL VISITS:-

• Brian Heywood (Processing Manger)	20/10/94
• Loughborough Delivery Office	17/11/94
• Dennis Jones (Delivery Revisions Manager)	14/12/94
• Birmingham Revision Team	01/02/95
• CADR revision (Stoke)	07/02/95
• Nick Edwards (DAM Leicester)	20/03/95
• TRANDOS	20/03/95
• Walk testing (Coalville)	22/03/95
• Manual Revision - A Case Study	
Terms of Reference	24/03/95
Calculations and plotting	27/04/95
Calculations and plotting	09/05/95
Calculations and plotting	26/05/95
Calculations and plotting	10/07/95
Final version agreed	29/09/95
Agreement & Re-sign	26/10/95
Implementation	24/01/96
Review	14/03/96
Review of processes	10/04/96
• Alan P. Smith (Revision Team Area Manger)	25/07/95
• Planning meeting	08/08/95
• Dennis Jones (Delivery Revisions Manager)	09/08/95
• Birmingham Revision Team	09/08/95
• POST CARDS training	18/08/95
• Terry Delbridge (WO Project Team)	02/10/95
• Geoff Ellis (Director Delivery)	18/10/95
• Process Trials	
Background information	27/10/95
Paul Challands	06/02/96
Data collection	05/03/96
Plotting	30/04/96
Jack Rosser (WO System)	25/06/96
• Geoff Ellis (Director Delivery)	15/11/95
• Aleta Weir (WO Project Team)	17/11/95

• CADR Training Course	27-29/11/95
• Nick Edwards (DAM Leicester)	01/12/95
• Andy Summers (A PLUS System)	01/12/95
• Alison Sheriff (DPMS System)	05/12/95
• Phil Berquez (WO Project Team Leader)	13/12/95
• Phil Berquez (WO Project Team Leader)	03/10/96
• Terry Delbridge (WO Project Team)	30/10/96
• Martin Bashforth (York)	15/01/97
• Dave Howell (London)	17/01/97
• Walk Optimisation Project Meetings	
Phil Berquez	03/05/96
WO	17/05/96
Questions for Tenders	03/06/96
Tenders (Milton Keynes)	06/06/96
WO Project Meeting (London)	17/06/96
WO Project Meeting (London)	17/07/96
WO Project Meeting (London)	16/09/96
WO Project Meeting (London)	04/11/96
WO Project Meeting (London)	29/11/96
WO Project Meeting (London)	06/01/97
WO Project Meeting (London)	04/03/97
• User Representative Group	
Set up of group	04/09/96
User Group meeting	04/10/96
User Group meeting	11/11/96
User Group meeting	09/12/96
User Group meeting	21/01/97
User Group meeting	26/02/97
• Strategy Group	
Rugby	11/10/96
Rugby	30/10/96
Rugby	07/01/97
• Workshops	
Plymouth	18/02/97
Harlow	19/02/97
Manchester	25/02/97
London	28/02/97
Dorking	07/03/97
Birmingham	19/03/97

APPENDIX A.2:

LETTER OF INTRODUCTION

date 15 November 1995
your ref
our ref GWE/SW

Royal Mail Midlands
Headquarters
Royal Mail Street
BIRMINGHAM
B1 1AA

To Whom It May Concern:

This is to introduce Debbie Philpott from Loughborough University. Debbie is conducting research for Royal Mail Midlands into the delivery revision process. She will be undertaking a number of interviews, surveys and case studies on the methods of revisions and procedures used.

The aim of this research is to identify and document these procedures and to see where there are possible areas for improvement and indeed what these improvements might be.

I would appreciate it if you could spend some time with Debbie, share your experiences with her and help her understand the intricacies of our revision procedures.

Your co-operation and input are essential if her research is to be completed successfully.

Many thanks for your co-operation.

GEOFFREY ELLIS
Director Delivery

APPENDIX B: HINCKLEY CASE STUDY

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APPENDIX B.1:

STAKEHOLDERS ANALYSIS

STAKEHOLDERS ANALYSIS

WHO NEEDS TO KNOW?	WHY DO THEY NEED TO KNOW?
• Customer Services	To ensure that customer needs are foremost and to advise on customer contact.
• Delivery Area Manager	As line manager responsible.
• DOM	As line manager responsible. As owner of the project.
• Industrial Relations	To highlight contentious issues. To advise on National Agreements. To ensure that the Industrial Relations Framework is being adhered to.
• Public Relations	Opinion formers and advise on media interest.
• Quality Team	Positive and negative changes in quality / on impact in Cross Functional Quality. Review duties proposals to ensure quality is maintained.
• Facilities	Office alterations, e.g. new office, floor plan changes. Costs, rents, rates, shared accommodation.
• Front Line Staff	To keep informed of the project's progress. To allow input into the process.
• Communication Workers Union	To keep informed of the project's progress. To allow input into the process.
• CMA	To keep informed of the project's progress. Any managerial changes.
• Distribution	Alterations to routings present and future. Alterations to collection work.
• Processing	Alterations to walk sorting present and future.
• Finance	Present LOSHAPE hours. Alterations to LOSHAPE e.g. budgets.
• Area Health And Safety Representative	Advice on safety issues - furniture, fittings, layout, etc. Risk assessment.
• Traffic Measurement	Present traffic levels and breakdowns. Traffic re-basing, re-sampling.
• A PLUS	Advise on the use of A PLUS - walk sequencing.
• DPMS Implementor	Initial analysis, health check, use of information. Any changes to the office need to be updated by the DPMS implementor.
• Door To Door	Information on delivery points - pre and post revision.
• Postcodes	Walk changes for redirections. To update PAF.
• Productivity Duty	To identify and negative or positive impact on EBS.
• Security	Inform of or advise on changes to office layout/ PHG enclosures. Advice on vehicle security category.
• Communication Manager	To advise and help in communication.
• Employee Relations	Advise on National Agreements. Highlight contentious issues.
• Personnel	Manpower issues. Levels of vacancies.

APPENDIX B.2:

WALK ANALYSIS AND TRAFFIC FORM

~~[illegible]~~ COALVILLE TPIC

ALK ANALYSIS AND TRAFFIC FORM

ALK NO Aux 12

WEEK ENDING Sun.

DELIVERY 1ST

Complete 1 - 6 only		Count all items Lettes	Flats	Pkts
1	Monday	445	84	12
2	Tuesday	476	86	16
3	Wednesday	ON	TEST	
4	Thursday	443	140	17
5	Friday	486	99	28
6	Saturday	635	87	22
Weekly Total				
Week Day Average				

Minutes occupied counting items	Preparation time From	To	Left SO at	First Call	Last Call	Returned To SO at	Method of out	travel in
	0600	0715	0720	0728	09.45	0950	BIKE	BIKE
	0600	0725	0730	0737	1020	1025	BIKE	BIKE
							BIKE	BIKE
	0600	0725	0730	0737	1023	1030	BIKE	BIKE
	0600	0725	0735	0742	1030	1035	BIKE	BIKE
	0600	0745	0755	0807	11.10	11.15	BIKE	BIKE

DELIVERY 2ND N/A

1	Monday			
2	Tuesday			
3	Wednesday			
4	Thursday			
5	Friday			
6	Saturday			
Weekly Total				
Week Day Average				

APPENDIX B.3:

P318 - DUTY SHEET

2-Feb-95 DUTY SHEET

OFFICE....COALVILLE

37T SECTION.... ROTATION....

N DATE.....06-Nov-94

EK	ATTENDANCE TIMES	MEAL RELIEFS
	0600-0930	

EK	TIME FROM	TIME TO	DETAILS OF DUTY	TIME OCC'D W'KLY	COD OF P13
	06.00	07.00	Preparation	06.00	L44
	07.00	09.30	Delivery (AS PER P760)	15.00	L50
			OR AS DIRECTED BY DELIVERY MANAGER		
			--- Assist as Directed ---	21.00	

s must be dated, signed by the office manager and

APPENDIX B.4:

INTERNAL TEST FORMS

ME Andy summers

LK NO

TY NO TP 37

DELIVERY (1st) 2nd

DATE OF TEST 22 3. 95.

WEATHER

ERATION	FROM	TO
clearing out	0558	0559
Prep letters	0559	0608
[illegible] to Andy	0608	0609
Prep letters	0609	0615
clearing out	0615	0616
missorts	0616	0617
[illegible]	0617	0621
[illegible]	0621	0622
Prep [illegible]	0622	0624
[illegible]	0624	0625
classing and tying up	0625	0631
Prep letters	0631	0633
Classing and Tying up	0633	0649
Bagging up	0649	0650
weighing Bag	0650	0651
Classing and tying up	0651	0705
Bagging up	0705	0707
~~weighing bag~~	~~0707~~	~~0708~~
Preparing to Depart	0708	0715
Depart Time	0715	

COUNT OF ITEMS		
Ltrs	Pkts	Flats
	7	

RLB	
REDIRECTIONS & SPL ITEMS cards	
REDIRECTIONS DONE	

O/W FIRMS		O/W OTHERS	

REG'D ITEMS	
MISSORTS	
ASM	ORD
5.	9

WEIGHT OF BAGS	
No	KLOs
2nd bag	7.6
1st Bag	17 2

Packet Given [illegible] TP 13 to be del[illegible]

10.

COMMENTS

on the duty 6 weeks [illegible] [illegible]

Bags and large packet TP 13

OFFICE

DUTY To 37 WALK NO

DATE

Depart time 0715

First letter 0726.

1st DELIVERY

2ND DELIVERY

MODE OF TRAVEL cycle

Name of Street etc	Nos From	Nos To	No of Calls	No of items Ltrs	No of items Pkts	Time span From	Time span To	Total Mins
1 LINFORD CRES	1	19	III	4	1	0726	0730	
2 Linford Cres	2	16	III	2		as	above	
3 Linford Cres	21	35	I	1		as	below	
3D Linford Cres	18	20	II	3		0730	0731	1
4 Linford Cres	37	69	II	3	1	0731	0733	
5 Greenace			I	8	1	0733	0733	
						0733	0736	
6 Linford Cres	73	101	I	1		0734	0735	1
	103	133	III	5		0735	0737	1
7	135	169	III	5		0737	0739	
8 Linford Cres	22	36	III	4		0739	0741	1
9 Linford Cres	38	52	III	4		0741	0742	
10 Verdon Cres	54 70	66 40	III	3		0742	0743	
11 Verdon Cres	38	2	IIII I	6		0743	0748	
12 Verdon Cres	19	1		3		as above		1
13 Greenhill Rd	79	103	IIII IIII II	20	1	0748	0756	1
14 Greenhill Rd	105	121	IIII II	10		0756	0801	1
15 Greenhill Rd	123	145	IIII IIII	19		0801	0805	1

OFFICE

DUTY WALK NO

DATE

1st DELIVERY

2ND DELIVERY

MODE OF TRAVEL

	Name of Street etc	Nos From	Nos To	No of Calls	No of items Lttrs	No of items Pkts	Time span From	Time span To	Total Mins	
16	Greenhill Rd	147	153	II	2	1	0805	0806		[illegible]
17	St Davids cres	1	19	卌 III	22	TT	0806 0807	0807 0812		[illegible]
18	St Davids cres	21	41	卌 卌 II	27		0812	0818		
19	Grasmere	1	23	卌 卌 I	24		0818	0823		[illegible]
20	Grasmere	16	2	卌 II	16		0823	0827	1	[illegible]
21	St Davids cres	43	53	IIII	8		0827	0830		
22	St Davids	72	50	卌 卌 II	26		0830	0836		[illegible]
23	St Davids	48	30	卌 IIII	18	1	0836	0842	III	
24	Thirlmere	1	5	III	6		0842	0843		[illegible]
25	Thirlmere	16	2	卌	10	1	0843	0847		
	St Davids cres	28	14	III	6		0847	0849		
	St Davids Court	1	6	II	3		0849	0850	1	
	St Davids cres	12	2	卌	17		0850	0853		[illegible]
	Greenhill Rd see 33	128	144 161	II I	6	TT	0853 0855 0856	0856 0857	→	[illegible]
5	Greenhill Rd	175	177	II	8		0857	0859		[illegible]
	Greenhill Rd	146	168	IIII	8		0906	0909		[illegible]

[illegible] sses [illegible] TP 18

OFFICE

DUTY WALK NO

DATE

1st DELIVERY

2ND DELIVERY

MODE OF TRAVEL

Name of Street etc	Nos From	Nos To	No of Calls	No of items Ltrs	No of items Pkts	Time span From	Time span To	Total Mins	
32) Greenhill Rd	170	180	卌	18	1	0903	0906		[illegible]
3) Greenhill Rd	187	181	卌	6		0894	0903		[illegible]
see 29	140	128	[illegible]	7					
33) Greenhill Rd	128	86	卌 卌 卌 卌	48	1	0909 0914	0914 0928	[illegible] packet card left	[illegible]
34) Greenhill Rd	84	70	卌	8		0928	0932		[illegible]
35) Greenhill Rd	68	60	1	3	1 T	0932 0933 0934	0933 0934 0935		
Test		pes				6 letters			
Amount of mail				Average for wednesday					
Last letter		0933			0935				
Arrive back at office and					0950				
Return packets									
							packets returned		
[illegible]	191								

APPENDIX B.5:

P302 - EXAMINATION OF PREPARATION FOR DELIVERY

P 302

EXAMINATION OF PREPARATION FOR DELIVERY

Office: COALVILLE

Name of Postman: Andy Sanders

Duty Number: TP 37

Name and/or No of Walk:

Delivery: FIRST

Tested on: Wednesday 22.3. 1995

Standard or WPF used: STANDARD

†Period(s) occupied exclusively on preparation (For details see overleaf)						Number of Items	
Scheduled		Actual		Recommended			
1		2		3		4	
From	To	From	To	From	To	Short letters	
0600	0700	0558	0715			Long letters	368
						Packets	7
						~~Parcels~~ Flats	31
						Sub Total	406
Total minutes 60		Total minutes 67		Total minutes		Redirection Cards and Special Instruction Cards	1
						Missorts	14
†Interim periods not occupied on preparation work, eg meal reliefs, weighing of pouch, walk sorting, should be shown in detail below:						Other items (Registered, Charged, etc)	
				From	To	Total	421
Clive picks up Andy				0608	0609	Approximate Percentage of items on which an address number is not shown:	
weighing 2nd Bag				0630	0631		
weighing 1st Bag				0707	0708		
preparing to Depart				0708	0715		

$$\text{Output} = \frac{\text{Total items (Col 4)}}{\text{Total minutes (Col 2)}}$$

= 6.3 Items per minute

Tested by D. R. Clift

Retention Period: Until next report

P 302

Note: Where wing type fittings are in use delete section 2(b) and 3
Where conventional fittings are in use delete section 2(a) and 9.

	Operations performed in the time shown in Column 2 overleaf	No of Items	Time Occupied			Rate per Minute
			From	To	Minutes	
1	Clearing from sorting fittings (including return of empty bags)		0558	0559	1	
			0615	0616	1	
			0621	0622	1	
2(a)	WING PREPARATION FITTINGS ONLY Street Sorting Short and Long Letters					
2(b)	CONVENTIONAL BOX PREPARATION FITTINGS ONLY Street Sorting Short and Long Letters Redirection and Special Instruction cards.		0559	0608	9	
			0609	0615	6	
			0617	0621	4	
			0631	0633	2	
3	CONVENTIONAL FITTINGS ONLY Setting-in Short and Long letters					
4	Preparation of Packets/Parcels for identification of address (by reversing letter)		0622	0624	2	
5	Transferring items to and from other walks		0616	0617	1	
6	Checking items for Firms, etc selected on Preparation fitting. No of firms					
7	Checking items for Firms, etc selected on Inward Primary/Secondary No of firms					
8	Obtaining Registered, Surcharged, Freepost and Business Reply items					
9	WING TYPE FITTINGS ONLY Sorting Redirection and Special Instruction cards					
10(a)	Redirecting Letters etc					
10(b)	Entering Recorded Delivery items					
11	Assembling items in order of delivery and bundling		0625	0631	6	
			0633	0649	16	
			0651	0705	14	
12	Packing of Pouch or Basket		0649	0650	1	
			0705	0707	2	
13	Visits PMG lockers. Other operations allied to preparation and not detailed above. (Details to be shown under remarks)		0624	0625	1	

Total Minutes .....67.....

REMARKS:– Only strictly factual and non confidential comments should be made on this form. All other comments should be the subject of a separate report.

APPENDIX B.6:

P947 - TEST OF DELIVERY / COLLECTION

P947

TEST OF DELIVERY/COLLECTION

Post No .....

Revd Oct 82

Office COALVILLE

Name/No of Walk/Collection ..... Duty No TP 37

Delivery/Collection 1st/~~2nd/3rd~~

Name(s) of Pmn Andy Summers

Mode of travelling Cycle Day Wednesday

Type and size of van ..... Date 22.3.95

Method of parcel preparation and no of bags if used –

		CLOCK TIME Scheduled	Actual	Proposed	Mileage Reading
lance for duty		0600	0558		
ation	begun	0600	0559		
ird or ar trip	begun		0715		
	ended		0726		
d	begun		0935		
	ended		0950		
occupied by:–		mins	mins	mins	No of Pools Items
ration		60	67		
ery		150	127		Other Abnormals
ction			1		
rn to office			15		Transfer from other walks/posts
ellaneous ior					
irections					

No of separate attendances	CREDIT FOR ACCELERATION	
	..... letters at	£
Covering periods of duty H M	..... parcels at	£
Frequency of Posts	Total	£

24.9 KG.

al weight carried

		OUTWARD or CIRCULAR TRIP No of lbs M	F	INWARD TRIP No of lbs M	F
ance ered	foot				
	motor or cycle				
of items vered	Letters	406			
	Parcels				
		mins	secs	mins	secs
al time occupied					
al duration of s					
al actual elling					
rage e	Delivery		40		
	Sub office				
	Letter box				
	Firm				
rage speed – s included/excluded		Included	Excluded	Included	Excluded
rage No ems vered hour	Letters	191			
	Parcels				

NOTES

The Delivery comprises of all residential delivery points.

The second Pouch is left in the Limpet box by Duty TP 13.

There was 13 mailsort only letters delivered.

The delivery crosses TP 10 on Abbotts oak to get to ST Davids Cresc and also part of Greenhill Rd is delivered by TP 2C.

The delivery officer said the amount of mail was average for a wednesday and the test was conducted fairly.

Weather Bright and Sunny

made by D.R. Clift Rank A/JVS

Proposals made by ..... Rank .....

Approved by ..... Rank .....

Places on Post Name or No of Street Name of SO, firm etc	No of calls		Items for each place		CLOCK TIME				Time on foot walking over 50 yds Cyclist Motorist	Duration of halt from rest to moving off	Mile	REMARKS (Nature of routes, gradient hills, etc)
	Driver	Other Pmn	L	P	Scheduled	Actual on Test Arr	Actual on Test Depart	Proposed				
Depart office							0715					
Cycle to first delivery point						0715	0726		11			
Linford cres												Knocked for packet quick answer
1 X 19												
2 X 16		6	6	1		0726	0730		4			
Linford cres												
21 X 35												
18 X 20		3	4			0730	0731		1			
Linford cres												
37 - 69		2	3	1		0731	0733		2			Knocked for packet quick answer
Greenacre		1	8	1		0733	0733		—			Old peoples home
	Travel time					0733	0734		1			
Linford cres												
73 - 101		1	1			0734	0735		1			Linford and [illegible]
111 - 133		3	5			0735	0737		2			crescent are old
135 - 149		3	5			0737	0739		2			peoples Bungalows
Linford cres												and houses.
22 - 36		3	4			0739	0741		2			
38 - 52		3	4			0741	0742		1			
54 - 68		1	1			0742	0742		—			
Gordon cres												
70 - 40		3	3			0742	0743		1			
38 X 2												
19 X 1		6	9			0743	0748		5			
Greenhill Rd												
79 - 103		12	20	1		0748	0756		8			Knocked for packet [illegible]
105 - 121		7	10			0756	0801		5			mixed properties
123 - 145		9	19			0801	0805		4			semi detatched and
147 - 153		2	2			0805	0806		1			detatched approx 15
	Travel time					0806	0807		1			paces.
T Davids cres												
1 - 19		8	22			0807	0812		5			Detatched bungal
21 - 41		12	27			0812	0818		6			
Grasmere												Detatched houses
1 - 23		11	24			0818	0823		5			and Bungalows.
16 - 2		7	16			0823	0827		4			15-20 paces.
T Davids cres												
43 - 53		4	8			0827	0830		3			
T Davids cres												
72 - 50		12	26			0830	0836		6			Detatched properti
48 - 30		9	18	1		0836	0842		6			

ces on Post ne or No of Street e of SO, firm etc	No of calls		Items for each place		CLOCK TIME				Time on foot walking over 50 yds Cyclist Motorist	Duration of halt from rest to moving off	Mile	REMARKS (Nature of routes, gradient hills, etc)
	Driver	Other Pmn	L	P	Sche-duled	Actual on Test Arr	Actual on Test Depart	Pro-posed				
airmate												
1 - 5		3	6			0842	0843		1			Detached properties
16 - 2		5	10	1		0843	0847		4			
Davies Cres												
28 - 14		3	6			0847	0849		2			
Davies Court												
1 - 6		2	3			0849	0850		1			
Davies Cres												
12 - 2		5	17			0850	0853		3			Detached properties
Connects	Second		Bag			0853	0855		2	Greenhill Rd letter box		Crosse 153
	Travel		time			0855	0856		1			
anhill Rd 161		1	6			0856	0857		1			
anhill Rd												
75 - 177		2	8			0857	0859		2			Detached houses
31 - 187		3	6			0859	0903		4			Detached houses with
nhill Rd												
80 - 170		5	18			0903	0906		3			Detached houses
68 - 146		4	8			0906	0909		3			Detached houses
th - 128 A		5	7			0909	0914		5			[illegible]
28 - 86		20	48	1		0914	0928		14			Quick reply.
84 - 70		4	8			0928	0932		4			Detached end
68 - 60		1	3			0932	0933		1			Detached properties
	Travel		time			0933	0934		1			
natures Post	Box	on	Hinton	Cres		0934	0935		1			
Cycle back	to	the	office			0935	0950		15			
Arrive back	at	the	office									
n return	packets					0950						
tems Deliv			406									
alls made			191									
Deliv span			127									
ollection			1									
ad time			1									

APPENDIX B.7:

FIXED TERMS OF REFERENCE

FIXED TERMS OF REFERENCE
P.D.O.

The overall objective of the revision is to :-
Produce an effective and cost efficient delivery and collection structure for all duties operating from this office, having due regard for the Quality, Customer, Profitability and Employee objectives of Royal Mail

D.P.M.S
A meeting shall take place with the D.P.M.S Co-ordinator, the D.O.M and the Project Manager to analyse office D.P.M.S data.

QUALITY
Any changes made during the project should have a positive impact on quality both Internal and External.

COMMUNICATION
The Project Manager will hold weekly meetings during the life of the Project with the Delivery Office Manager to appraise him of the current state of the Project. This will enable the D.O.M. to prepare regular Team Briefings.

RE-INSTATE THE 0930
Last letter drop should be targeted for 0930.

CLEAR OFFICE POLICY
All mail received at the office should be sorted for the next available delivery.

CLEAR FRAME POLICY
Time should be made available for all mail sorted to the walk sorting frame to be delivered on the next available delivery

FIRST DELIVERY
There should be maximization in use of first delivery as an outlet for all mail streams.

REDIRECTION
Time should be made available for all redirection's to be to be effected in line with the office policy. Prior to leaving on first delivery

PRIORITY SERVICES
Time should be made available for all Priority Service items at the office to be collected and delivered for first delivery. All priority Service Delivery Record cards to be handed in to the P.H.G. in time for inputting data to meet customer specification.

DELIVERY SPAN
Town delivery span should be between 0700-0930 this excludes traveling time.
Except for business deliveries the desired delivery span should be as near to two and a half hours as possible.

BUSINESS MAIL
Where operationally feasible all business mail should be delivered on dedicated firms delivery.
Where deliveries are mixed residential and business. Priority where operationally feasible should be given to meeting the business customer request for delivery.
Where specific delivery times have not been requested, current delivery times should not be worsened

FIXED TERMS OF REFERENCE

(Continued)

SATURDAY DELIVERY

Special consideration should be given to Saturday deliveries where access to shops or business's can not be made prior to 0900.

SPLIT POSTCODES

The use of split postcodes should be eliminated where it is operationally possible.

HEALTH & SAFETY

All changes in duty structure or office layout is to comply with the Health & Safety Policy.

TRAINING

Consideration must be given to any training requirement, where changes are made to sorting or sorting equipment.

INDUSTRIAL RELATIONS

All Discussion/negotiations with C.W.U. will be via the Delivery Office Manager and will be recorded.. Planners will offer advice, Information and support to the delivery office to enable him to conduct effective discussions/negotiations.

IMPLEMENTATION

During the first week of implementation the Project Manager will be on site to respond to any area needing amendments.

MEASUREMENT

A post implementation Review will be conducted within three months of the implementation date. The Manager will not make changes during the period between Implementation and the Review. Without prior consultation with the Project Manager.

---------- DATE----------

DELIVERY OFFICE MANAGER

---------- DATE----------

PROJECT MANAGER

APPENDIX B.8:

SPECIFIC TERMS OF REFERENCE

SPECIFIC TERMS OF REFERENCE.

When setting specific terms of reference with the Delivery Office Manager the following items can be used as a check list :-

Down grade/Upgrade O.M.Vs.

5 Day weeks.

Conveyance to first delivery point.(cycles, mopeds, crewbuses, bus.)

Type of fittings.

Mech Walk Sorted Mail.

Saturday Retention of Mail.

Office Layout.

Traffic Growth.

Delivery Point Growth.

Future New Development.

Office Layout (consider use of Industrial Engineers).

Second Drop Pouches.

Over size Packet Deliveries .

Mail Opening contracts (i/e D.S.S.).

Office Specific Contracts (i/e Gas Board, Timed Deliveries).

Team working.

Splitting Deliveries into Geographical area's.

Containerisation

File SPECIFIC.wps

Appendix 4

TERMS OF REFERENCE

REVISION DETAILS FORM

OFFICE	Date

REVISION CRITERIA *(FIRST MEETING)*	DETAILS NUMBERS
TYPE OF REVISION	
NUMBER OF WALKS REQUIRING TESTING	
NUMBER OF TESTING STAFF	
LINES OF COMMUNICATION	
USE OF ON SITE ROOM	
USE OF ON SITE COMPUTER	
AGREE PLOTTING STAFF	

Notes
TYPE OF REVISION
Full Office Revision, Part Office revision, Manual " W ", Table top, T.R.A.N.D.O.S Project Team to do it.
D.O.M to do it with Project Manager as informed supplier

NUMBER OF WALKS REQUIRING TESTING
As agreed

NUMBER OF TESTING STAFF
The number of testing staff shall determine the length of time required for testing
Agree number of testing staff. To be provided by the DAM of the District. To be paid for by the DOM/DAM.

LINES OF COMMUNICATION
Agree requirements of update meetings and time intervals.

ADD ANY OTHER SPECIFIC REVISION CRITERIA IN THE BLANK LINES

File REVCRIT1.wks

APPENDIX B.9:

HINCKLEY TERMS OF REFERENCE

HINCKLEY DELIVERY OFFICE REVISION

REVISION TEAMS TERMS OF REFERENCE

REVISION OBJECTIVES

1. To produce efficient and cost effective Delivery, inward sorting and collection arrangements for all duties operating out of the Hinckley Delivery Office. Having due regard for quality of service, customer satisfaction, unit costs, employee satisfaction, market share and profit also all requirements of Business customers will be either maintained or improved.

2. To facilitate enhanced managerial control by bringing up to date all managerial aids. These are to include P318s, P760s, P735s, OPALINES and signing on control sheets. Due regard should be given to the delivery Specification and A PLUS.

3. All aspects of Health & Safety should be taken into account when formulating all duties.

THE OBJECTIVES WILL BE ACHIEVED BY :-

1. The use of official transport to the first point of Delivery by either , foot, cycle or OMV.

2. A delivery span of 0700 first letter and 0930 last letter in recognised town delivery areas. A second delivery span of no earlier than 1045 first letter and no later than 1330 last letter. Travelling to and from first or last delivery points are outside these delivery spans. P318s will identify specific first and last letter times for each duty.

3. All duties will include return to the office time. Pouching off on 2nd deliveries will not normally be allowed.

4. Any new delivery duties, if required, should be associate grade and targeted at growth areas. This will enable the DOM to meet the set objectives.

5. A minimum preparation rate of 7.75 items per minute on deliveries with more than 50% residential type delivery points. Using the 48 type box fittings.

6. A minimum preparation rate of 9 items per minute on all other deliveries. Using 48 type box fittings.

7. Preparation times will be based on traffic levels taken from the manual "w" test and P143 self analysis forms. The only exceptions to this being where it is agreed that the times and traffic were " abnormal ". Bag weighing traffic figures will be used to confirm that these figures were " normal ".

8.Delivery times will be based on the manual "w" test and P143 self analysis forms . The only exception to this being , where it is agreed that these times were abnormal.

9. Inward sorting night duties and inward sorting content within all other duties will be based on the APC agreement signed in 1994. Temporary inward sorting hours will be used if the APC is not fully operational by the revision implementation date.

10. All existing delivery S/A and agreed delivery growth pressure overtime will be absorbed into actual working duty hours.(average pay within the Hinckley D.O. will be a consideration when formulating proposals).

11. LE postcode area missort sorting time to be included in an early postman duty. This time should be designed to meet local missort retrieval needs.

12. Each early delivery duty to have internal missort sorting time included in its duty code again designed to meet local needs.

13. All priority services items, with the exception of overweight items, to be delivered by the appropriate delivery duty on the first and second deliveries. Special arrangements will be made, by the DOM, if Q of S on these items is at risk.

14. The possibility of 2nd pouch boxes to explored, planned and costed.

15. Firms delivery driving duties to be planned to ensure 0930 cut off is met.

16. Drivers dedicated delivery areas to be created. Each duty to be responsible for 2nd pouches, overweight packets, flyers and overweight/size priority service items.

17. All collection driving duties to meet agreed revision objectives.

18. Discussions to take place at area level on the feasibility of the 0700 pillar box collection.

19. Cycle maintenance work to remain as now unless duty time is available to perform this work. All Health & Safety guidelines will need to be met.

20. All new AMW performed should be allocated to AWD hours, this work is to include :- loading and unloading hoist, bag opening and tipping, mailsort 3 segregation tipping. Empty bag control to be placed in AWD hours.

21. The Hinckley DO accommodation requirements are to be analysed. A shortage of work area may require the separate garage area to be utilised. (DOM to liase at area level).

22. The financial impact of the proposals to be calculated by the local planning manager using existing costing packages.

23. A steering group to be set up to monitor all plotting, planning and proposals. This group will consist of six members of the staff at Hinckley DO, the group will meet every Friday to discuss progress with the DOM and planning team.

24. The DOM, local planning manager and CWU rep to meet weekly to discuss progress.

25. The DOM assisted by the local planning manager to be responsible for all negotiations with the local CWU rep.

26. DOM to team brief all Hinckley DO staff on a regular basis.

27. The roll of the balance of staff PHG duty to be redefined to give it clearer responsibilities.

28. Negotiation period. See Appendix A.

29. During the first week of implementation of the new duties, members of the planning team will be on site. The delivery project manager will also allocate sufficient resource during the " bedding in period " to

respond to any major slip up that may have occurred during the planning process, and for this to acted upon immediately.

30. The DOM will only react to any minor problems that may arise during the course of the PIR period, in consultation with the Delivery project manager.

31. To ensure that any new duties if required are working as intended , the DOM will be required to implement and maintain the monitoring procedure regarding staff signing in and out of the office, before and after deliveries. This provides vital information for the planning team during the PIR period as well as being a requirement of the Health and Safety at work act. All P318s will state that it is a requirement for staff to do so :- i.e. All staff to sign in and out on all attendance's.

32. The communication process to private and business customers will be the responsibility of the DOM, in conjunction with the planning team, the DAM and the communications manager.

33. The use of new fittings to be explored.

34. Full containerisation of Hinckley D.O. to be explored.

SIGNED..... **DATE**.20/4/95
HINCKLEY D.OM.

SIGNED..... **DATE**.....
CWU REP HINCKLEY

SIGNED..... **DATE**.....
AREA PLANNING MANAGER

APPENDIX A

NEGOTATION TIMETABLE IN COMPLIANCE WITH THE I.R.FRAMEWORK

1. The industrial relations framework allows 4 weeks for the Delivery Office Manager and the Local CWU Office Representive to process negotiable issues through that framework at local level.

2. To assist the DOM and the CWU overcome any unnescessary delays during this period the following actions and time scales will be adhered to :-

a.All supporting data and evidence will be openly available.

b.Both paties will be realistic about whether progress is going to be made at local level.

c.A clear timescale will be given to the CWU for consideration of the proposals.

d.The CWU will be given a clear timescale and terms of reference, where opportunity is given for counter proposals.

e.Facility time will be given to the local CWU representative to ensure that the timescales given under the IR framework are met.

AGREED PREPARATION RATES AT HINCKLEY D.O.

A minimum preparation rate for deliveries with more than 50% residential type delivery points is agreed at 7.75 items per minute.

A minimum preparation rate for all other deliveries is agreed at 9 items per minute.

This agreement is based on all deliveries using 48 type box fittings.

SIGNED..... DATE.20/4/95...
DOM HINCKLEY D.O.

SIGNED..... DATE.....
CWU REP HINCKLEY D.O.

APPENDIX B.10:

PROJECT TIMINGS AND GANTT CHART

DELIVERY PROJECT SPECIFICATION	

OFFICE NAME

Ref i.e ST1	LE1
Version	1

Project
HINCKLEY

Type of project
FULL MANUAL 'W' REVISION

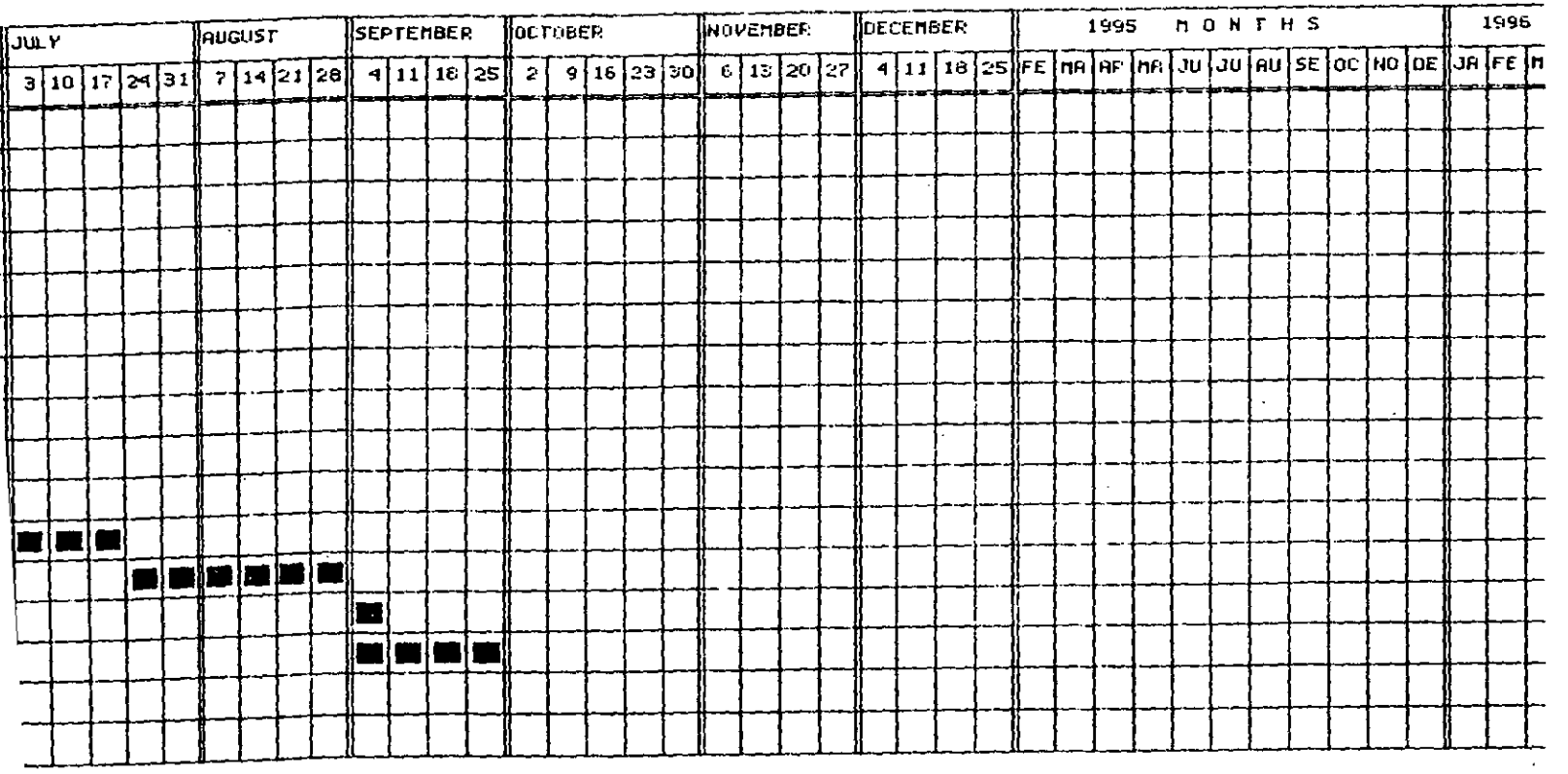
Project Leader
CLIVE DOUTHWAITE

Planning Time Scales **START 13\02\95** **Whole Project-FINISH** **P.I.R**

Impact on other Strategies **CUSTOMER** **QUALITY** **PROFITABILITY** **EMPLOYEE**

NO	CRITICAL SUCCESS FACTORS	DATES Start/Finish	ACTION BY	OTHER FUNCTIONS INVOLVED
1	STAKEHOLDERS ANALYSIS	1994\95		
2	COMMUNICATION PACKAGE	1994\95		
3	AGREE TERMS OF REFERENCE	7\04\95 AGREED	DOM\CWU PLANNING	
4	PRODUCE TIME SCALES (GANTS)	3--7\04\95	PLANNING	
5	TESTING STARTED	13\02\95	PLANNING	DOM\DAM
6	TESTING FINISHED	17\03\95	PLANNING	
7	AGREE TEST PAPERS	20--24\03\95 AGREED	DOM\CWU PLANNING	
8	AGREE PREPERATION RATES	27\03--7\04\95 AGREED	DOM\CWU	
9	PLOT DELIVERIES	10\04\95 23\06\95	PLANNING	DOM\DAM\CWU
10	PRODUCE P760 & P318s (PROPOSALS)	26\06\95 21\07\95	PLANNING	
11	AGREE PROPOSALS	24\07\95 1\09\95	DOM\CWU	
12	REVIEW No1 AND COMMUNICATION	4\09\95 8\09\95	PLANNING	
13	PRODUCE WORK AIDS OPALS. LABELS. WALK SEQUENCING etc	4--29\09\95	PLANNING	STENCILLS
14	AGREE DATE OF IMPLEMENTATION	NOT KNOWN	DOM\DAM\CWU PLANNING	
15	P.I.R.	NOT KNOWN	PLANNING	

	file:LEIVER1		JANUARY					FEBRUARY				MARCH				APRIL				MAY					JUNE			
REF No	A C T I V I T Y	WEEK COMMENCING	2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26
HNCKLY		ACTION By																										
1	STAKEHOLDERS IDENTIFIED	1994\95																										
2	COMMUNICATION PACKAGE	1994\95																										
3	AGREE TERMS OF REFERENCE															■												
4	PRODUCE TIME SCALES (GANT)															■												
5	TESTING STARTED								■	■	■	■	■															
6	TESTING FINISHED								■	■	■	■	■															
7	AGREE TEST PAPERS													■														
8	AGREE PREPERATION RATES														■	■												
9	PLOT DELIVERIES																■	■	■	■	■	■	■	■	■	■	■	
10	PRODUCE P760s & P318s (PROPS)																											■
11	AGREE PROPOSALS																											
12	REVIEW No 1 & COMMUNICATION																											
13	PRODUCE WORK AIDS. LABELS ETC.																											
14	AGREED DATE OF IMPLEMENTATION	NOT KNOWN																										
15	P.I.R.	NOT KNOWN																										


JULY
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OCTOBER
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DECEMBER
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1996
3 10 17 24 31
7 14 21 28
4 11 18 25
2 9 16 23 30
6 13 20 27
4 11 18 25
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APPENDIX B.11:

COMPARISON OF ACTUAL AND SCHEDULED TIMES FOR PREPARATION AND DELIVERY

FIRST DELIVERY HINCKLEY D.O.

BASED ON TEST RESULTS

WALK No	PREPARATION RATE	DELIVERY TIME (MINS) ACTUAL	DELIVERY TIME (MINS) SCHD	PREPARATION TIME (MINS) ACTUAL	PREPARATION TIME (MINS) SCHD	NUMBER OF ITEMS HANDLED
1	10.4	96	120	174	150	1810
2	8.0	150	120	138	150	1107
3	9.9	115	120	132	150	1307
4	7.1	132	120	115	150	815
5	8.0	126	150	59	95	473
6	9.3	131	150	141	120	1310
7	8.2	167	150	128	95	1050
8	6.4	185	150	143	95	915
9	8.4	140	150	78	100	655
10	8.0	121	150	67	95	537
11	7.1	168	150	107	90	760
12	8.7	166	150	87	95	757
13	7.5	176	150	119	120	888
14	7.3	143	165	85	95	624
15	8.8	152	165	123	95	1082
16	8.3	121	165	93	95	772
17	7.9	195	150	115	95	904
18	7.2	150	150	134	120	965
19	7.4	139	150	79	95	585
20	8.6	122	150	97	95	834
21	7.0	182	150	107	95	752
22	7.3	181	150	112	95	818
23	7.0	156	165	104	95	731
24	9.2	180	165	75	95	690
25	8.1	178	150	81	95	656
26	5.2	118	150	98	60	506
27	8.1	150	150	97	95	786
28	7.1	114	165	92	95	653
29	7.9	138	165	74	95	585
30	8.7	146	150	75	95	653
31	8.5	146	165	76	95	646
32	10.6	149	150	139	105	1473
33	10.0	123	150	92	95	923
34	9.0	111	165	56	95	506
35	8.9	161	150	70	95	623
36	9.6	157	150	72	95	691
37	7.7	149	180	53	45	408
39	6.3	92	135	68		428
40	7.8	117	135	70	60	546
45	10.2	59		74		755
M1	6.5	136	90	204	180	1326
M2	7.8	234	325	93	60	725
M3	7.2	261	325	141	60	1015
M4	37.4	149	120	35	80	1309
M5	8.8	119	135	112	90	986
M7	12.8	136	185	157	105	2010
M13	5.8	37	67	33	15	191
TOTAL	413	6774	7112	4674	4385	39539
AVERAGE	9	144	151	99	93	841

APPENDIX B.12:

MAP OF HINCKLEY

STREET MAP OF
HINCKLEY
REFERENCE
Class Roads ... A 447
Class Roads ... B 580
her Roads
ootpaths ... F.P.
ailways
vers or Streams
edestrian Precinct
Parks or Playing Fields
Woodlands
Cemeteries
Churches
Schools & Public Buildings
Official Public Car Parks ... P
One Way Streets
SCALE
1/4
1/2
3/4 Mile
1 Kilometres
(Site of Richard III's Camp on the Eve of Bosworth Field, 21st August, 1485)
The Bradshaws
Dadlington
St. James's Ch.
Picnic Area
Stoke Lane
Harper's Hill Farm
Abraham's Bridge
Glebe Farm
Barwell
Refuse Site
Barwell Park
Stoke Lodge Convent School
STOKE GOLDING
Surgery
Village Hall
Recn Grd
Westmoreland
Odd House
Frith House Farm
Cold Comfort Farm
Stoke Fields Farm
Barwell House
Barwell Fields
Mill Street Industrial Estate
St Mary's Ch
Sunnyside Hospital
West Green
Hinckley Fields
Wykin Farm
Hinckley Fields Farm
Neale's Farm
Spring Hill Farm
Home Farm
Wykin
Wykin Hall
Swallows Green
Hinckley Sports Club
Rugby Cricket Ground
Middlefield
Richmond Primary School
Boys Club
Redmoor High School
Clover Park
Richmond Park
Asda Superstore
Burbage Common
Visitor Centre
Picnic Area
Club House
Stonygate
Park House
Sheepy Wood
Wykin Park
Springfield Park (Caravan Park)
Primary Sch.
Ambulance Sta.
Cemetery
Hollycroft Park
Hollycroft
John Cleveland College
(Hinckley Golf Club)
Golf Course
Refreshments
HINCKLEY
Public Open Space
Dodwells Bridge Industrial Estate
Hinckley Business Park
Clarendon Park
College Playing Field
British Gas Op Centre
Recn Grd
Queens Pk Recn Grd
College of Further Education
Youth Centre
Bridleway
SEE ENLARGEMENT
Harrowbrook Industrial Estate
St John's Ch
Westfield Inf. Sch.
Hastings High Sch.
Industrial Estate
Station
British Rail
Greyhound Stadium
Nutt's Bridge
Water Reclamation Works
Works
Sketchley Brook
Reservoirs
Sketchley Hill Fm
Burbage
St Catherine's Ch
Village Hall
Sewage Works
The Limekilns
Plough Inn
Limekiln Bridge
Sketchley Lane Industrial Estate
Sketchley
Sketchley Meadows Business Park
Britannia Recn Grd
Roman
Watling Street
Boundary of Hinckley & Bosworth District
Boundary of Rugby District
(Leicestershire)
(Warwickshire)
Stretton Fields
Stretton Firs
Three Pots Inn
Burbage Fields
White House Farm
The Hollies
Burbage House
Stretton House
M.69
Junction 1
Start Barn
To Lutterworth & London
To Nuneaton, Atherstone & Shrewsbury
Based upon the Ordnance Survey Map with the permission of the Controller of Her Majesty's Stationery Office Crown Copyright Reserved.
The representation on this Map of a Road, Track or Footpath is not evidence of Right of Way
1
2
3
4
5
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9
10
A
B

APPENDIX B.13:

CHANGES AT HINCKLEY

HINCKLEY REVISION

CHANGES TO ACTUAL DUTIES

CYCLE AND FOOT DELIVERIES

PRESENT	PROPOSED
1st Deliveries = 39 + 2 pressure	**1st Deliveries = 45**
2nd deliveries = 34	**2nd Deliveries = 28**

SEE DUTY CODES FOR FULL DETAILS

MOTOR DUTIES

Firms 1st Deliveries = 4	**Firms 1st Deliveries = 4**
Firms 2nd Deliveries = 4	**Firms 2nd Deliveries = 3**
Overweight packets = 1	**Overweight packets = 2(M6 & M13)**
Rural Deliveries = 2	**Rural Deliveries = 2**
Split duties = 2	**Split duties = 2**
Late turns = 4	**Late turns = 3**

CHANGES MADE TO MOTOR DUTIES SEE DUTY CODES

NIGHT DUTIES

Night duties = 2 <---------- NO CHANGE ----------> Night duties = 2

PHG DUTIES

Early duties = 2	Early duties = 2
Late duty = 1	Late duty = 1

SOME MINOR CHANGES TO DUTY CONTENT SEE DUTY CODES

STAFFING LEVELS

PRESENT (POSTMEN/WOMEN)

Full time duties = 47
Part time duties = 6
Full time leave reserves = 5
Part time leave reserves = 1
TOTAL HOURS = 2339

PROPOSED (POSTMEN/WOMEN)

Full time duties = 41
Part time duties = 17
Leave reserves = *see note below
TOTAL HOURS = 2378.5

***Leave reserves:- Initially no additional leave reserves will be required , spare staff will be used as leave reserves.**

PRESENT PHG

Full time duties = 3

TOTAL HOURS = 124.5

PROPOSED PHG

Full time duties = 3

TOTAL HOURS = 124.5

SCHEDULED ATTENDANCE

PRESENT
Delivery S/A = 8 hours per week
Sunday collection = 8 hours per week
TOTAL S/A = 16 hours per week
PROPOSED
Sunday collection S/A = 8 hours per week
Firms collection S/A = 12 hours per week
Loading dock S/A = 10 hours per week
TOTAL = 30 HOURS PER WEEK

*** SEE DUTY CODES FOR FULL DETAILS***

PRESSURE OVERTIME

PRESENT
Average overtime per week = 150 hrs.
The above figure is made up by the following :-
Early IPS
Mailsort 3 IPS
Loading dock
Parcel collection
Pressure delivery/extended delivery
Sunday pressure
AMW bag tipping
Bag control work
PROPOSED
All regular agreed pressure O/T will cease, the only exceptions being:-
*A small amount of early IPS to take into account APC shortfall.
*Extended delivery (only in exceptional circumstances).
*Sunday pressure.

ABSENCE OVERTIME

PRESENT
Average absence overtime = 220 per week
The above figure is made up by the following:-
Sick leave
Special leave
Maternity leave
Annual leave
Jury service
Special projects
PROPOSED
Absence overtime will be substantionally reduced by increasing leave reserves and spare staff.

SUMMARY OF PROPOSALS

* 1st deliveries increased

* 2nd deliveries reduced

* Motor duties re-organised

* Late turn duties reduced

* Packet delivery time increased

* Earlier starts on most duties

* Increased actual duty hours

* Reduction in full time duties

* No compulsory redundances

* No compulsory transfers

* Reduction in overtime

* Increase in scheduled attendance

* Increase in NDA for most full time staff

* Pressure overtime converted to duty hours

APPENDIX B.14:

HOURS AND CASH COSTINGS

HOURS and CASH COSTINGS

OFFICE HINCKLEY

DATE AUGUST 1995

PRE REVISION	DUTIES	HOURS	AVE PAY	CASH	POST REVISION	DUTIES	HRS	AVE PAY	CASH
A.W.D FULL TIME MANAGER	1	42	£10.33	£433.86	A.W.D FULL TIME MANAGER	1	42	£10.33	£433.86
A.W.D FULL TIME P.H.G	3	125	£4.86	£607.50	A.W.D FULL TIME P.H.G	3	125	£4.86	£607.50
A.W.D FULL TIME P/PERSON	47	1950.5	£4.26	£8,309.13	A.W.D FULL TIME P/PERSON	41	1701.5	£4.26	£7,248.39
A.W.D. PART TIME	6	157	£4.26	£668.82	A.W.D. PART TIME	17	445.5	£4.26	£1,897.83
SCHED ATTEND WEEK DAY		8	£7.03	£56.24	SCHED ATTEND WEEKDAY		22.5	£7.03	£158.17
SCHED ATTEND SATURDAY					SCHED ATTEND SATURDAY				
O/T WEEKDAY		337	£6.18	£2,082.66	O/T WEEKDAY		51	£6.18	£315.18
O/T SATURDAY		21	£8.52	£178.92	O/T SATURDAY		13	£8.52	£110.76
O/T & S/A SAT & SUN		11	£8.52	£93.72	O/T & S/A SAT & SUN		11	£8.52	£93.72
O/T EXTEND DEL SATURDAY					O/T EXTEND DEL SATURDAY				
O/T OTHER (STATE)					O/T OTHER (STATE)				
SINGLE RATE O/T		30	£4.26	£127.80	SINGLE RATE O/T		25	£4.26	£106.50
BUS FARES					BUS FARES				
NIGHT ALLOWANCES		411	£1.41	£579.51	NIGHT ALLOWANCES		487	£1.41	£686.67
SATURDAY ALLOWANCES		307	£2.13	£653.91	SATURDAY ALLOWANCES		375	£2.13	£798.75
DRIVING ALLOWANCES	12		£4.71	£56.52	DRIVING ALLOWANCES	11		£4.71	£51.81
CYCLE ALLOWANCES				£102.24	CYCLE ALLOWANCES				
MOPED ALLOWANCES					MOPED ALLOWANCES				
OTHER ALLOWANCES					OTHER ALLOWANCES				
CREW BUS ALLOWANCE					CREW BUS ALLOWANCE				
R.U.L.C					R.U.L.C				
TOTALS				£13,950.83	TOTALS				£12,509.14

WEEKLY FIGURES

File HRSCASH.wks

APPENDIX B.15:

QUESTIONS RAISED AND RESPONSES

QUESTIONS RAISED FROM MEETING

1. What cash savings is the office making by the revision.
2. What O/T has the office got now, and what will it be after the revision.
3. Can full time staff sign for part time duties before all full time duties are signed for.
4. Any full time staff with 0600 start times what effect on pay re night allowance.
5.Dock work showes 2 hours, the present dock work is 2.5 hours?
6.Alan to invite Andy Connelly to next meeting.
7.Will there be enough staff to deal with 1st delivery IPS (target 05:20 off).

Overall feeling from meeting is not to bring revision in before christmas, but to agree to start after.

ANSWERS TO QUESTION RAISED

1.There will be a cash saving of approximately £75,000,although this will be reduced by the one off costs in the first year of the project. There is also the additional cost of the excess full time staff in this case four. This will cost the business approximately £48,000 per year.

2. O/T present = 358 hrs per week inc`
O/T proposed = 64 hours per week inc`(this does not include any early IPS O/T due to APC shortfall)
These O/T levels assume spare full time staff covering absence O/T, also there is an increase in S/A hours from the present level of 16 hrs per week to 30 hours per week.

3. No full time staff will be allowed to sign for a part time duty although they may be asked if they are reserves to cover a part time duty in the future.

4. The effect of staff starting later will be countered by them being allowed to start earlier on IPS so attracting night allowance.

5. The proposed dock work of 2 hours per day will be reviewed during the implementation review period.

6. Andy Connelly role as area CWU rep does not include involvement in the process at this stage.

7. Yes, the 0520 target is not negotiable, every effort will be made to ensure that this is the normal time each day.

The implementation date will be agreed at local level between management and the CWU. The date agreed will be the earliest possible date after agreement on the revision is reached.

APPENDIX B.16:

HINCKLEY DELIVERY OFFICE
REVISION AGREEMENT

HINCKLEY DELIVERY OFFICE REVISION AGREEMENT

Set out in this document are the minutes of a meeting between Steve Saunders Hinckley DOM and Alan Lord Hinckley CWU unit representitve. These minutes form the basis of the revision agreement. Also in attendance at the meeting was Clive Douthwaite, Leicester Delivery Planning Manager.

The following was agreed:

1) STAFF MIX

3 x fulltime PHGs.
41 x fulltime postmen/women.
17 x part time postmen/women.
30 hours scheduled attendance.

2) LEAVE RESERVES

5 x fulltime postmen/women.
1 x part time postman/woman. (24 hours per week)
Total leave reserve hours = 231.5

3) ACTUAL WORKING DUTIES (AWDs)

PHG = 124.5
Postmen/women fulltime = 1701.5
Postmen/women part time = 445.5

Total AWDs = 2271.5

4) DUTY CONTENT

Full details of duty content can be found in the agreed p318 duty codes. The following is the agreed duty mix.

2 early PHGs.
1 late PHG.
2 night sorting duties.
11 fulltime driving duties (inc. 1 split duty, 2 rural, 3 late turns)
2 part time driving duties. (inc. 1 split duty)
45 cycle/foot 1st deliveries. (inc. partime split duty, cycle maintenance duty)
28 2nd deliveries.

5) SUPERNUMERIES

The above proposals will leave four supernumery full time staff. It is agreed that these staff will remain at the Hinckley DO. These supernumery staff will be used on work as directed by the DOM, this work will include the following : additional leave and absence cover, vacancy cover, excess ect.

6) **FULL OFFICE RE-SIGN**

A full office re-sign will take place prior to the introduction of the revision. A separate agreement will cover this re-sign.

7) **INTRODUCTION DATE**

The introduction date will be Monday November 20th 1995.

SIGNED..... DATE....12/10/95.....
DELIVERY OFFICE MANAGER HINCKLEY D.O.

SIGNED..... DATE..12.10.95.....
CWU REP HINCKLEY D.O.

HINCKLEY D.O. RE-SIGN AGREEMENT

The following is agreed.

1. The re-sign will be in strict seniority order

2. There will be THREE seniority lists
- PHGs
- POSTMAN/WOMAN FULL TIME
- POSTMAN/WOMAN PART TIME

3. Driving duties may be signed for by existing drivers or staff who are former Royal Mail drivers. Former Royal Mail drivers will need to prove they have received formal change over training.

4. At least ONE reserve duty will be a driving reserve.

5. Staff will be expected to sign IMMEDIATELY it becomes their turn to sign for a duty.

6. The DOM will ensure that staff who's turn it is to sign are notified by 0600hrs of that day.

7. No member of staff will be passed by their turn to sign unless they refuse to sign for a duty.

8. Any member of staff who refuses to sign without a satisfactory reason will be allocated a duty by the DOM.

9. Any member of staff taking ANNUAL LEAVE during the re-sign period will be required to fill in an option form stating FIVE duties in preference order. These duties must be realistic, the option form must be signed and dated by the member of staff and the DOM.

10. Staff who are on ANNUAL LEAVE but are able to come into the office to sign will be notified by the DOM the day before attendance is required.

11. For contractual reasons the following part time duties have been allocated:- **M6,31 & 20.**

The re-sign will commence from WEDNESDAY 18th OCTOBER 1995.

SIGNED..... DATE..12/10/95
DOM HINCKLEY D.O

SIGNED..... DATE..12.10.95
CWU REP HINCKLEY D.O.

APPENDIX B.17:

DPMS SUMMARIES
PRE- AND POST- REVISION

ONE WEEK SUMMARY

19 Dec 95

Office Name :

HINCKLEY - LEICESTER - MIDLANDS

Period : 4 December 95 to 10 December 95

TRAFFIC	1st Delivery	2nd Delivery	Overall
Letters	216366	32217	248583
Flats	20786	3930	24716
Packets	9940	4140	14080
RECEIVED	247092	40287	287379
PREPARED	217729	35855	253584
Town Delivery	174418	29884	204302
Town Motorised Delivery	27077	7706	34783
Rural Delivery	0	0	0
VLU and ELU Delivery	18954	0	18954
Other	5190	0	5190
DELIVERED	225639	37590	263229

HOURS	1st Delivery	2nd Delivery	Overall
Inward Sorting	293.1	91.8	385.0
Preparation	411.6	53.3	464.9
Town Delivery	723.3	267.5	990.8
Town Motorised Delivery	92.5	57.7	150.2
Rural Delivery	0.0	0.0	0.0
Outward Sorting			0.0
Other Included			286.9
Total Included			2277.7
Excluded			173.8
TOTAL	1520.5	470.3	2451.5

WORKLOAD HOURS	1st Delivery		2nd Delivery		Overall	
	EP	OP	EP	OP	EP	OP
Inward Sorting	166.4	117.2	40.0	28.5	206.5	145.6
Preparation	347.3	309.1	66.3	47.8	413.6	357.0
Town Delivery	473.1		201.3		674.4	
Town Motorised Delivery	75.8		25.6		101.5	
Rural Delivery						
Outward Sorting						
Other					189.1	
TOTAL	1062.6	426.3	333.3	76.3	1585.0	502.6

PERFORMANCE	1st Delivery		2nd Delivery		Overall	
	EP	OP	EP	OP	EP	OP
Inward Sorting	56.8	40.0	43.6	31.0	53.6	37.8
Preparation	84.4	75.1	124.3	89.7	89.0	76.8
Town Delivery	65.4		75.3		68.1	
Town Motorised Delivery	82.0		44.4		67.6	
Rural Delivery						
Outward Sorting						
Other					65.9	
OFFICE	69.9	60.5	70.9	52.5	69.6	59.1

ONE WEEK SUMMARY

19 Feb 96

Office Name :

HINCKLEY - LEICESTER - MIDLANDS

Period : 12 February 96 to 18 February 96

TRAFFIC	1st Delivery	2nd Delivery	Overall
Letters	217598	35229	252827
Flats	23376	4420	27796
Packets	8710	3627	12337
RECEIVED	249684	43276	292960
PREPARED	220014	38516	258530
Town Delivery	176246	32102	208348
Town Motorised Delivery	27360	8278	35638
Rural Delivery	5244	0	5244
VLU and ELU Delivery	19152	0	19152
Other	0	0	0
DELIVERED	228002	40380	268382

HOURS	1st Delivery	2nd Delivery	Overall
Inward Sorting	309.8	78.8	388.5
Preparation	446.3	61.7	508.0
Town Delivery	749.6	290.6	1040.2
Town Motorised Delivery	83.8	29.2	113.0
Rural Delivery	65.0	0.0	65.0
Outward Sorting			0.0
Other Included			274.4
Total Included			2389.1
Excluded			164.9
TOTAL	1654.5	460.2	2554.0

WORKLOAD HOURS	1st Delivery		2nd Delivery		Overall	
	EP	OP	EP	OP	EP	OP
Inward Sorting	178.2	125.9	42.2	30.1	220.4	156.0
Preparation	370.7	319.8	60.4	46.9	431.1	366.6
Town Delivery	493.9		205.7		699.6	
Town Motorised Delivery	76.0		26.2		102.1	
Rural Delivery	59.1				59.1	
Outward Sorting						
Other					199.7	
TOTAL	1177.9	445.7	334.5	77.0	1712.1	522.7

PERFORMANCE	1st Delivery		2nd Delivery		Overall	
	EP	OP	EP	OP	EP	OP
Inward Sorting	57.5	40.7	53.6	38.2	56.7	40.2
Preparation	83.1	71.6	97.9	76.0	84.9	72.2
Town Delivery	65.9		70.8		67.3	
Town Motorised Delivery	90.6		89.8		90.4	
Rural Delivery	91.0				91.0	
Outward Sorting						
Other					72.8	
OFFICE	71.2	59.0	72.7	54.8	71.7	58.3

APPENDIX C: CADR CASE STUDY

Appendix C.1:	RML and UCW Agreement
Appendix C.2:	Sec 'A' Form
Appendix C.3:	Directory Extract
Appendix C.4:	Ordnance Survey Map
Appendix C.5:	Listing of Sector
Appendix C.6:	Change of Delivery Method
Appendix C.7:	New walk Summary

APPENDIX C.1:

RML AND UCW AGREEMENT

CADR . HANDOUT 1/A .

AGREEMENT BETWEEN ROYAL MAIL LETTERS (RML)

AND THE UNION OF COMMUNICATION WORKERS (UCW)

REGARDING THE USE OF THE COMPUTER ASSISTED

DELIVERY REVISION SYSTEM (CADR)

1 CADR has been developed as a simple and flexible planning tool for carrying out delivery revisions. It enables revisions to be done more quickly, which will help to maintain standards in the light of current traffic growth, and also facilitates the testing of alternative work patterns. Once all the basic information is held on computer file, future revisions become easier and can therefore be undertaken more often to provide for changing circumstances. Because of the advantages of simplicity, speed and flexibility, use of CADR is the preferred method of carrying out delivery revisions. This does not, however, rule out the use of the traditional revision procedure (usually referred to as a 'Manual W Revision') by local agreement to meet specific local needs.

2 CADR does not have built into it any basic work standards. It is designed to take a pre-determined total time and allocate it between walks in an equitable manner. The method for arriving at the total delivery time (first call to last call) for existing walks needs to be agreed locally before the revision is started; once the time has been agreed, this should be regarded as a fixed element in the revision and negotiating process. The precise method of arriving at this time is not specified centrally. Because only the total delivery time is required, the traditional revision procedure will not normally be necessary. The operational trials demonstrated that CADR accurately reflected Manual W results.

In any case where there is a disagreement over the time for a particular delivery walk, it is agreed that a 'Manual W' test would be a sensible way of resolving an impasse.

3 There will be full involvement by the UCW in the revision process (as laid down in the Revised Guide to Postal Overhauls Chapter 1) and a short training course on the use of CADR will be made available to appropriate UCW representatives.

4 The CADR system does not provide for the revision of inward sorting arrangements, and these therefore need to be revised separately. Preparation rates and travelling time will be input to the computer after having been determined in the normal way.

5 The UCW agrees to co-operate fully in the development of CADR to cover rural deliveries.

Signed on behalf of RML .....

Date 24th April 1989

Signed on behalf of UCW Alan Johnson .....

Date 24th April 1989

ST001.DOC

APPENDIX C.2:

SEC 'A' FORM

FORM 'SEC/A' FOR SECTOR CO3.3

1 POST CODE	2 NO. D.P.'S	3 NO. FLATS	4 PATH LENGTH (1/16in)	5 STREET LENGTH (in)	6 CUL-DE-SAC LENGTH (in)	7 NO. SIDES	8 SU/LU	9 WALK NO.(1)	10 WALK NO.(2)	11 ADDRESS
~~3BD~~	~~17~~	~~0~~					~~0~~			~~208-232 MALDON RD~~
3BE	20	0	2			1	0	1	1	234-272 MALDON RD
3BG	3	0	1	.5		1	0 30	1	1	259-263 MALDON RD 251 MELLCD CO SUPPLY
3BH	6	0	2	.75		1	0	1	1	189-199 MALDON RD
~~3BJ~~	~~24~~	~~6~~					~~0~~			~~143-157 MALDON RD~~
~~3BL~~	~~15~~	~~0~~					~~0~~			~~159-187 MALDON RD/CHURCH OF THE/NEW JERUSALEM~~
3BP	1	0	8				27	1	1	* DRURY FARM/DRURY RD
3BQ	28	3	1			1	0	1	1	201-255 MALDON RD/FLAT/FLAT
3BS	1	0	2				42	1	1	* GARAGE/MALDON RD
3NR	25	0	2	4			0	5	5	27-43 26-56 CAMBRIDGE RD
~~3NS~~	~~46~~	~~0~~					~~0~~			~~1-25 2-24 CAMBRIDGE RD~~
~~3NT~~	~~41~~	~~0~~					~~0~~			1-31 2-28 VICTORIA RD
3NU	28	0	2	5.75			0	5	5	33-67 32-52 VICTORIA RD
~~3NW~~	~~4~~	~~0~~					~~0~~			~~1-3 2-4 DELLA COURT WEST LODGE RD~~
3TN	13	0	1				0	16	16	1-19 2-6 ATHELSTAN RD
3TP	3	0	2	4	* 3.75	1	0	16	16	25 IRVINE RD/CHASE / KOSHA
3TR	23	0	1				0	16	16	1-15 2-30 IRVINE RD
3TS	13	0	1		2.5		0	16	16	17-23A 32-46 IRVINE RD
~~3TT~~	~~33~~	~~0~~					~~0~~			~~27-61 56-84 IRVINE RD~~
3TU	12	0	1		1.25		0	16		3-5 2-20 CAPEL RD
3TW	15	0	1		1.75		0			21-49 ATHELSTAN RD
3TX	6	0	1				0			22-32 CAPEL RD
3TY	32	0	1		7		0	16		1-29 2-32 AUDLEY RD
3TZ	22	0	1		2.5		0	16		33-63 34-42 AUDLEY RD

APPENDIX C.3:

DIRECTORY EXTRACT

DIRECTORY EXTRACT

POSTCODES OF STREETS OF COLCHESTER

Athelstan Road
- Odds 1-9 CO3 3TN
- 21-49 CO3 3TW
- Evens 2-6 CO3 3TN

Audley Road
- Odds 1-29 CO3 3TY
- 33-63 CO3 3TZ
- Evens 2-32 CO3 3TY
- 34-42 CO3 3TZ

Cambridge Road
- ~~Odds 1-25 CO3 3NS~~
- 27-43 CO3 3NR
- ~~Evens 2-24 CO3 3N~~S
- 26-56 CO3 3NR

Capel Road
- Odds 3-5 CO3 3TU
- Evens 2-20 CO3 3TU
- 22-32 CO3 3TX

Drury Road
- Drury Farm CO3 3BP

Irvine Road
- Odds 1-15 CO3 3TR
- 17-23a CO3 3TS
- 25 CO3 3TP
- ~~27-61 CO3 3TT~~
- Evens 2-30 CO3 3TR
- 32-46 CO3 3TS
- ~~56-84 CO3 3TT~~

The Chase CO3 3TP

Kenby CO3 3TP

Maldon Road
- Odds 1~~43-157 CO3 3BJ~~
- ~~159-187 CO3 3BL~~
- 189-199 CO3 3BH
- 201-255 CO3 3BQ
- 257-263 CO3 3BG
- Evens ~~208-232 CO3 3BD~~
- 234-272 CO3 3BE

~~Church of new Jerusalem CO3 3BL~~

Garage CO3 3BS

Shrub End Road
- Odds ~~1-5 CO3 3UA~~
- ~~9-27 CO3 3UB~~

Victoria Road
- ~~Odds 1-31 CO3 3NT~~
- 33-67 CO3 3NU
- Evens ~~2-28 CO3 3NT~~
- 32-52 CO3 3NU

West Lodge Road
- ~~Della Court 1-4 CO3 3NW~~

APPENDIX C.4:

ORDNANCE SURVEY MAP

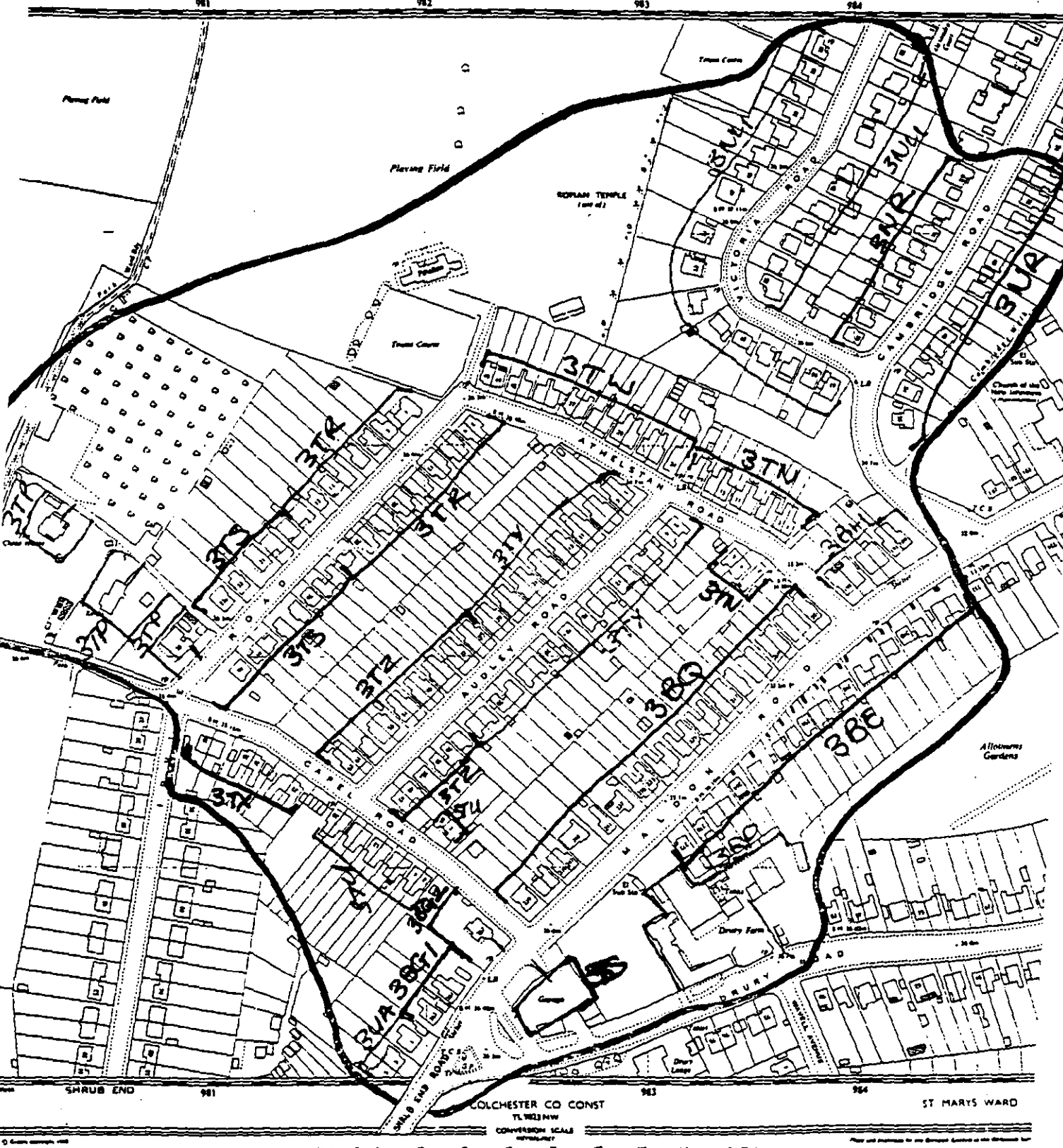
CADE 8

SIM (SUPPLY OF SURVEY INFORMATION ON MICROFILM)

GRID PLANS Scale 1:1250 ORDNANCE SURVEY HEIGHTS IN METRES PLAN TR

TL 9284 NW

ESSEX COUNTY COLCHESTER DISTRICT COLCHESTER No 3 (WEST) E D



COMPILATION DATA

BOUNDARIES

NATIONAL GRID REFERENCE

APPENDIX C.5:

LISTING OF SECTOR

LISTING OF SECTOR CO3.3

POST CODE	NO. D.P.'S	NO. FLATS	PATH LENGTH	STREET LENGTH	CUL-DE-SAC LENGTH	NO. SIDES	SU/LU	WALK NO.(1)	WALK NO.(2)	ADDRESS
3BE	20	0	2.00	3.00	0.00	1	0	1	1	234-272 MALDON RD
3BG1	3	0	1.00	0.50	0.00	1	0	1	1	259-263 MALDON ROAD
3BG2	1	0	1.00	0.00	0.00	1	30	1	1	257 SURGERY MALDON ROAD
3BH	6	0	2.00	0.75	0.00	1	0	1	1	189-199 MALDON RD
3BP	1	0	8.00	0.00	0.00	1	27	1	1	* DRURY FARM/DRURY RD
3BQ	28	3	1.00	3.25	0.00	1	0	1	1	201-255 MALDON RD/FLAT/FLAT
3BS	1	0	2.00	0.00	0.00	1	42	1	1	* GARAGE/MALDON RD
3NR	25	0	2.00	4.50	0.00	2	0	5	5	27-43 26-56 CAMBRIDGE RD
3NU	28	0	2.00	5.75	0.00	2	0	5	5	33-67 32-52 VICTORIA RD
3TN	13	0	1.00	1.25	0.00	2	0	16	16	1-19 2-6 ATHELSTAN RD
3TP	3	0	2.00	4.00	3.75	1	0	16	16	25 IRVINE RD/CHASE/KENBY
3TR	23	0	1.00	3.00	0.00	2	0	16	16	1-15 2-30 IRVINE RD
3TS	13	0	1.00	2.50	0.00	2	0	16	16	17-23A 32-46 IRVINE RD
3TU	12	0	1.00	1.25	0.00	2	0	16	16	3-5 2-20 CAPEL RD
3TW	15	0	1.00	1.75	0.00	1	0	16	16	21-49 ATHELSTAN RD
3TX	6	0	1.00	1.25	0.00	1	0	16	16	22-32 CAPEL RD
3TY	32	0	1.00	3.75	0.00	2	0	16	16	1-29 2-32 AUDLEY RD
3TZ	21	0	1.00	2.25	0.00	2	0	16	16	33-63 34-42 AUDLEY RD
3UA	3	0	2.00	0.50	0.00	1	0	16	16	1-5 SHRUB END RD

APPENDIX C.6:

CHANGE OF DELIVERY METHOD

CHANGE DELIVERY METHOD (FOOT/CYCLE)
Changing 1st Deliveries on hours reference A, writing to reference B

WALK	OLD TIME (MINS)	NEW TIME (MINS)	NEW METHOD
1	146.0	137.4	FOOT
2	145.6	134.6	FOOT
3	112.0	112.8	FOOT
4	116.4	122.8	FOOT
5	134.1	132.6	FOOT
6	145.2	127.7	FOOT
7	131.6	101.3	FOOT
8	174.2	142.0	FOOT
9	135.0	121.3	FOOT
10	149.3	136.3	FOOT
15	29.8	35.6	CYCLE
25	137.0	132.2	FOOT
26	123.0	113.6	FOOT
30	149.5	156.3	FOOT
31	147.6	156.6	FOOT
32	150.8	167.4	FOOT
101	115.9	122.9	FOOT
104	61.4	62.2	CYCLE
TOTAL	2304.0	2215.5	

APPENDIX C.7:

NEW WALK SUMMARY

NEW WALK SUMMARY - hours reference A, 1st Deliveries

WALK NO.	DELIVERY METHOD	TIME (hours:minutes) PREP	TRAVEL	DELIVERY	TOTAL	TRAFFIC	DELIVERY POINTS SU	LU	TOTAL
1	CYCLE	0:41	0:00	2:26	3:07	447	407	0	407
2	CYCLE	0:41	0:00	2:26	3:07	454	366	0	366
3	CYCLE	0:31	0:00	1:52	2:23	340	313	1	314
4	CYCLE	0:44	0:00	1:56	2:40	481	315	0	315
5	CYCLE	0:39	0:00	2:14	2:53	425	355	0	355
6	CYCLE	0:40	0:00	2:25	3:05	442	296	0	296
7	CYCLE	0:36	0:00	2:12	2:48	397	251	0	251
8	CYCLE	0:50	0:00	2:54	3:44	548	390	0	390
9	CYCLE	0:38	0:00	2:15	2:53	416	308	0	308
10	CYCLE	0:43	0:00	2:29	3:13	476	407	0	407
15	FOOT	0:14	0:00	0:30	0:44	152	95	0	95
25	CYCLE	0:43	0:00	2:17	3:00	473	283	1	284
26	CYCLE	0:42	0:00	2:03	2:45	464	314	0	314
30	CYCLE	1:02	0:10	2:29	3:41	678	300	1	301
31	CYCLE	1:04	0:01	2:28	3:33	709	312	0	312
32	CYCLE	1:01	0:10	2:31	3:42	673	316	0	316
101	CYCLE	0:40	0:00	1:56	2:36	443	374	1	375
104	FOOT	0:29	0:00	1:01	1:30	314	141	0	141
TOTAL		12:37	0:21	38:24	51:22	8332	5543	4	5547

APPENDIX D: PRINCE

Appendix D.1:	Role Descriptions
Appendix D.2:	Example of Gantt Chart and Product Flowcharts
Appendix D.3:	Example of Products for one stage
Appendix D.4:	Example of a Product Description

APPENDIX D.1:

ROLE DESCRIPTIONS

WALK OPTIMISATION PROCESS TRIAL

PROJECT BOARD - EXECUTIVE: **RON CLATWORTHY**

JOB OVERVIEW	Responsible for the integrity of the Business Case and completion of the project within the timescales and budget approved by the Approval Authority.
PRINCIPAL RESPONSIBILITIES	Provide overall guidance and direction to the project, ensuring it remains within any specified constraints. Define Project/Stage Managers responsibilities and objectives. Advise on the appointment of the BAC and give guidance to the BAC throughout the project. Review and approve the PID. Authorise expenditure and set stage tolerances. Review and approve stage and any exception plans. Conduct ESAs, sign off each completed stage and approve progress to the next stage. Report to the Approval Authority if required. Ensure that all products are completed and delivered. Sign the Business Acceptance Letter on satisfactory completion of the project. Recommend project closure to the Approval Authority.

WALK OPTIMISATION PROCESS TRIAL

PROJECT BOARD - SENIOR USER: **IAN FERGUSON**
ALEX GIBB

JOB OVERVIEW	Represent all users affected by the project. Monitor progress against User Management requirements.
PRINCIPAL RESPONSIBILITIES	Provide overall guidance and direction to the project, ensuring it remains within any specified constraints. Define Project/Stage Managers responsibilities and objectives. Advise on the appointment of the UAC and give guidance to the UAC throughout the project. Ensure that user resources required are available and funded. Review and approve the PID. Review and approve stage and any exception plans. Conduct ESAs, sign off each completed stage and approve progress to the next stage. Ensure that all products are completed and delivered. Resolve user requirement conflicts and priority conflicts. Brief and advise user management on all matters concerning the project. Sign the User Acceptance Letter on completion of implementation. Recommend project closure to the Approval Authority.

WALK OPTIMISATION PROCESS TRIAL

PROJECT BOARD - SENIOR TECHNICAL:

TREV STEGGLES (OR&S)
ROB JACKSON (IS)

JOB OVERVIEW	Represent the interests of those designing and implementing the project products. Monitor progress against technical management and operation requirements.
PRINCIPAL RESPONSIBILITIES	Provide overall guidance and direction to the project, ensuring it remains within any specified constraints. Define Project/Stage Managers responsibilities and objectives. Advise on the appointment of the TAC and give guidance to the TAC throughout the project. Review and approve the PID. Ensure technical resources required are available and funded. Approve product descriptions for technical products and sign off. Ensure resolution of any technical priority or resource conflicts. Brief non-technical management on technical aspects of the project. Authorise expenditure and set stage tolerances. Review and approve stage and any exception plans. Conduct ESAs, sign off each completed stage and approve progress to the next stage. Ensure that all products are completed and delivered. Sign Technical Acceptance Letter on completion of tests. Sign the Operations Acceptance Letter on completion of implementation.

WALK OPTIMISATION PROCESS TRIAL

PROJECT MANAGER: **PHIL BERQUEZ**

JOB OVERVIEW	To manage the day-to-day aspects of the project. To ensure that the project produces the required business and support products to the required standards of quality and performance within specified constraints.
PRINCIPAL RESPONSIBILITIES	Establish the required organisation for the project. Plan the production of the Project Plan and develop the Project Brief into a Project Initiation Document. Define objectives and responsibilities for each Stage Manager. Monitor overall progress and use of resources, initiating corrective action where necessary. Advise the Project Board of all deviations form plan beyond tolerance levels and supply Exception Plans. Liaise with the Quality Review Team to assure the overall direction and integrity of the project. Liaise with related projects. Participate in staff appraisals, training and career development. Prepare the Project Evaluation Report. Attend all Project Board assessment meetings.

WALK OPTIMISATION PROCESS TRIAL

STAGE MANAGER:

LIZ PAYLING (OR&S)
ANMARIE BYRNE (PURCHASING)
TERRY DELBRIDGE (PROCESS TRIAL)
SIMON BARNES (IS STRATEGIC FIT)

JOB OVERVIEW	To ensure production of the technical products of a stage to the declared status in a timescale and at a cost agreed with the Project Manager and Project Board.
PRINCIPAL RESPONSIBILITIES	Contribute to the preparation of the stage plan. Define objectives, responsibilities and work plans for the stage team and leader. Monitor stage progress and resource utilisation, initiating required corrective actions within the defined tolerances. Liaise with the Quality Review Team to ensure the business, technical and data integrity of the stage. Advise the Project Manager of deviations beyond tolerance, recommend corrective action and help prepare any Exception Plans. Prepare and present regular Checkpoint Reports to the Project Manager. Ensure the evaluation of Technical Exceptions and provide recommendations to the Project Manager.

WALK OPTIMISATION PROCESS TRIAL

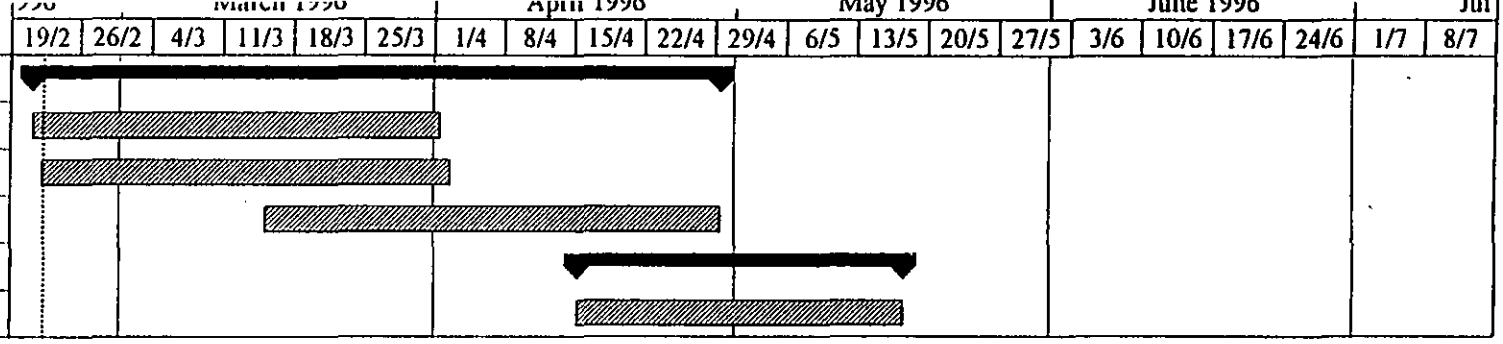
QUALITY REVIEW FORUM: LEAD PAUL TOLHURST

JOB OVERVIEW	To act as focal point for Quality Review activity.
PRINCIPAL RESPONSIBILITIES	To administer and co-ordinate all Quality Review activities, including maintenance of a quality review audit trail. To act as secretary to formal quality reviews and progress chase the follow-up actions. To identify from standards or devise an identification scheme for the project's products. To co-ordinate all Technical Exception procedures. To document Checkpoint Meetings.

APPENDIX D.2:

EXAMPLE OF GANTT CHART
AND
PRODUCT FLOWCHARTS

ID	Name
1	ANALYSIS
2	Costs & Benefits for CADR Offices (DTA1)
3	Costs & Benefits for Full Manual W (DTA2)
4	Costs & Benefits for WO (DTA3)
5	Report
6	Projection of National WO Benefits (DTA4)

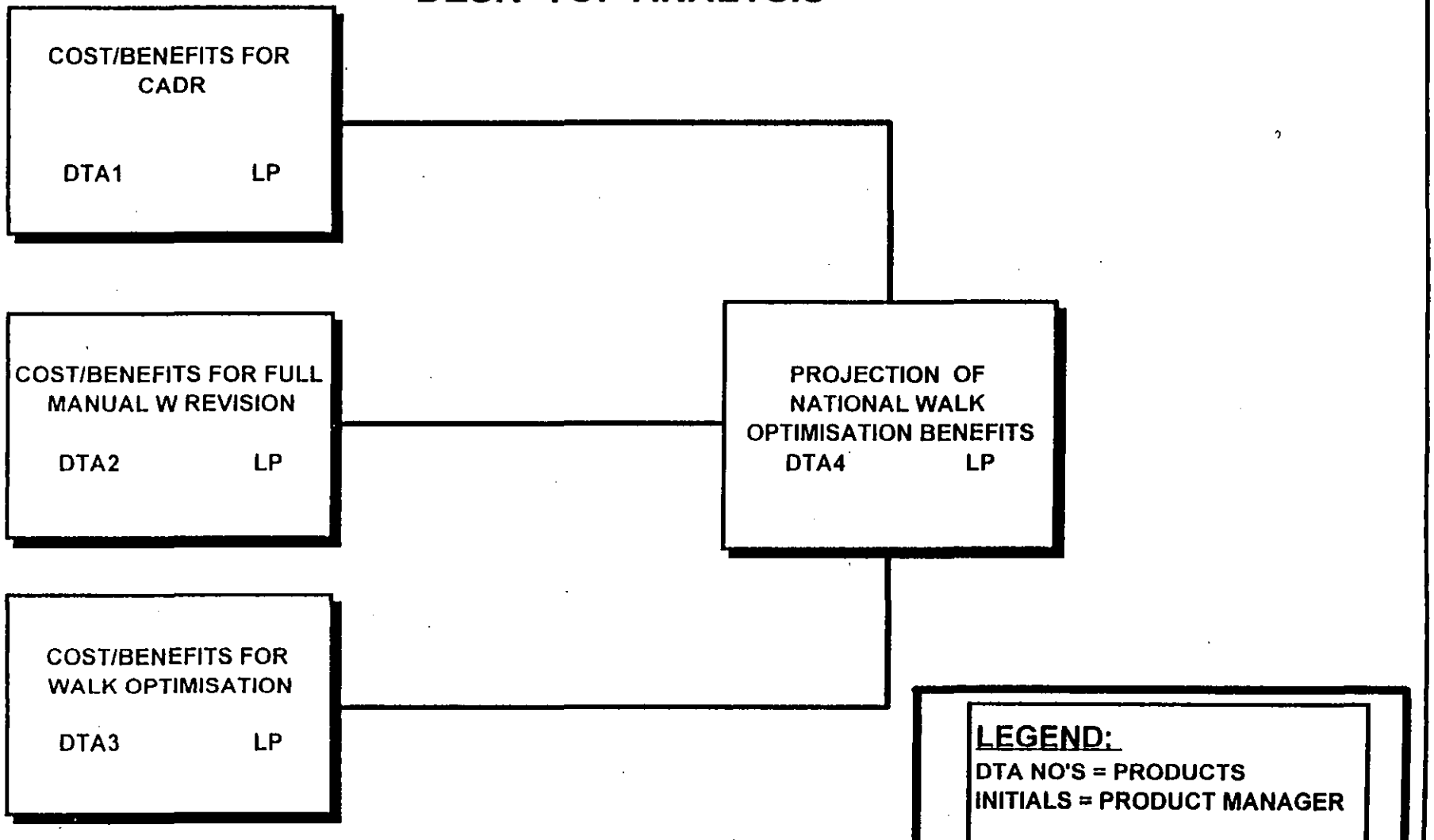


DTA Trial (stage)
Date: 22/2/96 (PT1.Mpp)

Critical
Noncritical
Progress
Milestone
Summary
Rolled Up

WALK OPTIMISATION TRIAL PRODUCT FLOW:

DESK TOP ANALYSIS



APPENDIX D.3

EXAMPLE OF PRODUCTS FOR ONE STAGE

QR LISTINGS - DESK TOP ANALYSIS STAGE

PRODUCT TITLE	PRODUCT NUMBER		FORMAL REVIEW	INFORMAL REVIEW	AUTHORITY	Sign Off
1:10000 scale base case	DTA1	DTAprod1		☑	Pm & Senior User	Ron Clatworthy
Landline 1:1250 mapping	DTA2	DTAprod2		☑	Pm & Senior User	Ron Clatworthy
Addresspoint added value	DTA3	DTAprod3		☑	Pm & Senior User	Ron Clatworthy
Oscar Added Value	DTA4	DTAprod4		☑	Pm & Senior User	Ron Clatworthy

PRODUCT LISTINGS - DESK TOP ANALYSIS STAGE

PRODUCT TITLE	PRODUCT NUMBER	DOCUMENT NUMBER	PRODUCT MANAGER	STAGE MANAGER
1:10000 scale base case	DTA1	DTAprod1	Aleta Weir	Liz Payling
Landline 1:1250 mapping	DTA2	DTAprod2	Aleta Weir	Liz Payling
Addresspoint added value	DTA3	DTAprod3	Aleta Weir	Liz Payling
Oscar Added Value	DTA4	DTAprod4	Aleta Weir	Liz Payling

APPENDIX D.4:

EXAMPLE OF A PRODUCT DESCRIPTION

Royal Mail

Title:	PRODUCT DESCRIPTION	Document No:	1
Project:	Walk Optimisation	Version No:	1
Stage:	Desk top analysis	Date Of Issue:	20-Feb-96
Project Manager:	Phil Berquez	Page No:	1
Author:	Liz Payling	File Reference:	DTAprod

Product Title:	Cost/benefit analysis for CADR	Product Reference:	DTA1

Purpose:

To identify relative costs and benefits of CADR as a revision method.

Composition:

Quantification of dead distance savings
Quantification of revision and re-revision costs.
Other qualitative benefits.

Form:

A4 report.

Derivation:

Office questionnaires, measuring exercises.

Quality Criteria:

Are offices representative?
Is assessment objective?
Are all the significant features covered?

Quality Method:

Review with project manager and Senior Technical Board member.

Product Manager:	QR Date:	Completion Date:
Aleta Weir		23 April 1996

APPENDIX E: FEASIBILITY TRIALS

Appendix E.1:	GIS Data Requirements
Appendix E.2:	CADR Data Requirements
Appendix E.3:	Postcards Data Requirements
Appendix E.4:	Example of WO Map
Appendix E.5:	Process Chart - Aireborough
Appendix E.6:	Individual Walk Plot (Showing Delivery Method)
Appendix E.7:	Postcards Individual Walk Detail

APPENDIX E.1:

GIS DATA REQUIREMENTS

DATA REQUIREMENTS - GIS

GIS

The input requirements for GIS are as follows :-

LINKS:-

1. The link number (this must be unique).
2. The address of the postcodes .
3. The method of delivery .
4. Whether a cycle can be used or not .
5. Whether there are any sensitive customers on the postcode .
6. Postcode left side .
7. Postcode right side .
8. One-way (y/n)
9. Cul de sac .
10. length of link. (Calculated by GIS)

LARGE USERS:-

1. Location
2. Postcode
3. Path length

TRANSPORT:-

1. Bus stop location
2. Inbound or Outbound from depot?
3. Time from depot to 1st stop
4. Time from last stop to depot
5. Average wait time per stop

All the above information can be obtained from local knowledge, A-Zs, bus time tables and the PAF (postcode address file).

APPENDIX E.2:

CADR DATA REQUIREMENTS

DATA REQUIREMENTS - CADR

Inward Postcode.

Number of delivery points.

Number of flats.

Path length (1/16 in)

Street length (in)

Cul-de-sac length (in)

Number of sides

Small or Large user

Walk No. (1st del)

Walk No. (2nd del)

In addition information on traffic, the use of cycles and time to start and end of walk are required. The postcode information can be obtained from the CADR centre with additional local knowledge being needed. Any distances are calculated from the maps.

APPENDIX E.3:

POSTCARDS DATA REQUIREMENTS

DATA REQUIREMENTS - POSTCARDS

DATA GATHERING

Household delivery sheets (door to door)
Sorting frame
Postperson

SEQUENCE FILE - all current walks in sequence

1. Postcode
2. Foot or cycle
3. No of delivery points
4. Method of delivery
5. House Category
6. Large user (y/n)
7. Traffic figures

If the postcode is in the sequence more than once then it is split for example LS18 3AJ may become LS18 3AJ1. This sequence is checked and adjusted with the GIS data to ensure the same postcodes are in both systems.

WORKLOAD FILE

Sequence file is exported to postcode workload spreadsheet to calcuate the workloads used by Postcards.

GIS FILE

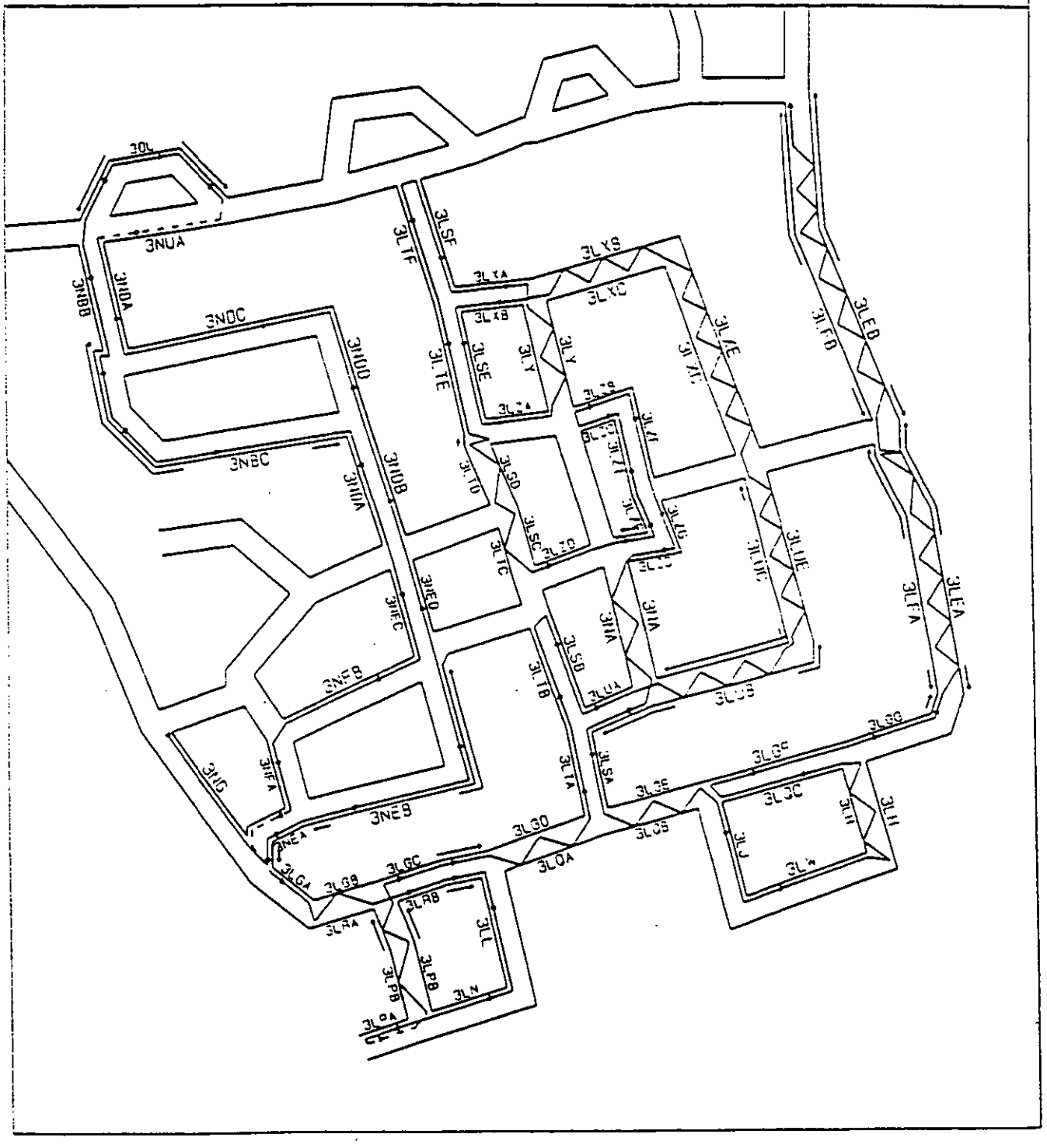
All GIS data

The above files are imported to Postcards via the interface software.

APPENDIX E.4:

EXAMPLE OF WALK OPTIMISATION MAP

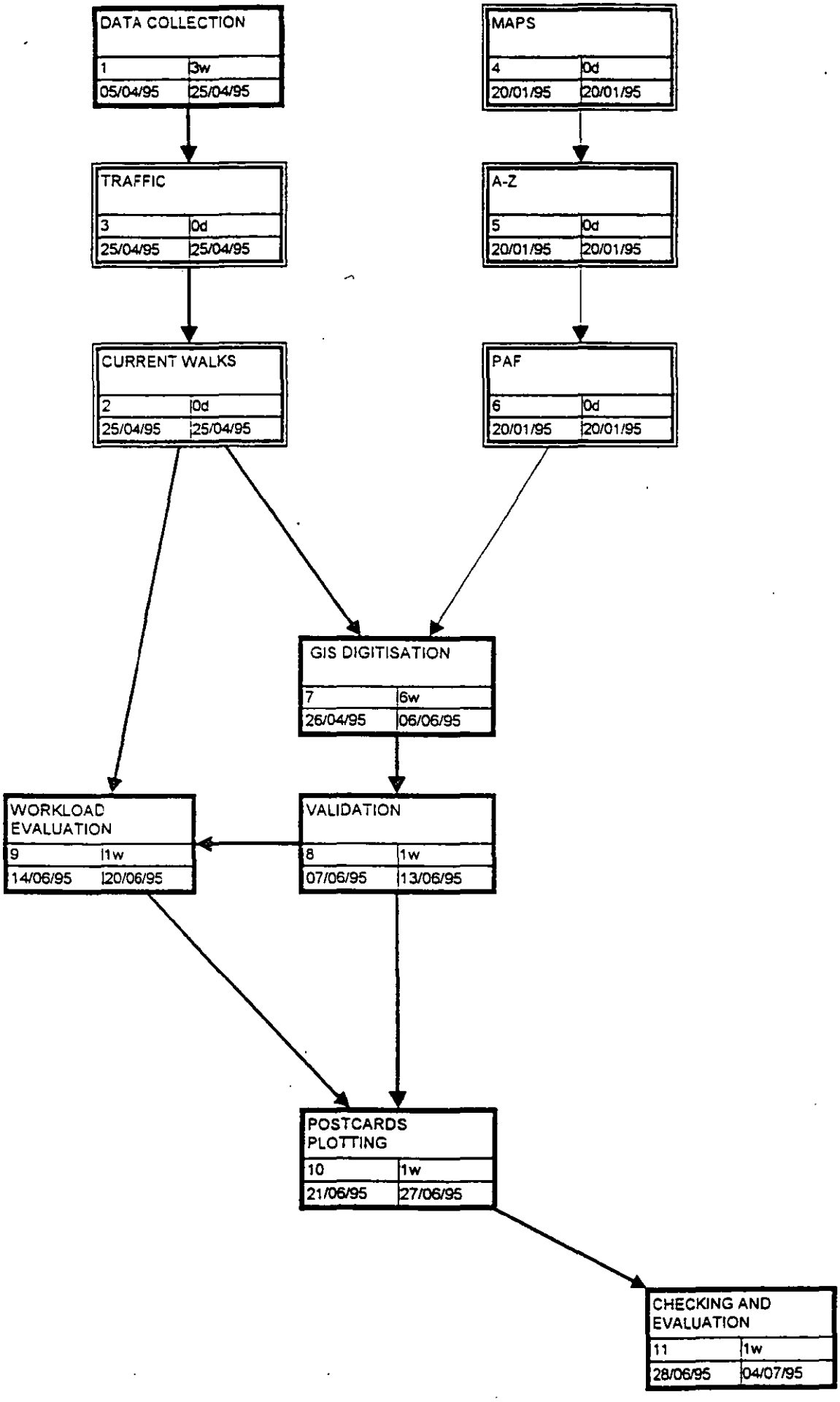
ROUTE 0015


3NUA
3NDC
3NBC
3NEB
3LTF
3LSF
3LTE
3LSE
3LY
3LXC
3LFB
3LEB
3LEA
3LFA
3LSD
3LTC
3LSC
3LTB
3LTA
3LSA
3LGG
3LGC
3LGA
3LGB
3LGD
3LQA
3LRB
3LL
3LPB
3LN

APPENDIX E.5:

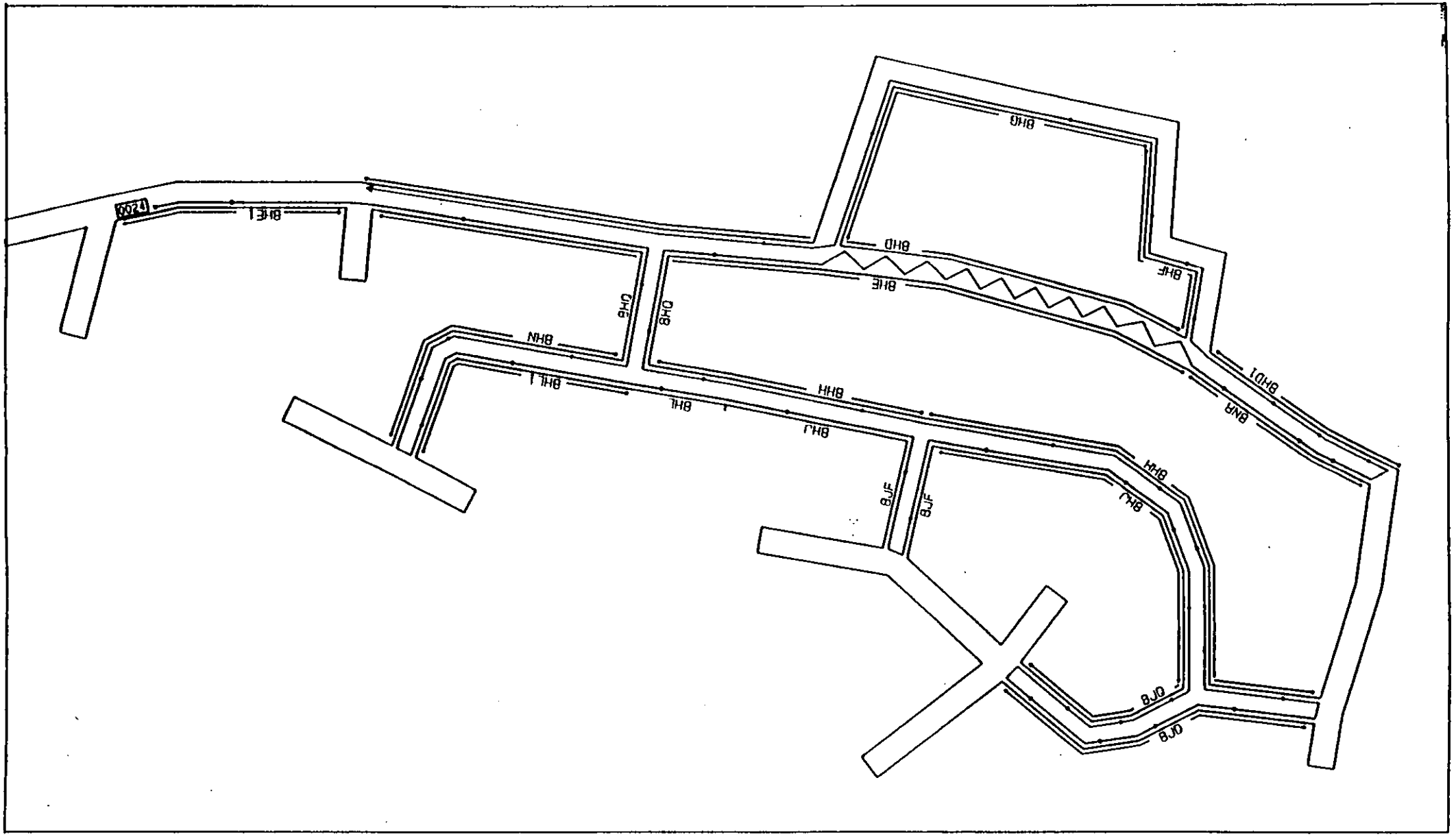
PROCESS CHART - AIREBOROUGH

PROCESS CHART FOR POSTCARDS REVISION



APPENDIX E.6:

INDIVIDUAL WALK PLOT
(SHOWING DELIVERY METHOD)


0024
8HE1
8HG
8HD
8HE
8HF
8HD1
8NR
8HN
8HL1
8HL
8HH
8HJ
8JF
8JF
8HH
8HJ
8JG
8JG

APPENDIX E.7:

POSTCARDS INDIVIDUAL WALK DETAIL

ay, April 6 1995 : new routes150

: 0024 CLASS : CYCLE DELIVERY : FIRST START OF DAY: 05h45

PREPARATION : 65.59 06h50

TRSP MODE : CYCLE TRSP TO : 10.33 07h00

	DEL	BUS	LENGTH	STREET	DEL.PTS	FLATS	TRAF-N	TRAF-L	PREP.	DELIV.	RELAY	WEIGHT	TOTAL	
HE1	1S	N	193	HAWKSWORTH LANE	8	0	22	0	2.21	4.91		(0.3)	7.12	07h05
HE	1S	N	231	HAWKSWORTH LANE	41	0	113	0	11.30	8.31		(1.7)	19.61	07h14
HQ	1S	N	104	SOUTHGATE	10	0	28	0	2.76	2.97		(2.1)	5.73	07h17
HN	1S	N	242	WESTGATE	16	0	44	0	4.41	9.17		(2.7)	13.58	07h26
HL1	1S	N	242	WESTGATE	8	0	22	0	2.21	5.14		(2.9)	7.35	07h31
HL	1S	N	73	WESTGATE	18	0	50	0	4.96	9.40		(3.6)	14.36	07h40
HJ	1S	N	153	WESTGATE	17	0	47	0	4.69	3.29		(4.2)	7.98	07h44
JF	1S	N	210	SOUTH DRIVE	7	0	18	0	1.80	4.38		(4.4)	6.18	07h48
HJ	1S	N	353	WESTGATE						7.58			7.58	07h56
JQ	1S	N	556	SOUTHWAY	25	0	64	0	6.44	14.84		(5.2)	21.28	08h10
HH	1S	N	579	WESTGATE	36	0	99	0	9.92	20.77		(6.5)	30.69	08h31
HQ	1S	N	104	SOUTHGATE						2.98			2.98	08h34
HE	1S	N	127	HAWKSWORTH LANE						4.57			4.57	08h39
HE	Z2	N	301	HAWKSWORTH LANE						10.81			10.81	08h50
HD	Z2	N	301	HAWKSWORTH LANE	19	0	52	0	5.24	6.36		(7.2)	11.60	08h56
NR	1S	N	171	HAWKSWORTH LANE	7	0	19	0	1.93	4.31		(7.4)	6.24	09h00
HD1	1S	N	171	HAWKSWORTH LANE	1	0	3	0	0.28	1.28		(7.4)	1.56	09h02
HF	1S	N	207	GREENFIELD LANE	5	0	14	0	1.38	3.48		(7.6)	4.86	09h05
HG	1S	N	373	GREENFIELD AVE	22	0	61	0	6.06	12.80		(8.4)	18.86	09h18
HD	1S	N	358	HAWKSWORTH LANE						6.86			6.86	09h25
DES		0			240	0	656	0	65.59	144.21	0.0	8.4	209.80	

TRSP MODE : CYCLE TRSP FROM : 11.04 09h36

LENGTH : 5.05 km ROUTE DURATION : 231.16 (min)

EAD LENGTH : 0.00 km DEADHEAD DURATION : 0.00 (min) NUMBER OF UP&BACK : 5

T DISTANCE : 2.81 (KM) TRAVEL TIME : 10.33 MIN

DISTANCE : 3.00 (KM) TRAVEL TIME : 11.04 MIN

21.36 MIN

APPENDIX F: PROCESS TRIALS

Appendix F.1:	Product Description for the Trial Offices (PT8)
Appendix F.2:	Product Flow: Project Consolidation
Appendix F.3:	Product Flow: Process Trials and Gantt
Appendix F.4:	Process Trials Product Listings

APPENDIX F.1:

PRODUCT DESCRIPTION FOR THE TRIAL OFFICES (PT8)

Royal Mail

Title:	PRODUCT DESCRIPTION	Document No:	8
Project:	WALK OPTIMISATION	Version No:	1
Stage:	PROCESS TRIAL	Date Of Issue:	20-Feb-96
Project Manager:	PHIL BERQUEZ	Page No:	1
Author:	TERRY DELBRIDGE	File Reference:	PTprod
Product Title:	Project Reports available for each trial office	Product Reference:	PT8

Purpose: To record the events of each live trial for the GIS / WES and Optimisation Software; to outline the process, methodology, etc. involved, and to establish the benefits and problems in this approach to the business.

Composition:
11 projects in Wokingham, EC1, Plymstock, Stoke, Sudbury, Dewsbury, Eccles, Musselboro, Bishop Briggs, Southampton, Hampton. Each are independent projects co-ordinated centrally. Hampton in S.E restarted their application following CWU problems and are well behind the others. The projects are of 3 types, offices with CADR, offices with 1250 maps and Offices with neither.
Sub products are : 2.1 Trial set up completed, 2.2 GIS network completed, 2.3 WES workload established, 2.4 Optimisation completed 2.5 Validation completed, 2.6 Evaluation completed and report produced.

Form:
A4 typed report for each individual office, with appendices showing the relevant data used.

Derivation:
End stage assessments reports, enhancement reports, base line information, Experience of the project team and the Project support consultant. Print outs from Postcards, CADR where available, Traffic DPMS reports, GIS information, planning diaries, WES information reports.

Quality Criteria:
Acceptance at each of the sub product end stages and of the final routes by the PAT;
Are the routes acceptable to the User? Is the validation over each route acceptable +/- 10%
Outline the basis of savings at each office against the start position.

Quality Method:
Validate a random sample of routes (50%) and compare the total route hours with that calculated by WES and Postcards.
Explanation of the benefits to the PAT.

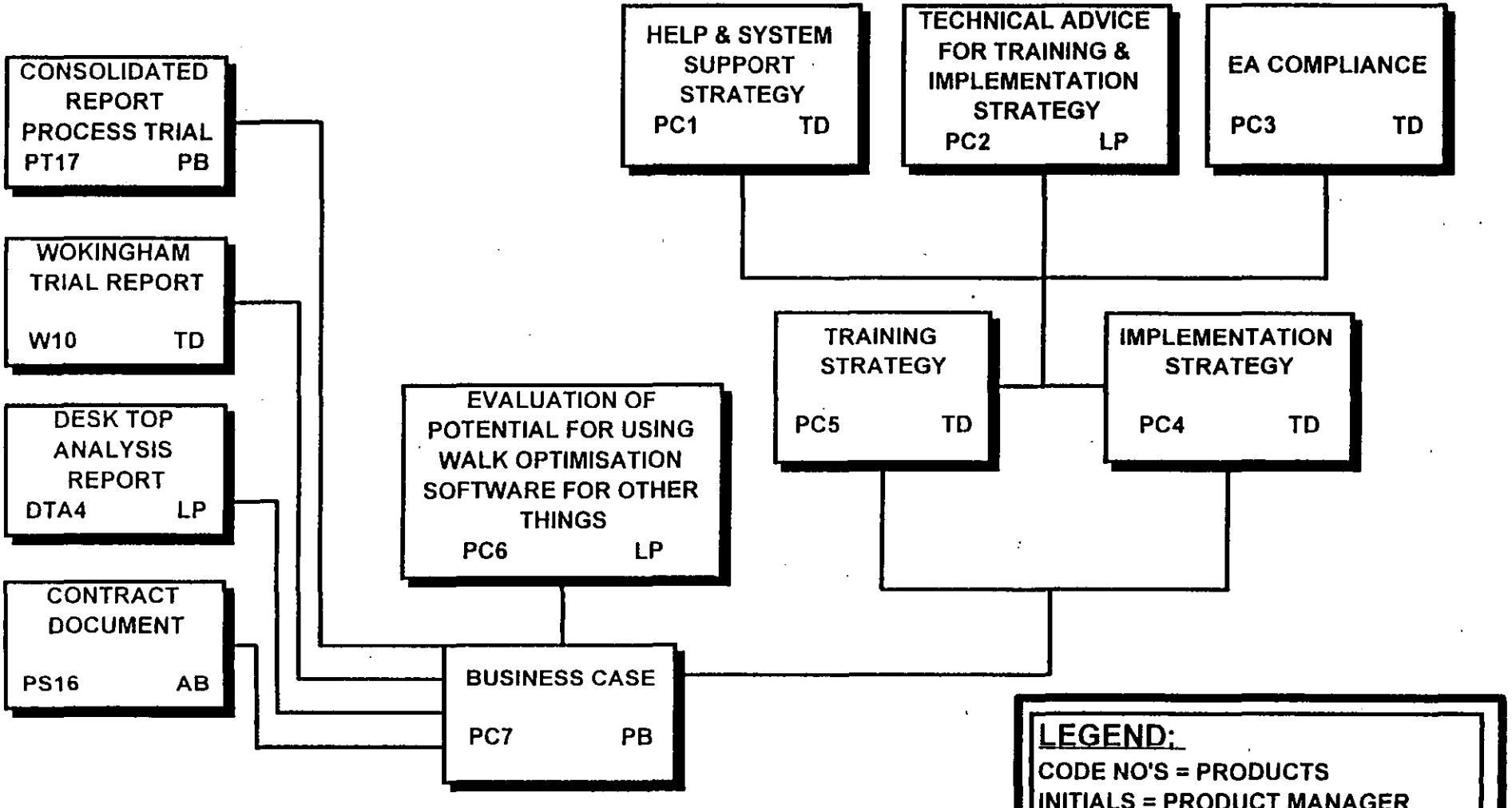
Product Manager: Terry Delbridge	QR. Date:	Completion Date:

APPENDIX F.2:

PRODUCT FLOW:
PROJECT CONSOLIDATION

WALK OPTIMISATION TRIAL PRODUCT FLOW:

PROJECT CONSOLIDATION

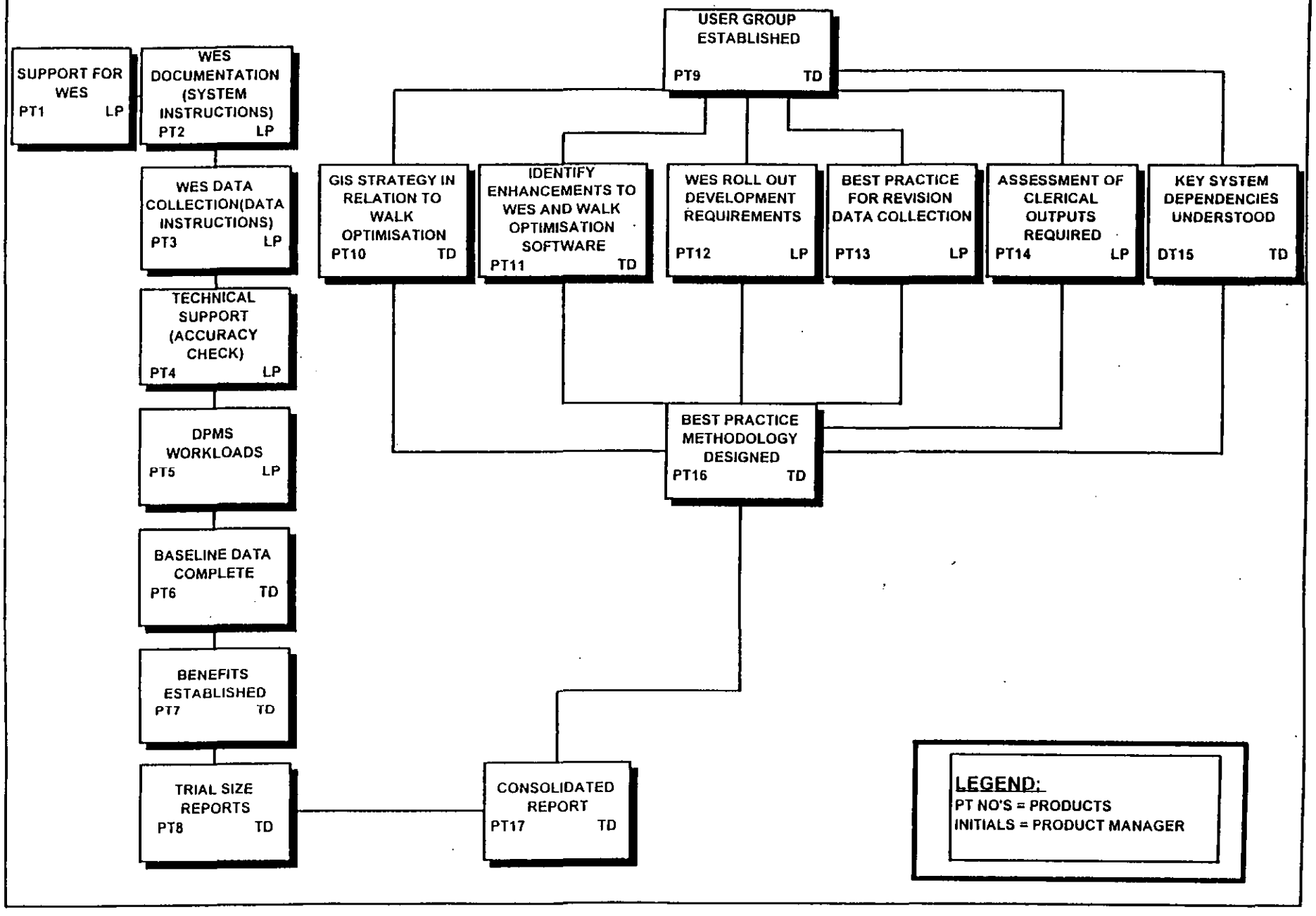


LEGEND:
CODE NO'S = PRODUCTS
INITIALS = PRODUCT MANAGER

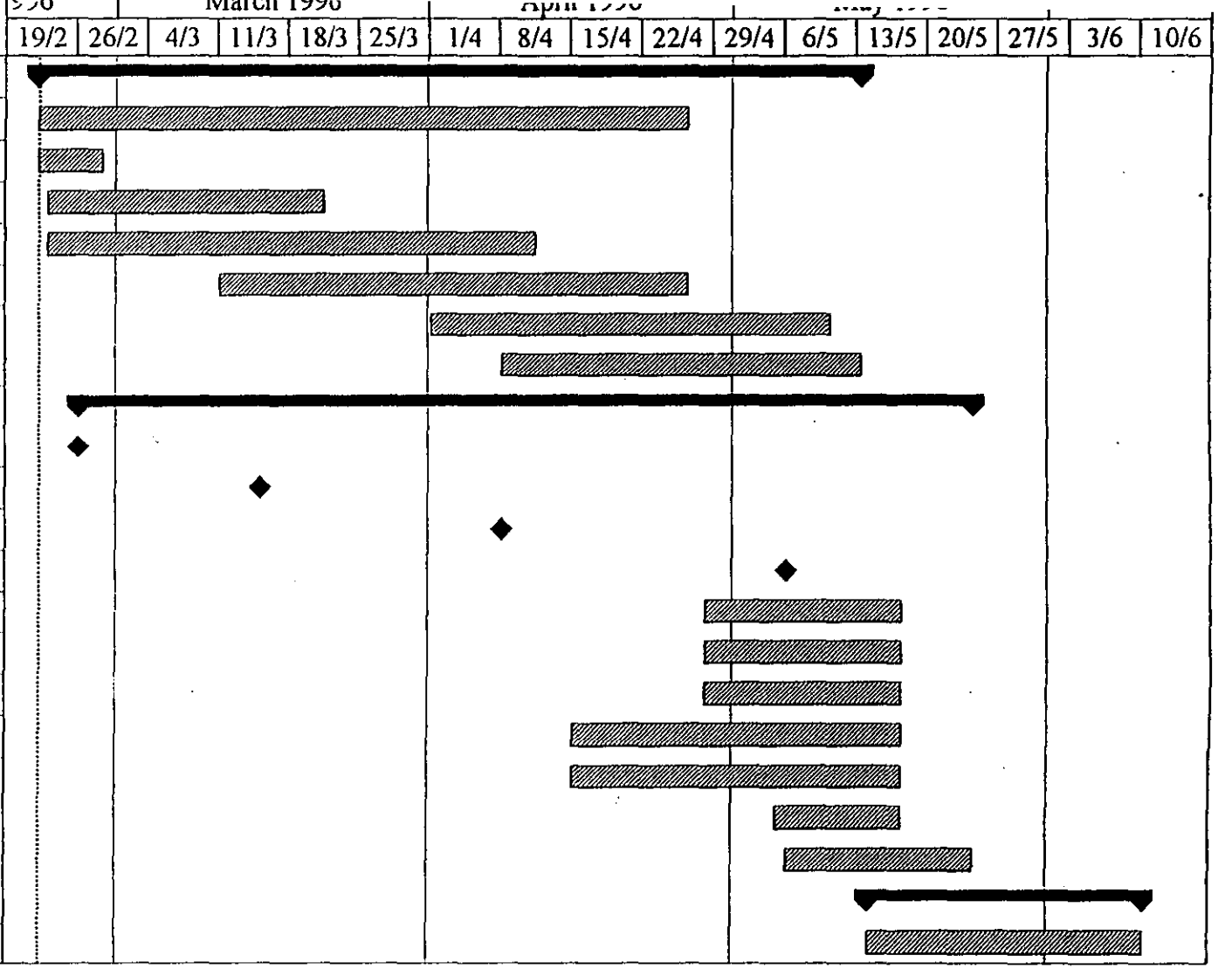
APPENDIX F.3:

PRODUCT FLOW:
PROCESS TRIALS AND GANTT

WALK OPTIMISATION TRIAL PRODUCT FLOW: PROCESS TRIAL STAGE



ID	Name
1	**Trial Completed**
2	Support for WES (PT1)
3	WES System Documentation (PT2)
4	Technical Support (Accuracy Check) (PT3)
5	DPMS Workloads (PT5)
6	Baseline Data Completed (PT6)
7	Benefits Established (PT7)
8	Trial Site Reports (PT8)
9	**User Group Activity**
10	User Group Established (PT9)
11	Meeting by :
12	Meeting by :
13	Meeting by :-
14	GIS Strategy in Relation to WO (PT10)
15	Enhancements (identified) (PT11)
16	Development Reqs' Identified (PT12)
17	Best Practice for Revision Data (PT13)
18	Clerical Outputs Identified (PT14)
19	Key System Dependencies (PT15)
20	Best Practice Methodology Designed (PT1
21	**Consolidation**
22	Consolidated Report (PT17)



Project Trial (stage)
Date: 22/2/96 (PT1.Mpp)

Critical — Noncritical — Progress — Milestone — Summary — Rolled Up

APPENDIX F.4:

PROCESS TRIALS PRODUCT LISTINGS

PRODUCT LISTINGS - PROCESS TRIAL STAGE

PRODUCT TITLE	PRODUCT NUMBER	DOCUMENT NUMBER	PRODUCT MANAGER	STAGE MANAGER
Support For WES	PT1	Ptprod1	Aleta Weir	Terry Delbridge
WES Documentation	PT2	Ptprod2	Aleta Weir	Terry Delbridge
Workload Data Collection Methods	PT3	Ptprod3	Aleta Weir	Terry Delbridge
Technical Support For Workload Data Collection	PT4	Ptprod4	Aleta Weir	Terry Delbridge
DPMS Workloads For Trial Offices	PT5	Ptprod5	Aleta Weir	Terry Delbridge
Baseline Data Completed	PT6	Ptprod6	Terry Delbridge	Terry Delbridge
Benefits Established	PT7	Ptprod7	Terry Delbridge	Terry Delbridge
Project Reports For Each Trial Office	PT8	Ptprod8	Terry Delbridge	Terry Delbridge
User Group Established	PT9	Ptprod9	Terry Delbridge	Terry Delbridge
GIS Strategy (For WO) Established	PT10	Ptprod10	Terry Delbridge	Terry Delbridge
Enhancements To WES / WO Software	PT11	Ptprod11	Terry Delbridge	Terry Delbridge
WES Roll Out Development Requirements	PT12	Ptprod12	Aleta Weir	Terry Delbridge
Best Practice For Revisions Data Collection	PT13	Ptprod13	Aleta Weir	Terry Delbridge
Assessment Of Clerical Outputs Required From WO	PT14	Ptprod14	Aleta Weir	Terry Delbridge
Key System Dependency Report	PT15	Ptprod15	Terry Delbridge	Terry Delbridge
Best Practice Methodology Designed	PT16	Ptprod16	Terry Delbridge	Terry Delbridge
Process Trial Consolidated Report	PT17	Ptprod17	Terry Delbridge	Terry Delbridge

APPENDIX G: LONGTON CASE STUDY

Appendix G.1:	Current Walk Data
Appendix G.2:	Hand Drawn Map
Appendix G.3:	Walks Optimised at 150 Minutes
Appendix G.4:	Proposed 1st Delivery Walks
Appendix G.5:	Results

APPENDIX G.1:

CURRENT WALK DATA

SUMMARY Of RESULTS

Q of S

Walks Achieving Q of S	28
% Achieving Q of S	45
Walks Failing Q of S	34
% Failing Q of S	55
Ave. Mins Failing Q of S	0
Delivery Span Std. Deviation	0

TRANSPORT

Mode	Out	%	In	%
Van	60	94	48	75
Public	1	2	1	2
None	3	5	15	23

DELIVERY

Mode	Walks	%
Foot	60	93.75
Cycle	4	6.25

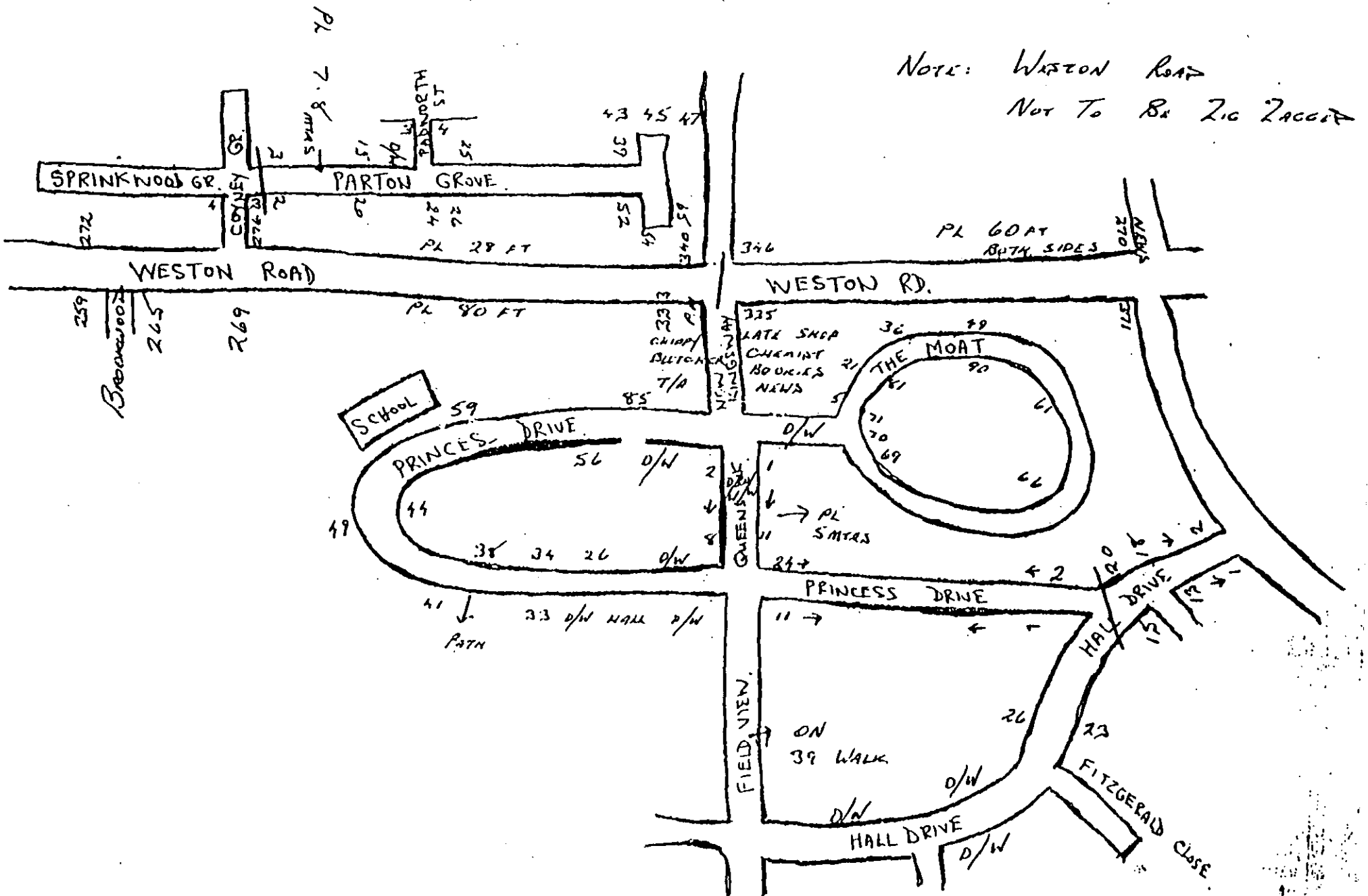
ZIG ZAG

Total No. of Codes Zig Zagged	N/K	% of Codes Zig Zagged	N/K
Total No of Delivery Codes	5829		

APPENDIX G.2:

HAND DRAWN MAP

WALK Nº 38 THE MOAT.



APPENDIX G.3:

WALKS OPTIMISED AT 150 MINUTES

Tuesday, May 7 1996 : Global opt 150 minutes at 78 items/1b and 98% EP

	#ATE	CLASS	DELIVERY POINTS	FLATS	SENSI. CODES	TRAFF. NORMAL	TRAFF. LARGE	PREP. TIME	TRANSPORT TO	TRANSPORT FROM	TRSP MODE TO	TRSP MODE FROM	RELAY TIME	DELIVERY TIME	ROUTE LENGTH	DEAD LENGTH	TOTAL TIME
1-	0001	FOOT	281	0	0	556	0	01h02	00h14	00h11	VEHIC.	VEHIC.	0.0	02h29	9.49	1.55	03h5
2-	0002	FOOT	319	1	0	571	0	01h04	00h08	00h09	VEHIC.	VEHIC.	0.0	02h26	8.22	0.57	03h4
3-	0003	FOOT	356	0	0	588	0	01h06	00h07	00h09	VEHIC.	VEHIC.	0.0	02h29	8.48	0.98	03h4
4-	0004	FOOT	433	0	0	541	0	01h00	00h07	00h07	VEHIC.	VEHIC.	0.0	02h19	6.02	0.30	03h3
5-	0005	FOOT	427	0	0	845	0	01h35	00h06	00h07	VEHIC.	VEHIC.	0.0	02h30	5.39	0.90	04h1
6-	0006	FOOT	446	0	0	577	0	01h04	00h07	00h09	VEHIC.	VEHIC.	0.0	02h30	7.53	0.51	03h4
7-	0007	FOOT	421	0	0	619	0	01h09	00h07	00h07	VEHIC.	VEHIC.	0.0	02h29	7.26	0.96	03h5
8-	0008	FOOT	239	0	0	336	0	00h38	00h06	00h06	VEHIC.	VEHIC.	0.0	01h36	4.90	1.09	02h2
9-	0009	FOOT	402	0	0	615	0	01h09	00h08	00h07	VEHIC.	VEHIC.	0.0	02h18	6.55	0.52	03h4
0-	0010	FOOT	59	0	0	90	0	00h10	00h06	00h06	VEHIC.	VEHIC.	0.0	00h22	1.02	0.08	00h4
1-	0011	FOOT	477	0	0	585	0	01h16	00h06	00h07	VEHIC.	VEHIC.	0.0	02h30	6.06	0.60	03h5
2-	0012	FOOT	376	0	0	573	0	01h04	00h05	00h07	VEHIC.	VEHIC.	0.0	02h23	7.66	0.83	03h3
3-	0013	FOOT	6	0	0	12	0	00h02	00h06	00h06	VEHIC.	VEHIC.	0.0	00h03	0.11	0.00	00h1
4-	0014	FOOT	554	0	0	574	0	01h04	00h06	00h05	VEHIC.	VEHIC.	0.0	02h26	6.48	0.23	03h4
5-	0015	FOOT	335	22	0	620	0	01h09	00h06	00h07	VEHIC.	VEHIC.	0.0	02h29	7.33	0.93	03h5
6-	0016	FOOT	575	2	0	537	0	00h59	00h06	00h05	VEHIC.	VEHIC.	0.0	02h16	6.43	0.17	03h2
7-	0017	FOOT	544	0	0	730	0	01h22	00h06	00h06	VEHIC.	VEHIC.	0.0	02h30	5.82	0.16	04h0
8-	0018	FOOT	589	0	0	499	0	00h55	00h06	00h06	VEHIC.	VEHIC.	0.0	02h30	7.72	0.29	03h3
9-	0019	FOOT	540	0	0	650	0	01h14	00h06	00h06	VEHIC.	VEHIC.	0.0	02h28	5.36	0.35	03h5
0-	0020	FOOT	619	0	0	527	0	00h59	00h07	00h05	VEHIC.	VEHIC.	0.0	02h27	6.75	0.12	03h3
-	0021	FOOT	543	4	0	751	0	01h24	00h05	00h06	VEHIC.	VEHIC.	0.0	02h29	4.91	0.18	04h0
-	0022	FOOT	393	79	0	575	0	01h05	00h06	00h05	VEHIC.	VEHIC.	0.0	02h30	6.89	1.39	03h4
-	0023	FOOT	590	132	0	713	0	01h20	00h05	00h06	VEHIC.	VEHIC.	0.0	02h25	5.39	0.34	03h5
-	0024	FOOT	495	8	0	585	0	01h17	00h04	00h05	VEHIC.	VEHIC.	0.0	02h29	6.41	1.29	03h5
-	0025	FOOT	558	0	0	551	0	01h02	00h04	00h05	VEHIC.	VEHIC.	0.0	02h18	5.71	0.06	03h2
-	0026	FOOT	412	0	0	845	0	01h34	00h06	00h04	VEHIC.	VEHIC.	0.0	02h27	5.16	0.79	04h0
-	0027	FOOT	577	28	0	535	0	01h00	00h04	00h05	VEHIC.	VEHIC.	0.0	02h22	6.01	0.68	03h3
-	0028	FOOT	462	0	0	615	0	01h09	00h05	00h05	VEHIC.	VEHIC.	0.0	02h27	5.35	0.09	03h4
-	0029	FOOT	416	0	0	671	0	01h15	00h04	00h05	VEHIC.	VEHIC.	0.0	02h16	5.45	0.45	03h4
-	0030	FOOT	501	30	0	686	0	01h17	00h04	00h05	VEHIC.	VEHIC.	0.0	02h30	5.65	0.21	03h5
-	0031	FOOT	390	2	0	551	0	01h03	00h06	00h04	VEHIC.	VEHIC.	0.0	02h18	6.15	0.23	03h3
-	0032	FOOT	549	0	0	852	0	01h35	00h05	00h04	VEHIC.	VEHIC.	0.0	02h28	6.31	1.17	04h1
-	0033	FOOT	522	0	0	461	0	00h52	00h04	00h05	VEHIC.	VEHIC.	0.0	02h19	6.70	0.47	03h1
-	0034	FOOT	537	48	0	590	0	01h17	00h05	00h04	VEHIC.	VEHIC.	0.0	02h19	5.57	0.16	03h4
-	0035	FOOT	457	30	0	956	0	01h47	00h04	00h26	VEHIC.	FOOT	0.0	02h30	7.95	1.38	04h4
-	0036	FOOT	494	0	0	561	0	01h03	00h04	00h05	VEHIC.	VEHIC.	0.0	02h26	6.63	0.16	03h3
-	0037	FOOT	455	28	0	567	0	01h04	00h04	00h05	VEHIC.	VEHIC.	0.0	02h30	6.61	0.26	03h4
-	0038	FOOT	515	21	0	824	0	01h32	00h27	00h03	FOOT	VEHIC.	0.0	02h29	5.24	0.46	04h3
-	0039	FOOT	518	4	0	722	0	01h21	00h05	00h27	VEHIC.	FOOT	0.0	02h27	6.44	0.60	04h1
-	0040	FOOT	460	0	0	540	0	01h00	00h05	00h04	VEHIC.	VEHIC.	0.0	02h23	5.88	0.07	03h3
	0041	FOOT	449	0	0	567	0	01h03	00h04	00h05	VEHIC.	VEHIC.	0.0	02h26	6.74	0.26	03h3
-	0042	FOOT	462	28	0	856	0	01h36	00h04	00h04	VEHIC.	VEHIC.	0.0	02h22	5.80	0.59	04h0
-	0043	FOOT	490	16	0	981	0	01h49	00h04	00h03	VEHIC.	VEHIC.	0.0	02h29	5.63	0.42	04h2
	0044	FOOT	471	0	0	793	0	01h29	00h24	00h13	FOOT	FOOT	0.0	02h27	5.75	0.39	04h3
	0045	FOOT	396	0	0	759	0	01h25	00h23	00h05	FOOT	FOOT	0.0	02h29	6.40	2.42	04h2
	0046	FOOT	453	0	0	723	0	01h21	00h27	00h04	FOOT	VEHIC.	0.0	02h27	5.52	1.02	04h1
	0047	FOOT	556	72	0	542	0	01h00	00h04	00h04	VEHIC.	VEHIC.	0.0	02h29	6.97	0.39	03h3
	0048	FOOT	455	0	0	528	20	00h59	00h04	00h21	VEHIC.	FOOT	0.0	02h23	6.37	1.60	03h4
	0049	FOOT	435	0	0	655	0	01h13	00h11	00h27	FOOT	FOOT	0.0	02h30	7.28	2.28	04h2
	0050	FOOT	452	0	0	712	0	01h19	00h04	00h13	VEHIC.	FOOT	0.0	02h29	6.72	0.45	04h0
	0051	FOOT	474	33	0	922	0	01h43	00h21	00h18	FOOT	FOOT	0.0	02h26	7.29	1.33	04h4
	0052	FOOT	473	20	0	1057	0	01h58	00h27	00h22	FOOT	FOOT	0.0	02h28	7.61	1.13	05h1
	0053	FOOT	486	1	0	670	0	01h14	00h24	00h04	FOOT	VEHIC.	0.0	02h25	6.55	0.33	04h0
	0054	FOOT	566	94	0	467	0	00h52	00h22	00h04	FOOT	VEHIC.	0.0	02h17	6.46	0.36	03h3
	0055	FOOT	548	33	0	566	0	01h03	00h16	00h03	FOOT	VEHIC.	0.0	02h30	6.77	0.54	03h5
	0056	FOOT	580	0	0	715	0	01h20	00h22	00h26	FOOT	FOOT	0.0	02h28	5.95	0.27	04h3
	0057	FOOT	506	80	0	652	0	01h13	00h20	00h04	FOOT	VEHIC.	0.0	02h18	5.34	0.39	03h5
	0058	FOOT	410	0	0	601	0	01h07	00h23	00h04	FOOT	VEHIC.	0.0	02h25	6.88	0.36	03h5
	0059	FOOT	535	0	0	646	0	01h12	00h22	00h21	FOOT	FOOT	0.0	02h29	6.29	0.34	04h2
	0060	FOOT	569	66	0	762	23	01h26	00h21	00h23	FOOT	FOOT	0.0				h34
	0061	FOOT	497	0	0	665	0	01h15	00h12	00h20	FOOT	FOOT	0.0				h15

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062	FOOT	631	59	0	852	0	01h35	00h20	00h11	FOOT	FOOT	0.0	02h27	5.14	0.11	04h31
063	FOOT	516	0	0	733	0	01h22	00h13	00h21	FOOT	FOOT	0.0	02h17	5.63	0.44	04h11
064	FOOT	568	36	0	1044	0	01h57	00h09	00h10	FOOT	FOOT	0.0	02h28	7.24	1.32	04h42
065	FOOT	583	68	0	592	0	01h06	00h16	00h23	FOOT	FOOT	0.0	02h28	6.64	0.37	04h11
066	FOOT	491	2	0	517	0	01h31	00h16	00h10	FOOT	FOOT	0.0	02h23	4.78	0.44	04h19
067	FOOT	521	0	0	644	0	01h12	00h15	00h13	FOOT	FOOT	0.0	02h27	5.97	0.98	04h06
068	FOOT	552	6	0	668	0	01h15	00h13	00h06	FOOT	FOOT	0.0	02h30	6.64	0.75	04h02
069	FOOT	102	0	0	158	0	00h18	00h07	00h09	FOOT	FOOT	0.0	00h19	0.66	0.03	00h51
age		465	15	0	645	1	01h12	00h10	00h09			0.0	02h19	6.15	0.61	03h49
num		6	0	0	12	0	00h02	00h04	00h03			0.0	00h03	0.11	0.00	00h15
num		631	132	0	1057	23	01h58	00h27	00h27			0.0	02h30	9.49	2.42	05h13
		32069	1053	0	44476	43	82h18	11h06	09h50			0	159h49	424	42	263h02

APPENDIX G.4:

PROPOSED 1ST DELIVERY WALKS

Tuesday, May 7 1996 : Global Opt 150 minutes at 78 its/1b 98% EP and changes 1s

#RTE	CLASS	DELIVERY POINTS	FLATS	SENSI. CODES	TRAFF. NORMAL	TRAFF. LARGE	PREP. TIME	TRANSPORT TO	TRANSPORT FROM	TRSP MODE TO	TRSP MODE FROM	RELAY TIME	DELIVERY TIME	ROUTE LENGTH	DEAD LENGTH	TOTAL TIME
0001	CYCLE	314	0	0	622	0	01h09	00h20	00h36	CYCLE	CYCLE	0.0	02h22	14.07	3.21	04h25
0002	CYCLE	319	1	0	571	0	01h04	00h19	00h19	CYCLE	CYCLE	0.0	02h10	8.85	1.20	03h51
0003	FOOT	393	0	0	635	0	01h11	00h06	00h08	VEHIC.	VEHIC.	0.0	02h18	6.01	0.32	03h42
0004	FOOT	433	0	0	547	0	01h00	00h06	00h07	VEHIC.	VEHIC.	0.0	02h20	6.05	0.33	03h32
0005	FOOT	465	0	0	847	0	01h35	00h07	00h06	VEHIC.	VEHIC.	0.0	02h30	5.13	0.54	04h16
0006	FOOT	446	0	0	577	0	01h04	00h07	00h09	VEHIC.	VEHIC.	0.0	02h30	7.53	0.51	03h48
0007	FOOT	335	0	0	491	0	00h54	00h06	00h06	VEHIC.	VEHIC.	0.0	01h58	5.84	0.68	03h04
0008	FOOT	352	0	0	565	0	01h04	00h06	00h06	VEHIC.	VEHIC.	0.0	02h27	7.25	1.35	03h41
0009	FOOT	355	0	0	564	0	01h04	00h07	00h08	VEHIC.	VEHIC.	0.0	02h03	5.99	0.34	03h20
0011	FOOT	415	0	0	591	0	01h06	00h06	00h07	VEHIC.	VEHIC.	0.0	02h10	5.24	0.42	03h28
0012	CYCLE	424	0	0	622	0	01h10	00h14	00h17	CYCLE	CYCLE	0.0	02h19	7.60	0.33	03h58
0014	FOOT	562	0	0	577	0	01h04	00h05	00h06	VEHIC.	VEHIC.	0.0	02h29	6.61	0.21	03h43
0015	FOOT	346	0	0	654	0	01h14	00h05	00h05	VEHIC.	VEHIC.	0.0	02h24	6.91	0.10	03h46
0016	FOOT	602	2	0	564	0	01h02	00h05	00h06	VEHIC.	VEHIC.	0.0	02h22	6.82	0.09	03h34
0017	FOOT	514	0	0	716	0	01h20	00h06	00h06	VEHIC.	VEHIC.	0.0	02h26	5.57	0.34	03h57
0018	FOOT	562	0	0	472	0	00h52	00h05	00h05	VEHIC.	VEHIC.	0.0	02h27	7.26	0.29	03h28
0019	FOOT	523	0	0	621	0	01h10	00h06	00h06	VEHIC.	VEHIC.	0.0	02h29	5.58	0.63	03h49
0020	FOOT	619	0	0	527	0	00h59	00h05	00h07	VEHIC.	VEHIC.	0.0	02h27	6.75	0.12	03h37
0021	FOOT	543	4	0	751	0	01h24	00h05	00h06	VEHIC.	VEHIC.	0.0	02h29	4.91	0.18	04h02
0022	FOOT	373	101	0	527	0	00h59	00h05	00h06	VEHIC.	VEHIC.	0.0	02h10	5.26	0.71	03h18
0023	FOOT	590	132	0	713	0	01h20	00h05	00h06	VEHIC.	VEHIC.	0.0	02h25	5.39	0.34	03h54
0024	FOOT	536	0	0	770	0	01h26	00h04	00h05	VEHIC.	VEHIC.	0.0	02h30	5.62	0.68	04h04
0025	FOOT	604	0	0	616	0	01h09	00h04	00h05	VEHIC.	VEHIC.	0.0	02h30	6.11	0.05	03h47
0026	FOOT	431	0	0	861	0	01h36	00h06	00h04	VEHIC.	VEHIC.	0.0	02h28	5.17	0.56	04h13
0027	FOOT	592	28	0	549	0	01h02	00h05	00h05	VEHIC.	VEHIC.	0.0	02h29	6.35	0.81	03h40
0028	FOOT	462	0	0	616	0	01h09	00h05	00h05	VEHIC.	VEHIC.	0.0	02h27	6.35	0.09	03h44
0029	FOOT	430	0	0	717	0	01h20	00h04	00h05	VEHIC.	VEHIC.	0.0	02h24	5.85	0.67	03h52
0030	FOOT	501	30	0	668	0	01h17	00h05	00h04	VEHIC.	VEHIC.	0.0	02h30	5.65	0.21	03h55
0031	FOOT	390	2	0	561	0	01h03	00h06	00h05	VEHIC.	VEHIC.	0.0	02h21	5.31	0.39	03h33
0032	FOOT	535	8	0	872	0	01h37	00h22	00h05	FOOT	VEHIC.	0.0	02h23	6.54	0.88	04h25
0033	FOOT	528	0	0	466	0	00h52	00h04	00h04	VEHIC.	VEHIC.	0.0	02h25	5.94	0.67	03h23
0034	FOOT	576	48	0	740	0	01h23	00h05	00h05	VEHIC.	VEHIC.	0.0	02h30	5.97	0.22	04h01
0035	FOOT	429	30	0	980	0	01h49	00h23	00h04	FOOT	VEHIC.	0.0	02h21	7.96	1.48	04h36
0036	FOOT	491	0	0	559	0	01h02	00h04	00h04	VEHIC.	VEHIC.	0.0	02h30	6.78	0.45	03h39
0037	FOOT	401	28	0	513	0	00h58	00h05	00h05	VEHIC.	VEHIC.	0.0	02h25	6.23	0.51	03h31
0038	FOOT	515	21	0	824	0	01h32	00h27	00h03	FOOT	VEHIC.	0.0	02h29	5.24	0.46	04h31
0039	FOOT	588	4	0	660	0	01h14	00h27	00h26	FOOT	FOOT	0.0	02h28	6.15	0.10	04h33
0040	FOOT	460	0	0	540	0	01h00	00h04	00h04	VEHIC.	VEHIC.	0.0	02h28	5.97	0.15	03h35
0041	FOOT	449	0	0	567	0	01h03	00h04	00h04	VEHIC.	VEHIC.	0.0	02h28	6.81	0.33	03h38
0042	FOOT	447	28	0	843	0	01h34	00h04	00h04	VEHIC.	VEHIC.	0.0	02h21	5.66	0.67	04h02
0043	FOOT	479	16	0	951	0	01h46	00h05	00h04	VEHIC.	VEHIC.	0.0	02h27	5.49	0.21	04h20
0044	FOOT	491	0	0	632	0	01h33	00h14	00h24	FOOT	FOOT	0.0	02h28	5.43	0.16	04h37
0045	FOOT	367	3	0	788	0	01h29	00h16	00h01	FOOT	FOOT	0.0	02h14	7.89	1.99	03h59
0046	FOOT	460	0	0	735	0	01h22	00h27	00h04	FOOT	VEHIC.	0.0	02h29	5.50	0.69	04h20
0047	FOOT	553	72	0	539	0	01h00	00h04	00h04	VEHIC.	VEHIC.	0.0	02h28	6.87	0.20	03h35
0048	FOOT	530	0	0	550	0	01h02	00h27	00h04	FOOT	VEHIC.	0.0	02h23	5.92	0.29	03h54
0049	FOOT	479	0	0	888	0	01h39	00h20	00h21	FOOT	FOOT	0.0	02h30	5.21	0.73	04h48
0050	FOOT	452	0	0	712	0	01h19	00h13	00h04	FOOT	VEHIC.	0.0	02h30	6.72	0.45	04h05
0051	FOOT	434	33	0	937	0	01h44	00h20	00h21	FOOT	FOOT	0.0	02h27	6.76	0.83	04h51
0052	FOOT	509	20	0	1062	0	01h58	00h24	00h23	FOOT	FOOT	0.0	02h28	7.22	0.94	05h12
0053	FOOT	484	0	0	671	0	01h15	00h27	00h24	FOOT	FOOT	0.0	02h30	6.95	0.50	04h35
0054	FOOT	595	94	0	485	20	00h54	00h22	00h04	FOOT	VEHIC.	0.0	02h25	6.92	0.47	03h44
0055	FOOT	548	33	0	566	0	01h03	00h16	00h03	FOOT	VEHIC.	0.0	02h30	6.77	0.54	03h51
0056	FOOT	580	0	0	715	0	01h20	00h15	00h26	FOOT	FOOT	0.0	02h30	6.00	0.33	04h29
0057	FOOT	530	81	0	700	0	01h19	00h15	00h04	FOOT	VEHIC.	0.0	02h27	5.81	0.39	04h03
0058	FOOT	373	0	0	552	0	01h02	00h19	00h26	FOOT	FOOT	0.0	02h21	6.23	0.66	04h07
0059	FOOT	549	0	0	663	0	01h14	00h22	00h21	FOOT	FOOT	0.0	02h30	6.11	0.15	04h25
0060	FOOT	604	66	0	786	23	01h28	00h18	00h21	FOOT	FOOT	0.0	02h28	6.86	0.52	04h34
0061	FOOT	488	0	0	653	0	01h14	00h14	00h14	FOOT	FOOT	0.0	02h29	6.46	0.57	04h08
0062	FOOT	631	59	0	852	0	01h35	00h17	00h11	FOOT	FOOT	0.0	[illegible]	[illegible]	[illegible]	[illegible]4h30
0063	FOOT	496	0	0	719	0	01h21	00h21	00h16	FOOT	FOOT	0.0	[illegible]	[illegible]	[illegible]	[illegible]4h31

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0064	FOOT	599	39	0	940	0	01h45	00h04	00h04	FOOT	FOOT	0.0	02h24	6.04	0.98	04h15
0065	FOOT	519	68	0	524	0	00h59	00h13	00h16	FOOT	FOOT	0.0	02h17	6.04	0.39	03h43
0066	FOOT	470	2	0	799	0	01h29	00h11	00h12	FOOT	FOOT	0.0	02h28	5.25	0.93	04h19
0067	FOOT	458	0	0	577	0	01h05	00h04	00h12	FOOT	FOOT	0.0	02h07	5.20	0.53	03h27
0068	FOOT	539	0	0	590	0	01h06	00h05	00h13	FOOT	FOOT	0.0	02h14	5.24	0.05	03h37
age		486	16	0	674	1	01h15	00h11	00h10			0.0	02h24	6.33	0.55	03h59
mum		314	0	0	466	0	00h52	00h04	00h01			0.0	01h58	4.91	0.05	03h04
mum		631	132	0	1062	23	01h58	00h27	00h36			0.0	02h30	14.07	3.21	05h12
		32069	1053	0	44476	43	82h18	11h47	10h02			0	158h05	418	36	262h10

APPENDIX G.5:

RESULTS

Office LONGTON Division: MIDLANDS Date: 29/04/96

DAM Area STOKE Postcodes: ST 3 & ST 11

1st DELIVERY	Current		150 Mins			Proposed		
	Total	Cost	Total	Cost	% Diff.	Total	Cost	% Diff.
WALK	64		66		3.13	66		3.13
PREP HRS	82.87	421.79	82.87	421.79	0.00	82.87	421.79	0.00
T'SPORT HRS	9.10	46.32	12.28	62.52	34.98	12.28	62.52	34.98
DELV. HRS	162.65	827.89	158.62	807.36	-2.48	158.62	807.36	-2.48
Q of S %	45		100		121.43	100		121.43
1st Del. DW Kms	No Value for First Delivery Available							
% ZIG ZAG	No Value for First Delivery Available							

2nd DELIVERY	Current		150 Mins			Proposed		
	Total	Cost	Total	Cost	% Diff.	Total	Cost	% Diff.
WALK	54		31		-42.59	31		-42.59
PREP HRS	7.43	37.84	7.43	37.84	0.00	7.43	37.84	0.00
T'SPORT HRS	6.98	35.55	4.43	22.57	-36.52	4.43	22.57	-36.52
DELV. HRS	55.42	282.07	34.35	174.84	-38.02	34.35	174.84	-38.02
1st Del. DW Kms	No Value for First Delivery Available							
% ZIG ZAG	No Value for First Delivery Available							

N.B The data used for the benefit sheets has been extracted from the Walk Optimisation Software Statistics, the values used are accurate to two decimal places

2nd Delivery Current Data obtained from Delivery Office Statistics

Office LONGTON Division: MIDLANDS Date: 29/04/96

DAM Area STOKE Postcodes: ST 3 & ST11

DAILY TOTAL	Current		150 Mins			Proposed		
	Total	Cost	Total	Cost	% Diff.	Total	Cost	% Diff.
PREP HRS	90.30	459.63	90.30	459.63	0.00	90.30	459.63	0.00
T'SPORT HRS	16.08	81.86	16.72	85.09	3.94	16.72	85.09	3.94
DELV. HRS	218.07	1109.96	192.97	982.20	-11.51	192.97	982.20	-11.51
1st Del. DW Kms No Value for First Delivery Available								
TOTAL		1651.45		1526.92	-7.54		1526.92	-7.54

WEEKLY TOTAL	Current		150 Mins			Proposed		
	Total	Cost	Total	Cost	% Diff.	Total	Cost	% Diff.
PREP HRS	534.37	2719.93	534.37	2719.93	0.00	534.37	2719.93	0.00
T'SPORT HRS	89.52	455.64	95.87	487.96	7.09	95.87	487.96	7.09
DELV. HRS	1252.98	6377.69	1123.45	5718.36	-10.34	1123.45	5718.36	-10.34
1st Del. DW Kms No Value for First Delivery Available								
TOTAL		9553.25		8926.25			8926.25	

ANNUAL TOTAL	Current		150 Mins			Proposed		
	Total	Cost	Total	Cost	% Diff.	Total	Cost	% Diff.
PREP HRS	27080.63	137840.42	27110.37	137991.77	0.11	27110.37	137991.77	0.11
T'SPORT HRS	4472.45	22764.77	4841.45	24642.98	8.25	4841.45	24642.98	8.25
DELV. HRS	63074.50	321049.21	56862.53	289430.29	-9.85	56862.53	289430.29	-9.85
1st Del. DW Kms No Value for First Delivery Available								
TOTAL		481654.40		452065.04			452065.04	

Office Longton Division: Midlands Date 01/05/96

DAM Area Stoke Postcodes: ST3, ST11

PROPOSED 1st DELIVERY WALKS

Walk No.	Mode of Delv	Mins on Delv	Mins diff From 150 span	Q of S	Dead Walk Km's	TRANSPORT				Prep Mins
						Mode	Mins To	Mode	Mins From	
1	C	142.00	-8	Y	3.21	N	20.00	N	36.00	69.00
2	C	130.00	-20	Y	1.20	N	19.00	N	19.00	64.00
3	F	138.00	-12	Y	0.32	V	6.00	V	8.00	71.00
4	F	140.00	-10	Y	0.33	V	6.00	V	7.00	60.00
5	F	150.00	0	Y	0.54	V	7.00	V	6.00	95.00
6	F	150.00	0	Y	0.51	V	7.00	V	9.00	64.00
7	F	118.00	-32	Y	0.68	V	6.00	V	6.00	54.00
8	F	147.00	-3	Y	1.35	V	6.00	V	6.00	64.00
9	F	123.00	-27	Y	0.34	V	7.00	V	8.00	64.00
10	F	130.00	-20	Y	0.42	V	6.00	V	7.00	66.00
11	C	139.00	-11	Y	0.33	N	14.00	N	17.00	70.00
12	F	149.00	-1	Y	0.21	V	5.00	V	6.00	64.00
13	F	144.00	-6	Y	0.10	V	5.00	V	5.00	74.00
14	F	142.00	-8	Y	0.09	V	5.00	V	6.00	62.00
15	F	146.00	-4	Y	0.34	V	6.00	V	6.00	80.00
16	F	147.00	-3	Y	0.29	V	5.00	V	5.00	52.00
17	F	149.00	-1	Y	0.63	V	6.00	V	6.00	70.00
18	F	147.00	-3	Y	0.12	V	5.00	V	7.00	59.00
19	F	149.00	-1	Y	0.18	V	5.00	V	6.00	84.00
20	F	130.00	-20	Y	0.71	V	5.00	V	6.00	59.00
21	F	145.00	-5	Y	0.34	V	5.00	V	6.00	80.00
22	F	150.00	0	Y	0.66	V	4.00	V	5.00	86.00
23	F	150.00	0	Y	0.05	V	4.00	V	5.00	69.00
24	F	148.00	-2	Y	0.56	N	6.00	V	4.00	96.00
25	F	149.00	-1	Y	0.81	V	5.00	V	5.00	62.00
26	F	147.00	-3	Y	0.09	V	5.00	V	5.00	69.00
27	F	144.00	-6	Y	0.67	N	4.00	V	5.00	80.00
28	F	150.00	0	Y	0.21	N	5.00	V	4.00	77.00
29	F	141.00	-9	Y	0.39	V	6.00	V	5.00	63.00
30	F	143.00	-7	Y	0.88	V	22.00	N	5.00	97.00
31	F	145.00	-5	Y	0.67	V	4.00	V	4.00	52.00
32	F	150.00	0	Y	0.22	V	5.00	V	5.00	83.00
33	F	141.00	-9	Y	1.48	V	23.00	N	4.00	109.00
34	F	150.00	0	Y	0.45	V	4.00	V	4.00	62.00
35	F	145.00	-5	Y	0.51	V	5.00	V	5.00	58.00
36	F	149.00	-1	Y	0.46	V	27.00	N	3.00	92.00
37	F	148.00	-2	Y	0.10	V	27.00	N	26.00	74.00
38	F	148.00	-2	Y	0.15	V	4.00	V	4.00	60.00
39	F	148.00	-2	Y	0.33	V	4.00	V	4.00	63.00
40	F	141.00	-9	Y	0.67	V	4.00	V	4.00	94.00
41	F	147.00	-3	Y	0.21	V	5.00	V	4.00	106.00
42	F	148.00	-2	Y	0.16	N	14.00	N	24.00	93.00

Walk No.	Mode of Delv	Mins on Delv	Mins diff From 150 span	Q of S	Dead Walk Km's	TRANSPORT				Prep Mins
						Mode	Mins To	Mode	Mins From	
43	F	134.00	-16	Y	1.99	N	16.00	N	1.00	89.00
44	F	149.00	-1	Y	0.69	N	27.00	N	4.00	82.00
45	F	148.00	-2	Y	0.20	V	4.00	V	4.00	60.00
46	F	143.00	-7	Y	0.29	N	27.00	N	4.00	62.00
47	F	150.00	0	Y	0.73	N	20.00	N	21.00	99.00
48	F	150.00	0	Y	0.45	N	13.00	N	4.00	79.00
49	F	147.00	-3	Y	0.83	N	20.00	N	21.00	104.00
50	F	148.00	-2	Y	0.94	N	24.00	N	23.00	118.00
51	F	150.00	0	Y	0.50	N	27.00	N	24.00	75.00
52	F	145.00	-5	Y	0.47	N	22.00	N	4.00	54.00
53	F	150.00	0	Y	0.54	N	16.00	N	3.00	63.00
54	F	150.00	0	Y	0.33	N	15.00	N	26.00	80.00
55	F	147.00	-3	Y	0.39	N	15.00	N	4.00	79.00
56	F	141.00	-9	Y	0.66	N	19.00	N	26.00	62.00
57	F	150.00	0	Y	0.15	N	22.00	N	21.00	74.00
58	F	148.00	-2	Y	0.52	N	18.00	N	21.00	88.00
59	F	149.00	-1	Y	0.57	N	14.00	N	14.00	74.00
60	F	149.00	-1	Y	0.21	N	17.00	N	11.00	95.00
61	F	142.00	-8	Y	0.75	N	21.00	N	18.00	81.00
62	F	144.00	-6	Y	0.98	N	4.00	N	4.00	105.00
63	F	137.00	-13	Y	0.39	N	13.00	N	16.00	59.00
64	F	148.00	-2	Y	0.93	N	11.00	N	12.00	89.00
65	F	127.00	-23	Y	0.53	N	4.00	N	12.00	65.00
66	F	134.00	-16	Y	0.05	N	5.00	N	13.00	66.00
Total		9517.00	-383.00		36.06		737.00		633.00	4972.00

SUMMARY Of RESULTS

Q of S

Walks Achieving Q of S	66
% Achieving Q of S	100
Walks Failing Q of S	0
% Failing Q of S	0
Ave. Mins Failing Q of S	0
Delivery Span Std. Deviation	7

TRANSPORT

Mode	Out	%	In	%
Van	36	55	35	53
Public	0	0	0	0
None	30	45	31	47

DELIVERY

Mode	Walks	%
Foot	63	95.45
Cycle	3	4.55

ZIG ZAG

Total No. of Codes Zig Zagged	1085	% of Codes Zig Zagged	30.21
Total No of Delivery Codes	3591		

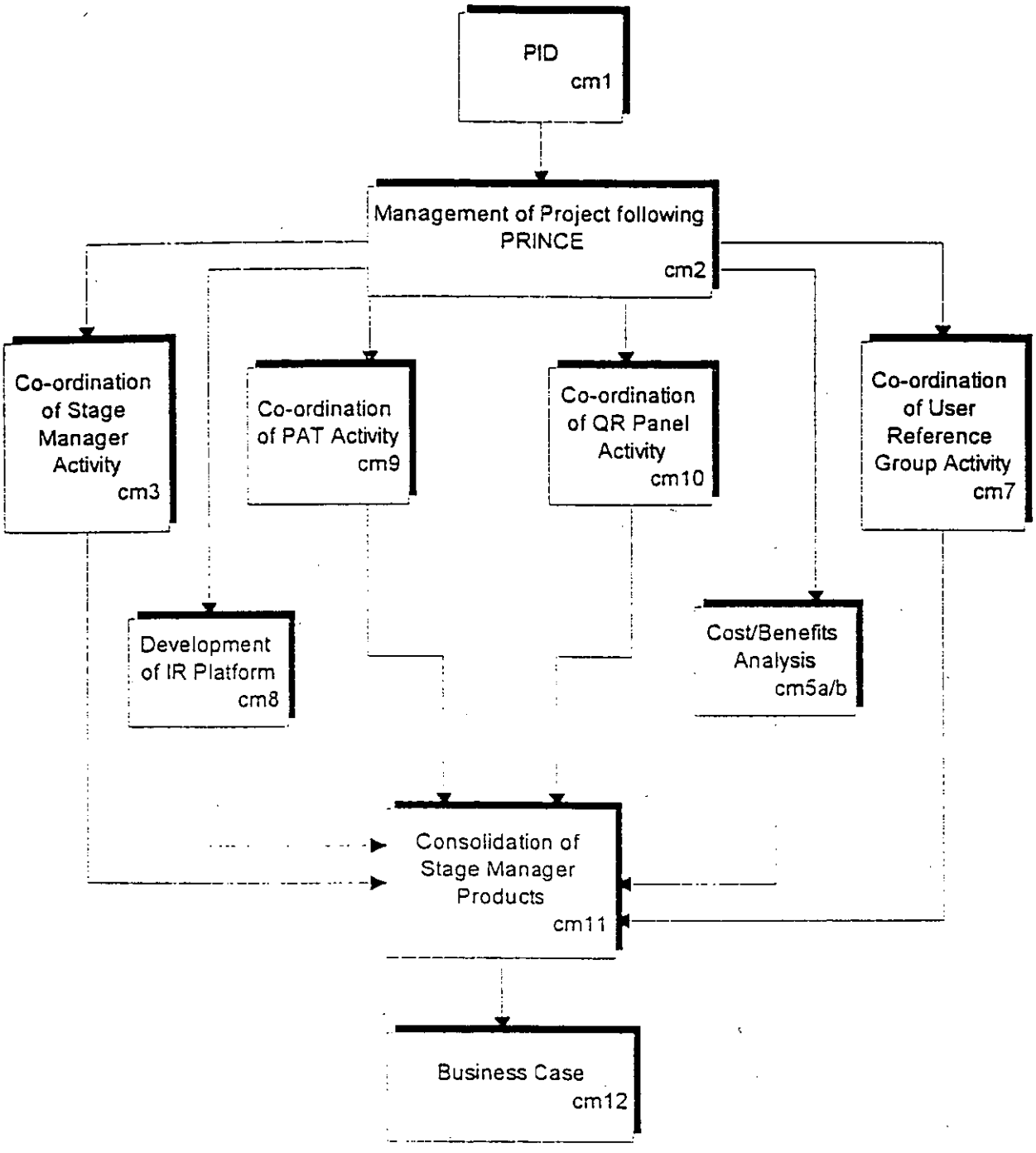
APPENDIX H: ANALYSIS AND DESIGN PHASE

Appendix H.1:	Product Flow: Project Consolidation
Appendix H.2:	Product Flow and Breakdown: Implementation Strategy
Appendix H.3:	Workload and Staffing Assumptions
Appendix H.4:	Ongoing Maintenance Plan

APPENDIX H.1:

PRODUCT FLOW:
PROJECT CONSOLIDATION

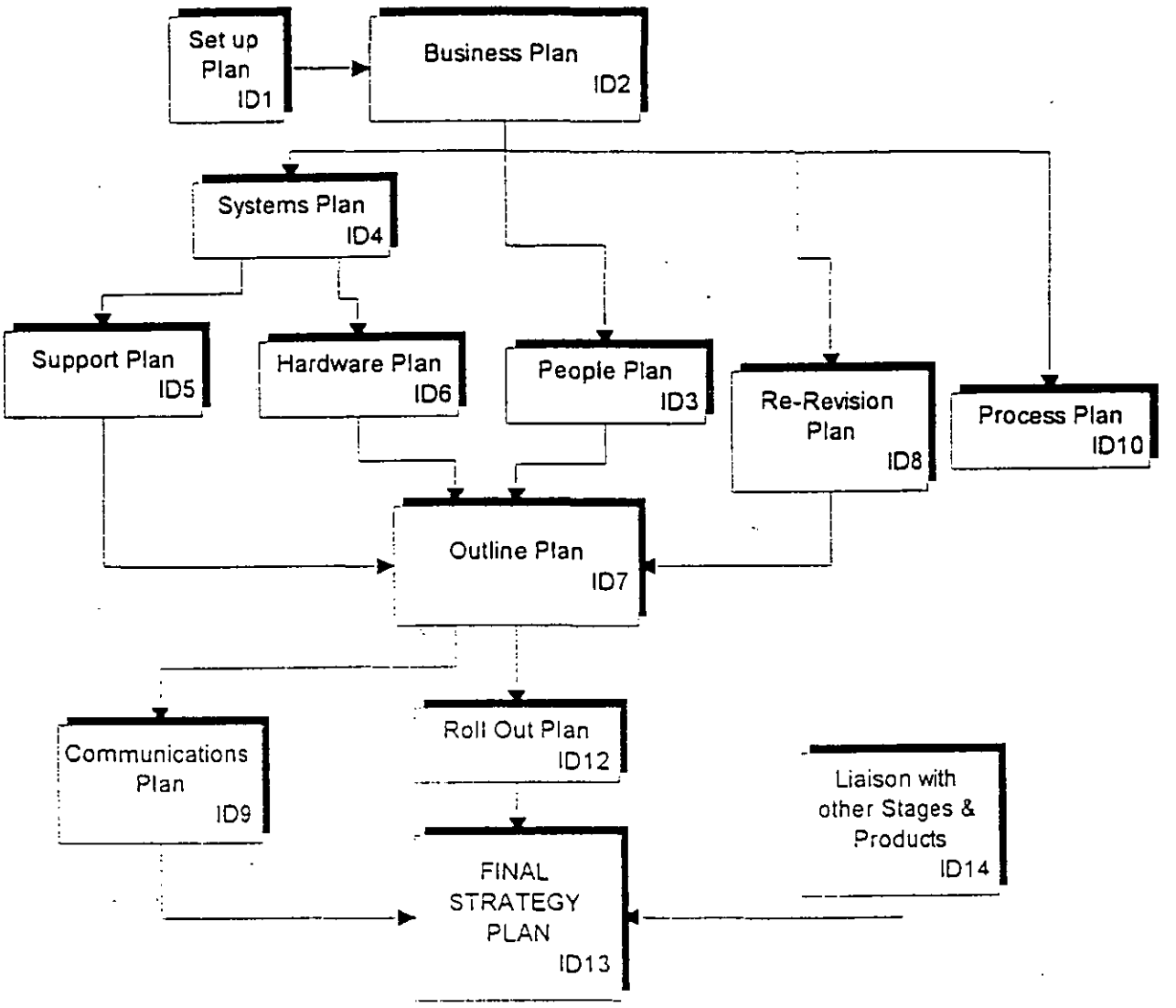
CONSOLIDATION AND MANAGEMENT STAGE PRODUCT FLOW
VERSION 2.0 14/10/96



APPENDIX H.2:

PRODUCT FLOW AND BREAKDOWN: IMPLEMENTATION STRATEGY

IMPLEMENTATION STRATEGY DEVELOPMENTSTAGE PRODUCT FLOW
VERSION 2.0 14/10/96



Walk Optimisation Phase 2 Product Breakdown
Implementation Strategy Development Stage

Product: ID1	Set Up Plan - Initial Plans complete - User Group Meetings Organised
Product: ID2	Business Plan - Roll Out Plan Complete - Resources Plan
Product: ID3	People plan - Training Plan Complete
Product: ID4	Systems Plan - WES Software Plan - GIS Plan - WO Plan - Upgrade Plan - IS Infrastructure Plan Integration - Dependent Projects Plan - Pilot New Software Plan Complete
Product: ID5	Support Plan - Help Desk Plan - Central Co-ordination Plan - Local Support Plan - User Group Plan
Product ID6	Hardware Plan - Hardware Plan - Infrastructure Provision Plan
Product ID7	Outline Plan - Outline Strategy Designed - Impact Analysis Complete
Product ID8	Re - revision Plan Completed
Product ID9	Communication Plan Completed
Product ID10	Process and Documentation Plan Complete
Product ID11	Data Plan Complete

Product ID12	Local Roll Out Plan by Division
Product ID13	Final Strategy Plan
Product ID14	Liaison with other Stages and other Products

APPENDIX H.3:

WORKLOAD AND STAFFING ASSUMPTIONS

WORKLOAD & STAFFING ASSUMPTION

1. Current Divisional Planning Resource template :-

Grade / Division	SE	SW2	London	S/Central	NE	Mids	NW2	Anglia	SNI
JV2					6				
JV3	9		12	6	4	10	8	1	9
JV4									
JV5	12		20	16	17	13	11	5	16
Pipeline Planners		18							
Totals	21	18	32	22	27	23	19	6	25
Grand Total		193							

Notes :

1. It is still not clear if this represents the definitive divisional position.
2. Clarification on the roles & responsibilities of the template is being sought.
3. Planning is based on 44 weeks weeks per annum to cater for AL, training etc..

2. Rate of Progress Assumptions:-

Based on the assumptions that :-

- *Phase 1 revisions* - will each take six months. This is primarily due to the fact that this phase will be the Pilot and all the learning curve issues which will need to be addressed;
- *Phase 2 revisions* - will take on average three months. Planning resource will be familiar with the system & robust processes will be in place;
- *Phase 3 revisions* - will take on average two months. Primarily the smaller offices & those with initial IR difficulties (which should no longer be relevant)
- In general, an average of 50 major revisions scheduled per Division per year is a manageable.

The following scenario has been developed which :-

- grosses up working weeks into staff requirements;
- Provides an early indication on the project progress.

Scenario 1:-
44 working weeks per annum & standard timescale per phase

Phase	1	2	2	3	3
Elapsed time since 'go live'	0- 6 Months	6 - 18 Months	18 - 30 Months	30 - 42 Months	42 - 54 Months
Applications	45	464	464	476	476
Staff requirement	45	137	137	94	94

2. Cont/..

Rate of Progress Assumptions: *sensitivity analysis*

Three further scenarios are considered below :-

Scenario 2:- Timescales for revisions reduced as follows :- phase 2 revisions reduced to 2.5 elapsed months & phase 3 projects reduced to 1.5 months each.					
Elapsed time since 'go live'	0- 6 Months	6 - 18 Months	18 - 30 Months	30 - 42 Months	42 - 54 Months
Staff requirement	45	114	114	70	70

Scenario 3:- 43 working weeks per annum & standard timescale per phase					
Phase	1	2	2	3	3
Elapsed time since 'go live'	0- 6 Months	6 - 18 Months	18 - 30 Months	30 - 42 Months	42 - 54 Months
Applications	45	464	464	476	476
Staff requirement	45	140	140	96	96

Scenario 4 :- 43 working weeks per annum & timescales for revisions reduced as follows :- phase 2 revisions reduced to 2.5 elapsed months & phase 3 projects reduced to 1.5 months each.					
Elapsed time since 'go live'	0- 6 Months	6 - 18 Months	18 - 30 Months	30 - 42 Months	42 - 54 Months
Staff requirement	45	117	117	72	72

It is worth noting that all options can be contained within the existing Divisional templates headcount but would necessitate a redefinition of the roles.

APPENDIX H.4:

ONGOING MAINTENANCE PLAN

ONGOING MAINTENANCE PLAN

1. Maintenance Plan

A programme of annual audits should be established to review and update any changes. It is likely that this review process will generate two categories of update requirements :-

⇒ Minor change : minor consequential change to existing walks due to minor new developments, small traffic changes etc..

⇒ Major change : due to substantial redevelopment, traffic growth etc..

It is envisaged that an audit[1] willl take 3 days to carry out.

In addition to the time required to undertake the audit, the assumption is that:

⇒ A minor change will be required in 50% of cases and will take 2 weeks to complete;

⇒ A major change will required in 20 % of cases and will take 4 weeks to complete.

This annex considers the staffing and timetable implications of the proposed maintenance plan

SCENARIO 1 - Minor Reviews 50% and Major Reviews 20% of Audits

Maintenance	Applications	Implementation Planners	Audits	Audit Staff	Minor Reviews @50% staff	Major Reviews @20% staff	Total Maintenance staff
Phase1 (0-6mth)	45	45	0	0	0	0	0
Phase 2 (6-18mth)	464	137	45	1	1	1	2
Phase 2 (18-30mth)	464	137	509	7	12	9	28
Phase 3 (30-42mth)	476	94	973	13	22	18	53
Phase3 (42-54mth)	477	94	1449	20	33	26	79
Maintenance (54-66mth)	0	0	1926	26	44	35	105

[1] Although overall Business economies of scale are possible by combining audits of DPMS & traffic during the same visit - for the purposes of this report these are not considered.

2. Maintenance Plan: *sensitivity analysis*

The mix of major/minor revisions has been changed in the following analysis :-

SCENARIO 2 - Change Minor Reviews to 40% and Major Reviews to 10% of Audits							
Maintenance	Applications	Implementation Planners	Audits	Audit Staff	Minor Reviews @40% staff	Major Reviews @10% staff	Total Maintenance staff
Phase1 (0-6mth)	45	45	0	0	0	0	0
Phase 2 (6-18mth)	464	137	45	1	1	0	2
Phase 2 (18-30mth)	464	137	509	7	9	5	21
Phase 3 (30-42mth)	476	94	973	13	18	9	40
Phase3 (42-54mth)	477	94	1449	20	26	13	59
Maintenance (54-66mth)	0	0	1926	26	35	18	79

SCENARIO 3 - Change minor Reviews to 60% and Major Reviews to 30% of Audits							
Maintenance	Applications	Implementation Planners	Audits	Audit Staff	Minor Reviews @60% staff	Major Reviews @30% staff	Total Maintenance staff
Phase1 (0-6mth)	45	45	0	0	0	0	0
Phase 2 (6-18mth)	464	137	45	1	1	1	3
Phase 2 (18-30mth)	464	137	509	7	14	14	35
Phase 3 (30-42mth)	476	94	973	13	27	27	66
Phase3 (42-54mth)	477	94	1449	20	40	40	99
Maintenance (54-66mth)	0	0	1926	26	53	53	131

It is worth noting that all options can be contained within the existing Divisional templates headcount but would necessitate a redefinition of the roles.

APPENDIX I:
FIS WORKSHOPS

Appendix I.1:	Letter to URG
Appendix I.2:	RM Walk Optimisation Pre-Reading
Appendix I.3:	Walk Optimisation System
Appendix I.4:	Probable Checklist
Appendix I.5:	Royal Mail Questionnaire
Appendix I.6:	Student Questionnaire

APPENDIX I.1:

LETTER TO URG

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14th January 1997

Dear Tony,

Subject - Delivery Revision in the Royal Mail: A Future Scenario

Please find enclosed a document outlining a study I am planning to undertake using all 9 divisions in the Royal Mail. The document outlines a future scenario that I will present to stakeholders to ascertain their views on how the scenario would affect their roles and responsibilities in the delivery revision process. The scenario assumes that an optimisation system is already in place and is therefore concerned with the processes involved in re-revisions.

In order to conduct the studies I aim to run a half day work shop in each division. This would bring together various stakeholders who would use or be affected by the implementation of such a system, i.e. Planners, Delivery Office Managers, Delivery Area Managers, etc. I am hoping to enlist the help of the Divisional Representatives on the User Refernce Group to set-up the workshops and to help with any additional information needed to understand the current revision procedures in their division.

I would appreciate it if you could find time to look at the document before the next Walk Optimisation User Reference Group meeting (21st January) and provide any feedback at the meeting.

Thank you for your time.

Yours sincerely

D. Philpott

Debbie Philpott

Enc

cc Delivery Revision User Reference Group

Delivery Revision In The Royal Mail: A Future Scenario

DRAFT (VERSION 2)

In confidence

Debbie Philpott

Cognitive Ergonomics Research Group
Loughborough University

Delivery Revision In The Royal Mail: A Future Scenario

INTRODUCTION

The introduction of a new system into an organisation has many ramifications, many of which may be overlooked prior to implementation. The aim of my research is to improve the prediction process, highlighting potential problems, prior to implementation. There are many existing ideas on how to improve the prediction process, one of which is by the use of scenarios.

Scenarios have been long evident as an informal method of systems design, however there has recently been a rise in popularity of the use of scenarios reported in journal articles and conferences. These articles aim to encourage the wider use of scenarios as a tool for design; claiming that they are a useful tool at various stages of the design process, and yet there still appears to be no clear definition of what a scenarios is, or how it should be used.

One area which is still contentious in systems design is the use of stakeholders in evaluating design options. Most people would agree that user evaluation is a vital part of design, but debate whether the participants should be actual users or their representatives. Also, where representatives are used, there is debate over how useful / valid the evaluations are. Literature on systems implementation encourage the use of ACTUAL stakeholders to evaluate new technology, however often in organisations a group of representatives is used, whether this is for political reasons or reasons of convenience. These representatives being managers, designers, etc. and not the actual stakeholders. I aim to investigate differences in evaluations from both stakeholders and stakeholder representatives within the Royal Mail.

THE STUDY

To conduct the study I plan to bring together the various stakeholders, namely Divisional Managers, Area Managers, Delivery Office Managers and Planners and members of the design team in each division for a half day workshop.

My work is concerned with investigating people's roles and responsibilities within the revision process and the scenario I present is my own view of one possible future situation for delivery revisions if an optimisation system were to be introduced in the Royal Mail.

There are two main aims of the studies; firstly for my own research to gauge the validity of users and user representatives being used to evaluate the impact of technology on a particular person's roles and responsibilties in the system; and secondly to feed the results into the Walk Optimisation project. The project will benefit from the views of the actual stakeholders taking part in the study and these views may inform any eventual strategy that the Royal Mail might adopt for such a system.
The study will enable the walk optimisation team to see the particular views of various stakeholders at different levels in each of the divisions. This will therefore provide a balanced view of the costs and benefits a system will bring to the people that will eventually be using the system or be affected by the system. It will also highlight any difficulties which arise because of current revision processes and structures within a division.

THE FUTURE SCENARIO

INTRODUCTION

This scenario describes the processes, which enable a revision to take place, and the roles and responsibilities of various stakeholders of the walk optimisation system. Figure 1 shows who has access to each part of the system and what level of access is allowed.

THE REVISION PROCESS

There are two types of maintenance and update procedures which are in place, either of which may trigger the revision process.

MONITORING

Ad hoc (see Figure 2)

The Area Planners maintain the system throughout the year and update the system with any changes which are notified to them by the Delivery Office Managers, it is the Delivery Office Managers responsibility to ensure these changes are notified. These will be due to factors such as new development, growth/decrease in the area, business relocation, etc..
All the information associated with the particular change, i.e. the information needed to update the system, is collected by the Delivery Office Manager and passed to the Area Planner.

Annual Audit (see Figure 3)

Annually the Delivery Offices will be monitored to ensure that all changes have been notified and the system will be updated, where necessary, with any additional changes.
The monitoring will be performed by the Area Planners; they will visit the Delivery Office and check the current office details are accurate and collect any additional data that is required to update the system.
TIME TAKEN - Approx. 3 days.

MAINTENANCE

The Area Planner goes to the Delivery Office and updates the GIS and WES. If the changes are only minor (determined by an acceptable % change) then these are processed through to the walk optimisation system, for example to add / delete the delivery points to an existing walk. The Delivery Office Manager then verifies the amended walk(s).
TIME TAKEN - Approx. 2 weeks.

INITIATION (see Figure 4)

If more major changes are required (i.e. % change greater than acceptable) the Area planner notifies the Divisional Planners, it is their responsibility to request authority from the Delivery Area Manager for a revision to be conducted. If no authority is granted the Area Planners are instructed to update the Walk Optimiser with the changes. If authority is granted the Delivery Office Manager is contacted by the Divisional Planner and the full revision begins.

DATA COLLECTION (see Figure 5)

The Divisional planning team go to the delivery office and are responsible, with the aid of one or more of the delivery office staff, to gather the latest office figures and any other relevant data.

PLANNING

The data is fed into the system and the Walk Optimiser is then used to plot the new walks, the Delivery Office Manager provides any local knowledge that is needed. The walks remain as stable as possible.
After the walks have been plotted using the optimisation system there is some fine tuning that is needed to adjust for local factors not taken into account by the optimisation system, for e.g. steep hills.
TIME TAKEN - Approx. 4 weeks (full revision).

NEGOTIATION

The new routes are then presented to Delivery Office Manager, who has to approve the new walks, these are then presented by the Delivery Office Manager and Divisional Planner to the Delivery Area Manager.
Once the Delivery Area Manager has approved the walks they are presented by the Delivery Office Manager to the union and staff. Printouts of the routes are provided along with descriptions of the duties. When the walks have been agreed by the union the Divisional Planner prints out the office changes which are necessary, notifies other systems of any changes and prepares the office for implementation.

IMPLEMENTATION

The new walks are then implemented and the Divisional Planner is responsible for attending to any problems that arise. After the initial settling in period the Divisional Planner moves on leaving the printouts of all the information that is needed.

SUPPORT

There is a help desk to provide systems support nationally and the Divisional Planners provide support for the Area Planners.

FIGURE 1

A FUTURE SCENARIO: SYSTEM ACCESS

	GIS	WES	WO
NATIONAL			
HELP DESK	S	S	S
DIVISIONAL			
MANAGER			
AREA			
MANAGER			
PLAN. TEAM	U and S	U and S	U and S
SECTOR			
MANAGER			
PLAN. TEAM	M and S	M and S	M and S
DELY OFFICE			
MANAGER	V	V	V and P
POSTPERSON			P
CWU			P

KEY

M = Maintenance
S = Support
U = Update
V = View to verify
P = Printouts

APPENDIX I.2:

RM WALK OPTIMISATION PRE-READING

AN OUTLINE OF WALK OPTIMISATION

Introduction

The current manual process for delivery revisions is slow, laborious, labour intensive and extremely difficult to deploy into the field. In the circumstances the business has been exploring a number of avenues in order to radically improve the process.

As a result of recent research and benchmarking of foreign postal administrations, a number of specialised computerised packages have been identified for use in the improvement of delivery revisions. The operational feasibility of walk optimisation using such a package was evaluated by Royal Mail in a series of process trials.

The trials proved the process was feasible and identified the system components necessary to implement such a solution. The main system components are:

- **GIS** - to allow geographic/network Infomation to be digitised on a map
- **Workload System** - to calculate preparation/sortation/delivery workloads based on traffic
- **Optimisation Package** - to sequence postcodes into a series of delivery walks which minimise deadwalking

The remainder of this document describes the high level business processes which fall into the following areas:

- Data Gathering/Digitisation
- Workload
- Optimisation
- Tailor Walks
- Implement Revision

The system components to be used in each process and potential data sources and interfaces are also referred to.

DATA GATHERING/DIGITISATION

Identify Office For Revision

A Delivery Office, or part of a DO or some other area within the Division will be identified as requiring a revision or re-revision to its existing walks. The criteria for selecting the office may include those offices failing Q of S targets; areas with large numbers of new/changed delivery points. A Revision's Decision tree may be used to assist the decision.

Prepare For Revision

Plotting of the network on the GIS map requires that certain data has been captured. Although some of this information may be readily available, the remainder will require a specific exercise in order capture it. Information to be captured includes:

- Bus Timetables
- Traffic volumes - first/second delivery
- Preparation volumes - where items are prepped at the office under review
- Sortation volumes - where items are sorted at the office under review
- Postcode data - from PAF
- Geographic features - can the street be zig-zagged, is it a steep hill
- Delivery point features - location of letter box, restricted access, fierce dog
- Path length - distance to the letter box
- Collection Points - location of post boxes to be collected from on the delivery walk
- Existing walk information - current walks/delivery points in the review area

BASELINE WALK DATA

A baseline for the data used for the revision is required after which changes in traffic/postcode figures will not be incorporated into the revision. Changes may be incorporated into the revision on a controlled manner later in the process. This baselining of data will potentially lead to 3 versions of office/walk data co-existing at the same time:

- current
- revision - the output from the revision exercise(s)
- planned - awaiting implementation, change may be applied after the revision

Digitise Network

The selected optimisation package requires a digitised network in order to optimise walks. This is produced by the use of a GIS product which allows the definition of map segments along which a delivery postman/woman may walk/cycle. The appropriate postcodes are then assigned to each of the segments. Additional geographic information captured during data gathering is also added at this point including:

- location of the delivery office
- large user location
- location of pouch boxes
- bus routes/bus stops
- van routes
- post boxes
- flat counts

- whether the segment may be cycled, zig-zagged

Some of this data e.g. flat counts, is then correlated with PAF to ensure consistency and updates/amendments to either PAF or the GIS network processed accordingly.

In certain circumstances the maps provided by Ordnance Survey may be incomplete, for example where new delivery points have been created. In such instances digitisation will also involve drawing in these missing areas.

PAF data will be used to provide a basis for postcode information. It is likely that at this point this interface will use a floppy disk. In the future this PAF disk interface may be replaced by a direct interface to the RAISINS database. Postcodes which are not on PAF will not be available to the user. In such instances, action must be taken to update PAF.

It may be possible to use the GIS to capture information currently input to the WES package e.g. traffic figures, path lengths

Review Digitised Data

Since those individuals performing the digitisation may not be experts in the review locality, the digitised network must be reviewed against local knowledge. This should identify, for example, restrictions in access which are not shown on the OS maps and is likely to involve the DOM, postmen/women.

WORKLOAD CALCULATION

Collect Workload Information

In addition to information about the network, the The WO package package requires workload information for the various aspects of delivery work e.g. sortation, preparation, delivery. The total workload for any one delivery walk will be a combination of this information and other data related to volumes of mail, delivery mechanism (e.g. cycle, foot).

Calculate Workload

Workload values will be calculated in the WES PC package. This package will use network data relating to the segment/postcode mapping from the GIS. Standard rates for sortation and preparation for each type of frame used will be supplied together with the workload calculations. Traffic volumes by postcode segment for first/second deliveries will then be added utilising the GIS data.

WES will perform validations to ensure that there is consistency between the data input during digitisation, traffic figures input and PAF data. The WES package will calculate workloads for each of the postcode segments to be provided as input to the Walk Optimisation package.

OPTIMISATION

Optimise Walks

The Walk Optimisation package provides a graphical representation of the network, displaying the progress of optimisation whilst in process.

The WO package takes the digitised network from the GIS containing the transport routes and the workloads for each segment from WES, and then uses a series of algorithms to produce optimised walks. Walk Op will select the delivery method for each defined segment e.g. zig-zag, up and back which will minimise the amount of deadwalking. It will then group the segments and sequence them into walks which will not exceed the delivery span.

At the end of optimisation Walk Op will produce a series of walks which will entail the minimal amount of deadwalking and which will maximise the delivery time.

These walks are displayed in graphical format on the VDU.

TAILOR WALKS

The initial optimised output from The WO package is unlikely to be the final scheme of walks to be implemented. The WO package cannot cater for all factors which may affect the delivery of mail. For example, the WO package cannot cater for steep hills. In such instances the walks may be changed to route round such features. This may be done by freezing a certain number of the walk segments and asking the package to re-optimise or by manually defining the walk. It may also be necessary to change the optimised output to reflect best utilisation of staff/resource. For example, the optimisation package may produce four walks of 149 minutes and one of 20 minutes. This may be locally altered so that four walks of 130 and one walk of 88 are produced.

IMPLEMENT REVISION

Once the walks have been agreed, a timescale for their implementation will be set and the appropriate measure put in place. This will involve the production of walk logs/instructions for the delivery postmen/women and notification of the changes to PAF to facilitate update to automation sorting plans.

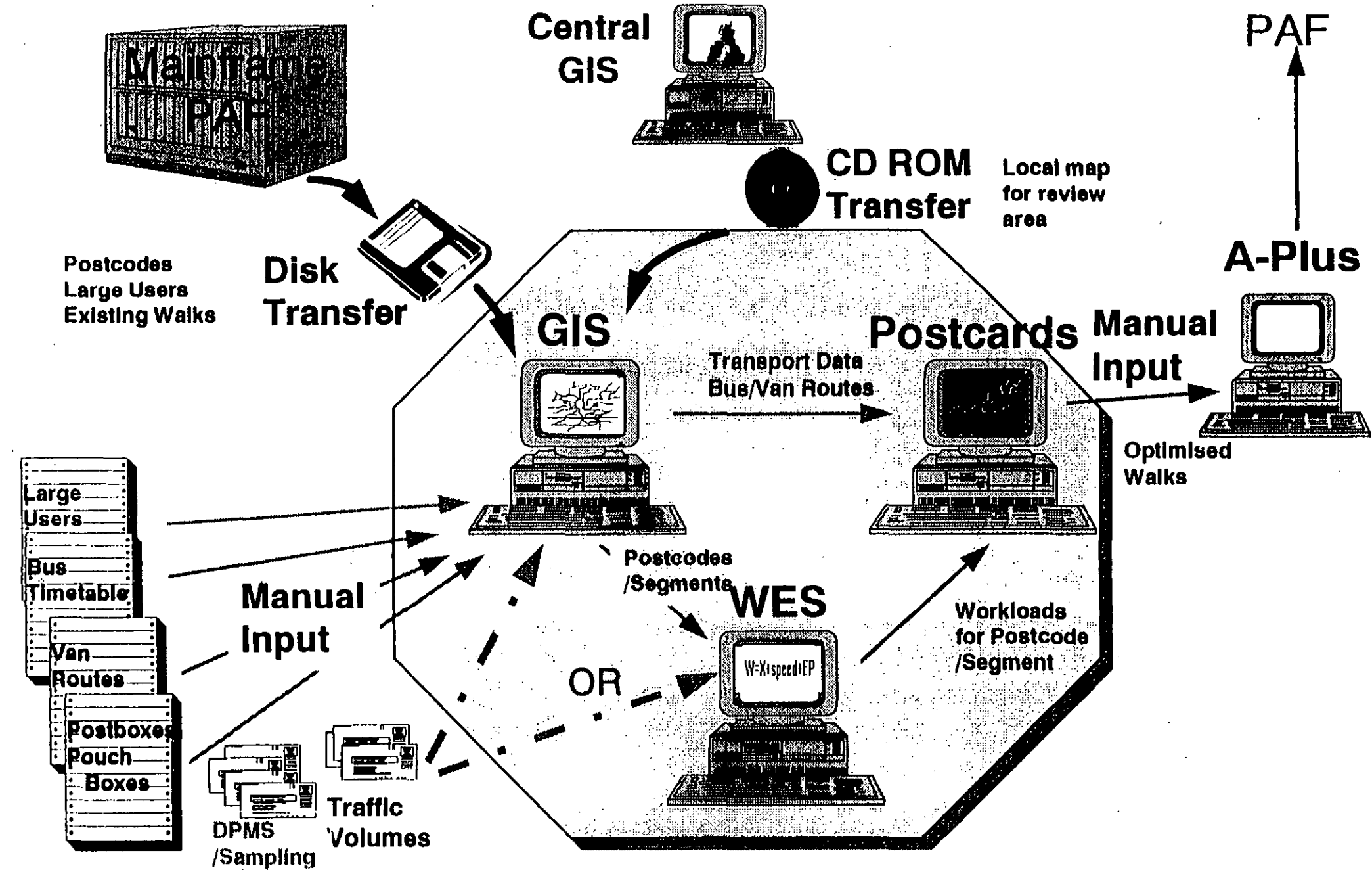
GLOSSARY OF TERMS

DOM	Delivery Office Manager.
GIS	Geographic Information System. A PC based system which allows the capture/display of information via a map.
OS	Ordinance Survey - provides the maps used by the GIS.
PAF	Postcode Address File. A mainframe DB2 based database containing the master for all Postcode/Address information used by the Post Office.
The WO package	A DOS based PC based package for optimising/providing a graphical representation of delivery walks.
VDU	Visual Display Unit - a PC display/monitor
Walk	A collection of delivery points to which mail is delivered by a postman/woman. The route is determined during the Delivery Revisions process and is fixed apart from minor changes as a result of the odd new building/demolition. For the purposes of walk optimisation, this excludes rural and motorised deliveries.
WES	Workload Evaluation System. A windows PC based package developed in Access which calculates workloads for network/postcode segments.
Wings	The GIS currently used by the Post Office. The Post Office is currently in the process of procuring a new GIS.

APPENDIX I.3:

WALK OPTIMISATION SYSTEM

Proposed Outline System Structure



APPENDIX I.4:

PROBABLE CHECKLIST

DELIVERY REVISION: PROBABLE OUTCOMES

NAME _____ ROLE _____

	CHANGE	ADV. +	DISADV. -
TECHNOLOGY a. GIS			
b. WES			
c. Walk Optimiser			
d. Report Facility			
SPECIFIC TASKS A. Skills & effort			
b. Work Pace & Load			
c. Satisfaction			
d. Resources			

DELIVERY REVISION: PROBABLE OUTCOMES

	CHANGE	ADV. +	DISADV. -
THE OVERALL TASK a. Discretion & Control			
b. Power & Influence			
c. Responsibilities			
d. Performance			
PERSONNEL POLICIES a. Job Security			
b. Pay & Rewards			
c. Career & Prospects			
d. Industrial Relations			

APPENDIX I.5:

ROYAL MAIL QUESTIONNAIRE

User Group Representative

Section 1 BACKGROUND INFORMATION

1 Name _____

2 Current position (& grade) _____

3 How long have you worked for Royal Mail?

- 1 year or less ☐
- 1 - 5 years ☐
- 6 - 10 years ☐
- 11 years or more ☐

4 How long have you been in your current position?

- 1 year or less ☐
- 1 - 5 years ☐
- 6 - 10 years ☐
- 11 years or more ☐

5 How often do you use a computer:

a) at work?

- Never ☐
- Rarely ☐
- Frequently ☐

b) at home?

- Never ☐
- Rarely ☐
- Frequently ☐

Section 2 GENERAL REVISION INFORMATION

6 How many times have you been involved in the following revisions:

	T/top	Man-W	CADR
Never	☐	☐	☐
1 - 5	☐	☐	☐
6 - 10	☐	☐	☐
More than 10	☐	☐	☐

7 What is your preferred method?

- T/top ☐
- Man-W ☐
- CADR ☐
- No preference ☐

8 Who decides which method is used?

- Planning team ☐
- DOM ☐
- DAM ☐
- Union ☐
- Other (please specify) _____

9 Could the current revision process be improved?

a) YES ☐ go to part b
NO ☐
Don't know ☐

b) Explain briefly the main problems (e.g. time, results, etc.)

_____
_____
_____
_____
_____

Section 3 WALK OPTIMISATION

10 How much do you already know about Walk Opimisation? (Tick all that apply)

- Nothing ☐
- A little information informally ☐
- A lot of information informally ☐
- A little information formally ☐
- A lot of information formally ☐
- Was involved in the trial ☐
- Have been involved with W.O. since the trial ☐

11 Do you feel Walk Optimisation will be beneficial for:-

	YES	NO	Don't know
a) The Royal Mail	☐	☐	☐
b) The Division	☐	☐	☐
c) The Area	☐	☐	☐
d) The Delivery Offices	☐	☐	☐

12. Do you feel Walk Optimisation will benefit the following people:-

	YES	NO	Don't know
a) Divisional Managers	❐	❐	❐
b) Area Managers	❐	❐	❐
c) Delivery Office Managers	❐	❐	❐
d) Planners	❐	❐	❐
e) Delivery staff	❐	❐	❐
f) The union	❐	❐	❐
g) The customers	❐	❐	❐

13 How do you think WO will affect your current role in the revision process?

- Major disadvantage ❐
- Disadvantage ❐
- Minor disadvantage ❐
- No change ❐
- Minor advantage ❐
- Advantage ❐
- Major advantage ❐
- Don't know ❐

THANKS

APPENDIX I.6:

STUDENT QUESTIONNAIRE

STUDENT WORKSHOP

1 Name _____

2 Age _____

3 Sex _____

4 Current course and year _____

5 Has your course included any modules that have looked at:

- Organisational change through the introduction of new technology ☐
- Organisational change for other reasons ☐
- Management of change in organisations ☐
- Managing people ☐
- Human computer interaction ☐

Any other relevant modules _____

_____

6 Previous course(s) (above 'A' level) _____

_____

7 Did your previous course included any modules that have looked at:

- Organisational change through the introduction of new technology ☐
- Organisational change for other reasons ☐
- Management of change in organisations ☐
- Managing people ☐
- Human computer interaction ☐

Any other relevant modules _____

_____

7 a) Have you worked full time before?

Yes ☐

No ☐ go to 8

JOB 1

b) Which company did you work for _____

c) How long did you work for them _____

d) In what capacity (brief description) _____

_____

_____

_____

e) What was the company's main area of work (brief description, e.g. supplying stationery to businesses) _____

_____

_____

_____

f) How many people did the company employ (approx.)

under 20 ❐ 20 to 100 ❐
101 to 500 ❐ over 500 ❐

JOB 2

b) Which company did you work for _____

c) How long did you work for them _____

d) In what capacity (brief description) _____

_____

_____

_____

e) What was the company's main area of work (brief description, e.g. supplying stationery to businesses) _____

_____

_____

_____

f) How many people did the company employ (approx.)

under 20 ❐ 20 to 100 ❐
101 to 500 ❐ over 500 ❐

8 a) Have you ever worked for the Royal Mail?

Yes ❐
No ❐ go to 9

b) How long did you work for them _____

c) In what capacity (brief description) _____

_____

_____

_____

9 How often do you use a computer:

a) at work?

- Never ☐
- Rarely ☐
- Frequently ☐

b) at home?

- Never ☐
- Rarely ☐
- Frequently ☐

THANK YOU

APPENDIX J:
FIS WORKSHOP RESULTS

Appendix J.1:	Example of Completed Checklist
Appendix J.2:	Comparison of the Average Number of Disadvantages per Question (Student vs RM)
Appendix J.3:	Comparison of the Average Number of 'No Change' per Question (Student vs RM)

APPENDIX J.1:

EXAMPLE OF COMPLETED CHECKLIST

DELIVERY REVISION: PROBABLE OUTCOMES

NAME SIDP4 ROLE Divisional Planner

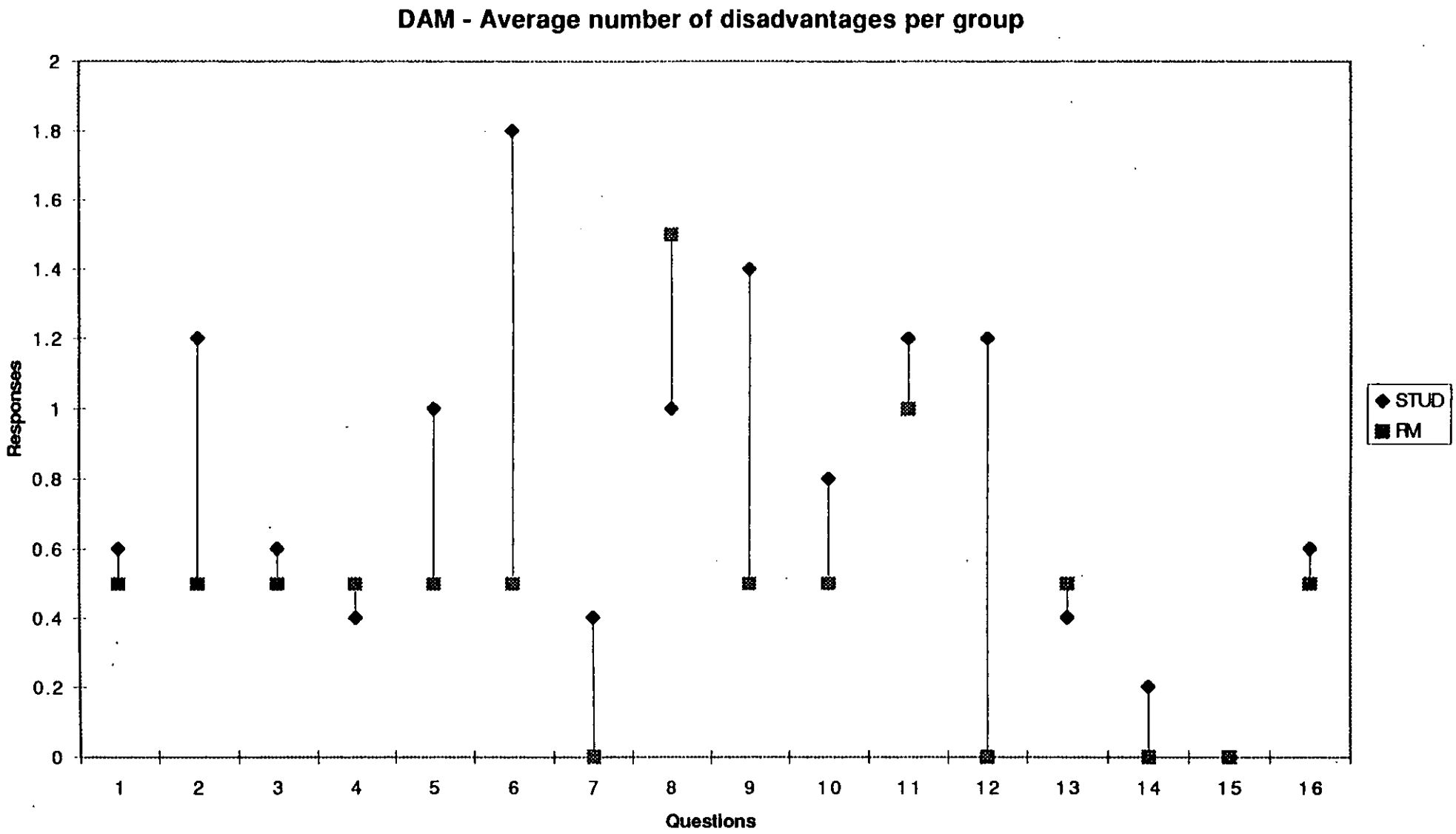
	CHANGE	BENEFIT +	COST -
TECHNOLOGY			
a. GIS	More accurate maps updated centrally	3	
	Updating may be slow and few personnel can do this		-1
	Only DP can use this - saves workup	2	
b. WES Number crunchers	Considerable benefit on number crunchers	3	
	Can't account for local conditions		2
	Saves time on measuring maps + more accurate	3	
c. Walk Optimiser	Can't account for local conditions (pathways)		2
	Can't account for differences in speed of different personnel		1
	Algorithm questionable		1
d. Report Facility Printouts	Useful for disputes - paper record	2	
	APs should be able to access reports		2
SPECIFIC TASKS			
A. Skills & effort	DP needs to be more skilled	2	
	Effort level may be higher	2	2
	High range of skill levels required from computer systems to sorting tasks	3	1
b. Work Pace & Load	Should be controlled by DP	3	
	Danger of bottle necks due to others efforts eg local knowledge of DOMS		-2
c. Satisfaction	Should be high - have power, autonomy, big computers on desk etc	3	
	May not like range of skills required		1
d. Resources	Have full access to computers	3	
	Have full access to requisition skill as required	3	

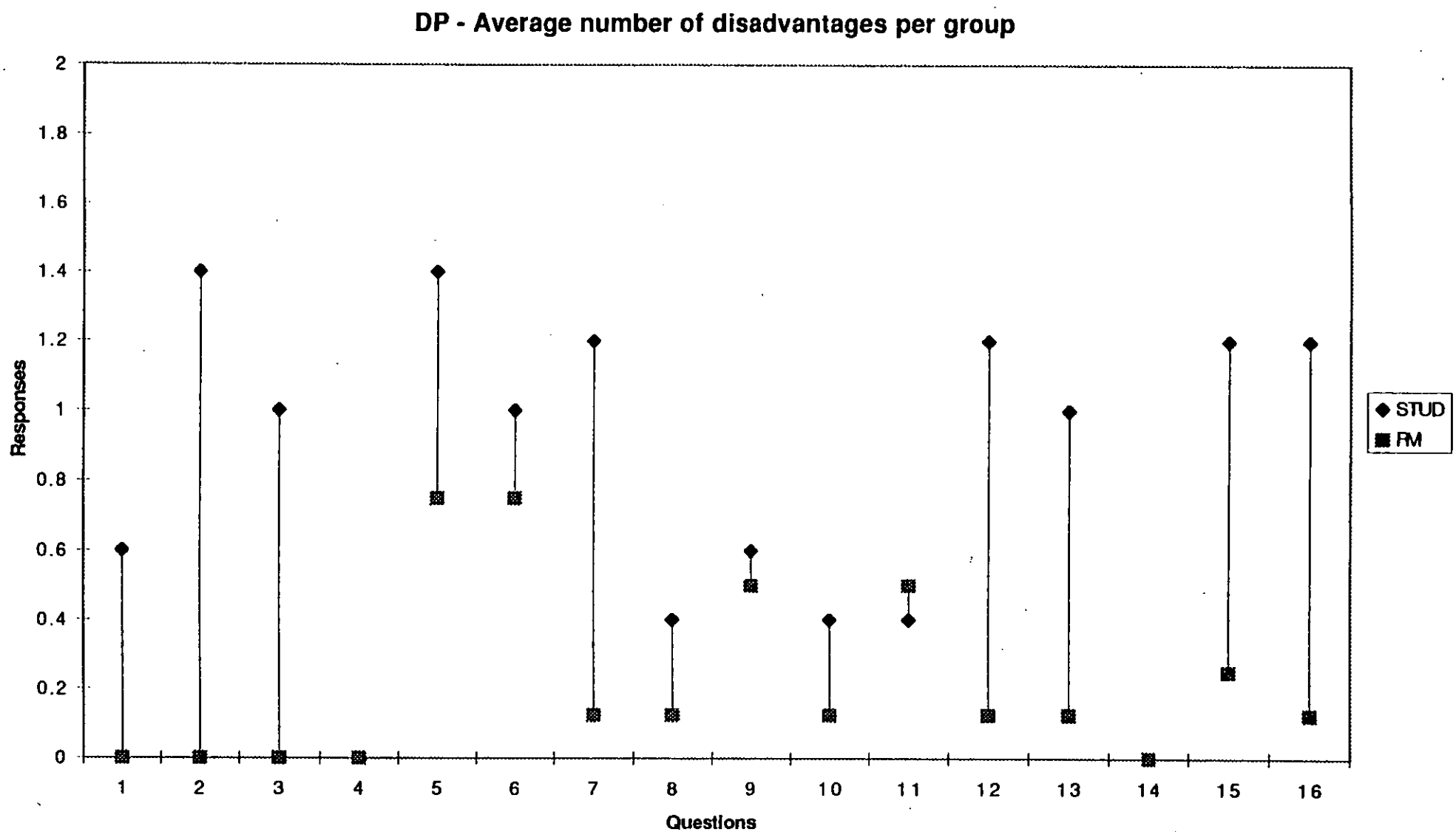
DELIVERY REVISION: PROBABLE OUTCOMES

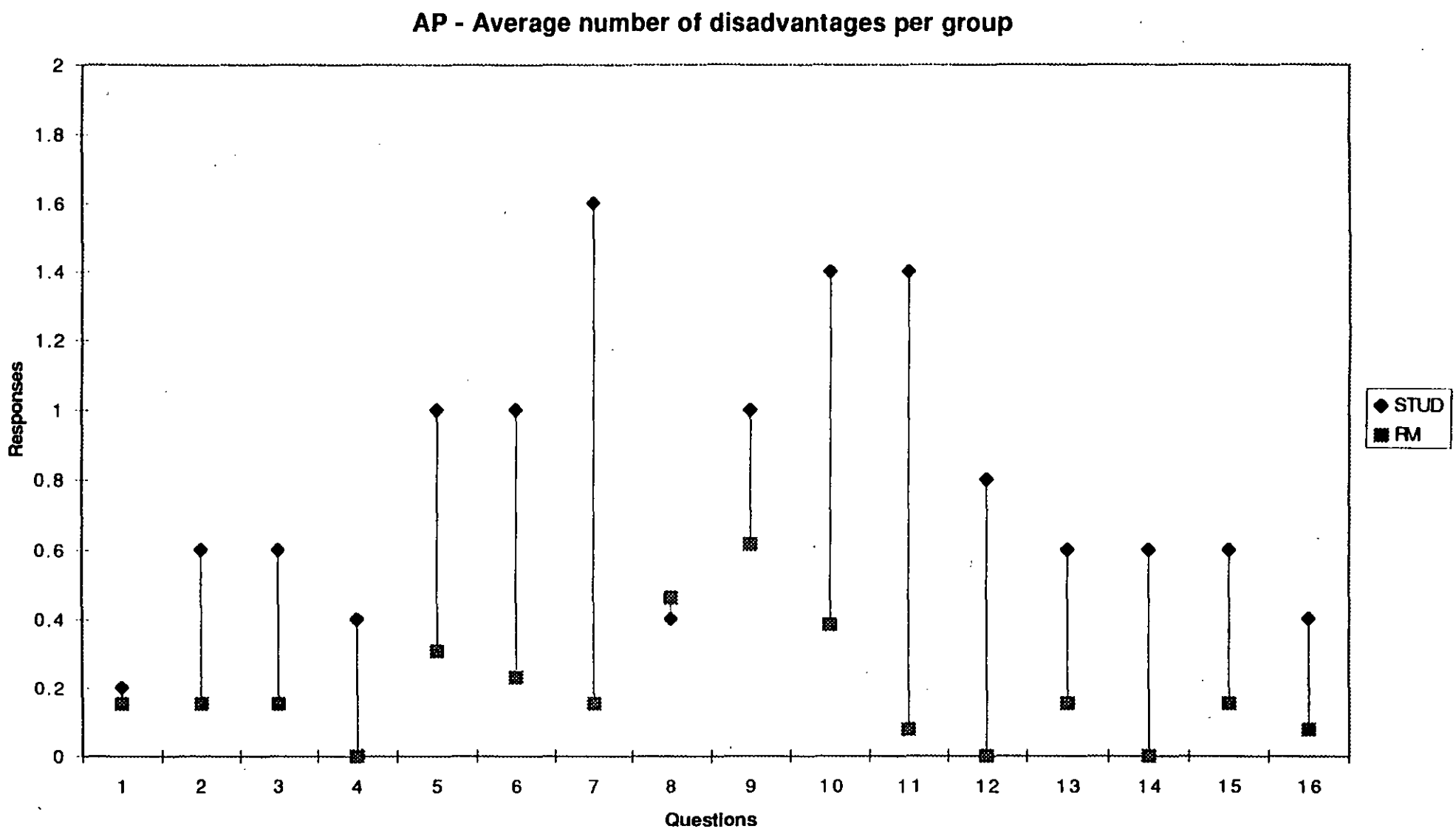
	CHANGE	BENEFIT +	COST -
THE OVERALL TASK a. Discretion & Control	DP has full control over planning AP has power reduced & more clearly defined	3 2	
b. Power & Influence	DP has full power & loads of influence If DP inefficient, major cockups possible if AM & AP not on the ball	3	2
c. Responsibilities	Plenty Problem of AP AM & DOM inefficient, will slow process & reduce efficiency of DP	3	3
d. Performance	Stressful, but performance should be okay Danger of local offices having a we don't do that this way attitude (Procedures should be centralised)	2.	2
PERSONNEL POLICIES a. Job Security	Presumably dependent upon performance primarily of self & secondarily of others	3	
b. Pay & Rewards	Job satisfaction high if allowed autonomy & discretion Travelling removes desk bound mentality (may be -ve effects as well)	3 3	2
c. Career & Prospects	Few prospects for advancement within same job specification as already seen Career should be good for DP	2	3
d. Industrial Relations	Severe danger of lack of communication between DP and others Severe danger of efficiency of system being curtailed by unions being bolstered		3 3

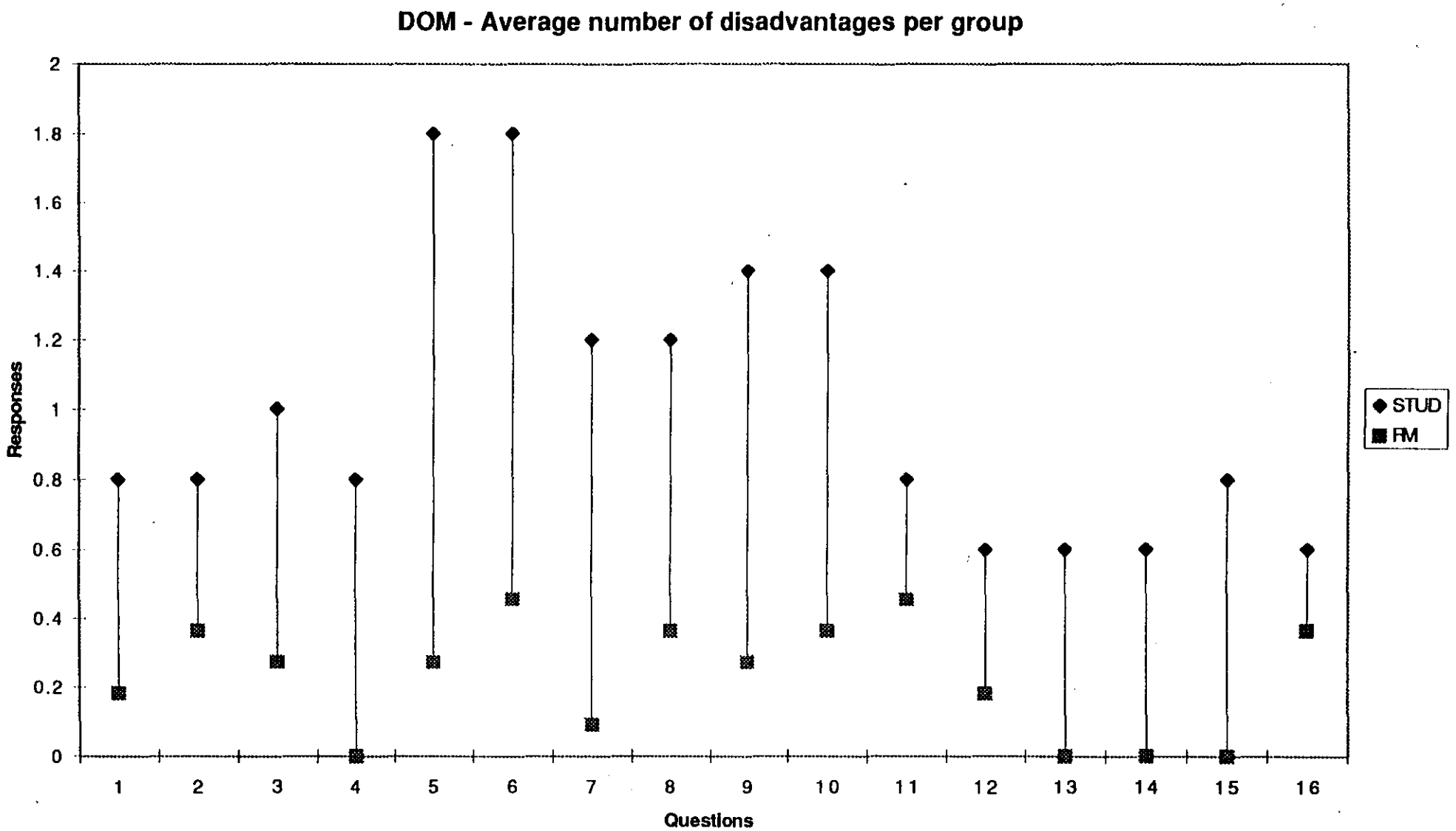
APPENDIX J.2:

COMPARISON OF THE AVERAGE NUMBER OF DISADVANTAGES PER QUESTION


DAM - Average number of disadvantages per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
RM

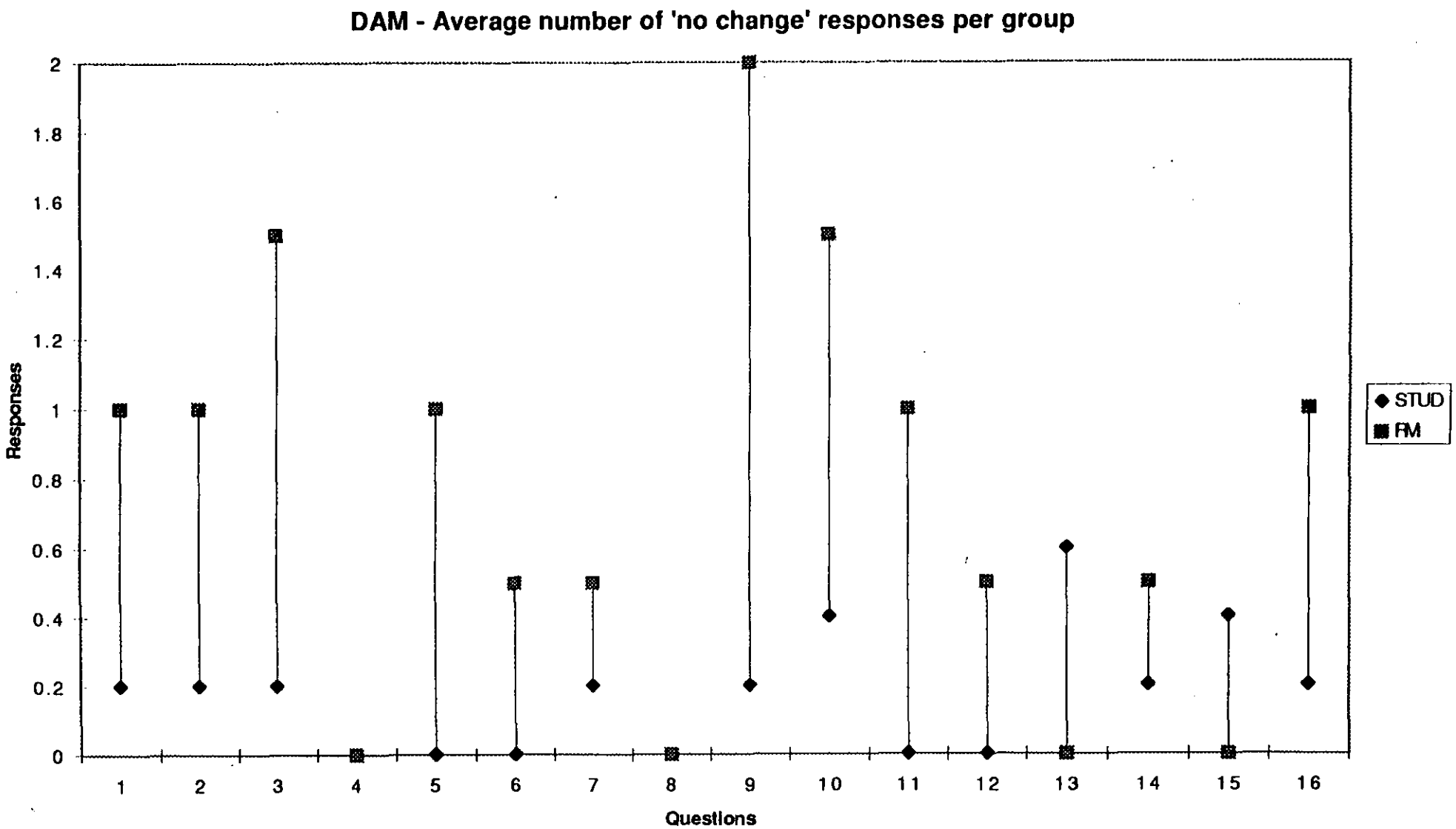

DP - Average number of disadvantages per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
RM

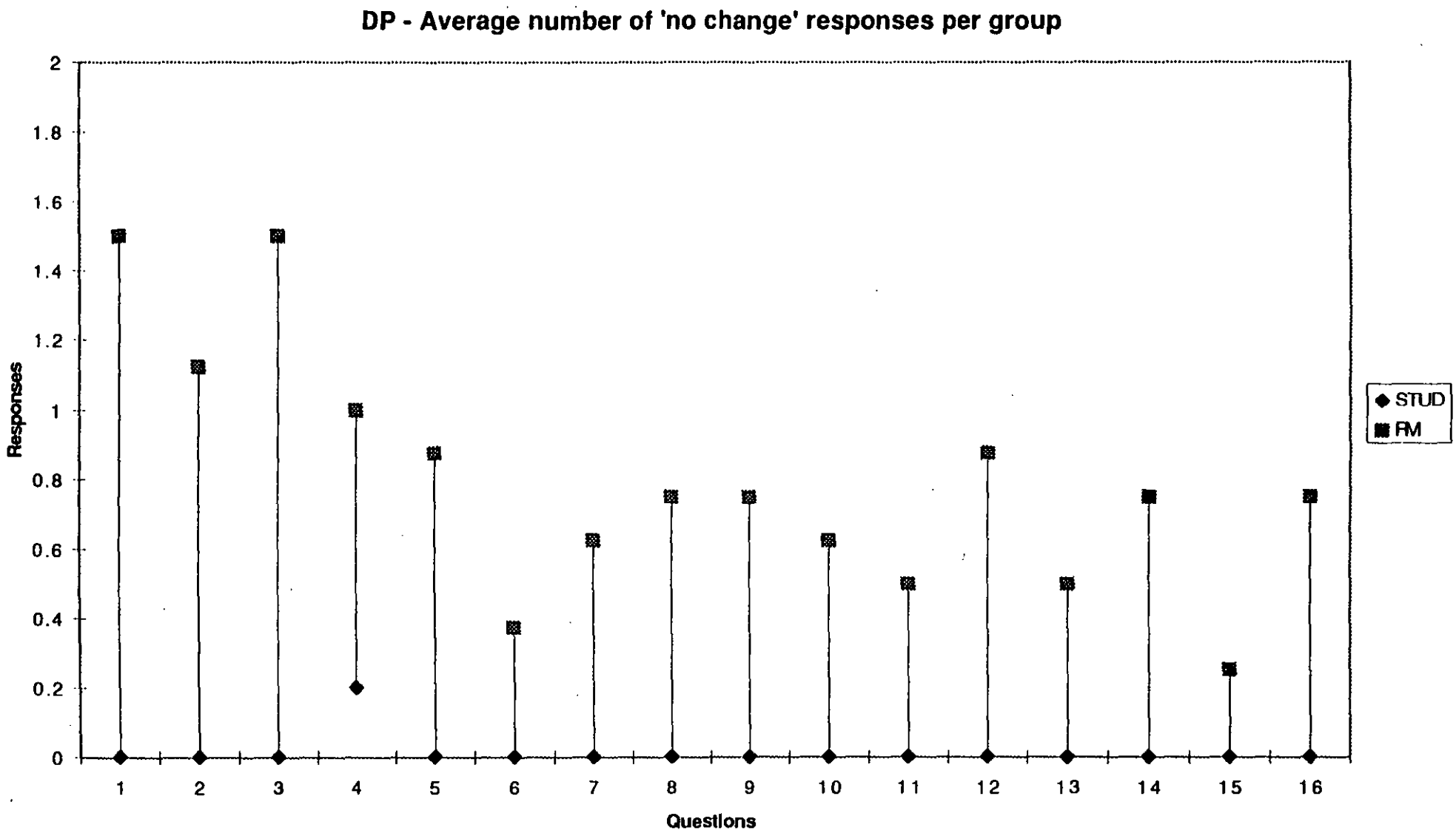

AP - Average number of disadvantages per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
RM

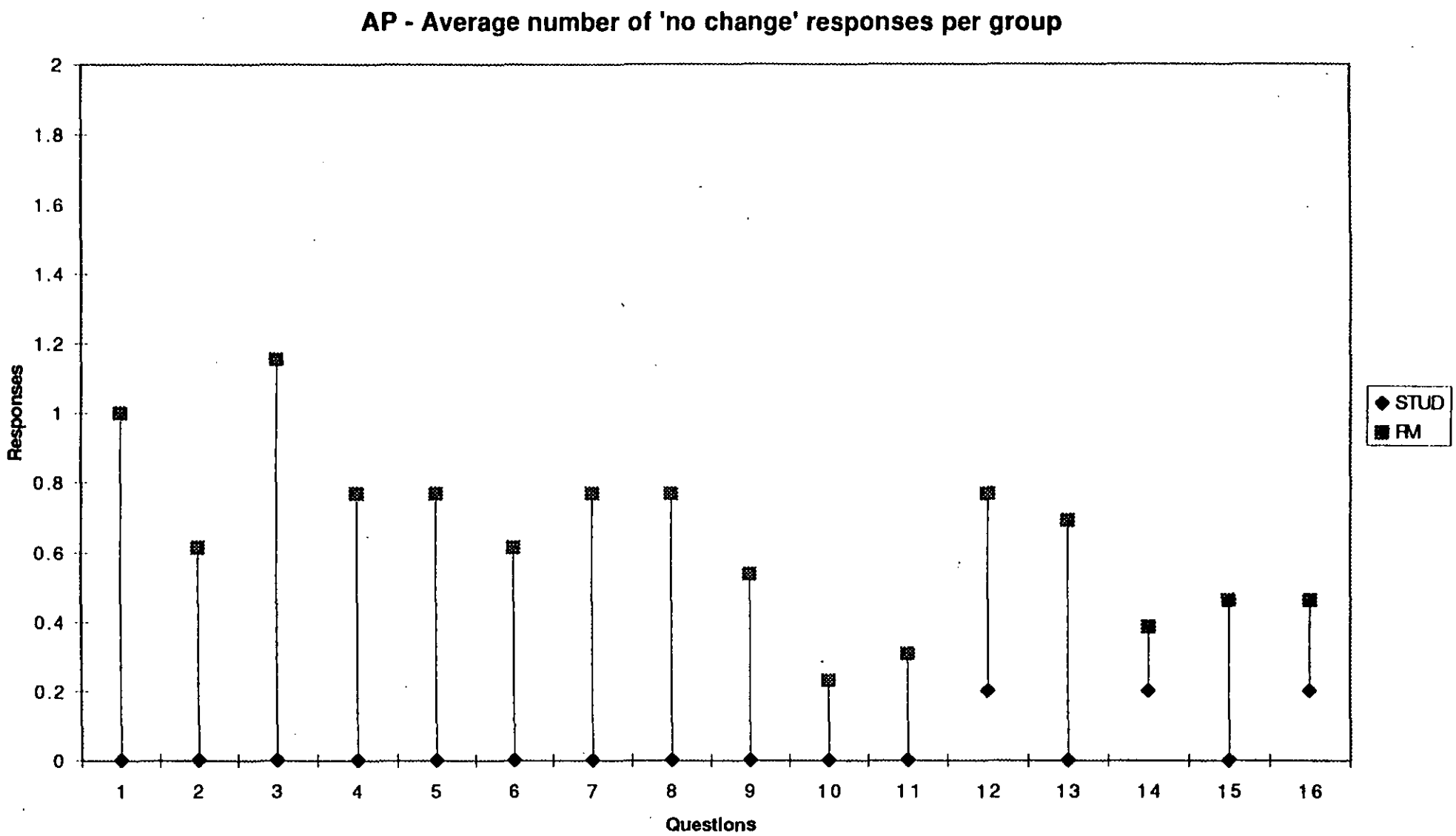

DOM - Average number of disadvantages per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
RM

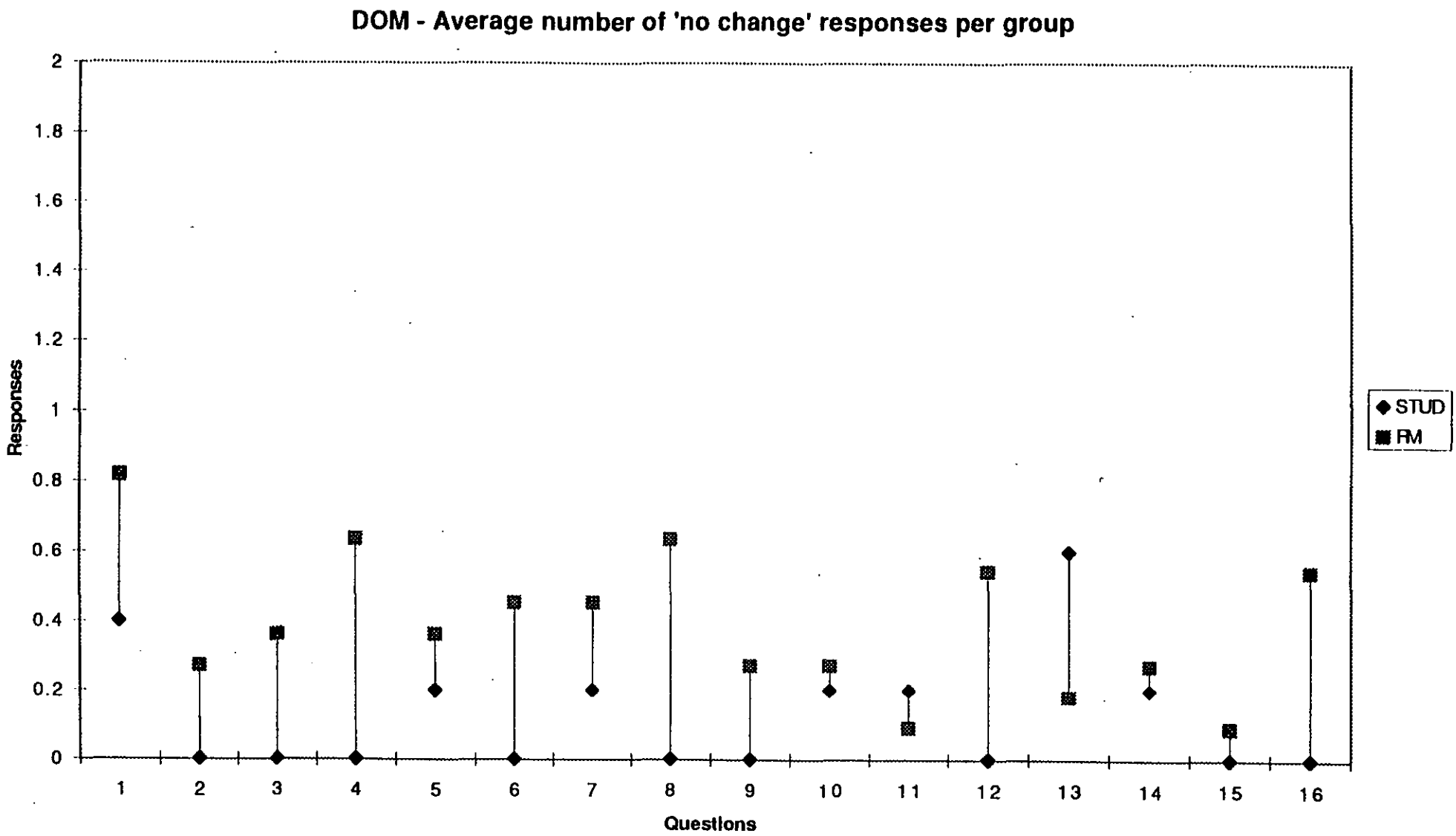
APPENDIX J.3:

COMPARISON OF THE AVERAGE NUMBER OF 'NO CHANGE' PER QUESTION


DAM - Average number of 'no change' responses per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
FM


DP - Average number of 'no change' responses per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
FM


AP - Average number of 'no change' responses per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
RM


DOM - Average number of 'no change' responses per group
Responses
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Questions
STUD
RM