

## APPENDIX 1 WORD LIST AND ABBREVIATIONS

Indian usage	General usage, other terms	Definition or description
	articulated	Also known as semi-trailer - a trailer with wheels at the back is pulled by a tractor which is similar to a short heavy truck.
	availability	The percentage of time that a vehicle or piece of equipment is in a serviceable condition and ready to be used.
chowki	muster station	Municipal office to which labourers report at the beginning and end of the day's work
colonies	housing estates	One or more multidwelling building(s) erected and managed by an organisation
conservancy	sanitation department	Originally concerned with the management wastes from bucket latrines, but now, as bucket latrines are phased out, conservancy departments are concerned with solid waste and cleaning of public toilets
crore		ten million (Rs 1 crore is roughly US\$ 300 000)
dumper-placer	container hoist truck, skip truck	Truck which lifts container off ground by means of chains, for transportation and emptying by tipping; container rests between lifting arms.
dumping ground	dump, tip	Place where solid waste is deposited as a final resting place, that is not controlled and where no attempt has been made to minimise pollution
dustbin	solid waste container	This term can be used for a wide range of types and sizes of waste containers in India, including masonry enclosures.
godown	warehouse, store	Used to describe warehouses of conventional construction, but also used for rough shelters used to store salvaged items that are to be recycled.
halalkhore	toilet cleaner	Responsible for cleaning excreta, not other types of solid waste, from toilets, roads or elsewhere
kabariwallah	Itinerant waste buyer	Person going door-to-door to buy clean materials such as newspaper or glass, that have been kept separate from the solid waste that is discarded
lakh, lac	one hundred thousand	Rs 1,00,000 is approximately US \$ 3000.
motor loaders	vehicle crew	Labourers who load waste into collection vehicles
mukadam	foreman	The lowest level of supervision, in charge of up to about 15 labourers, not expected to do manual work
nullah	drain	Usually an open, natural drainage path
pelletisation plant	RDF plant	Plant for producing cylindrical pellets of dried, combustible waste for use in boilers as a substitute for coal. (RDF = refuse-derived fuel)
peon		Lowest grade of administrative employee in administrative organisations
pipe bin		Enclosure for waste without floor made from a section of iron, steel or concrete pipe

Indian usage	General usage, other terms	Definition or description
rag-picker	scavenger	Man, woman or child who sorts through waste at a community storage point or disposal site, looking for items that can be sold, reused or recycled.
roll-off	hook lift, or arm roll, or roll-on, roll-off	Truck-mounted system for lifting containers onto the back of a flat-bed truck by a hydraulically-operated hook or by cables; containers are emptied by tipping.
scavenger	sweeper	Person responsible for emptying bucket latrines, street sweeper.
trolley bin	wheeled container	Steel, trough-like bins that roll on three steel wheels, capacity 1m <sup>3</sup> , emptied by hydraulic mechanism on compactor trucks (photograph 7)
wheel barrow	handcart	Also known as pushcart, here used to refer to a cart with two, three or four wheels, that is propelled by the effort of the labourer

### List of Abbreviations

AMC	Ahmedabad Municipal Corporation
BMC	See MCGM
BRC	Bulk refuse carriers - large trucks used to carry waste from a transfer station to a disposal point (Chapter B-1)
ESI	Employees' State Insurance
FRP	Fibre-reinforced plastic also known as glass fibre.
J.O.	Junior overseer - supervisor above the level of mukadam
MCGB	See MCGM
MCGM	Municipal Corporation of Greater Mumbai - the local government body responsible for running the City. During the time of the study the name <i>Bombay</i> was used, so the Corporation was known as MCGB. Before that it was known as BMC (Bombay Municipal Corporation). The current formal name for the MCGM is Brihan Mumbai Mahanagarpalika.
MTS	Mahalaxmi transfer station - the large split-level transfer facility in Mumbai (chapter B-1)
NEERI	National Environmental Engineering Research Institute, Nagpur
RMC	Rajkot Municipal Corporation, Gujarat
SI	Sanitary inspector - employee of the Health Department of a Municipal Corporation, with supervision responsibilities at the Ward level.
SSI	Sanitary Sub Inspector - under a Sanitary Inspector, also at Ward level.
STS	Small transfer station as described in chapter A-3

### Exchange rates

The value of the Rupee varied during the three years of study reported here, but an approximate exchange rate of Rs 30 to US\$ 1 gives a reasonable guide to the international value of the Rupee.

## APPENDIX 2 ACKNOWLEDGEMENTS AND LIST OF CONTRIBUTORS

The number of people who have helped with this compilation must be over one hundred. The contributions in this book arose from a series of courses running from 1993 to 1995, and many people contributed to the success of these courses in many ways. It is inevitable that some of those who played an important role in some activities leading to the production of this book are not included in the list below, and they are asked to accept my apologies. It is also difficult to rank the importance of the contribution of each member of the team that helped with this project, so no attempt at ranking the contributions is made; there is no significance in the order in which the names appear. It has been a remarkable fact that all concerned with the preparation of this book have been pleasant and helpful, so that I can truly say that it has been a great pleasure to work on this project. To all who have helped in any way, I am very grateful.

The material for this book was prepared while I was a staff member at the Water, Engineering and Development Centre, and so I pass on my sincere thanks to the whole WEDC team, but particularly to Professor John Pickford, OBE, who encouraged me to develop my interest in solid waste management, and who has provided so much inspiration and leadership over the years. My special thanks to Kathy Brown and Rowena Steele for all their hard work and secretarial support.

Each course had a component in UK and a component in India. Our "home" in India was the All India Institute of Local Self Government, in Mumbai, and Professor Sneha Palnitkar was the reason why the India components were so successful, valuable and enjoyable. Her talents as a team player helped us out time and again.

Manfred Scheu (currently working for GTZ in Gaza) played a major part in developing the courses, particularly the practical field work which led to the chapters of this book. His thoroughness, high standards, hard work and companionship are like a foundation to the whole exercise.

Manus Coffey made a valuable contribution throughout the programme, both in terms of his practical knowledge of waste management and his development of computer software, but in the 1995 course his contribution was much greater in that he was a tutor for the India component.

David Jackson has had an important "behind the scenes" role, encouraging the development of the course, providing valued lecture inputs and leaving the legacy of enriched understanding and attitude in the minds of many Indian engineers with whom he worked on his visits to India.

The Overseas Development Administration (now known as the Department for International Development) sponsored and administered the training programmes, and have generously funded the preparation of this book. The British Council has been heavily involved in co-ordination and organisation, and two allies in Delhi, whose consistent help has been much appreciated, are Dr G S Gujral and Leela Imam.

The course participants have, of course, played a very significant part in the preparation of this book. They came from a variety of backgrounds - engineers, administrators and scientists - and they all contributed to the experience of the course and to the knowledge that benefited all participants. It is they who collected most of the information within these pages, sometimes getting up early to be at a muster chowki before the crews arrived, or working in slum areas collecting all kinds of data, or spending days on unpleasant disposal sites, or collecting data in other ways, and then working under considerable time pressure to prepare a written report and a spoken presentation to pass on what they learned. It is unfortunate that (because of time constraints) it has not been possible to publish all of their work in this compilation, but the efforts and friendship of all of them are gratefully acknowledged. A list of the course participants (or study fellows) is presented on the next page.

Amongst participants from the series of courses, four stand out because of their ongoing contributions to training in Mumbai. They are G P Vora, M T Bondre, V K Rao and S A Bargir, all of the Municipal Corporation of Greater Mumbai. In spite of their heavy workloads and responsibilities they were always ready to share their knowledge and expertise with subsequent courses.

## Course Participants (Study Fellows) 1993 - 5

Most of the information presented in this publication was collected and written up by participants on training courses conducted in the period 1993 to 1995. The names of the course participants are shown below, according to the course they attended and showing the positions they held at the time they participated in the training programme.

Name	Position at the time of making the contribution
<b>1993</b>	
S A Bargir	Assistant Engineer, SWM, R&D section, MCGM
N Bandyopadhyay	Executive Engineer, Municipal Affairs Dept., Govt. of West Bengal
B Majhi	Public Health Engineer, Urban Development, Orissa
Dr C H Nagarabett	Medical Officer of Health, Bangalore City Corporation
Prof (Mrs) S A Palnitkar	Director, (International Relations/Research) All India Institute of Local Self Government, Mumbai; Course Co-ordinator
Mrs P R Singh	Assistant Appraisal Officer, HUDCO, New Delhi
G P Vora	Chief Engineer, (SWM), MCGM
K V Ramarao	Executive Engineer, PHED, Govt. of Andhra Pradesh
V S Rao	Municipal Engineer, M&PHED, Andhra Pradesh
Dr L S Reddy	Environmental Engineer, Andhra Pradesh Pollution Control Board
P S Pahade	Executive Engineer, MCGM
<b>1994</b>	
Dr D C Bhandari	Health Officer, Jaipur Municipal Corporation
J K Bhattacharyya	Scientist, SWM Division, NEERI
R S Chavan	Dy. Director General, All India Institute of Local Self Government, Baroda
Dr P K Makwana	Medical Officer of Health, Ahmedabad Municipal Corporation
R R Pal	Administrator, Dept. of Urban Development and Municipal Affairs, Goa
R Ramanathan	Superintending Engineer (SWM), Corporation of Madras
V P Rao	Addl. Dy. Commissioner/Administrator, Municipal Corporation, Delhi
A K Sarkar	Deputy Chief Engineer, Calcutta Municipal Corporation
T M Shantaram	Medical Officer of Health, Bangalore Municipal Corporation
N H Waghela	Deputy City Engineer, Rajkot Municipal Corporation
B B Uppal	Assistant Advisor (PHE), CPHEEO, Ministry of Urban Development
<b>1995</b>	
S Chatterjee	Assistant Advisor, PHE Section, Ministry of Urban Affairs and Employment
B M Desai	Municipal Engineer, Surat Municipal Corporation
A K Gurung	Divisional Engineer, PHED, Gangtok
J B Kagathara	City Engineer (Special), Rajkot Municipal Corporation
Dr S P Kulkarni	Additional Health Officer, Ahmedabad Municipal Corporation
Dr (Miss) G B M Mihsill	Health Officer, Shillong Municipal Board
Miss D J Mukhia	Under Secretary, Urban Development & Housing Dept., Sikkim
M Patel	Executive Engineer, Municipal Corporation, Baroda
V B Pawar	Ward Officer, F/N Ward, Mumbai
T K Raveendran	Secretary, Calicut Corporation
P Roychowdhry	Executive Engineer & Member, SWM Unit, CMDA, Calcutta
Mrs Jaiwanti Sheokand	Director, Local Bodies, Chandigarh

During the India components of the courses, we visited many sites and projects, mainly in Mumbai, but also in Ahmedabad, Rajkot and Pune, sometimes all together and sometimes as small teams. We met so many people were willing to spend time to explain, to show, and to pass on data and information, and the support of such people made the visits and investigations useful and stimulating.

Most of the visits were in Mumbai, mainly with the Municipal Corporation of Greater Mumbai, and to them we owe a huge debt of gratitude, not only for the visits, but also for the transport. In Ahmedabad we were treated to the best programme of site visits that I have ever experienced, and helped in many other ways by Mr P U Asnani, then Deputy Municipal Commissioner. In Pune the Deputy Medical Officer of Health, Dr R R Pardeshi, showed us many of the interesting developments in his city. Our time in Rajkot was special because of the hospitality and efforts of the Municipal Corporation, and the current and previous study fellows from the Rajkot Municipal Corporation.

Amongst those in Mumbai who helped us were (in alphabetical order):-

- Mr Barve, Assistant Engineer, Municipal Workshop
- Mr Chitale, Assistant Engineer, (SWM)
- Mr Gawali, Sub-engineer, Santa Cruz Garage
- Mr S V Parkale Sub-engineer, Prabhadevi Garage
- Mr Prajapati, Sub-engineer, (Bandra Garage)
- Mr J M Shetty, Assistant Engineer, Prabhadevi Garage
- Mr Shinde, Assistant Engineer, Santa Cruz Workshop
- Mr S L Soni, Executive Engineer, Santa Cruz Workshop
- Mr Thanekar, Junior Engineer, Bandra Garage

Two of the companies that provided valuable inputs to the courses were:

- Excel Industries Limited, [Dr S R Maley, Vice President (Bio-tech)]
- Western Pacques India Limited, [C L Kale, Executive Director]

Finally, there is one special person to whom I owe a great debt of gratitude - my wife Elisabeth - who has encouraged me in this work from beginning to end.

Adrian Coad  
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