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## We cash, on your trash

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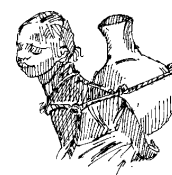
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## We cash, on your trash

C.H.A. Ratnam, South Africa

A SCAVENGER IS someone who searches for or finds useable objects at no cost, especially among waste. This is an innocuous definition. However when one talks about scavengers, some show sympathy, some squirm, but most act righteously. How should we accommodate scavengers. They are found at waste sites, in most parts of the world, specially in developing countries. In developing countries scavenging is a reality. We cannot wish them away. Is the dump environment any worse than conditions in some of the towns or settlements in developing countries? Some of the reasons for not wanting scavengers at landfill sites are:

- Exposure of people to diseases.
- Danger of people being injured by the machine working at the site.
- Death from eating contaminated food.
- Disruption of disposal operations.
- Moral guilt of people and governments.

At the 20th WEDC Conference a paper was presented on waste management carried out in an area embracing 4 towns. Seven existing uncontrolled dumping grounds were gradually transformed into 4 fully managed landfill sites, including 2 transfer stations and one parkland. cursory mention of scavengers and scavenging at these sites was made. This paper is a record of observations from March 1994 to February 1997 of the landfills and the effect of the scavengers at these sites. In the process of upgrading the landfills, the need to adhere to the government regulations, which are becoming more and more stringent, and addressing the presence of people at the landfill sites was considered with great concern. These people have been at the sites for several years extracting saleable items and making a living. On one hand the landfill has to satisfy the regulations, which does not encourage scavenging at landfills. On the other hand the moral obligation towards scavengers has to be considered. Stopping them would cut off their livelihood. This could turn them towards anti-social acts and crime, which is increasing in the country. Ignoring their presence would worsen their poor situation. To keep within the regulations all the technical requirements were adhered to. However, when it came to addressing the presence of scavengers ( or salvagers as we prefer to call them ) the following was carried out;

- A leader was identified among the group. He was to keep order among them and act as spokesman with the

site operator and to organise collection of wind blown items.

- Clean drinking water and toilet facilities were provided.
- Action was taken to provide health care to the salvagers and schooling for children at the sites. A mobile clinic visits the site once a week. A hut has been provided to be used as a class room. A catholic mission provides a teacher twice a week to teach both children and adults.
- Local welfare bodies have been requested to provide upliftment assistance.

### Transfer station at Mabopane

The existing 9 hectare waste site was a discarded quarry which was used for dumping without any proper management. It had to be closed as it had reached its capacity. Further it was polluting the river running alongside, and housing development had come close to the site.

As there was no suitable area at Mabopane for a new waste site, an acceptable solution was to transfer the waste to the Ga-Rankuwa landfill. The Mabopane site was transformed into a parkland, the river protected from pollution and a transfer station built. The total cost was R 2, 317, 876.00.

Uncompacted waste is delivered to the transfer station by numerous vehicles which vary in size and loading. The site operator maintains daily records of waste volume brought to site. The records of waste delivered to, and transferred from site, for a period of 36 months showed:

Total waste delivered to transfer station

=159, 480 m<sup>3</sup> ( before salvaging )

Waste transferred to Ga rankuwa landfill

=95, 400 m<sup>3</sup> ( after salvaging

i.e a steady loose volume of 4430 m<sup>3</sup> arriving and 2650 m<sup>3</sup> being transferred per month

Ratio of Transferred =  $\frac{95,400}{159,480} = 60\%$

Delivered

Therefore the loose volume as delivered to Mabopane is being reduced by 40% due to extraction of recyclable materials by the salvagers. The items retrieved from the waste are collected regularly by outside agents for which the salvagers are paid spot cash. Therefore no transport costs are incurred by salvagers. The average income of a group of two from sale of the salvaged items per month is as follows:

Metal Cans R 300, Plastic R 80, Cardboard R 90, Glass R 10, a total of R 480.

Some local market rates as at July 1997:

**Table 1.**

Items	Delivered cents / kg	Collected cents / kg
Al. cans	372	
Steel cans	34	10
Glass	15	3 to 6
Paper		
Any Mix	13	
Clean White	68	
Cardboard	20	5
Plastic		
Mixed	70	
Dirty, mixed		10

Glass hardly features in the above analysis, not because of payment rate, but because only small volumes are salvageable.

- 55, 000 Aluminium cans = 1 Tonne
- 25, 000 Steel cans = 1 Tonne

There are 140 people at this transfer station who cash (  $140/2 \times 480$  ) R 33,600 from (  $159\,480/36$  )  $4430\text{ m}^3$  of trash per month.

### Cost saving by salvagers

The actual cost of this operation for 36 months from March 1994 to February 1997 is as follows:

Operational cost	= R 2 284 384
Escalation for the period	= R 257 640
Value added tax ( VAT )	= R 355 884
Total Cost	= R 2 897 908

i. e. R 80 500/ month

Waste delivered =  $4430\text{ m}^3$ / month

Waste transported =  $2650\text{ m}^3$ / month

Amount extracted =  $1780\text{ m}^3$ / month

The handling and transporting cost for uncompacted waste volume of  $2650\text{ m}^3$  is R 80 500.

Cost saving due to volume reduction per month =  $80\,500 \times 1780 / 2650 = \text{R } 54,071$ .

This is due to reduction in disposal machine hours and reduced road transport costs.

### GA Rankuwa waste disposal site

The waste site is an active quarry. The worked out area has been used to dump waste without proper management. The cost of upgrading the site to an acceptable landfill was R 394, 609. The waste stream is similar to that at Mabopane transfer station and it could be assumed that this site also enjoys a 40% reduction of waste by volume by the 70 people present at site. Each group of two earns R 480/ month.

Earnings by scavengers/ month  
 $\text{R } 70/2 \times 480 = \text{R } 16,800$ .

### Cost saving by salvagers

Uncompacted waste to this site comes from:

- Mabopane transfer station ( salvaged ).
- Ga-rankuwa residential area ( unsalvaged ).
- Ga-rankuwa industrial area ( unsalvaged ).
- Mothutlung transfer station ( salvaged ).

Average waste delivered from Mabopane  
 =  $2650\text{ m}^3$ / month ( salvaged )

Average waste from Mothutlung  
 =  $800\text{ m}^3$ / month ( salvaged )

Total salvaged waste =  $3450\text{ m}^3$ / month

Average waste from residential area  
 =  $3270\text{ m}^3$ / month ( unsalvaged )

Average waste from industries  
 =  $1000\text{ m}^3$ / month ( unsalvaged )

Total un-salvaged waste =  $4270\text{ m}^3$ /month Waste extracted by salvagers from:

Residential waste  $40\% \times 3270 = 1308\text{ m}^3$ / month

Industrial waste  $20\% \times 1000 = 200\text{ m}^3$ / month

Total waste salvaged =  $1508\text{ m}^3$ / month

It was observed that industrial waste had less materials to be salvaged. Waste tending to be in the toxic range, like treated leather shavings, are disposed of in a dedicated area and handled separately.

Actual cost of this operation for the 36 months from March 1994 to February 1997:

Operational cost	= R 1 573 299
Escalation for the period	= R 177 442
VAT	= R 245 104
TOTAL	= R 1 995 845

i. e = R 55, 440/ month

Total uncompacted waste delivered to site per month;

From Mabopane =  $2650\text{ m}^3$

From Mothutlung =  $800\text{ m}^3$

Residential waste =  $3270\text{ m}^3$

From industries =  $1000\text{ m}^3$

Total =  $7720\text{ m}^3$

Extracted by salvagers =  $1508\text{ m}^3$

Volume to be compacted =  $6212\text{ m}^3$

Total saving due to volume reduction  
 =  $55\,440 \times 1508 / 6212 = \text{R } 13\,458$  / month

Assume  $1\text{ m}^3$  of loose waste is compressed to  $0.6\text{ m}^3$  of compacted waste ( 60% ). Assume 100 mm of compacted cover material for every 500 mm of compacted waste ( 20% ).

Loose volume to be compacted =  $6212\text{ m}^3$

Compacted volume  $0.6 \times 6212 = 3727\text{ m}^3$

Compacted cover material  
 $0.2 \times 3727 = 745\text{ m}^3$

Total =  $4472\text{ m}^3$

If no salvaging has taken place the total loose waste delivered to this landfill per month would be:

From Mabopane =  $4430\text{ m}^3$

Ga-rankuwa residential area =  $3270\text{ m}^3$

Industrial area =  $1000\text{ m}^3$

Mothutlung transfer station =  $1333\text{ m}^3$

Total = 10033 m<sup>3</sup>

Therefore the compacted waste volume would be  
60% x 10033 = 6020 m<sup>3</sup>

Cover material would be

20% x 6020 = 1204 m<sup>3</sup>

Total = 7224 m<sup>3</sup>

The current rate of deposition is 4472 m<sup>3</sup> per month of waste plus cover material

The average cost of providing 1 m<sup>3</sup> of airspace is about R 10.00 (in soft material).

Therefore the cost saving due to reduction of airspace  
(7224 - 4472) = 2752 m<sup>3</sup> x R 10.

= R 27520 / month

Airspace reduction has increased life span of the landfill  
by 7224 / 4472 = 1.62 times i.e. 62 %

Total volume extracted by salvagers from waste to Ga-rankuwa landfill site

At Mabopane = 1780 m<sup>3</sup>

At Mothutlung = 533 m<sup>3</sup>

At Ga Rankuwa residential = 1308 m<sup>3</sup>

At Ga-Rankuwa Industrial = 200 m<sup>3</sup>

Total = 3821 m<sup>3</sup>

The effective operational cost saving at this site is

55440 x 3821 / 6212 = R 34101

### Kudube waste disposal site

This started as an intended waste disposal site. It was based on the classical trench system. The disposal was disorganised and un-managed with burning of incoming waste and irregular compaction and covering. The cost of upgrading the site was R 413, 537. 00

Here a group of 50 people carry out salvaging in a disciplined manner under the control of the landfill operator. Their salvaged goods are safely stored inside the security fence of the site. The extraction and earning are similar to the other sites as described above. Earnings of salvagers per month = 50/2 x R 480 = R 12 000

The delivery of waste to site was recorded for 40 months which showed that at the start the site received 6000 m<sup>3</sup> of loose waste. This reduced to 3100 m<sup>3</sup> loose waste within the first four months of operation And in the next five months to 2200 m<sup>3</sup> per month. This could be that initially waste accumulated in the town was brought in.

### Cost saving by salvagers

Loose waste per month = 2205 m<sup>3</sup>

Extracted by salvagers = 882 m<sup>3</sup>

Loose waste to be compacted = 1323 m<sup>3</sup>

Actual cost of this operation for 36 months from March 1994 to February 1997 is as follows:

Operational cost = R 1 098 460

Escalation for this period = R 123 888

VAT = R 171 129

Total = R 1 393 477

i. e. R 38 708 / month

Handling and compacting cost for loose waste volume of

1323 m<sup>3</sup> is R 38 708 per month

Cost saving due to volume reduction

= R 38 708 x 882 / 1323 = R 25805 month

If there were no salvagers the volume of waste and cover material compacted would be :

Compacted waste 60% x 2205 = 1323 m<sup>3</sup>

Cover material 20% x 1323 = 265 m<sup>3</sup>

Total = 1588 m<sup>3</sup>

Actual waste compacted 0.6 x 1323 = 794 m<sup>3</sup>

Cover material compacted 0.2 x 794 = 159 m<sup>3</sup>

Total compacted = 953 m<sup>3</sup>

Saving due to airspace reduction (1588 - 953)

= 635 x 10. = R 6350.

Increase in life span of landfill due to reduction of airspace is 1588 / 953 = 1.67 times i.e. 67 %

In addition to normal waste, food from a nearby luxury hotel/ gambling resort including numerous restaurants and fast food outlets are brought to the landfill. Upon investigation it was found this food was rarely "older" than 8 to 12 hours, and consequently had not deteriorated into a health hazard. However the food comes mixed with other items and was dumped with the rest of the waste. The luxury hotel was contacted to separate the food from the rest. This they complied with. Further, the food is separated before disposal and the leader is responsible for orderly distribution.

The saving at Ga-rankuwa and Kudube landfills are due to:

- Reduced machine hours.
- Reduction in volume of cover material.
- Reduction in landfill volume.

The effect of salvagers on the landfill/ transfer stations is shown in the table below. It could be concluded that in developing countries having salvagers at landfill sites is an advantage. However, it is important that they become part of the operation and their welfare is looked after. As in this instance there has not been an accident and the people are happier than before upgrading the operations of waste management.

Table 2.

	Earnings by salvagers	Savings to Due Reduced Waste Volume	Savings Due to Reduced Airspace of landfills	Life Extension of landfills %
	R/month	R/month	R/month	
Mabopane	33600	54000		
Ga rankuwa	16800	13458	27520	62
Kudube	12000	25805	6350	67

It is a duty of the owners of the landfill to improve the conditions under which the salvagers work such as providing facilities like drinking water, toilets, health care and education. The local councils should encourage recycling entrepreneurs to have a contract with the salvagers and could then be requested to provide better working conditions such as providing protective clothing boots, masks and others facilities including health education. Where possible government should assist to deploy them elsewhere.

### **Acknowledgement**

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1 US\$ = R 3.65 (1994) = R 6.00 (1999)

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