

## TASKS FOR ITDG KENYA

### 1 Introduction

Questions were asked and answers obtained as follows:

### 2 General Information

- Pay levels (in Kshs per week, month or year - state which)

- Labourers

2,800

- < Junior Managers

5,000

- < Graduate Engineers

15,000

- X Unemployment %

80 – 90%

- Rainfall statistics for Nairobi area

Monthly Totals of Rainfall (mm) (1996 – 1998)

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1996	9.0	43.1	134.0	125.4	121.0	81.6	76.4	21.7	21.2	1.0	213.7	Nil
1997	Nil	Nil	Nil	292.6	110.3	26.6	12.1	7.0	Nil	67.8	167.8	54.0
1998	183.5	171.6	12.9	90.7	336.9	53.0	15.5	16.1	23.2	3.0	37.8	69.5

*Source: Department of Meteorology, Meteorology Observatory*

- List of major industries in Kenya

They include East African Industries, Bidco Oil Company, Tea/Coffee, Firestone, cement industries, manufacturing

- Materials availability - can these materials be easily obtained?

- < Mild steel - angle, channel, tube, sheet, plate

Readily available

- < Stainless steel

Readily available

- < Electrical motors and switchgear

Readily available

- < Refractory materials

Not readily available

### 3 The Incinerator Manufacturer

A British group of companies, Marshall Fowler Group makes and sells the incinerator. The contact person is the General Manager, Mr. Mutizo.

- What kind of incinerators does he make/sell?

- < Size range

The incinerator is capable of holding 0 – 300 tons of waste per day.

< Materials incinerated  
Materials are generally hospital and municipal wastes.

< Operating temperature  
It operates at a temperature of about 500 - 800<sup>0</sup> C

< Do they have afterburners?  
No, they do not have afterburners.

< How is ash removed (automatic/manual)?  
The ash removal is both automatic and manual.

Does he do his own design?  
Yes

Can we see some specifications/designs (these could be faxed to me)?  
Yes

What does he think of our project?  
He thought that the project is a good one.

Would he like to participate - i.e. build (he would be paid) and even help with design (he probably wouldn't be paid)  
Yes

Is he interested in marketing the product, if it is successful?  
Yes

Would he be prepared to invest some of his time in the development of the plant at his own cost?  
Yes

What does he think the problem with the Bata incinerator is? (I expect he'll say that they don't operate it correctly - and he may be right)  
The manufacturer designed and constructed only part of it.

How many plants does he sell per year?  
In one year, he sells 0 – 12 incinerators per year.

What else does he manufacture?  
He also manufactures equipment for the tea and coffee factories as well as water treatment equipment.

What is his annual turnover?  
100 Million

Is he financially sound?  
Yes

What kind of a guy is he?  
He looked and sounded good.

Anything else you can think of  
The incinerator is for the City Council and it situated at the Karura Forest

- Take a photo or two of his equipment, scan it and send it to me

#### 4 National Environmental Action Plan

I understand that one exists. Presumably Munene will know about it.

X What objectives have been set for Municipal Solid Waste.

X Has anything been done to meet them?

#### 5 Environmental Management Act

Get a copy, if it is published

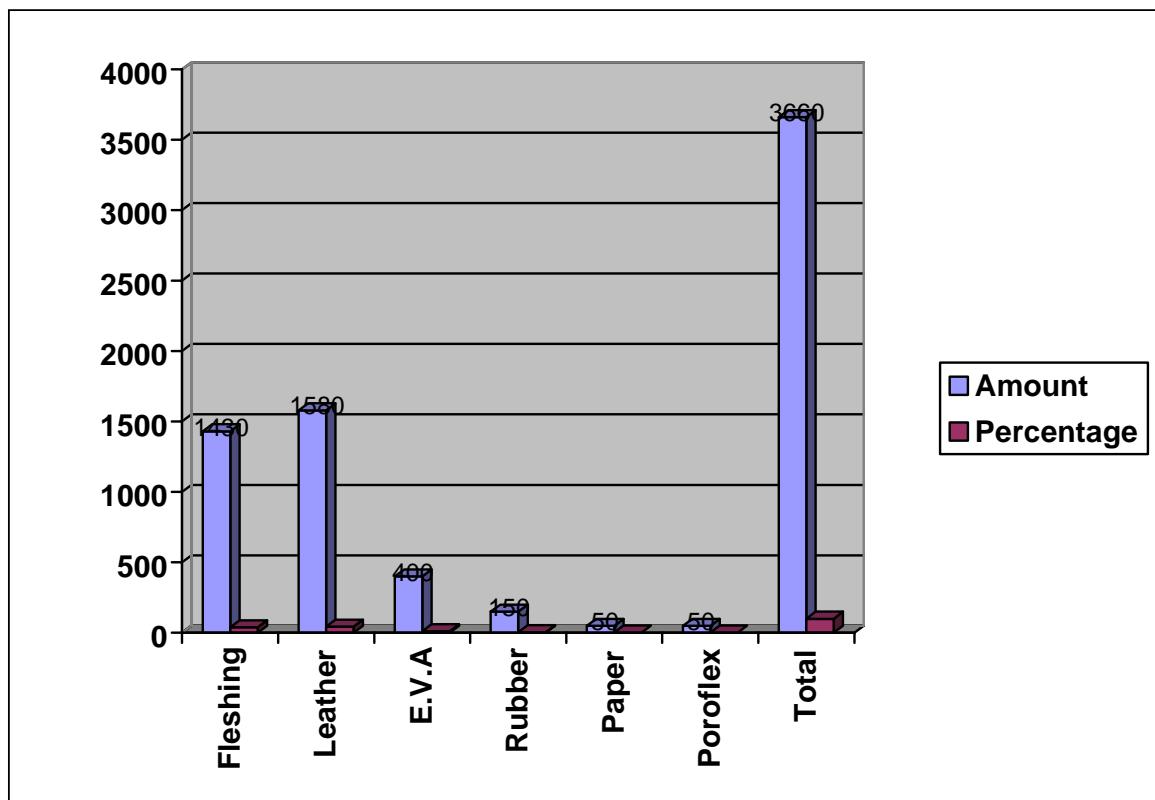
#### 6 Bata Incinerator

- What they think of the proposed project

They think that the project is a good one.

- Types and quantities of waste incinerated

There is about 50% paper, 35% leather and about 10% rubber.



- Reasons for the scrubber

The scrubber removes the smell, sulphur and nitrogen oxides as well as the particulates.

- Operating temperature

It operates at a temperature of about 500 – 800<sup>0</sup> C

- How many operatives?

There are four operatives.

- How many shifts does it operate? (i.e. is it operating 24 hrs a day or fired up each day?)  
It operates two shifts.
- Do they wait for it to reach operating temperature before putting the waste in? Yes
- Emissions measurements
- Reasons why it was closed down and the causes  
The community around complained of too much smoke and corrosion of iron sheets
- What are they doing about it?  
They have been working on improving the scrubbing as well as the loading technique which is now complete.
- Would they be interested in letting us burn their waste?  
Yes
- If so, how much of their waste would not be suitable for a plant without a scrubber?  
60%
- Would the fact that it would be located in the forest help solve this problem?  
No
- If our plant was to burn their waste, could they help by providing labour to operate our plant?  
It is negotiable
- Could they help in any other way?  
They could help in giving ideas for the design. The Chief Engineer of Bata Mr. Munga is willing to participate.
- Get some pictures of the plant

## 7 **Limuru**

- What is the population?  
According to the 1989 census, it had a population of 300,000 that was increasing at a rate of 2%.
- Are the senior officials interested in our project?  
Yes
- Would they make land available at the dumpsite?  
Yes, this would come from the forest department.
- Would they provide two or more labourers (four is ideal) to sort a load of waste? This will probably take two days.  
Yes
- If we constructed a plant for them, could they provide (and pay for) the necessary labour?  
This might be three or four men - one of which would be a working foreman with a reasonable level of education. It might have to work shifts too - but perhaps we shouldn't mention this at this stage.  
Yes

- Has Limuru got a sewage treatment works?  
Yes

## 8 Waste Analysis at Limuru

Take one load on the tipper on a Monday and analyse it. The methodology is shown on the next sheet.

### METHODOLOGY FOR MSW COMPOSITION ANALYSIS

**Equipment required:** Platform scale, rakes, protective clothing, woven polypropylene sacks, sieve of gauge ~10mm (e.g. a garden sieve), a bucket to drain liquids from bottles and other containers.

**Staff required:** At least 2 men plus a supervisor from ITDG.

#### Method:

Unload the truck onto a clean, dry, level soil or grass surface. The analysis should be done on a dry day, when rain is not forecast.

Each of the personnel should be provided with gloves, boots and overalls.

The emptied pile of waste should be levelled to a depth of 0.6m and larger items removed. Items of the following categories should be placed in sacks, preferably of woven polypropylene, and weighed on a platform scale of 100-200Kg capacity, ideally reading to 0.2Kg or better:

Type of Waste	Wgt (Kgs)	%	
Food waste and vegetable matter	1.5		9
Paper	0.75	5	
Cardboard	2.5	16	
Plastic film	1.25	8	
Other plastics (e.g. bottles)	2.5	16	
Textiles	2.25	14	
Wood	0.5	3	
Leather and Rubber	1	6	
Glass	2	13	
Metal cans	0.5	3	
Bones and horns	0.5	3	
Sisal		0	
Hair pieces	0.1	1	
Other metals	0.5	3	
Fines i.e. dust etc.			
Liquids			
Total	15.85	100	

After picking over the pile the remaining material should be raked into a pile of 0.4 m depth and the hand picking process repeated. The pile should then be raked to a depth of 0.2m and a final hand picking undertaken.

Bottles containing liquid (if any) should be emptied into a container which is weighed empty and full to calculate the weight of liquid.

The pile should then be thoroughly mixed, build into a pile and divided into quarters, taking 2 opposite quarters to provide a sub-sample for analysis down to approximately 10mm. This can be achieved by sieving. The sub-sample should then be separated to remove paper, plastics and food waste which can be separately weighed. The remainder of fines (dust, soil etc.) and any other unclassified matter should then also be weighed.

It is important to record the total weight of the entire sample, as this is needed to assess the total quantity of waste.