

## **CONSTRUCTION WASTE, AN OPPORTUNITY FOR PROFIT?**

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### **SUMMARY**

The paper covers the detail retrieved from a landfill site survey. The construction wastes which are deposited on such sites have potential profit. These materials, if quantified, could be liberated and then reused or recycled. The text highlights the detail of the study and examines the implications of extracting the materials economically. The text also considers the implications of the new landfill tax in the UK and the associated problems facing the landfill operators. Both the survey detail and the new landfill tax provide the impetus for maximisation of profit from the landfill business. A plan to exploit this potential, using existing knowledge and experiences with reuse and recycling will be discussed.

**KEYWORDS:** Landfill, waste, construction, survey, reuse, recycle.

### **INTRODUCTION**

Construction waste which at present is placed into UK. landfill sites may change in character over the next few years, due to the implementation of the new Landfill Tax in October 1996. From this date the UK. Construction Industry is faced with another increase in cost. This will force the Construction Industry to examine and identify which materials are being disposed of on their sites, in what quantity and at what cost.

The questions which arise from this are, Could a contractor reduce the amount of waste he creates? What is the potential of construction waste material? Could waste be identified and reduced before it gets to the landfill site? Could the waste material be reprocessed after delivery to the landfill site into a new resource?

Whatever the process adopted, this is where the dilemma starts for many UK. landfill companies. Do the landfill operators pay the Customs and Excise Duty and continue to fill diminishing landfill space or exploit the potential of recycling by a capital injection into the company to expand their business.

### **CONSTRUCTION WASTE SURVEY**

A detailed construction waste survey has attempted to identify and evaluate quantities of waste being disposed of by builders and contractors in the Greater Nottingham area [1].

The objective of the survey was to identify the smaller components of the waste stream, quantify if possible, suggest whether the material could be reused, recycled or, as at present, thrown away into the landfill site, suggest potential markets for the recyclable fraction of the waste and place some valuation on the waste material as a cost and as a saleable product.

This landfill survey, has identified in detail the types of materials that the UK. Construction Industry is disposing of daily. It has also considered what material was being thrown away by the 'DIY' (Do-it-yourself) market at the week-ends at household recycling centre as this waste too ends its life at the same landfill sites.

The results of the survey showed that there were over one hundred identifiable products discarded in the skips which had been examined, in the month of June 1995, see Figure 1. The total tonnage examined in the survey was approximately 770 tonnes from approximately 10,500 tonnes arriving on the sites in the weeks of the survey.

There were several kinds of error present in the final data. Various assumption had to be made when weighing facilities were not

available on the landfill sites, densities of materials were used and these were listed in the report. This could inflate the smaller items of materials in the extrapolation of annual tonnages.

The survey identified the wastes not considered in detail in previous surveys, Howard Humphreys 1994 [2] and CIRIA SP 122, 1995 [3]. The data expands these surveys which have provided bulk quantities to the waste minimisation and secondary materials sources data in line with UK. Government objectives. This new data provides the more valuable material detail which will allow the Construction Industry to see what it is actually wasting and assess its cost and potential loss in terms of profit.

The material varied, see chart 1, from soils to bricks to broken concrete, all of which could be recycled[4], to boxes of nails and packet of bricks which had hardly been used. Timber seemed to be in abundance, which because of its shape and size, filled the skips disproportionately and increased the cost of disposal.

The detail in Figure 1 shows the materials as a proportion of the waste surveyed. The potential is there in the detail, which should be examined and extrapolated into annual tonnages. If these potential annual figures prove to be acceptable, materials could be sorted, recycled and marketed at landfill sites.

Construction companies can analyse the data and examine where and why the waste occurs and attempt to eliminate the cost. This saving should then be reflected in future contracts for those companies.

The photographs show a tipped skip on arrival at the landfill site with the material sorted into piles.. The reusable material cost was calculated as £201.00 [6] plus the skip at a cost of £60.00 [5](weighed 6.795 tonnes), a total cost to the contractor of £261.00 or £38.41 per tonne of waste. This cost has to come from the items of "waste disposal" and, in part, by the "waste factor" used in the estimate of the contract price [7]. If this occurs on site several times a day or week, the total cost could be exorbitant.

This should be compared, with waste management in other European countries, where recycling as an industry has been in existence for several decades, to different degrees in each country [10]. These countries have had to answer the same questions, cannot the UK learn from their experiences?

Beyond Europe these types of waste hardly exist, due to the salvaging or reuse processes. Alternatively waste is found on a very large scale due to dereliction, war or natural disasters [11].

The landfill survey also indicated the utilisation of the skips by building sites. The survey showed that skips delivered to the landfill sites were fuller at the beginning of a week (D-I-Y week-end work?) and emptier by the end. The average weight for a skip of mixed materials (4.865 tonnes) was just over half its capacity (8.000 tonnes).

If this is related to the new Landfill Tax then contractors will find themselves paying the highest tax, £7.00 per tonne, for this type of skip to be emptied. On average £34.05 extra per skip. The inert or inactive materials will be charged at £2.00 per tonne [9]. On average £9.73 per skip. Alternatively an average tax rate may be negotiated with Customs and Excise for all types of waste loads.

**Figure 1. Waste Survey Results from sites in the Nottingham area.**

*Inert materials - Inactive in water.*

	Percentage		percentages
Soil / dirt	36.0	Mortar	0.75
Concrete pieces	18.0	Aluminium	0.37
Asphalt	6.81	Metal straps	0.10
Common bricks	3.34	Manhole covers	0.10
Concrete slab pieces	3.06	Kerbs	0.10
<i>Inert material cont.:</i>			
Facing bricks	1.38	Stone gullies	0.05
Stone	1.20	Stone paving	0.00
Concrete paviers	1.19	Precast paving	0.00
Clay tiles	1.02	Cement (hard)	0.05
Steel sections small pieces	0.82	Plaster	0.025
Aggregates	0.75	Sand	0.025

Engineering bricks 0.75

***Non-Inert materials - Active in water.***

Timber soft wood	6.40	Fibre board	0.10
Ash	1.50	Electric cable	
Paper	1.20	Corrugated sheets metal	
Colliery Waste	1.19	Steel lintels	
Domestic waste	1.19	Washing machines	
Plastic waste	1.12	Concrete lintel	
Plastic pipes	0.92	Window frames	
Hardboard	0.90	Electric fittings	
Chipboard	0.89	Mattress	
Plywood	0.50	Plastic skirting	
Steel Reinforcement		Glass panes	
Textiles		Nails	0.05
Paint		toilet fittings	
Cardboard		Carpet	
Clay drains		Door frames	
Plastic drain pipes		Stainless steel	
Clay blocks		Polystyrene sheets	
Plaster board		Chain fence	
Doors	0.25	Vinyl floor	0.01
Insulation		Plastic gutter	
Sarking felt		Rubber sheets	
Slate		Wire fence	
Asbestos pieces		Carpet tiles	
glass	0.20	Wall ties	
Ceiling tiles		Joist hangers	
Scaffolding	0.10	Galvanised steel	
Fibre glass			

***Items weighing less than 0.01 of a percent.***

Toilet seats	Pipe insulation	Soffit vents
Venetian blinds	Shovels	Valley Trim
Saw	Wheel barrows	W.C. pan
Lead pipe	Oil drums	Wall tiles
Shelving	Copper fittings	Cutting discs
Adhesive tube full	Rollers	Wallpaper
Screws	Eaves combs	Car parts
Damp proof felt	Mastic tube full	Floor tile clay
Hose pipes	Guillotine	Double glazed units
Handbags	Chain	Grass cuttings
Hardwood	Water tank	Beer crates
Trees	Hedges	Bath
Safety barriers		

**WHAT PROFITS COULD BE PRODUCED?**

The inert or inactive wastes, e.g., soils, bricks and concrete can and are reprocessed into topsoils and crushed aggregates for low grade uses. This needs exemplification as the way forward, but on a wider scale, so all contractors have the opportunity to use this type of product. Specifications should be produced so that recycled products can be sold in the market place against minimum standards. RILEM and CEN are discussing recycled aggregate standards, for use in Euro-codes, at the present time.

The potential of active wastes has not yet been fully examined, although the market for existing users of the wastes, in the UK, was found to be narrow for the variety of wastes being generated by the construction sites.

Trials for sorting large quantities, have to be undertaken so that actual cost and sorting processes can be assessed. Here experiences from Europe and America should be drawn upon. Planning applications for transfer stations are welcomed by Local Planning Authorities but as with all processes there are a number of requirements that have to be considered [8]. The potential operators of such plants find the investments cost high because of the controls which are necessary for Planning and Environmental control. The costs are a risk and unlikely to be recouped within a few weeks of commencing the operation with low value, and variable supply of waste, (as indicated in the "waste survey") invariably some UK companies see this as a possible profit reduction at the end of the financial year and not as a profit venture for the future.

## **USE OF ACTIVE WASTE**

The data collected from this survey demonstrates the vast array of materials and the amount of active waste that are being discarded by the UK Construction Industry. This highlights the problems of landfill operators calculating the risk of sorting, storing and supplying a potential recycler with waste material.

Therefore the data presented in Guthrie and Mallet CIRIA special paper 122 may be very broad and generalised but that is all that could be expected from such a diverse industry.

The identification of these small items by the waste survey is relevant when reuse or recycling is considered because if a secondary use could be found then this avenue should be pursued. The other factor is whether all the potential uses have been investigated. There are companies in the market which utilise these waste materials but it is not known whether they will be able to absorb the scope and quantities that could be liberated from the waste stream. The material liberated could saturate the supply market for a time until other companies appreciate the potential and set up in the market or existing companies increase their capacity. Government incentives could increase this potential and the cost could be covered from the Landfill Tax. Mainland Europe and their governments are still researching potential markets for some wastes so there is still potential and profits to be made in these areas(13).

A solution to help with the pre-sorting of wastes, could be to use different coloured skips for different tax bands throughout the country. Building sites may be able to have two or three coloured skips on site at a time to sort the waste and a reduction in the skip hire rate might be available to these users. Training of operatives and sub-contractors and good sign-posting of the skips on site would be necessary, Contra charges made to subcontractors not complying could be included in contracts. This would then maximise the use of the skip with inert material, i.e.: soils, brick and concrete etc. and the active/non-inert could be placed in a separate skip and sorted at a transfer station.

## **THE WAY FORWARD ?**

It would appear that the new Land Tax is an opportunity for the UK. Construction Industry to examine once again the way it wastes material in design, estimating, purchasing and site control. If nothing is done to control the wastes then costs to the client will continue to grow, therefore:

1. Can the Construction Industry afford to throw all this material away and continue to cover the cost?, No if it comes out of profits.
2. Can the Construction Industry increase its cost to cover the new landfill tax, with the tax rate increasing possibly every year?, This is the easy way out for a wasteful nation.
3. Will the Landfill Operators negotiate with the Local Authority for transfer stations and therefore reduce the quantity of waste placed into the landfill sites?, Yes but an incentive would help.
4. Will the liberation of the waste materials with potential for recycling from the tip face produce the saving of the cost of extracting new natural resource? Yes once specifications are accepted.
5. Will all the taxable waste be tipped at landfill sites or will waste turn up in cheap exempt sites or be fly tipped?. No and

Yes more than likely.

6. Is there a need to maximise the potential, by all countries, of the waste which is being generated by construction and other industries? With greater trust of research, answers to many problems could be found and utilised immediately.

These questions and their answers need to be considered very quickly before the opportunity slips into increased costs and lost profits.

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