SUMMARY

A. Title of project - A study on Solid Waste Management of the Colombo Municipal Council semi residential areas.

B. Research Institute - Open University of Sri Lanka

C. Chief scientific investigator - Dr. Shahane De Costa

D. Period of Contract

Date of award - 13 / 1 / 98

Date of completion - 30 / 12 / 99

E. Scope / objective of project -

Development of viable systems for, solid waste management in semi residential areas of the Colombo Municipal Council was the aim of the project.

Identifying volume, per capita generation and other characteristics of solid waste, development of optimum man power, machinery, equipment and other resource requirements for the collection and transportation of the solid waste, development of route plan and frequency of collection etc., were the main objectives of the project.

F. Experimental method

In order to establish the characteristics for the garbage generated in Sri Lanka, a series of investigations and analysis have been carried out on garbage samples of different categories (residential, restaurants, parks etc). Thereby the in house storage able period as well as the garbage composition has been obtained. The total generated garbage weight has been analyzed and thereby the per capita generation has been calculated.

1176 households have been investigated and thereby the average number of residents per house hold and the per capita garbage generation of low income as well as high income house holds were obtained. Data from weigh bridges were obtained and thereby an analysis of the actual transported load and the design load of vehicles has been performed.

The average time taken for collection of solid waste at each point as well as the average time taken to travel each segment has been found by observation for the real situation. This has been obtained for varying number of crews and different collection types. The average time taken for road sweeping, road brushing and poster removal has also been obtained by observation.

G. Results obtained and Conclusions

The maximum in house garbage storage able period for each of the categories (residential, restaurants, parks, road sweepings etc.) have been established. In addition the composition variation and the per capita garbage generation for these categories have been established.

A study on the appropriate point of collection has been performed and it has been found that the most viable point of collection of solid waste in semi residential areas is the curb / entrance and that, back yard and station collection is not suitable.

A cost comparison for both labour and machinery has been performed and it has been found that the most economic number of labourers that must be attached to vehicles is 4. It has also been found that even though the running cost per hour of the 12 cu. m. compactor truck is the highest it is the most economical when considering the solid waste volume that could be transported. The cost comparison has revealed that if there is adequate quantity of solid waste to be transported and if the road condition is suitable for a 12 cu. m. compactor truck to enter then the most economic means for transporting solid waste is to use a 12 cu.m. compactor truck with 4 labourers attached to it. The next best alternative in sequence is the 8cu.m compactor truck, the tractor and the tipper.

It has been found that the reduction of variation between the actual and design loads to a minimum would increase the economic usage of the vehicles.

The total time in the collection cycle per trip has been investigated. Thereby the average time for each aspect and the optimum crew size has been calculated. A route planning exercise has been performed and thereby, the best route according present conditions as well as the average time taken for each interval ha been found. The optimum number of trailers per tractor and skip bins per skip hoist has also been investigated.

It has been found that the number of residents per house is 5.8. Further, it has been found that the residential per capita waste generations varies according to the income group and that the low income per capita waste generation is 0.49 kg / per day and the high income per capita waste generation is 0. 64 kg/day. The average per capita residential collection has been found to be 0.54 kg.

A model has been developed to calculate the feasible number of collection points per vehicle per shift, for any semi residential area in order to optimize the capacity of waste transportation vehicle. The norms for road sweeping, road brushing and poster removal by machine have been developed.

H. Papers published on work done

- Solid Waste Generation and its storage, Journal of the Institute of Engineers, Vol. 30, No.3, pp34-40, 1999.

Final Report

1.

A. Contract number - CRG / 98 / P / 001

B. Title of project - A study on Solid Waste Management of the Colombo Municipal Council semi residential areas.

C. Institute where research was carried out - Colombo Municipal Council and Open University of Sri Lanka.

D. Chief scientific investigator - Dr. Shahane De Costa
Co – investigator - Mr. T. Ananda Gamage

E. Date of award - 13 / 1 / 98

F. Date of completion - 30 / 12 / 99

G. Total allocation - Rs. 227,000

H. Total spent - Rs. 226,474.20

I. Number of Research assistants - 1 x 4 months
Number of technical assistants - 1 x 4 months

J. Whether RA has registered for or obtained post graduate degree - No, but co investigator registered for a M. Phil and in the process of obtaining post grad degree.

2. Annexed
3. Annexed
4. Annexed
5. Annexed
6. An explanation of significant departures from the level of activity foreseen

- All items were looked into and therefore no significant departures. The items dealing with transfer station location and final disposal system were not looked into in detail as they were subject to constant change at the time of research due to numerous reasons.

Dr. Shahane De Costa

Mr. T. Ananda Gamage

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