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Technical Bulletins: Automated and Semi-Automated Refuse Collection Technologies

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In cooperation with the Tennessee Municipal League

AUTOMATED AND SEMI-AUTOMATED REFUSE COLLECTION TECHNOLOGIES

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Most cities in Tennessee collect refuse today in much the same way as or 30 years ago. Advances in technology have made conventional collection methods obsolete. Cities can choose from several automated and semi-automated refuse collection systems which will meet their needs in a highly cost-effective manner.

An automated refuse collection system is one in which a single crew member, remaining in the cab of a specially designed vehicle, operates equipment which automatically collects refuse from standardized containers left at curbside. With semi-automated systems, using either rear or side loading collection vehicles, crew members wheel containers from curbside to the vehicle and attach them to mechanical dumping devices which lift and dump them.

Automated and semi-automated systems are quick, easy-to-use, less labor intensive and reduce on-the-job injuries. They can be adapted to operate efficiently in almost any climate, terrain or street configuration.

Figure I provides cost and productivity estimates for five different refuse collection technologies, each serving 4,000 customers per week. The fully automated side loading system serving 600 customers per day per vehicle is the most cost-effective at an estimated $45,361 per year or $0.96 per customer per month.

The data in Figure I are based on the following calculations. Labor cost is $200 per week per salary per crew member. Equipment cost, based on a six year life cycle, is $6,000 per year for rear loaders and $9,750 per year for side loaders, all costs prorated to actual equipment use. Other costs include fringe benefits at 25% of salary; supervision at 6.5% of salary; insurance and storage of equipment at 10% of annual equipment costs; and vehicle operation and maintenance costs estimated on vehicle usage.

Productivity rates (or customers served per day) are average figures which most cities should be able to achieve. These rates assume that each crew works 40 hours per week, spends 30 hours on the route and collects only refuse placed in containers or plastic bags. Data from a variety of jurisdictions around the country show that with proper management, equipment and incentives, these or higher productivity rates can be met.

Figure I
Annual Cost Estimates and Productivity Rates
Five Selected Refuse Collection Methods
(4,000 Customers per week)

Collection Method	Labor Cost	Crew	Equipment Cost	Vehicles	Other Costs	Total Annual Cost	Cost per Customer per Month
Manual, rear loader, back door -- 350 customers/day/vehicle	$74,880	3	$14,400	3	$39,427	$128,707	$2.68
Manual, rear loader, curbside --500 customers/day/vehicle	$49,920	3	$ 9,600	2	$26,285	$ 85,805	$1.79
Semi-auto, rear loader, curbside --700 customers/day/vehicle	$37,440	3	$7,200	2	$19,714	$ 64,354	$1.34
Semi-auto, side loader, curbside -- 500 customers/day/vehicle	$16,640	1	$15,680	2	$19,609	$ 51,929	$1.08
Automated, side loader, curbside -- 600 customers/day/vehicle	$14,560	1	$13,650	2	$17,151	$45,361	$0.96

Note: The data in this figure should be used for comparative purposes. Actual costs may vary due to factors unique to specific communities.

The most critical difference among the systems presented in Figure I is labor cost. It is largely this difference, which is over $60,000 per year between the most and the least efficient collection methods, which produces overall system cost differences.

Automated and semi-automated refuse collection technologies are based on the curbside collection of standardized, wheel-type refuse containers. Curbside collection not only promotes more economical refuse collection but also provides the opportunity for automation. Standardized containers, or carts, are necessary as the lifting devices or automated and semi-automated collection vehicles are engineered to handle only specially designed containers.

Data from cities as diverse as Maryville (pop. 17,000) and Memphis (pop. 700,000) show that automated and semi-automated refuse collection work well. In Maryville, a newly implemented automated system is expected to save the city approximately $100,000 per year over the cost of its previous system. In Memphis, an anuual savings of $9 million is expected after implementing semi-automated collection using the city's present rear loading equipment. Projected dollar savings for Memphis and Maryville include the cost of new equipment, such as new automated side loading vehicles in Maryville and standardized refuse containers in both cities.

In order to achieve significant savings, local communities must ensure that their new automated or semi-automated systems work effectively. Factors such as how to finance the system, what to do with personnel displaced by automation, proper maintenance of automated equipment and efficient route design must be taken into consideration well in advance of system implementation.

Public reaction to converting to curbside automated or semi-automated refuse collection can be critical to system success. In Maryville and Memphis, the public has been supportive, but not without real effort. Officials in both cities anticipated the genuine concerns of citizens, answered those concerns honestly and showed citizens that the new systems will save taxpayer dollars while maintaining or improving refuse collection service. Also, both cities have implemented special programs for persons, such as the elderly and the handicapped, whose physical limitations prevent them from wheeling refuse containers to curbside for collection.

Another consideration in refuse collection is fuel cost. Many cities in Tennessee collect refuse twice per week. Using standard containers and automated or semi-automated systems, cities can save up to 40% on fuel costs by converting to collection once per week. The standard containers are adequate to handle a week's refuse for the average family and are virtually water proof and spill proof. In addition, over the life of the containers, they actually cost less to the home-owner than use of two metal garbage cans and a plastic bag per week.

Automated and semi-automated technologies represent reliable, cost-effective methods of refuse collection which should be given serious consideration by almost every city which provides refuse collection service.

For Further Information . . . about automated or semi-automated refuse collection and your city's needs or to arrange for a showing of the MTAS 16mm color film on new technologies in refuse collection entitled "There Is A Better Way", contact:

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