



LITTER FROM SOLID WASTE COLLECTION TRUCKS

April 2003

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Report #03-04

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The Florida Center for Solid and Hazardous Waste Management conducted a visual survey in Alachua County to determine if waste was being spilled, what waste was being spilled, and why the spillage occurred. Researchers also wanted to learn where and when the spillage occurred and what steps might be taken to eliminate future spills. This study focused on front-loading trucks servicing commercial dumpsters. Three solid waste haulers utilizing front loaders operate in Alachua County: Boone/Waste Management, Waste Pro, and SWS.

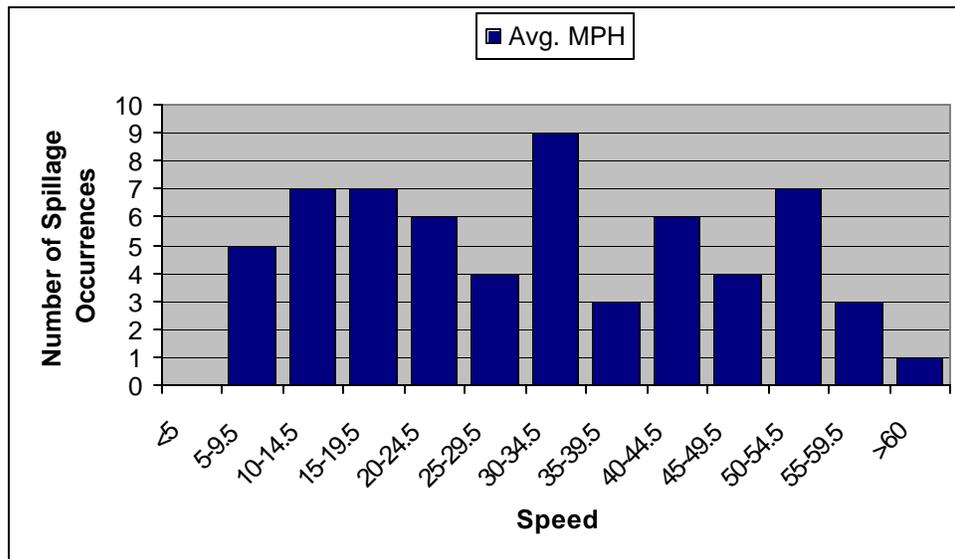
Several days were spent following waste haulers to observe their operations and gather information before designing the data sheets used in the study. These data sheets had space to record date; company name; truck number; type of solid waste (trash or cardboard); pickup number; whether the dumpster was overfilled, full, or partially filled; whether the dumpster lids were closed, half-open, or open; whether a pickup spill occurred; and whether a road spill occurred while travelling and if so, what was spilled and at what speed the truck was travelling.

Digital still cameras and video cameras recorded spillage as it occurred. Video cameras were either handheld or attached to the vehicle. After consulting with the School Board of Alachua County Transportation Department and the Alachua County Sheriff's Office regarding vehicle-installed video cameras, an Ultrak system designed for school bus use was purchased. Due to problems focusing the Ultrak camera, this equipment was inadequate for research needs. Handheld video cameras provided the best quality. However, using video to log data is erroneous because leaves from the top of the truck

can be mistaken for litter and some small pieces cannot be seen at all. The most reliable method for collecting data is recording it while in the vehicle following the truck. Two people are recommended for this task to verify actual littering.

Sixteen trucks were followed, picking up 337 dumpsters and travelling 1277 miles. Spills occurred at 28.8% of the pickup sites, and spills on the road (public streets and highways) occurred after 20.8% of the pickups. Occasionally, littering occurred multiple times when the distances between pickups were longer.

When documenting road spills, researchers noted the speed (in miles per hour) the truck was travelling as the spillage occurred. Speed was measured by pacing the truck and recording the speed the car was moving. The following chart shows the speeds at which spillages occurred, in 5 MPH increments. Spills occurred over the entire range of speeds and did not tend toward any range. The peaks and valleys shown in the chart may be due to speed limits in town and in rural areas. Researchers concluded that the speed at which the truck travelled was not significant.



It was hypothesized that the level of fullness of the dumpster and whether the dumpster lids were open or closed affected whether a pickup spill occurred. Using the chi-squared test for independence at 95% confidence level, it was concluded that these two factors did impact pickup spills. The p-values for these two tests were 5.07×10^{-6} and 4.10×10^{-5} , respectively.

Pickup Spill.



Researchers hypothesized that the level of fullness of the dumpster and whether the dumpster lids were open or closed impacted whether a road spill occurred. No conclusion could be reached about whether road spills were dependent on these two factors. The p-values for the chi-squared test for these two factors were 0.406 and 0.716, respectively, well above α at the 95% confidence level.

Research was conducted to test whether an occurrence of a road spill was dependent on the previous pickup spill. Using the chi-squared test, at 95% confidence, researchers were unable to conclude that a pickup spill and a road spill are related. The p-value for this test was 0.898. One suggestion as to why there may be no correlation is that sometimes there was no time on the road between pickups. This happened in large apartment complexes and at businesses with more than one dumpster.

Truck design appeared to be similar for all three companies. The trucks followed were made by three different manufacturers: Heil, McNeilus, or New Way. All three types are made with a sliding lid used to cover the hopper. From the position of the researchers' vehicle, it was impossible to tell if the cover was slid into the closed position while travelling on the road between pickups.

Driver/operator performance varied considerably from careful to reckless while driving and careful to sloppy while making the pickups. Some operators would exit the cab and retrieve spillage from the ground and others would climb to the top of the truck and remove spillage. At times, drivers were confronted with dumpsters containing items that

could not be accepted by the truck, such as long pieces of lumber or a muffler and tailpipe. These items required the driver to exit the cab and remove or rearrange the problem items. Some drivers did not attempt to solve potential littering problems.

Overfilled, uncovered dumpsters.



From the analysis of the data and visual observation, the prominent factors leading to spillage are overfilled dumpsters and uncovered dumpsters. Pickup spills consisted of any type of items spilling over from usually uncovered and/or overfilled dumpsters. Road spills consisted mostly of pieces of paper and plastic and other small items. It often looked as if these items had settled on top of the truck during pickup and blew off while on the road.

One factor that was not recorded, but appeared to contribute substantially, was unbagged garbage. It was difficult to assess whether a dumpster contained mostly bagged or unbagged garbage, especially when the lids were closed. Yet most road spills were small pieces of litter that, if properly bagged, would not have flown out of or off of the truck. The worst offenders in this regard are uncontained polystyrene foam peanuts.



One apartment complex used tall dumpsters with doors on the side (see above picture). It would be difficult to overfill this dumpster because of the height. Also, the sliding doors on the sides of the dumpster close as the dumpster is picked up, potentially reducing or eliminating spillage.

In conclusion, causes of pickup spills are easily determined, however many more factors may cause road spills. While the litter spilled at the dumpster site is unattractive, the business or property owner is responsible for picking it up. Road spills, however, become the problem of the counties or the state and ultimately the taxpayers.

The suggestions for reducing litter from commercial waste haulers are the same as for residential curbside pickup. Encourage businesses to bag their waste, to close the lids on the dumpsters, and not to overfill their dumpsters.