

Residential Automated Collection Makes Sense for Idaho Falls

By performing a feasibility study, the Sanitation Department of Idaho Falls was able to determine if moving forward with an automated collection program would be worth the transitional cost and provide the desired levels of service.

■ By Marc J. Rogoff, Chris Canfield and Tony Arehart

The evolution of solid waste collection vehicles has been historically driven by an overwhelming desire by solid waste professionals to collect more waste for less money, as well as lessening the physical demands on sanitation workers. Residential waste collection over the past century has evolved from the horse-drawn and human powered carts to motor-operated vehicles specifically designed for solid waste collection. These included the first collection vehicles in the 1940s and 1950s, which incorporated the cab over engine chassis design and improved winch and compaction technologies, to address the need for a shorter turning radius vehicle and for improved waste capacity on each truck that was needed for more efficient residential collection.

It was not until the early 1960s, however, that solid waste collection took a monumental leap in technology to improve overall efficiency. During this era, public works departments in communities in mostly western states, which were experiencing rapid customer growth in suburbia in the post-World War II period, were exploring the concept of improving their labor productivity with their oftentimes limited resources. It is important to point out that

these cities and agencies were less constrained by formal labor agreements, which were more typical of their larger sister communities in the east and midwest. Consequently, they began to explore ways of moving in the direction of improved vehicle automation as a substitute for labor to lift, tip and empty garbage containers that were placed curbside.

About this same time, the Federal government also began to study ways of improving solid waste management in the U.S. Between 1965 and 1975, the U.S. Public Health Service (the predecessor agency of the U.S. Environmental Protection Agency) provided support for research studies to develop improved solid waste collection equipment with the aim of eliminating the need for multiple collection workers on each truck to manually lift and empty containers. Major truck manufacturers such as Lodal and Maxxon worked with various cities in the west (Santa Clara, CA, Scottsdale and Phoenix, AZ) to pioneer the development of a drop-frame truck chassis, stand-up driver stations, the use of both right and left hand steering wheels, and the standardization of refuse containers.

Figure 1: Residential hand unload with heavy volumes of MSW. Photos courtesy of SCS Engineers.





Figure 2 (left): Residential curbside littering.
Top right: Public Comment, October 16, 2014.
Photo courtesy of KIDK 3 News.

Solid Waste Collection in Idaho Falls

Residential solid waste collection is performed by city crews once per week (roughly 15,000 households) using modern, rear-end load compaction vehicles and crews composed typically of a single driver and collector (“bucker”). During peak seasonal waste collection seasons, these teams are supplemented by temporary collectors. The daily objective is to collect everything placed by the public on the public curbs or alleys in order to keep the City clean. This mission becomes extremely problematic or difficult at times due to the areas’ high winds and impacts from scavenging pets and birds contributing to litter on the streets and alleys. As illustrated in **Figures 1 and 2, page 36 and above**, many residential homes with larger families place an enormous volume of containerized municipal solid waste (MSW), along with bagged and un-bagged trash curbside or in the alleys. As we observed, the crews do an excellent job in cleaning up the roadways with the litter, but the issue can be mitigated further.

As noted above, the City provides rear-alley collection to roughly 15,000 residential customers. Alley collection oftentimes poses a variety of problems for solid waste operations due to the inherent nature of typical City right-of-way conditions. Alley maintenance, utility easements and homeowner infringement into alleys all impact collection operations. All of these conditions make alley collection more time consuming as compared to curbside collection.

Why the Feasibility Study?

Not unlike other communities nationwide, the City was considering whether transitioning to automated collection would provide advantages to its customers, increase levels of service, reduce safety hazards and minimize costs. In recent years, the City has seen its insurance and worker’s compensation claims increase. In 2014, the City engaged the services of a solid waste consultant, SCS Engineers (SCS), to evaluate the City’s solid waste operations, provide a review of current rates, and make recommendations on possible cost savings and implementation alternatives in the following specific areas:

- Conduct a rate or cost of service study for the Department
- Study and analyze a conversion to automated solid waste collection for the City’s residential customers
- Develop a cost estimate for this automated program

SCS conducted a thorough review of the City’s current operation and found that the current services provided by the Sanitation Department (Department) were to be of the highest level with regards to types of services offered and volumes collected. The Department’s collection operation is also cost-effective when measured against other similar manual, rear-load systems. However, regardless of efficiencies, manual systems have inherent limitations, including

a required high level of staffing, lower production rates, and by design, employees are prone to the inherent risks of physical injury, posing worker’s compensation liability concerns for the City. The cumulative impacts of lifting waste collection containers throughout an entire worker’s career have proven to result in major musculoskeletal injuries.

SCS kicked off the project with an initial face-to-face meeting shortly following the award of this project. Background information, data and other relevant materials to collection operations were requested prior to the meeting. SCS then conducted a review of requested information and data on the City’s solid waste collection system, including analysis of its existing rate structure, policies, procedures and ordinances.

Many solid waste agencies are transitioning from manual collection of solid waste to semi or fully automation. There are many advantages and disadvantages to automation and each community is somewhat different (see **Generic Advantages and Disadvantages of Automation sidebar**). To analyze these issues in detail for the City, SCS conducted an automation feasibility analysis that took into account the following major issues:

- Current and projected City solid waste budget for the next five years
- City growth and demand projections
- Existing and proposed sanitation routes
- The fleet replacement plan
- The proposed staffing plan for automation
- Cost of replacement vehicles and carts (along with City financing alternatives)
- Injury and insurance claims
- Transition plan for automation
- Citizen public education programs

Findings and Recommendations

A Pro-Forma Model was constructed to help estimate the projected costs to the City to implement an automated solid waste collection program. The Model illustrates the estimated financial impact of implementing an automated collection program that includes once weekly collection of 95-gallon containers. The following assumptions were used to construct the Model:

- 15,000 hand-unload customers
- 110 homes per hour rate of production
- Five-day work week
- Labor cost assumptions based on the median of salary ranges as provided by the City, escalated 2.3 percent for most recent 11-year average CPI
- Benefit costs calculated at 72 percent of total salaries
- Model does not consider revenues from sale of surplus equipment
- Equipment depreciated over useful life of vehicle (six years)

- Vehicle acquisition costs provided by the City
- Vehicle spare (backup) ratios calculated at 50 percent
- Manpower backup ratio calculated based on City provided time off (vacation and sick time) benefits
- Automated containers are depreciated for 10 years (coinciding with factory backed warranty of 10 years)
- Spare ratios for carts calculated at 5 percent for spares and replacements (new accounts, resident damage to carts, etc.) over a 10-year period
- Insurance cost reduction estimated at 30 percent of similar municipal experience

SCS was asked to conduct a financial analysis of the residential solid waste and yard waste system. To conduct this analysis, administrative costs of approximately \$1.7 million (FY 2014), those that are considered part of the entire department, need to be allocated to the residential services portion of the system in order to recognize a true cost of operations. The administrative allocations include the current costs experienced by the Department and were allocated by a variety of methods including number of trucks, staffing and percent of revenue, depending on the cost category. A minimum of 30 percent savings in the Department self-insurance fund is estimated to occur upon full conversion of automation. Similar systems have recognized greater than 50 percent in some cases. The Model showed that with the assumptions in place, the City can reduce overall operating expenses for residential service by approximately 9 to 10 percent after three years of full implementation.

The majority of these savings were in the personnel expense category, as the full time employee (FTE) headcount is reduced by approximately eight. There is also a significant reduction in insurance claims costs and operating maintenance costs that can be recognized after three years from full automation.

Public Comments

A public meeting was conducted on October 16, 2014 at the City Council Chambers to discuss the Citywide Sanitation Autoload Program. Participants were notified about the meeting by an article that was printed in the *Post Register* describing what was to be covered and letting them know the date, time and place along with postings on the City's social media. The meeting was held in an open house format, allowing meeting participants to examine displays and discuss project information with the project staff.

The City received many comments on the proposed program. These were very fairly typical of similar automation efforts by other municipalities nationwide. Many residents were in agreement with the findings of the report. Others were concerned with the size of the rolling carts that were going to be provided, how the refuse outside the container would be handled, clearances for parked cars and service to disabled residents. The Department noted these concerns and plans to address those that can be mitigated through current Department programs or by phasing the implementation of the automated program.

City Implementation

The Final Report was reviewed by the City Council and the program received unanimous approval to proceed with implementation. As of this writing, the City has ordered two new automated vehicles for initial implementation of the program in 2015. Plans are to roll out the new automated program first in the major suburban subdivisions and then later in future years with the urban core area. | **WA**

Marc J. Rogoff is a Project Director with SCS Engineers (Tampa, FL). He is a nationally recognized expert in the financial modeling of solid waste management systems. With more than 30 years of experience in solid waste management as a public agency manager and consultant, he has managed more than 100 Pro Forma modeling and rate assessments throughout the U.S. on all facets of solid waste management. They include waste collection studies, facility feasibility assessments, asset valuations, transfer station versus long-haul transport evaluations, fleet management and vehicle acquisition planning, MRF contract assessment and operations, and waste conversion feasibility. He can be reached at (813) 810-5547 or via e-mail at mrogoff@scsengineers.com.

Chris Canfield is the Assistant Public Works Director for the City of Idaho Falls, ID. He has background in both public and private municipal engineering and served as the City's project manager on this study. Chris can be reached at (208) 612-8259 or via e-mail at ccanfield@idaho FallsIdaho.gov.

Tony Arehart is Superintendent of the City of Idaho Falls Sanitation Department, ID. He has served as manager of the Sanitation Department for many years. He can be reached at (208) 612-8491 or via e-mail at tarehart@idaho FallsIdaho.gov.

Generic Advantages and Disadvantages of Automation



Advantages

For Residents

- Convenient and easy method for residents to dispose of trash
- Wheeled containers are easier, more maneuverable and safer for residents because there is no carrying or lifting of heavy trashcans
- The capacity of most cans provided in these programs are equal to three or four regular trash cans
- The containers keep rodents and pets out of trash given the tight lids
- Cleaner, healthier neighborhoods with no litter on streets after pickup

For the Community

- Improved collection efficiency
- Reduced employee injuries
- Lower turnover rate and increased productivity due to less time missed by injured employees
- Reduced Worker's Compensation claims and insurance premiums
- Reduced rodent problems

Disadvantages

- Automated vehicles require more maintenance than traditional rear end load vehicles and require specialized training of technicians.
- Homeowners must be educated on where to place bins and what kinds of trash can be collected. Bulky items that do not fit in the cart usually require a separate collection. Overloaded containers, or waste left on the ground can impact the productivity of collection.
- Automated collection also does not work in densely populated areas with on-street parking on collection days. However, on-street parking does not prevent a cart-based approach to collection. A hybrid system can be employed in these cases where carts are collected in a semi-automated fashion and many cart system benefits can still be enjoyed.
- Adjustments typically need to be made to alley collection in areas with limited side-loader clearance. Some communities have required these areas to migrate to street side collection or implemented semi-automation (use of flippers).