The Impact of Smart Technologies on the Florida Waste Market

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The solid waste industry has in recent years embarked on a quest to include "smart technologies" in everyday processes and programs. The objective for most municipalities and private haulers in Florida is to provide their services, cheaper and quicker, to their customers. Here are some types of technologies that have been implemented to date and others which are only showing up on the drawing boards of technology designers.

Waste Collection

Automation

Rather than slogging through rain and high temperature environments, operators of automated refuse collection systems spend their shifts in climate controlled comfort. The reduced physical requirement increases the diversity and longevity of the workforce that is able to collect waste. Automated collection has proven to significantly reduce collection worker injuries resulting in reduced workers compensation costs, decreasing disability claims, decreasing the number and cost of light duty assignments, and reducing salary fringe benefit costs in the future.

Driverless Collection

The next phase of automation for solid waste collection appears to be "self-driving trucks". That is, trucks that can navigate, stay in their lane, and slow or stop in response to traffic conditions completely without human intervention. What seemed futuristic and 30 or 40 years off into the future is now upon us. Currently in Sweden, collection trucks are driving the streets without drivers. Meanwhile in the U.S. alone, waste collection vehicles are involved in thousands of crashes a year, resulting in many fatalities. Virtually all of these incidents can be traced to human error. The potential savings in lives, property damage and exposure to liability will eventually become irresistible to both public and private waste haulers.

Figure 1 - SCS eTools landfill gas monitoring equipment.

Customer Accounting Software

Accounting software is currently used by public and private operators to help in logistics, dispatch, manage customer communications and contracts, as well as billing and payments. When these accounting software tools are integrated with some of the smart technologies discussed in the paragraphs above, the organization can use the "Big Data" generated by these software programs to create efficient workflows and set efficient pricing for waste management services.

Route Optimization

Since its introduction in the early 1990s, innovative route optimization technology has been used throughout the U.S. by both private and municipal operations to streamline solid waste collection and monitor fleet performance. Saving on significant operating expenses like equipment costs, labor and fuel drives the need for waste collection operations to increase efficiency by reducing the number of routes, labor hours and mileage through route optimization technology. The three benefits of solid waste routing include improving efficiency, potentially reducing the number of vehicles out on the road and also future replacements, and improving morale through balancing routes across a solid waste collection system.

Smart Electronics

Collection vehicles are not easy to maneuver and this is in part responsible for the 6,000 or more accidents that they are involved in every year. To solve this driver safety issue, companies like Waste Pro are installing high tech camera systems in all of their vehicles. The 3rd Eye camera technology provided by Alliance Wireless Technologies (AWTI) enable a 360-degree external video system, which Waste Pro has installed on its 1,800-vehicle fleet.

Municipal solid waste departments and private waste management

companies are increasingly buying radio frequency identification (RFID) tags and embedding them in solid waste and recycling bins. An RFID tag is like a barcode that can transmit its identifying numbers as a radio signal. This means that it is not necessary to see an RFID tag or even be close to it to scan it, as opposed to a barcode, which must be scanned with a handheld reader. The data on an RFID tag is a series of numbers that can store the name and address of the trashcan's owner as well as other information.

Material Recovery Facilities

MRF design has evolved over the past several decades due to a number of important drivers, principally changes in governmental polices and expanding recyclables markets. To improve the quality of the products recovered from the recyclables stream, MRFs have become more highly automated as well as increasing in design throughput capacity. Recent surveys of the recycling industry have shown more reported application of optical scanners, drum and eddy current separators, and air classifiers, as well as increasing retrofits of dual-stream systems to handle single-stream recyclables.

Industrial robots have increasingly taken on routine tasks of many operations in a variety of manufacturing situations as well as in surgical settings. More advanced robots are gaining sensors and software, allowing them to perform non-routine manual, repetitive tasks such as welding, cutting and suturing. As previously mentioned in the discussion, most MRFs already use a combination of advanced sorting technologies followed by hand separation.

Landfill Operations

The life of a landfill is dependent on three things: the volume of the permitted landfill, the amount of waste received and the density to which the waste is compacted. The compaction is the variable that is most readily influenced by the landfill operators. For this reason, many landfills have their active area surveyed anywhere from once a year to meet regulator demands to as often as monthly to assess the compaction that is achieved. Before GPS surveying equipment became available, it was prohibitively expensive and time consuming to survey frequently.

However, with GPS survey equipment more readily available and less expensive, having the active area of a landfill monitored on a monthly basis is not out of the question anymore. For landfills that are owned by a municipality and operated by private companies, it is common to require the contracted company to meet a required level of compaction on a monthly or quarterly basis. Once gathered, the GPS data is analyzed to confirm that the requirements were met.

GPS systems are used in many ways at landfills today. Adding GPS to the heavy equipment itself can pay huge dividends, increasing compaction and therefore revenue. In the future, drones will see even more use in the world of landfills, taking progress photos, performing monthly surveys using LIDAR and GPS, flying programmed paths to monitor remote locations of the landfill and much more.

Environmental Monitoring

Automation is not limited to groundwater or compactors; the whole landfill gas collection system can be automated as well. Several companies offer "well-mounted" wireless sensor and control systems that feature a whole range of options when paired with one of their software applications. These systems work in real time and can show everything from flowrate of each individual well to the gas composition on each well in the collection system. This level of automation can significantly reduce the number of hours and personnel required to monitor and control a landfill gas system.

Automation is going to become more prevalent in the next few years, but one of the new challenges will be in adapting to managing an application aiming to assist facilities with their data management as automation gains ground. SCSeTools and similar applications (Figure 1) assist in collecting, storing, and managing data with the end goal of helping the facility become more efficient. This type of web-based application provides an around-the-clock, nearly real-time view of the systems it monitors and controls.

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