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November-December 2011

Picking Up the Pieces

Managing, moving, collecting, sorting, and recycling operations require increasingly sophisticated equipment.

By Lori Lovely
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The most recent figures released by the US Environmental Protection Agency, which has collected and reported data on the generation and disposal of waste in the United States for more than 30 years, indicate that Americans generated 243 million tons of trash in 2009. Municipal waste, which includes household, commercial, and demolition waste, must be managed: collected, transported, processed, and recycled or disposed.

Although the average size of landfills has increased, the number of landfills has steadily declined, and capacity is limited in some areas of the country. Ameliorating the lack of space, recycling and composting programs are reducing the amount of garbage being dumped into the great open maws of the landfills.

Again according to the EPA, in 2009 Americans recovered about 61 million tons of MSW through recycling and an additional 21 million tons through composting—or about 33.8% of the total amount of MSW generated. Another 12%, or 29 million tons, was combusted for energy recovery. Since 1990, the total amount of MSW going to landfills dropped by more than 13 million tons, from 145.3 million to 131.9 million tons in 2009.

Of the average 4.34 pounds per person generated daily, 1.46 pounds is recycled, composted, or combusted. That leaves 2.9 pounds per person per day to be dealt with. In 2009, it added up to roughly 132 million tons of MSW going to landfills. Fifty-five to 65% of the total amount of MSW consists of residential waste, with the rest coming from commercial and institutional locations.

From Rolloffs...

Construction debris is 40% of what goes into landfills in Lynchburg, VA, according to general contractor Scott Elliott. Now that Lynchburg is building its first LEED-certified home, Elliott has noticed what he calls “dinosaur techniques” when it comes to collecting recyclable materials. Instead, he acquired MADROCs—multiple activated dump rolloff containers—from CS Creative Systems.

MADROCs, which debuted at Waste Expo, provide individual compartments for separating recyclable content. They’re available in six standard container sizes measuring from 1.5 yards to 12 yards, and nine standard unit configurations, as well as custom sizes. Optional lids keep pests out and eliminate contaminated stormwater runoff. “The design is based on the C&D [construction and demolition] industry,” Elliott states, “but it can be used for recycling, medical, hazardous material, aggregate and landscape supplies.”

“There are 12 yards on each side,” Elliot explains. “The configurations can be different on each side. It allows a driver to take two loads in one trip instead of multiple trips with a dump truck.” Depending on the material, the container is designed to fill evenly.

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The goal, he points out, is to make the industry more efficient. "Some contractors pay a guy just to pick up stuff on the job site, but it takes time and money to collect stuff on a job. This encourages recycling on demo and construction jobs, rather than dump everything in one container. They know what we need on a construction site."

What most contractors need on the job site is safety and efficiency, although space is sometimes a sought-after commodity. If space is limited on a demo job, Elliott says, or if a staging area is critical, a MADROC takes up less room.

It also provides fast dump cycles. As Elliott explains, "You can pick up 20 yards or 40 yards by just grabbing the remote. The driver doesn't have to get out at all." Because the driver doesn't get out at the transfer station, Elliott says that all the containers can be emptied in four minutes (as compared with the typical 15 minutes for three-compartment containers).

Keeping the driver in the cab also enhances safety. "There's no pulling pins and gates," Elliott adds. The automated system features a programmable controller, a specially designed gravity door latch system and an alarm.

Compatible with all makes of truck, it works with most hook-lift and cable-rail lift systems. It also works independently without any retrofit. "There's no special equipment needed," Elliott continues.

While each MADROC comes with a standard plug-in harness system to be used for new and existing rolloff container trucks, there are three other power options. Solar with battery backup enables zero emissions, Elliott points out. Solar power is rated for up to 10 dumps per container before recharge is necessary—which occurs within two hours of direct sunlight. In addition, a 6.5-horsepower engine converted to propane is available, complete with electric start and 5-gallon LP tank for refueling. And finally, a hydraulic-powered priority flow control valve plugs into the hydraulic system of truck.

...to Rollouts

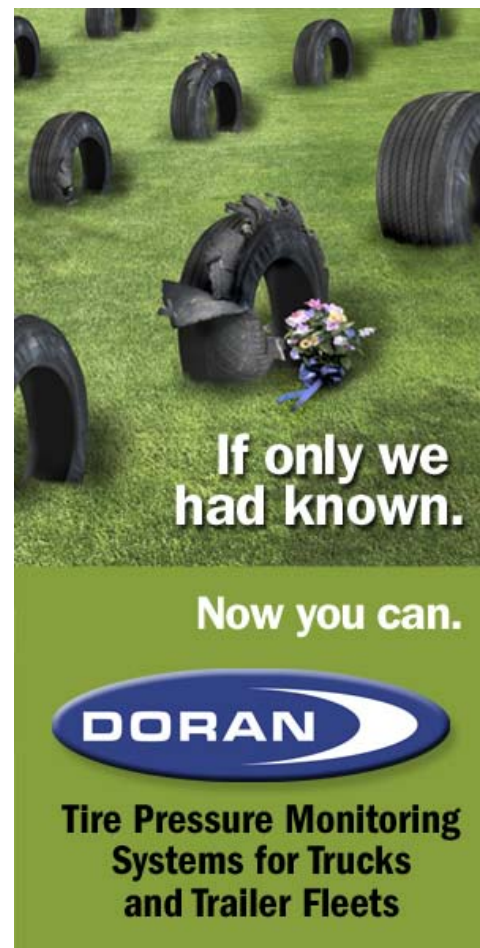
Although rolloffs located at collection points or commercial and industrial sites can now accommodate separate streams of recycling waste, most residential containers are too small for such extensive segregation. Nevertheless, there remains a need to distinguish recycle containers from rubbish containers, and both need to be durable, sturdy, and easy to use.

Round Rock Refuse, in Round Rock, TX, a privately owned company near Austin established in 1988, collects both trash and recycling, using ROC-95NB rollout carts from Rehrig Pacific Co. in Los Angeles, CA. Founded in 1913, Rehrig Pacific is one of the leading plastic pallet and container manufacturers. "We started using them years ago," recalls Round Rock's Ralph Rocco. "They're proven, have an excellent warranty, and good customer service."

The 95-gallon nestable metal catch bar carts are constructed of high-density polyethylene resin for durability and strength at critical wear and load-bearing points. "They last a long time," Rocco observes, estimating a typical cart's lifespan at over 10 years. "It's a significant difference from our old brand; they weren't as durable. Having a well-made product is huge. We don't like to have to pick up and replace damaged units. Any cart takes the same amount of time...until it breaks. If it's prone to breaking, it costs more." Fortunately, he adds, problems with Rehrig's carts are "very rare."

But even when the carts are new, delivering them is time-consuming. When Round Rock got a new municipal contract in January for 60,000 additional carts, Rehrig Pacific delivered to the street, Rocco reports.

That's one example of how Rehrig carts help them save time. When replacing their previous carts for Round Rock's 50,000 customers, Rocco says there was very little assembly to be done. "That's important when you're getting a truckload to put together. There are no screws. You just slip the axle through the base, snap on the wheels, and you're good to go."



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Because they're designed for both automated and semiautomated collection of household waste and recyclables, and feature reinforced lift points under the skirt and rim, as well as a freely rotating metal catch bar, pickup is also quick and easy.

Similarly, the carts are easy for the customer to use, Rocco says, with ample room and even cutouts in the lids for bottle, can, and paper recycling. A choice of 10-inch or 12-inch wheels makes them easy to maneuver, and different colored carts with descriptive lids makes it easy to distinguish recycle from trash carts. And an important point: they are stable. A wide, ground-hugging base ensures they aren't easily tipped over. "They're big recycle containers, so the wind doesn't blow stuff all over."

Reuse It or Lose It

Making it easier for the customer also makes waste management easier for the collection company. It's a sword that cuts both ways. "Our biggest challenge is training the customer," states Doug Owen, vice president of Arizona Pacific Recycle 1, based in Phoenix, AZ. To ease the pain of costly and time-consuming sorting for both customer and employee, the company uses different colored bins from Action Container Solutions for different types of items.

It can be complicated. There are 100 types of paper alone, and 10 types of cardboard. However, "the more we do, the less you make. If we just unload, we pay more." In fact, margins are so slim on recycled material, Owen says, it's not always cost-effective for his crews to add customers. "Everybody wants to recycle, but the economy has slowed down and it's hard to sell material. If a company is too far, we can't afford to send a truck and two drivers. We try to find a neighbor to make it cost effective." For those who don't have sufficient amounts, Arizona Pacific offers three dropoff facilities.

In such a competitive market, where netting one-fifth of a cent per pound is good, Owen says Arizona Pacific, like many other companies, now picks up trash to make ends meet. "We used to be able to choose the product we wanted to recycle," he elaborates. "Now we take the (trash) account to get the recycling. A lot of companies commingle like that. Waste Management was a hauling company that opened a recycling center for furniture. Now they have to diversify; they pick up recycling because there's money in it. Some companies even take foam from mattresses."

The younger generation is smart about recycling, he continues. Many are coming up with creative ways of keeping reusable waste out of landfills. Owen mentions an example in Las Vegas where foodwaste is taken to a pig farm. The program is working so well, the farm doesn't need to buy food for its 500,000 pigs. Others are joining in the green movement in different ways. He lists schools like Arizona State University that break down foodwaste and return it to the water system. Pet Smart uses shredded paper in easy-to-carry 50-pound bales for pets. Wood pallets are recycled for horse bedding and fertilizer.

If people don't take the initiative, Owen believes, it's just a matter of time until the government forces people to recycle. "Zero waste is coming," he predicts. Until then, the incentive is often financial. "It's better to recycle for no money than pay to dump trash." He mentions one company that saves \$24,000 per year by recycling instead of dumping.

For now, recycling is optional in most locations, although heartily encouraged and supported by municipalities. "A lot of cities supply compost cones for backyards. There are receptacles for everything, including medical waste like needles."

The receptacles used by Arizona Pacific are as diverse as the materials they contain. "We use 2-, 3- and 4-yard boxes for different types of businesses," Owen explains. "In underground parking, we use large, low-profile receptacles that we can pick up with a front-end loader or forks. They have different pockets."

In other situations, a high-profile container may be more suitable. "Action Compaction has a smart engineering crew," Owen says. "They make containers with different-size openings and different-size press heads." How they decide on the right container depends on the type of trash, how it's transported, if there is a loading dock, ramp, sufficient voltage, transformers, etc. "We audit the trash. We dump it on the ground, photograph it, weigh it, sort it."

For all but foodwaste, Owen says, a compactor and baler are used. Balers range in size, weight, height and can be solar-powered. "There are some solar-powered front-load receptacles at ASU that work great. They cost about \$50,000 each." He has a formula for placing equipment. "If they have only two bales a month, I'll use 20-to-30-year-old machines. If they do 10 to 15 bales a day, I give them newer equipment." Even then, he's watching costs closely. "If I buy a five-to-six-year-old machine for \$6,000, I pass the savings along. It can make the difference of getting the account or not."

Making the Switch to Plastic

TDS Collection Service doesn't have a problem getting customers in Torrington, WY, because the state mandated that greenwaste be separated from landfill waste and used for compost. However, the company's president, Gary Olson, had to make some adjustments on his routes.

For years, his automated side-loader trucks circulated through the small town north of Cheyenne, picking up solid waste in steel containers from 5,000 residential and rural customers. But when garden waste was added to his collection route 10 years ago, steel was out. "Greenwaste is 80% water/moisture," Olson says. "It eats steel alive."

In Wyoming, there weren't a lot of choices, he says, so he opted for poly dumpsters from Rotonics Manufacturing Inc. in Riverside, CA. Available in 2- and 3-cubic-yard sizes, the poly containers are lighter weight than their steel

counterparts, without worry about rust and corrosion. The low-maintenance material never needs welding or painting either. Because of its smooth interior surface that doesn't retain waste or odor, it's an appropriate option for foodwaste.

"I didn't think they'd stand up to the cold and handling," Olson recalls, "but they do." In fact, they are more durable than steel containers. For the past five years, he's been buying 30–50 at a time to add to his inventory. "I've got about 700 so far," he estimates. "Eventually, we'll move to all-plastic due to the cost of steel."

Plastic Surgery

Olson isn't the only one buying more plastic containers to replace steel. As division vice president of Waste Connection in Portland, OR, Jason Craft oversees all collection transfer within Oregon for residential, commercial, and industrial customers. "[Waste management] is now a collaborative process: The customer has to sort, and we're taking material to many destinations for further processing. Plastic works better for customers with heavier, sloppy or organic waste because there's no worry about rust and corrosion. It's also easier on the guys for push-outs. We only recommend steel to customers who have less weight, less liquid, and less organics."

Another advantage is that the return on investment for plastic containers is beginning to outpace that of steel. The cost of plastic has become very competitive with steel and is sometimes cheaper, Olson notes. "When steel goes up, plastic goes with it, but there used to be a premium on plastic. Now that that's gone, it's very competitive." Contributing to plastic's affordability is its long-term durability. "Its lifetime is probably longer than steel. Plastic is more durable and holds up with acidity." There's a downside, however. "They don't clean up from graffiti as well," Olson reveals. "Unfortunately, it is an issue."

They may not clean up well, but they're lightweight, which is a safety feature for employees. "I'd say the biggest benefit of plastic is safety. Plastic is lighter, so it moves around easier," Olson explains. "We're driving to a zero-incident culture, so anything to improve safety, driver performance, and driver environment is good."

They do clean up well on the inside, though. "Organics leave residue," Olson says. "The container, in effect, becomes the liner. You want the material to be clean when it's sent to organic compost." To combat that issue, he says, they're experimenting with weekly wash-outs using an onboard pressurized water system. It's one illustration of how the industry is changing. "It continues to evolve," Olson believes.

For an industry adapting to organic collection, plastic containers can be beneficial because they're watertight, eradicating spills and leaks. Kitchen waste involves pre- and post-consumer waste, Olson says. The heaviest dense material is collected in separate containers to go to compost—often in separate trucks to avoid contamination, but it adds time because there's so much liquid and moisture content. It also adds weight, so container size must be limited.

"Some manufacturers make organic containers with a locking lid and convex floor," Olson says. Waste Connection uses Double Impact Lids from Impact Plastics Corp. in Elgin, IL. These lids are made with 40% PCR, are vacuum-formed, have a reinforced, six-knuckle hinge line, with no bend in the center and a UVI package. The company also offers recycle chute lids, organics lids and a full line of container replacement parts, including casters, container bottoms, and other parts.

Handle With Care

Maintenance relies on the hauler, so choosing the right lift system could save on cart replacements and also improve efficiency. Carts take a beating 24/7, and replacements come at a hefty price.

Reducing the raw impact from dump cycles will drastically extend the life of the cart itself. "Necessity is the mother of invention," says Jon Bain, operations manager of Diamondback Products. Diamondback offers a line of lifters with a patented, spring-loaded technology that gently secures the bottom bar on carts and absorbs impact.

The lifter acts like a shock absorber and damage to the cart bottom bar is almost eliminated.

While in full dump position, a spring latch allows for more flexible and less damaging movement when compared with solid linkage systems. This "spring-action" also allows the operator to make easy and quick cart-lifter engagement during pickups.

Bain also explains how self-aligning ball bushings on the Diamondback lifters lend a hand in efficiency. Because there is no metal-on-metal contact due to the spherical motion of the pivots, the lifters are virtually frictionless. With thousands of lifts per week, this unique design involves fewer moving parts, therefore reducing downtime for maintenance and repairs. If maintained properly, Diamondback lifters often exceed the average life span of a typical lifter.

Diamondback offers a full cart lifter line that suits customizable needs and now offers new models that accommodate medical and industrial waste pickup applications.

Big Brother Is Watching the Garbage Man

Another indication of a changing industry is the use of technology to monitor drivers. Although Olson says RFID tags and routing software aren't typically used in Oregon, his trucks are equipped with global positioning systems and drive cams. "It's an event recorder on the dash, with a lens out front, [pointing] into the cab to catch risky behavior of the driver: crashes, adverse conditions, bumps..." He uses it as a training tool to promote safe habits and says it has been highly effective.

In general, the waste management industry has been slow to adopt new technologies such as radio frequency identification (RFID) tags, GPS and integrated routing software packages that enable data to be collected automatically. Particularly in larger cities, the benefits of these technologies are now recognized.

In West Bradford, PA, the department of public works recognizes the value of using RFID tags. "We're not tracking individual drivers," says Randy Behmke, director. "We have only four trucks. We're tracking missed houses and houses not participating in the recycling program. It's state law here: you have to recycle."

However, because the department uses 96-gallon carts, Behmke realizes that some customers may not put out recycling every week. Keeping track of 4,000 customers is an onerous task, so the DPW invested in a system from Schaefer Systems, based in Charlotte, NC. "Schaefer has the most advanced system," Behmke believes. "They have the most reports; it's the most comprehensive. We can do the most with it.

"Before the system," he continues, "we did no reports. There was no way to track a missed stop, no way to tell if a house was not participating." Since incorporating the RFID tags, he's been able to determine that they have 60%–70% participation in the recycling program. It also enables him to attempt to improve that percentage, important not only from a regulatory standpoint, but also from a financial one. "When we went to single-stream recycling, we saw reductions in the amount of trash. We're getting money back from single-streaming: \$23 per ton for recycling versus paying \$60 per ton to dump."

The RFID system allows Behmke to run many kinds of reports. Data from the reports is sent via letter to remind and inform the customer of their obligation to recycle. "Technically, they can be fined if they don't participate."



Reports help the DPW meet the state requirement of reporting annual collection amounts. They also serve other purposes. "We can tag a house if a cart is broken or if there's trash in the recycling (or vice versa). The last trash pickup of the month allows one bulk item; if it's too big, we can tag the house so two guys can go back with a truck to get the item." It also provides real-time information so the staff can respond to call-ins from customers to verify pickups.

Each recycling cart has a tag and each house has a cart number. The trucks are automated; every time the arm contacts a cart, the computer system records it. Interactive buttons allow drivers to put additional information into the system also. "It's one more thing for the drivers to keep track of, to do," Behmke admits, "but they understand that it makes us more streamlined, more efficient—and it saves them from running across town to pick up missed carts." Behmke is so impressed with the system, he says all new carts the West Bradford DPW buys will have the chips, and they'll add stick-ons to the refuse carts as well.

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