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## Management

The Journal for Municipal Solid Waste Professionals

NOVEMBER/DECEMBER 2009

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# MRFs and Diversion



Northshore Manufacturing

**By Carol Brzozowski**

**MRF equipment suppliers are developing new technologies to divert more materials away from landfills.**

**S**olid waste operations are seeking equipment that provides efficiencies and accuracy against a backdrop of safety and ease of maintenance.

The current trend is targeting “zero landfill,” points out Becky Smith. She’s the marketing supervisor for the Marathon Equipment Co., which manufactures onsite waste compaction and recycling systems.

“When there is financial incentive and the material has payback value, it is not a hard sell,” she says. “The value of recyclables is rebounding slowly, but for some materials, recycling is cost-prohibitive.

“Although recycling is the responsible thing to do for our planet, in many cases the materials end up in the landfill, as it costs more to process them than the commodity is worth. Unless the program is subsidized, there is no financial incentive to recycle some materials.”

Smith sees more businesses restructuring contracts on materials and removing the

“floor price” for the materials.

“When commodity prices fall low enough to make the recycling cost-prohibitive, there is a processing fee assessed in lieu of material rebates that most material generators have grown accustomed to,” says Smith.

Municipal solid waste operations are on the lookout for ways to not only reduce space needed to store solid waste, but to generate income as well.

Such is the case in Valdosta, GA, where the use of a DuraTech Industries tub grinder is helping the municipality do both. Valdosta uses Model 3010, a fifth-wheel with loader industrial tub grinders to process all of the city’s yardwaste.

Of its many features, Robert Bryant, the maintenance superintendent for Valdosta’s solid waste operation, favors its automation. The 7000 Series Grapple Loader enables the operator to stay in the machine throughout its use, providing an advantage for efficiency and ergonomics.



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Excel

**Ultimately, the only measure that really counts is that of bales on the ground.**

The tub grinder also features a C15 Caterpillar Tier III electronic diesel engine with an enclosed engine compartment, a rotary self-cleaning screen, a command console, a PT-TECH HPTO 14 wet clutch, a single-drive orbit motor, a 44-inch rotor, a hydraulically-operated tub cover, a wide belly belt, and a stacking conveyor.

The municipal solid waste operation picks up yardwaste curbside from throughout the city.

“In the past, we took it to an inert landfill which naturally, over time, turned into mountains,” says Bryant. “It was so high, it was almost like a landfill. That’s when we did a little research and went to using the tub grinder.”

Now all yardwaste is taken to the city’s compost site, where it is ground into mulch and some of it is turned into compost.

“It has really reduced the amount of space we had to have in the past,” points out Bryant. “Plus, we can sell the mulch and bring back some type of profit.”

The mulch is sold commercially. Mulch is offered to residential clients at no cost. Valdosta’s parks department also uses the

mulch for ground cover and erosion control.

School groups also are given tours of the facility in order to inspire the younger generation to think about what they throw out and what happens to it after they do.

Bryant says before Valdosta invested in the tub grinder, “we researched other machines, but this machine has just run flawlessly.”

In researching for a tub grinder, Valdosta solid waste managers were looking for a piece of equipment that would be large enough to handle the operation’s needs.

“Sometimes if you buy just enough for what you need, then you wind up overworking it,” Bryant points out. “We wanted to get something that was at least a mid-grade tub grinder or heavier duty.”

Bryant also considered safety options as a priority.

“With this equipment, if something ever gets held up in it, it would automatically kick out and shut down,” he says. “It had a lot of safety options and features other companies did not have. It is very well-designed.”

Bryant says maintenance on the tub grinder has been minimal over the past three years Valdosta has had it in service.



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"It has a great service record," he says, adding that as such, the city has had little downtime on the machine, and that's mostly to replace the cutting teeth as needed. It took city workers about three days to learn to operate it, and doing so became natural to them after a few weeks, Bryant says.

Bryant notes that the tub grinder is time- and energy efficient due to the fuel it consumes for the amount of material it grinds.

"This machine has the largest fuel tank available," he says. "This thing runs eight hours a day and we fill it with about two weeks worth of fuel."

Factors such as safety, maintenance, automation, accuracy, and through-put are those elements municipalities such as Valdosta consider when seeking a return on the investment in equipment that will help them achieve those goals.

Safety is a prime issue among equipment manufacturers.

"Every year, there are addendums to the ANSI and OSHA standards," Smith points out in reference to safety. "As the equipment and the processes change, the safety regulations change with them to provide the safest environment possible to the equipment operators.

"With the increased level of automation, operators are doing fewer manual tasks, therefore reducing exposure to on-the-job injuries," she adds. "Operator training and thorough equipment manuals are also under constant review and alteration to be current and accurate."

With any accident having the potential to be a major one in the baling industry, safety is of prime importance, says Todd Wondrow, president of Excel Manufacturing, a baling equipment supplier.

While he notes his company is active with WASTECC's standards committee responsible for the ANSI Z245 baler safety standard, "unfortunately, far too many baler accidents can be all or partially attributed to improper operation and/or blocked-out safety features," he says.

"We try to develop features that are not only safe, but encourage the operator to use them as a benefit to their work. Our Mobile Command is a good example of a system that reduces work for the material feeder, yet makes it safer for him or her to complete their job."

Maintenance is a key factor in the longevity and efficiency of a MRF operation, says Smith.

"Our customers are provided a manual

with detailed descriptions of the preventative maintenance items for each piece of equipment," she says. "There are recommended spare parts lists included as well as specifications for hydraulic oils, maintenance intervals, and safety concerns such as lock-out/tag-out."

The ability to diagnose electronic systems is a "hot topic" these days, says Wondrow.

His company used diagnostic telephone modems as a standard option in the mid-1990s and has since expanded its diagnostic

and communication capabilities to include Ethernet connections that allow company technicians access to a baler directly over the Internet. The Ethernet-capable hardware also offers the option of WIFI and cellular wireless connections if necessary.

"With these new communication capabilities, we are developing many new reporting and diagnostic options that are already helping our customers monitor production from their office desktop computers and possibly a laptop on the other side of the world," Won-

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## UNIQUE RECOVERY SYSTEM EXCEEDS EXPECTATIONS

GreenWaste Recovery of San Jose, CA, recently marked the first anniversary of a highly successful dual line MRF by reporting a recovery rate of nearly 80% of the recyclables from the city of San Jose's MSW wastestream. The dual-line system procured from Bulk Handling Systems (BHS) of Eugene, OR, also efficiently processes single-stream material in the same facility.

San Jose has long enjoyed a reputation as a recycling leader. The city's landfill diversion rate of 62% is among the highest in the nation. However, with the city's goal of achieving zero waste by 2022, it was clear to city officials that more would need to be done in pursuit of this target. GreenWaste Recovery worked closely with BHS to analyze the remaining recovery opportunities in the San Jose wastestream. "We routinely find that, even with outstanding curbside and commercial recycling programs that collect at the generation point, 40% to 50% of the remaining wastestream may still be recoverable," says Eric Winkler, BHS northwest regional sales manager. "This number climbs to 80-plus percent if there is a desire to capture foodwaste."

The MSW material GreenWaste Recovery receives varies from day to day, says Frank Weigel, chief operating officer. "Some days it's rich in normal recyclables; other days, the material is more on the organic side." The bulk of the commercial material the facility processes is from restaurants and is rich in organic material as well as in high-density polyethylene (HDPE), polyethylene terephthalate (PET) containers, aluminum cans, and ferrous metals. "We also do a little bit on the commercial side from offices with paper-rich loads," Weigel adds. GreenWaste Recovery's processing system has been designed to handle all of these various in-feed materials and features screens that are designed for processing mixed MSW material containing high levels of residue and film. "The key to this system is that it is really flexible to be able to handle the combination of material: single-stream, commercial loads and MSW," says Weigel.

While the GreenWaste Recovery MRF has been able to recover 80% of the recyclables from incoming MSW material, most "dirty" MRFs achieve much lower recovery rates of from 15% to 25%, including organics, and are heavily reliant on manual sorters. The GreenWaste Recovery system, however, relies primarily on a patented automated sorting process developed by BHS that incorporates screening, air systems and optical sorting technology, translating into significantly lower processing costs per hour.

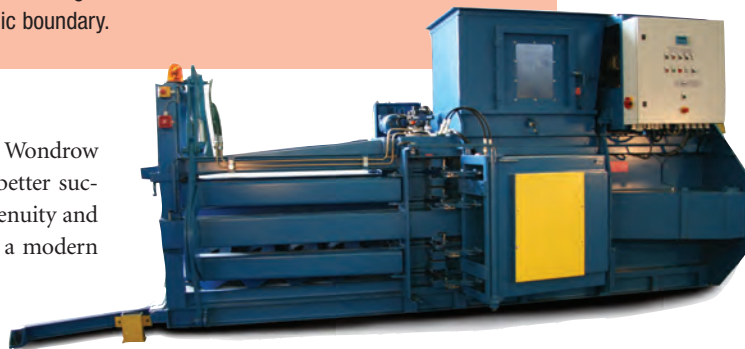
As many communities strive to divert more material from landfills, dirty MRFs, or facilities that recover recyclables from municipal solid waste (MSW), are likely to grow in popularity. According to BHS President Steve Miller, the focus on increased diversion is not the only factor that works in favor of facilities similar to GreenWaste Recovery's MRF. Concerns about greenhouse-gas emissions, energy use, and energy production could all lead to increased interest in these types of facilities. "The best way to reduce greenhouse gas emissions is to stop material from going into the landfill," he adds. While California has traditionally led the effort to increase landfill diversion rates, Miller says the concept of a dirty MRF that can achieve a level of diversion on par with GreenWaste Recovery's has broad appeal. The cost savings and environmental benefits of such facilities, he says, know no geographic boundary.

drow points out.

As for industry automation, Wondrow argues that it's difficult to find a better success story in the application of ingenuity and technology than what's evident in a modern day MRF.

"A combination of magnetics, eddy current, infrared, machine vision, X-ray, and mechanical sorting cause plastics, cans, paper and OCC to seek out their respective bunkers as if they had a mind of their own," Wondrow points out. "This wide variety of recyclables being sorted in massive volumes all within one facility require processing for shipment fast and often."

What it has meant to his company is that now its equipment must be able to process



Harris Baler

**Solid waste operations are seeking equipment that provides efficiency and accuracy against a backdrop of safety .**

high volumes of products and perform on-the-fly commodity changes, Wondrow says.

To that end, his company has responded with technologies that allow its balers to be fed and materials to be changed with no operator present on the baler platform.

"These systems reduce mistake and minimize labor costs, which can easily budge out profits in today's tight markets," he says.

Smith is seeing more automation coming into the field relative to specific types of materials.

"Automation is growing from the way the material is picked up to how it is sorted and processed into the reclaimed product," she says. "For example, you can now throw insulated copper wire into a machine and it is chopped and separated to the point where the insulation comes out independent of the clean copper."

Excel manufactures a wide range of balers, from 20-horsepower single-ram horizontals up to 200-horsepower two-rams.

"Despite the recently lower commodity prices, a surprisingly strong segment of our business has been our large two-ram machines," says Wondrow. "In many cases, these large two-ram balers are placed where historically open-end auto tie balers would have been used." The reason for this change is twofold, says Wondrow.

"First, the typical cost of wire is significantly reduced when replacing an open-end auto tie with a two-ram," he says. "This wire cost savings dramatically reduces processing cost per ton.

"Second and no less important is the ability of the two-ram balers to make rapid-clean changes from one material to another without cross-contamination and virtually no production downtime."

Wondrow points out that one can hardly watch a NASCAR Sprint Cup series race without hearing a commentator say, "Races are won and lost in the corners.

"Similarly, having the fastest baler in today's MRFs just isn't enough," he adds. "A baler must be fast, but if turning the corners—such as switching from OCC to mixed paper to UBCs and back—causes

significant slowdowns, then all the speed is for naught."

Necessary to an efficient MRF operation is equipment accuracy. Tom Musschoot, marketing director for General Kinematics Corp., which manufactures vibratory processing equipment, points out there are a host of screening technologies on the market that do an efficient job, depending on the desired outcome.



Bulk Handling Systems

**Throughput is only restricted by the money that operators are willing to spend.**

“Innovations such as optical sorting have taken automated processing to the next level,” says Smith. “Material contamination is counterproductive and often results in a less valuable end product or a complete rejection of the material being recycled.”

But automation also needs to be paired with accuracy and accuracy is a cornerstone of efficiency.

Wondrow says Excel has worked for 15 years to perfect its Autonetics system to automatically control the baling process to create optimum target size bales, consistent weights, reduce shear/eject jams and in so doing, eliminates the need for a baler resident operator.

Wondrow cautions that throughput is a “buyer beware” scenario.

“Oftentimes, baler purchase decisions are made based on cycle time published on an equipment brochure,” he says. “Unfortunately, this is ‘dry cycle time,’ which means no load. Choosing a baler based on dry-cycle time is about as valid as choosing between two sports cars based on which one spins the tires faster when lifted up on jack stands. Unless you’re planning to bale air, the best shopping strategy is to visit current equipment owners doing similar commodities.

“This is a benchmark that not only measures cycle time, but also all of the other functions of the baler. After all, two balers may have identical cycle times, yet one may jam far more often, or material changes may require significant operator action and time.”

At the end of the day, the only measure that really counts is how many bales are on the ground and how much labor did it require to get them there, Wondrow says.

Throughput is only restricted by the amount of money MRF operators are willing to spend on the equipment, says Smith, adding that there are systems available to handle just about any volume generated.

Depending on the quantity of municipal solid waste material coming into the facility, “you can get between 100 and several hundred yards per hour out of a properly supplied system with an efficiency of anywhere between 60% and 90%, depending on the amount of equipment you employ and the amount of labor that’s involved in the process,” she says.

One of the most significant changes taking place in the industry is energy savings, Wondrow points out.

“Regardless of whose baler you looked at, the old school was huge cylinders with huge vane pumps moving massive amounts of oil,” says Wondrow. “This required enormous oil reservoirs and oil coolers just to deal with the heat and wasted energy.”

Wondrow says in 1991 his company took its cues from changes made in the aerospace industry “and for the same reasons of reliability and energy efficiency, we pioneered the use of piston pumps in an industry where vane pumps ruled.

“In the same way that the high-pressure, more efficient piston pumps contributed to more reliable and efficient aircraft, these benefits were designed into our smallest as well as our largest balers and have now proved effective for 18 years.”

Throughout 2009, high-pressure piston pump systems are aggressively being adopted across the baler industry for their high efficiency, long life, and the reduced creation of wasteful and damaging heat, says Wondrow.

“The net effect for MRF operators is they

pay less money in energy costs and get more work done,” he adds.

MRFs are essentially beholden to what comes in through the door, which may be beyond their control.

Placing requirements on the presentation of recyclables to the MRFs “is a step backward,” Wondrow believes.

“I remember years ago when residential recycling was just getting started and you were required to sort paper from cardboard from clear glass from green glass and so on,” he says. “These requirements just didn’t fit the average suburban kitchen, and since family members aren’t generally campaigning for the position of household recycling coordinator, the requirements ultimately caused a significant portion of the recyclable stream to be landfilled.”

Smith believes that change will come through a myriad of educational efforts.

“Kids are learning about recycling at a young age in school and older adults are being educated through community programs,” she says. “Public and private trash hauling/recycling companies are very involved in educating their customers about recycling and giving them alternatives to the landfill. Municipalities are mandating recycling in many areas.”

Musschoot says one Chicago neighborhood requires residents to separate materials, and those who don’t are actually billed back for not doing so.

“People have become very diligent in pulling out their recyclables before they just dispose of them,” he notes.

Smith believes the supply stream is improving with time.

“Materials are better separated and cleaner than years ago, resulting in less processing time and a better product output,” she says. “People are also better educated on what materials make up the supply stream. Efforts such as labeling recycling cans and having openings to accept the proper materials make a big difference.”

Public outreach programs are certainly beneficial to recycling, points Wondrow.

“The majority of people are unaware that simple actions or decisions they make can profoundly affect the recyclability of their waste,” he says. “Provided doing the ‘right thing’ doesn’t significantly inconvenience the consumer, I believe they will do what’s best if they know what’s best.”

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