

**Stress Management:**

Dumping Your  
Mental Trash

Page 34.

**Emergency Planning:**

Ensuring that Your  
Emergency Plan Will  
Not Fail Page 38.

**Waste-By-Rail:**

Planning for  
the Future  
Page 44.

Shop at the MarketPlace!  
Page 63.

Recycling/Transfer  
Stations/Landfills Section  
Page 49.

www.wasteadvantagemag.com July 2013 Vol.4, No.7

# WasteAdvantage magazine

The Advantage in the Waste and Recycling Industry

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**The Anatomy of a Waste Handler**

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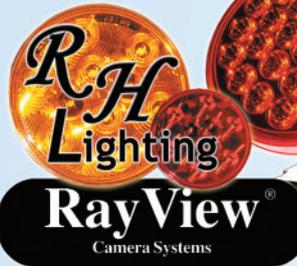


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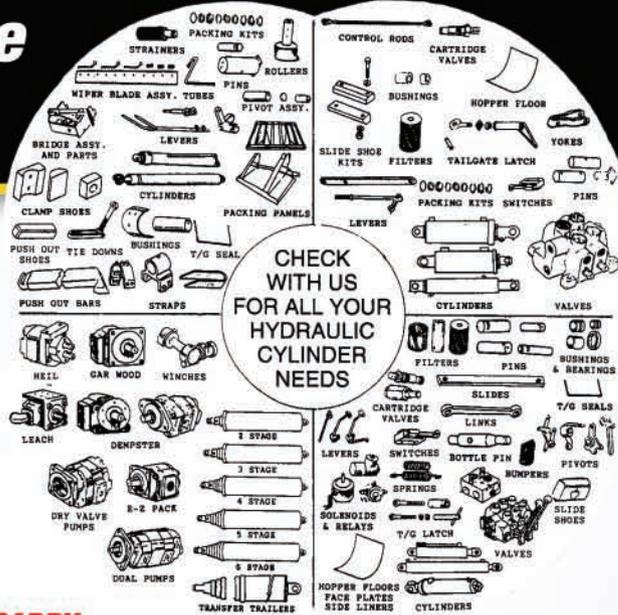
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**SEE MORE OF OUR INVENTORY ON PAGES 98-101.**

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## Editor's Note



### WELL, SCHOOL IS OUT, CAMP IS IN AND I HOPE ALL OF YOU ARE STAYING

cool in the hot, and sometimes humid, weather that comes in these summer months. Remember to stay hydrated, put on sunscreen and wear loose-fitting clothing in order to beat the heat as much as you can while still on the job. Summer fatigue is a big part of safety concerns during this time of the year and this is the time to review your procedures to make sure of your employees' well-being, not only within any facility, but also out on the road. In fact, our special section this month focuses on safety trends (starting on page 18) covering some tips and strategies, from engaging employees in a safety culture to preventing backover accidents as well as a discussion about where safety stands now and what things the industry still needs to focus on in order to keep moving in the right direction.

This issue's spotlight (page 14) features SA Recycling, a California scrap metal recycling company that has taken its processes to a whole other level, charging forward with new ideas and meeting any challenge. "The Anatomy of a Waste Handler" (page 30) outlines factors to consider when specifying that type of machine for your operation, while "Three Steps to Help Ensure Your Emergency Plan Will Not Fail" (page 38) gives some advice on how to deal with being ready for any crisis and integrating an effective contingency plan. This is especially important considering the many natural weather disasters that we have had this year already. Finally, "The Garbageman's Guide: Letting the Inner Garbageman Take the Wheel" (page 34) takes a different approach to things by showing you how to keep a clear head and an open mind so you'll be ready for anything.

And stop by our Recycling/Transfer Stations/Landfills section and check out "Biochemical Clogging of Landfill Leachate Collection Systems" (page 50) and find out what it is and how to prevent it. In addition, "Implementing a Pay-As-You-Throw Program" (page 56) and "Clea Types and Patterns" (page 58) for compactors are great articles to review as well.

Because *Waste Advantage Magazine* is committed to sustainability and best practices for hazardous chemical reduction in the waste and recycling industry, we, in partnership with Green Endeavor, are in the process of creating an industry award for those haulers and recyclers that have reduced or are in the process of reducing its hazardous chemical use, taking a proactive approach to fluid regulations and are committed to sustainable practices. Log on to our Web site at [www.wasteadvantagemag.com](http://www.wasteadvantagemag.com) for full details along with an application form and other information. As always, feel free to contact me with any comments, topic suggestions, concerns, questions, etc. I look forward to hearing from you.

Best Regards,

Angelina Ruiz  
Editorial Director  
[angelina@wasteadvantagemag.com](mailto:angelina@wasteadvantagemag.com)

---

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The Advantage in the Waste and Recycling Industry

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# In This Issue

July 2013 Volume 4, Number 7

## 14 In the Spotlight

### SA Recycling: Recycling Redefined

Dedicated employees, innovative processes and environmentally business practices keep this company ahead of the recycling curve

## Safety Trends

## 18 Safety: An Ongoing Issue

Even though safety has improved in some areas, there is still a lot of work to be done.

## 22 Don't Waste the Opportunity to Prevent Backover Accidents

While many waste management companies are embracing backing safety with various combinations of spotters, rear-facing cameras and obstacle detection systems, statistics show that continued improvements are in order.  
BRIAN DIEHL

## 25 Empower Your Change Drivers: Strategies for Engaging Employees in Safety Culture Improvement

Understanding how to successfully engage and empower your workforce is key to ensuring that your organization can start and continue the journey toward safety culture excellence.  
BRETT HASKINS, CSP

## 30 Material Handling Equipment: The Anatomy of a Waste Handler

Tier 4 engine solutions, special guarding packages and application-specific tire options are just a few of the factors to consider when specifying a waste handler for your waste or recycling operation.  
ROB MARRINGA

## 34 Workplace Dynamics

### The Garbageman's Guide: Letting the Inner Garbageman Take the Wheel

Getting rid of your mental clutter is mission-critical to keeping a clear head and an open mind.  
NORM LEMAY AND STEVEN KAUFMAN

## 38 Emergency Planning

### Three Steps to Help Ensure that Your Emergency Plan Will Not Fail

The success or failure of your plan does not depend on how well it is written or conforms to an external standard. It depends on your understanding of the nature of crisis and the level to which you have integrated your plan with your business processes and workplace culture.  
LUCIEN CANTON

## 40 Maintenance Case Study: Driven by Data

Casella Waste Systems uses maintenance data to bolster its waste services.  
MONICA TRUELSCH

## 44 Waste by Rail

### Railcar Supply: Planning for the Future

Securing the railcars you need for today and in the future will help your supply chain to thrive.  
JULIE MINK



## On the Cover:

SA Recycling's Port of Long Beach location loads its first shipment of iron ore this past March.

Photo courtesy of SA Recycling (Orange, CA).

## In Every Issue:

4 Editor's Note

8 Trash Talk

10 Mark Your Calendar

12 Government Gossip

46 Breakthroughs and Innovations

49 R/T/L Section

108 Ad Index

# 63

## ADVANTAGE MARKETPLACE

The place for ONE-STOP-SHOPPING TO FIND ANY EQUIPMENT to fit your needs. Turn to this featured section to discover who is selling what in the solid waste industry today.

Photos courtesy of CASE Construction, Casella Waste Systems and Caterpillar.



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## Wayne Engineering Fills Director of Sales Position

Todd Morrison has recently been promoted to **WAYNE ENGINEERING's** (Cedar Falls, IA) Director of Sales and National Accounts. A 20-year veteran of the waste industry, Morrison has held a variety of roles at Waste Management, Waste Industries, Toter and EZ Pack Manufacturing. Morrison has moved from sales to regional manager positions, developing national accounts, specializing in residential and commercial hauling operations as well as municipal and private markets. With Wayne Engineering, Morrison has developed the business working with Casella, Waste Connections, Waste Pro and other larger hauling companies. Now, taking on a new role, Morrison looks forward to the challenges that come with the position. "I will continue to mentor the guys that I have now, traveling with them to make sure that they are cultivating the business that we have and teaching them how to sell to the private market. I will also monitor the day-to-day business and ensure we are being competitive within our industry." Morrison continues, "My goal is to be a 50/50 company, where 50 percent of our business is private haulers and 50 percent municipalities. When you achieve that, you have a good balance regardless of what happens with the economy." Another part of Morrison's role is to bring more awareness to Wayne Engineering's power-on-demand hydraulic system. "It's the next level of technology for our industry. We have a long way to go but we've certainly made a big stride."

*For more information, call Todd Morrison at (336) 420-4841 or [tmorrison@wayneusa.com](mailto:tmorrison@wayneusa.com).*



**Todd Morrison**

## Composting Said to Create More Jobs

**THE INSTITUTE FOR LOCAL SELF-RELIANCE** (ILSR) (Washington, DC) has published a study of composting, incineration and landfilling job support in Maryland. ILSR determined that employment at composting plants averaged 4.1 full-time equivalent workers per 10,000 tons per year processed, with smaller facilities having relatively more staff than their larger counterparts. In contrast, the research showed that landfills and waste-to-energy plants average 2.1 and 1.2 employees per 10,000 tons per year, respectively. ILSR found that composting also created employment beyond the basic processing operations, which the alternatives did not. Use of compost products were estimated to raise job numbers by 6.2 workers per 10,000 tons per year

Survey data show, further, that jobs sustained per dollar of capital investment also favor composting by a factor of three with respect to landfills and 17 compared with incinerators. Composting becomes even more attractive, according to ILSR, because a third to a half of the municipal solid waste generated in Maryland can be recycled in this manner.

*For more information, visit [www.ilsr.org](http://www.ilsr.org).*

## Mike Iafigliola Named New Product Development Manager

**AKRO-MILS** (Akron, OH) announces that Mike Iafigliola has been named New Product Development Manager. In his new position, Iafigliola will drive Akro-Mils' revenue growth through development, implementation and execution of new products and innovation initiatives.

Prior to joining Akro-Mils, Iafigliola was Commercialization and Marketing

Project Manager at MTD Products Inc., where he was responsible for developing and managing new products for the outdoor power equipment market.

*For more information, visit [www.akro-mils.com](http://www.akro-mils.com).*

## Wayne Grundmeier Named National Account Sales Manager for New Way Trucks

**NEW WAY TRUCKS** (Scranton, IA) has recently appointed Wayne Grundmeier as the National Account Sales Manager. Having held similar positions with Heil, Autocar and most recently American LaFrance as VP of their Commercial Products Group, Grundmeier brings extensive experience in servicing both national and mini-national accounts in the waste management industry. After hearing positive remarks from customers about the quality of New Way trucks and witnessing the manufacturer's growing visibility in the refuse truck industry, Grundmeier seized the chance to work for the company when it arose. "I think it's one of the best opportunities I've seen in a long time," says Grundmeier. "New Way is a company that has a brilliant future in front of it." Grundmeier's focus will be providing information and arranging demonstrations for companies in the upper echelons of the industry in order to continue growing New Way's market presence.

"We are extremely pleased to add a person of Wayne's caliber to the New Way sales team," said Phil Allen, New Way VP of Sales and Marketing. "Wayne's hiring further exemplifies New Way's commitment to our customers and putting the best people available in key company positions."

*For more information, visit [www.newwaytrucks.com](http://www.newwaytrucks.com).*



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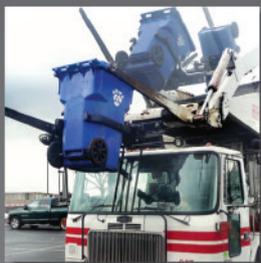
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# Mark Your Calendar



## JULY 2013

### 24 – 26: PROPs 23rd Annual Recycling & Organics Conference

The Woodlands Inn & Resort  
Wilkes-Barre, PA  
[www.proprecycles.org](http://www.proprecycles.org)

### 28 – 30: 2013 Summer Conference

Hyatt Regency Sarasota  
Sarasota, FL  
[www.swanafl.org](http://www.swanafl.org)

## AUGUST 2013

### 15 – 17: Florida League of Cities' 87th Annual Conference

World Center Marriott  
Orlando, FL  
[www.floridaleagueofcities.com](http://www.floridaleagueofcities.com)

### 21 – 23: 8th Annual Georgia Environmental Conference

Jekyll Island Club Hotel  
Jekyll Island, GA  
[www.georgiaenet.com](http://www.georgiaenet.com)

### 25 – 28: APWA International Public Works Congress & Exposition

McCormick Place  
Chicago, IL  
[www.apwa.net](http://www.apwa.net)

### 26: Recycling Innovators Forum

Louisville Convention Center  
Louisville, KY  
[www.recyclinginnovators.com](http://www.recyclinginnovators.com)

### 27 – 28: Resource Recycling Conference

Marriott Louisville Downtown  
Louisville, KY  
[www.resource-recycling.com/rr\\_conference/index.html](http://www.resource-recycling.com/rr_conference/index.html)

### 27 – 30: SWANA Quad State Conference 2013

Kingston Plantation  
Myrtle Beach, SC  
[www.scswana.org](http://www.scswana.org)

## SEPTEMBER 2013

### 10 – 11: NSWMA Southeast Annual Conference 2013

The Westin Savannah Harbor Golf Resort  
Savannah, GA  
[www.environmentalistseveryday.org](http://www.environmentalistseveryday.org)

### 10 – 12: National Advanced Biofuels Conference & Expo

CenturyLink Center Omaha  
Omaha, NE  
[www.advancedbiofuelsconference.com](http://www.advancedbiofuelsconference.com)

### 11 – 12: E-Scrap 2013 Conference

Omni Orlando Resort at Championsgate  
Orlando, FL  
[www.e-scrapconference.com](http://www.e-scrapconference.com)

### 15 – 17: Waste Conversion Technology Conference & Trade Show

Hyatt Regency Mission Bay Spa & Marina  
San Diego, CA  
[www.waste-to-fuels.org](http://www.waste-to-fuels.org)

### 17 – 19: WASTECON 2013

Long Beach Convention Center  
Long Beach, CA  
[www.wastecon.org](http://www.wastecon.org)

### 23 – 25: 23rd Annual ARC Conference & Trade Show

Best Western Inn of the Ozarks  
Eureka Springs, AR  
[www.recycleark.org](http://www.recycleark.org)

### 24 – 25: NSWMA South Central Annual Conference 2013

Hyatt Regency Hill Country Resort  
San Antonio, TX  
[www.environmentalistseveryday.org](http://www.environmentalistseveryday.org)

## OCTOBER 2013

### 1 – 2: NSWMA Heartland Annual Conference

Quartz Mountain Resort  
Lone Wolf, OK  
[www.environmentalistseveryday.org](http://www.environmentalistseveryday.org)

### 7 – 9: 2013 Iowa Recycling & Solid Waste Management Conference

Hilton Garden Inn  
Council Bluffs, IA  
[www.iowaconference.org](http://www.iowaconference.org)

### 7 – 11: ISWA World Congress 2013

Reed Messe Wien  
Vienna, Austria  
[www.iswa2013.org](http://www.iswa2013.org)

### 8 – 9: NSWMA Mid-Atlantic Annual Conference 2013

The Grove Park Inn Resort & Spa  
Asheville, NC  
[www.environmentalistseveryday.org](http://www.environmentalistseveryday.org)

### 10 – 11: Recycled Rubber Products Technology Conference

Tropicana Hotel  
Las Vegas, NV  
<http://recycledrubberproducts.org>

### 14 – 16: NSWMA/WASTEC Executive Roundtable Conference 2013

The Ritz-Carlton, Palm Beach  
Manalapan, FL  
[www.environmentalistseveryday.org](http://www.environmentalistseveryday.org)

### 16 – 18: Paper Recycling Conference

Marriott Downtown Magnificent Mile  
Chicago, IL  
<http://americas.paperrecyclingconference.com>

### 20 – 23: 13th Annual Conference on Renewable Energy from Organics Recycling

Hyatt Regency Columbus  
Columbus, OH  
<http://biocycleenergy.com>

### 29 – 30: World Bio Markets USA: The Race for Scale

Parc 55 Hotel  
San Francisco, CA  
[www.greenpowerconferences.com](http://www.greenpowerconferences.com)

### 29 – 30: Northeast Recycling Council 2013 Annual Conference

Northampton Hotel  
Northampton, MA  
[www.nerc.org](http://www.nerc.org)

## NOVEMBER 2013

### 12 – 14: Renewable Energy World Conference & Expo North America

Orange County Convention Center  
Orlando, FL  
[www.renewableenergyworld-events.com/conference.html](http://www.renewableenergyworld-events.com/conference.html)

### 13 – 14: Small-Mid Scale LNG Infrastructure Conference

Sheraton Houston Brookhollow Hotel  
Houston, TX  
[www.lngsupplyevent.com](http://www.lngsupplyevent.com)

### 18 – 21: 2013 North American NGV Conference & Expo

Georgia World Congress Center  
Atlanta, GA  
[www.cleanvehicle.org/conference](http://www.cleanvehicle.org/conference)

### 20 – 21: Canadian Waste and Recycling Expo 2013

Palais de Congrès de Montréal  
Montréal, QC  
<http://canadian-waste-recycling-expo-us.messefrankfurt.com>

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## Government Gossip



### Vermont Governor Signs Paint Stewardship Bill into Law

Vermont Governor Peter Shumlin signed a bill last month that will require manufacturers to fund and operate a post-consumer paint take-back program across the state. This law, which was passed by both houses of the legislature in late May, ensures the environmentally responsible end-of-life management of leftover architectural paint throughout the State of Vermont, while shifting the managerial and financial burden away from the state and local governments. The passage of H262 makes Vermont the sixth state in the nation to implement an extended producer responsibility law for paint based on a model program facilitated in 2007 by the Product Stewardship Institute (PSI). PaintCare, Inc. will fund and oversee the implementation of Vermont's program, as it has done and will do for the other states. Similar to the other paint take-back programs, Vermont's program will be funded through a small per-container fee that manufacturers pay to PaintCare. Manufacturers pass the fee onto retailers, who then pass it on to consumers at point-of-sale. These paint recovery fees fund the entire take-back program, including collection, transportation, recycling, public outreach and administration. All architectural paint manufacturers that sell their products in Vermont are required to register with the PaintCare program.

For more information, visit [www.paintcare.org](http://www.paintcare.org).

### Senate Introduces the "LNG Excise Tax Equalization Act of 2013"

In June, the U.S. Congress took an important step in advancing the use of clean, domestic natural gas in heavy-duty applications by introducing bipartisan legislation to equitably tax liquefied natural gas (LNG) as a

transportation fuel. Senators Michael Bennet (D-CO) and Richard Burr (R-NC) introduced the legislation, titled the "LNG Excise Tax Equalization Act of 2013" (S.1103). The bill makes a simple but important modification in the way LNG is taxed as a transportation fuel. Currently, the federal highway excise tax on both diesel and LNG is set at 24.3 cents per gallon (Internal Revenue Code 4041). However, it takes about 1.7 gallons of LNG to equal the energy content of one gallon of diesel. The result is the taxation of LNG at a rate 70 percent higher than diesel on an energy equivalent basis. This legislation changes the way LNG is taxed—from a volume (gallon) to an energy content (diesel gallon equivalent) basis.

For more information, visit [www.ngvamerica.org](http://www.ngvamerica.org).

### Governor Signs CT Mattress Recycling Bill First-in-Nation Law

Governor Dannel Malloy has signed the nation's first mattress stewardship bill into law in Connecticut. House Bill 6437, signed at the end of May, was passed by the state legislature in early June. This historic law will result in an estimated \$1.3 million cost savings for local governments, and will increase opportunities for recycling businesses in the state. This law will require the mattress industry to develop a single stewardship organization that will provide free collection and recycling services to municipalities, which include storage containers for municipalities to aggregate mattresses at transfer stations. A stewardship plan will be submitted to the Connecticut Department of Energy and Environmental Protection (DEEP) by July 1, 2014.

For more information, visit [www.productstewardship.us](http://www.productstewardship.us).

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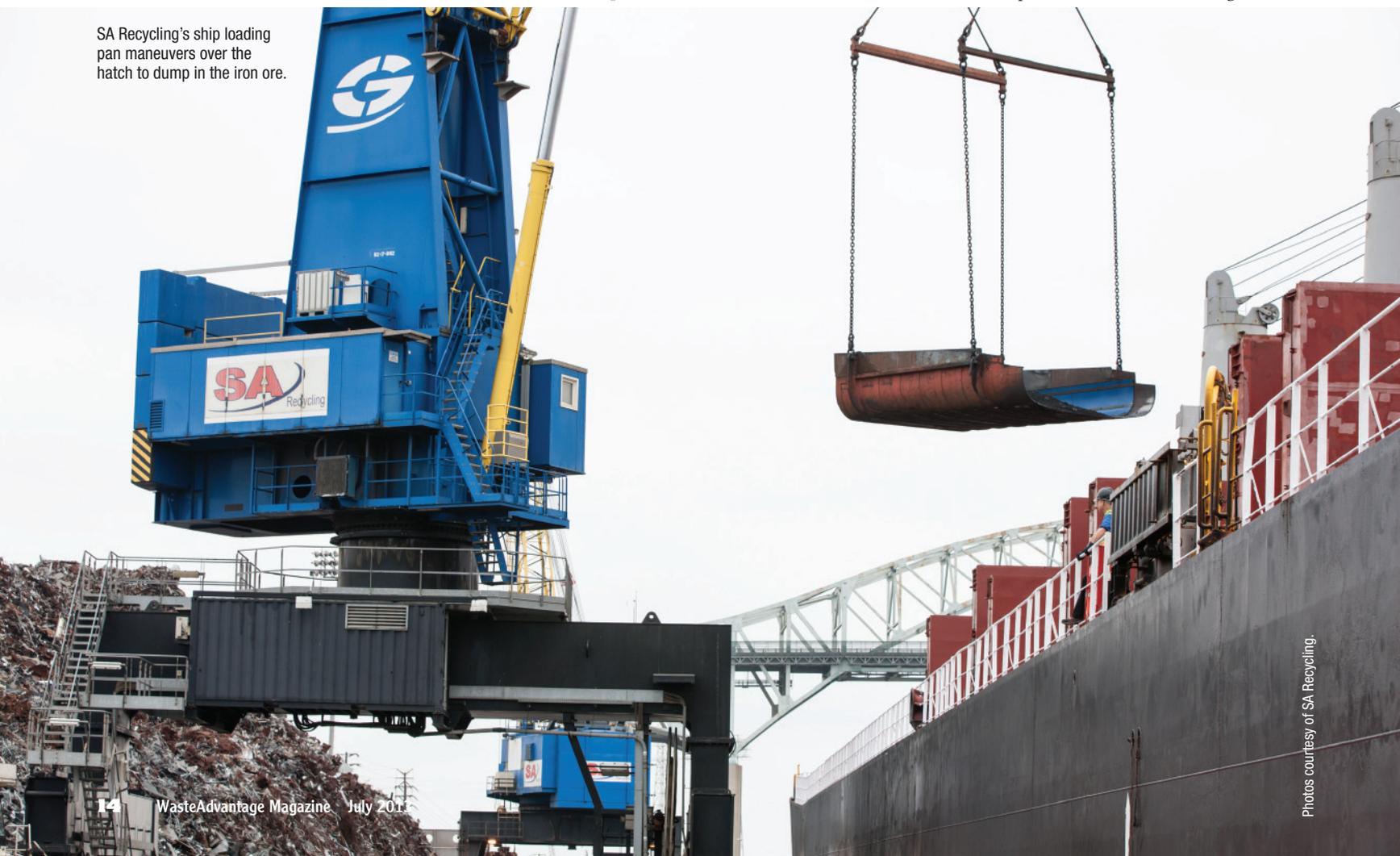
assets of Sims Metal Management and Adams Steel, SA Recycling (Orange, CA) was formed six years ago in order for the two companies to join forces and work together to create a world class recycling operation serving the southwestern U.S. Adams Steel had been in business in Anaheim, CA since the early 1970s while Sims Metal Management is the largest scrap metal recycling company in the world. The merger allowed Adams Steel's management team to expand their reach and to have access to deep water ports. Today, SA Recycling is a full service metal recycler processing scrap steel, iron ore, copper, aluminum, brass and stainless metals with more than 1,200 employees and over 50 facilities throughout the southwestern U.S. The company's day-to-day operations are managed by brothers George, Mike and Terry Adams while Sims contracts the metal export sales.

SA Recycling's phone number, 1-800-GOT-SCRAP, is the primary method that both residences and businesses use to contact the company for scrap and metal pickup. Most of the company's locations also allow for the public to come in and drop off metal, including contractors, demolition companies and recycling dealers. Says David Thornburg, SA Recycling's Director of Public Affairs, "It's a good avenue that gives unwanted metal a new life. The best thing about metal is that it can be melted over and over again and it doesn't degrade, rather than plastic, which can only be reused several times."

### Becoming More Efficient

Thornburg points out that the downturn in the economy has affected the recycling industry in many ways. Not only have the prices for scrap metal gone down almost 50 percent, but the cost of doing business

SA Recycling's ship loading pan maneuvers over the hatch to dump in the iron ore.



## COMMUNITY ORGANIZATIONS

### Charities

A Place Called Home (Non-Profit Youth Center)  
Anaheim Arts Council  
Anaheim Family YMCA  
Anaheim Community Foundation  
Boy Scouts of America  
Boys and Girls Clubs of America  
Cabrillo Marine Aquarium  
Canning Hunger  
Canyon Acres Children & Family Services  
Century Sheriff's Station's Youth Activities League (Los Angeles)  
CRSI Foundation (Education and Research)  
The Eli Home (Orange)  
The Friends of Banning's Landing (Community Center)  
Foundation for Prader-Willi Research  
Goodwill Industries  
Hirshberg Foundation (Pancreatic Cancer Research)  
Heritage for the Blind  
Katella High School Baseball Fund  
The Kinship Center (Non-Profit Foster Care)  
The Kiwanis Club  
Leukemia & Lymphoma Society  
LA Youth Opportunity  
Meet Each Need with Dignity (Pacoima)  
Mothers Against Gang Violence  
Orangewood Children's Home  
Orange County Council Boy Scout Outreach  
Paint Your Heart Out Anaheim  
Pancreatic Cancer Action Network  
Project Hope & the Hope School (Anaheim)  
People In Progress (LA Substance Abuse Treatment)  
Rady Children's Hospital  
The Scleroderma Foundation  
San Pedro City Ballet  
Sun Valley Graffiti Busters  
UNICEF  
Young America's Foundation  
International Trade Education Program (ITEP)  
The Toberman House  
NAACP  
Port Tech LA  
Conquer the Bridge  
International Seafarer's Center  
US Coast Guard Foundation  
CSULB Foundation

### Partnerships and Organizations

Anaheim Firefighters Association  
Anaheim Chamber of Commerce  
Anaheim Police Activities League  
Anaheim Family Justice Center  
Anaheim Hills Rotary  
Anaheim Rotary Club  
Auto Dismantlers Association  
Anaheim Fall Festival  
Brawley Chamber of Commerce  
City of Anaheim Police Department  
El Centro Chamber of Commerce  
Gardena Police Department  
Holtville Chamber of Commerce  
Imperial County Sheriff Department  
Los Angeles Fire Departments  
Orange Main Library  
Orange Chamber of Commerce & Visitor Bureau  
Tulare County Sheriff Department  
UNICEF  
Young America's Foundation



The Port of Long Beach, SA Recycling, and CML Metals celebrated the kick off of the exportation of iron ore for the first time in 40 years. The ceremony included over 100 invited guests, which included elected officials to the region, officials from the Port of Long Beach and the city, company officials from SA Recycling and CML Metals, and many interested individuals. From left to right: Don Snyder, Port of LB; David Thornburg, SA Recycling; Mike Adams, SA Recycling; Robert Garcia, Vice Mayor; Thomas Fields, Port of LB Harbor Commissioner; Dale Gilbert, CML Metals; George Adams, SA Recycling; Terry Adams, SA Recycling; Moises Figueroa, SA Recycling.

has also gone up. Because of the slowdown, people have bought less cars and appliances, built less houses or even put remodeling on hold, resulting in a decrease in metal recycling. In order to face this head-on, SA Recycling has worked hard to re-evaluate their costs, streamline their process and revise the way that they do business. "We have certainly streamlined a lot of our processes and become more efficient. One direction we have entered into this last spring is exporting iron ore and so far it has been a promising opportunity for the company. We have two facilities—one at the Port of Los Angeles, where we export scrap metal and one at the Port of Long Beach where we export the iron ore in addition to scrap metal. Some of the same customers that we ship scrap metal to, we can also now ship iron ore. In addition, since Long Beach has the deepest water of all North American ports, we are able to bring in heavier capacity ships and larger size vessels into the port in order to be more competitive in the world market," says Thornburg.

With all these changes, SA Recycling remains committed to safety—the most important goal of the company. "Because it can be a very dangerous industry, no one cuts corners. There is a lot of heavy equipment and if you are not doing things correctly just like in other heavy-duty industries, there can be injuries. So our safety programs are so important and entrenched in us," Thornburg stresses. This includes not walking out into the yard unless you have your PPE and always making eye contact with any equipment operator that may be working in the area. "Safety is the number one priority in the company and management wants to make sure the employees go home to their families every night."

Environmental safety is also a very important concern to SA Recycling. The company has an incredible environmental team, including someone who used to work for a government agency so they know the ins and outs of relevant regulations, and several who have devoted their entire lives to environmental studies. In addition, when it comes to water treatment in the ports, SA Recycling owns tanks that can hold 1 million gallons at each facility and if any water needs to be discharged, it is not done so until it is extremely pure. This also includes rainwater and stormwater so the company can make sure that any water discharged is not harming the environment.

Staff is constantly trained in both safety and environmental issues. Safety officers are on hand to make sure that employees get every shred of information they need, including their newer export iron ore handling and its regulations and company policies. The training is required to let workers know what things the ore can contaminate—water, air, etc. "We make sure that everyone is trained because it just takes one person to do something incorrectly that could really change the life of someone else," says Thornburg.

## Overcoming Challenges

Thornburg stresses that one of SA Recycling's major challenges is unfair competition from rogue, unpermitted companies. While brothers, George, Terry and Mike believe in doing the right things to protect our environment, there are other companies who may not do the same. It is hard for a company like SA who obeys all of the laws to compete with the illegal practices of other rogue scrap companies. However, the company prides itself on having the best available technology for their shredders, fitting them with regenerative thermal oxidizers (RTO). RTOs are used in manufacturing to remove VOCs out of the air. He says, "We strive to implement the latest technology. So we go above and beyond our requirements. It's a challenge because there are others who don't have the standards and don't follow the rules."



SA Recycling's euclid dumps iron ore into the pan that will then dump into the ship.



SA Recycling's Port of Long Beach location loads its first shipment of iron ore this past March

SA Recycling also works very closely with law enforcement regarding stolen material. If anyone comes into one of the company's facilities with material that is suspected stolen, the transaction is continued at the front of the shop while the police are called in the back. A retired law enforcement officer is on staff to also ensure everyone is following the regulations and doing everything possible to combat theft, including identifying the businesses around them that are breaking the rules. "I'm so proud to be working for a company that cares not only about the bottom line, but also about doing the right thing," says Thornburg.

Another challenge is making sure that people follow the rules within recycling. Although recycling is a wonderful thing for the environment, it has to be done correctly in order to be effective. SA Recycling provides educational materials to the community, sharing about recycling and what to do. "The more education we can give to kids, the more they will learn about recycling—what it means to the environment and keeping it out of landfills," says Thornburg.

### Thinking Outside of the Box

Thornburg points out that SA Recycling is most proud of their dedicated employees who work tirelessly every day to make the company successful. The company's workforce works together as a team to make sure operations run smoothly, often working nights, weekends and holidays to complete tasks. One-third of SA Recycling's workforce in the port facilities has been working with the company for 35 years. Thornburg points out there is one man (Pancho) who has just celebrated his 45th year with the company. He has worked his way up from a entry-level job to now being in charge of the shredders and 25 employees who all look up to him. "He is positive every day and loves his job spreading his happiness to others. He comes in at five in the morning works all day; he is incredible," says Thornburg.

He also believes that the company's ability to think outside the box by partnering with the ports and exporting iron ore has been a great achievement. Although it took a lot of time and effort in the beginning to get things into

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place, it is now proving to be a success for the company. He stresses that the brothers' mindset is that they are not going to leave the company assets idle, they are going to do something about it actively and get it turned back around.

When it comes to community, SA Recycling makes sure that it is right out there front and center. Not only do they provide receptacles to public events, but they also participate in school recycling programs where possible, which brings huge benefits to the school because they can bring in thousands of dollars to put towards field trips and other funding. And the company does not stop there; they also volunteer, donate or sit on the board of the local chambers, Port of LA High School, Boys and Girls club, YMCAs, Beacon House (a rehab center) and the Sullivan House (brings food to needy families). "We partner with the schools and take the kids field trips to our facility. They can even see a car get crushed in three seconds with pieces coming out for the shredder the size of your fist. We love to give back so much for the community," says Thornburg (see **Community Organizations sidebar**, page 15).

### Looking Ahead

As for the future, SA Recycling will continue to look for ways to be more productive while continuing to be environmentally conscious and working with the appropriate agencies. They are also looking at LED lighting, fuel cells, electric trucks and all sorts of technology to become even greener and reducing the nation's dependence on energy.

SA Recycling will also maintain its focus in five primary areas. First and foremost, the company will continue to strive to reduce employee injuries and become the safest recycling company in the U.S. Second, SA Recycling will continue its growth focus and seek acquisitions that are a strategic fit to the



Iron ore coming out of the rail car is unloaded in seconds, processed and sent to a holding area awaiting a ship for export to Asia.

company's growth. Third, the company will focus on additional cost reductions by broadening its benchmarking into all areas of its business. Fourth, SA Recycling feels that it is essential to develop its managers for the future through well-designed training of its employees. Finally, they will continue to broaden its business through diversification in seeking participation into product areas that have not been part of the business up until now. Thornburg says, "SA Recycling successes are due to the will of so many talented people that have devoted a good portion of their lives to making sure it succeeds. The tenacity of the owners to successfully compete in an industry that has more competition than most is a testament to their knowledge of this business. The DNA of the company, with the ideology of George Adams Senior and his sons, makes our success unavoidable." | **WA**

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## Safety: An Ongoing Issue

**Even though safety has improved in some areas, THERE IS STILL A LOT OF WORK TO BE DONE.**

**EVEN THOUGH THE WASTE AND RECYCLING** industry are making some strides towards a safer work environment, there is still work to be done since the industry remains on the top 10 most dangerous occupations according to the U.S. Bureau of Labor Statistics. *Waste Advantage Magazine* spoke with one of our EAB members and an industry expert on safety, to get their opinions on where the safety issue stands as well as some ideas for improvements.

Will Flower has more than 28 years of experience working in the field of environmental protection, working for the organization such as Illinois Environmental Protection Agency, Waste Management, Inc. and Republic Services, Inc.

Nick Collins is Marketing Director for Ritz Safety, an international safety products distributor company that services the safety and personal protective equipment needs of businesses and industries of all types, from construction to waste management, farming to emergency services, and everything in between.

### **Do you believe that companies' employees are safer than they were six months or even one year ago?**

WF: The risks employees face are essentially the same. Therefore, the question of employees being safer really depends on how much safety training the employees have received. Workers who receive regular safety training and are part of an organization where safety is a real priority are probably safer. Employees who are not adequately trained and work in an environment where no one is focused on safety are probably more at risk of an accident or injury. One alarming factor that is putting solid waste employees at greater risk is distracted driving. Drivers who are texting while driving are dangerous and such action results in greater risk to industry drivers and helpers who are collecting wastes and recyclables. As an industry, I believe we should aggressively support bans on texting while driving all vehicles. Obviously, operating a solid waste collection vehicle is very different than driving a car. In order to maintain safety, professional drivers make adjustments for stopping distance, turning ratios and the navigation of narrow streets. Since solid waste vehicles are large and heavy, they require extra time to come to a stop and wide angles to make turns. Garbage truck drivers must be aware of their surroundings and the limitations of their vehicles, and drive defensively at all times.

NC: Safety is ultimately the responsibility of the individual. No matter how comprehensive a safety program is, if an employee neglects to follow procedure, an injury will happen. That said many management teams are beginning to put a greater emphasis on safety if for no other reason than as a cost-savings maneuver. In realizing the costs of increased insurance rates (including health, property and vehicle), OSHA fines and even lawsuits due to accidents, we are seeing an increase in the number of onsite training requests and site safety audits. Many managers are trying to get ahead of potential safety hazards and get their employees trained in the latest safety regulations and standards that in some cases, they have neglected in the past. And with the economy starting to pick back up, many companies are beginning to hire more, which requires updates in their safety standard, so many are going the route of re-training their entire workforce. So an increased emphasis in safety has certainly been seen over the past few years.

### **What is the most efficient way to keep up with changing safety regulations?**

WF: Keeping up with regulatory changes is like drinking from a fire hose. The standards that are in place today will continue to evolve while new regulations will be imposed. Bottom line, change is constant! As safety regulations change and best practices emerge, managers who are not carefully monitoring recent regulatory developments may find that they are no longer in compliance. To ensure that you are current, I would recommend conducting a safety audit of your entire operation from time to time. Conducting a thorough risk assessment by a qualified safety consultant will help you identify areas of non-compliance or weaknesses. Even good safety programs can benefit from a safety assessment. Once that is done, you need to keep pace with future changes. There is a wealth of knowledge available online from organizations such as OSHA, ANSI and ISO. Industry publications and trade associations such as NSWMA and SWANA are excellent resources. You may also want to check with your insurance company and vendors who can help. Finally, there are a variety of webinars, industry seminars and training courses to keep you current on the latest in safety regulations and trends. Keeping ahead of the curve requires time and resources to ensure the safety of your workers.



NC: Continuing to monitor OSHA, ANSI, ISO organizations and inquiring how your vendors can assist with training are great ways to stay on top things. No one can ever know all the new regulations, so reaching out for the assistance of some of your trusted contacts are easy ways to help ease that burden. Personally taking part, and offering the same opportunities to your employees, in various Webinars, safety shows and vendor training courses is another way to keep up on the ever-changing safety regulations.

## What is the biggest safety issue in the waste and recycling industry?

WF: To identify the biggest safety issue, I would examine the root cause of accidents and injuries that results in the greatest number of accidents and injuries. When doing so, I am struck by how often "fatigue" is the culprit. As an industry we have long struggled with the issue of "Hours of Service". This is a management issue. Drivers, helpers and other workers can only be pushed so far. I'm all for maximizing productivity, but I would never do it at the expense of someone's safety. Other big safety issues include:

- Obeying size and weight limits
- Following speed limits
- Avoiding texting while driving and other distractions
- Improper lifting or lifting too much weight resulting in strains and sprains
- Backup accidents

All of these issues can be effectively addressed with a comprehensive safety program.

NC: Across the nation, no matter what industry, hand injuries continue to be near the top of the list of safety issues. Ensuring that the various work areas of your work sites have the proper hand protection based on the task will help reduce your injuries. Also providing periodic training that is appropriate for each work area will play a vital role in reducing safety claims.

Fall rotection training is also something that we as a distributor are seeing an increase in. Whether it is falls from truck roofs during cleaning and maintenance, or while someone is working inside a transfer station or recycling depot, fall hazards exist everywhere. Per OSHA 1926.502 (subpart M), any time an employee is working near an unprotected edge that is 6' or more above a lower level, they must be protected by use of a guardrail system, safety net system or personal fall arrest system. With OSHA's increased emphasis in this, many employers are beginning to address their fall safety issues at their workplace.

## How important is it for a company to have a safety program, safety coordinator/trainer? Do you see the differences in companies that have these things vs. companies that do not?

WF: Having both a qualified safety coordinator and an effective safety program are critical to an organization's success. Additionally, safety programs are known to increase employee moral as workers gain confidence that their employers are looking out for them.

NC: A safety program is absolutely vital to a safe workplace. The key is if the program is properly installed and effectively used by those it is meant to protect. Employees who know

management has a dedicated focus on their own safety, will only have a stronger level of confidence in them. Companies must have a qualified safety coordinator or trainer. This can be in-house or through external third-party consultants. The safety coordinator has to own the process and work in conjunction with management to maintain the required training, updates on regulations, and safety auditing of their worksite and industry. Those companies that do not have a qualified safety coordinator or trainer, and an effective safety program, are at a greater risk.

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## What is the number one thing that companies can do to improve their safety statistics?

**WF:** Simple—make sure that everyone is involved. From helpers to supervisors and managers, safety has to be “top of mind”. The acceptance, involvement and commitment to the safety program by top management are critical if you are going to achieve a true “culture of safety”. Training is another critical activity that will improve safety performance. A good training program will make workers aware of risks and educate employees about how they can stay out of harm’s way.

**NC:** Having an open door policy on safety is a great way to improve safety statistics. Your employees are driving the trucks, working the yards or sorting the materials, and experience day in and day out the safety risks that management is trying to protect them from. Allowing them to speak freely about the potential risks they see, hazards that are present or instances they have experienced only helps make everyone safer.

## When designing a safety program, what is important to include?

**WF:** First, you need to understand your audience and get them to be actively engaged in the program. Your goal should be to create a program in which all the people within the organization understand the importance of safety. Second, make sure all employees can relate to the various components of the program. I find that keeping it simple is best. Third, I have found that small group meetings work better than a large group. Therefore, safety

programs should include small group meetings to emphasize new safety initiatives. The best person to deliver a safety message is the employee’s immediate supervisor who should regularly reinforce safety messages. Finally, I believe that incorporating a mentoring program into your safety efforts is beneficial. As your program grows, you will see safety leaders emerge. These leaders can help mentor and coach new employees in an effort to keep the organization’s culture focused on safety.

**NC:** Knowing what your work force and worksite’s potential risks and hazards are is the first step. Have a qualified safety professional (internal or third party) conduct a thorough survey of your worksite. Be sure to ask your employees what they are experiencing and be sure that past safety claims are reviewed as well. Second, draw up a plan that addresses your findings and that looks to prevent future issues. Third, be sure all employees, no matter what tenure or management level, are properly trained based on their job requirements. Ensuring each and every employee fully understands the program will go a long ways towards a safer workplace. Next, periodically review your safety program to make sure that your industry and specific site’s standards are being effectively followed. Continue to review safety claims, keep an open door policy with your employees and staying current on industry regulations will help to keep your program effective. Finally, make a spectacle of safe habits, new safety records or special instances of safety. When employees see that management is making note of what is happening, everyone wins.

## Is there a time when safety is more important?

**WF:** Safety is always important—24/7/365. Many companies see a spike in incidents and injuries during the summer months. The increase is due to a number of factors including employee fatigue from higher temperature and higher humidity, increased pedestrian traffic as children are out of school, increased motor vehicle traffic and higher waste volumes. During the summer, safety messages should focus on:

- Drink plenty of water
- Understand the signs of heat-related illnesses
- Get an appropriate amount of rest/sleep
- Watch for children
- Use your helper when backing up the truck
- Drive defensively
- Wear your seatbelt
- Do not use your cell phone or send text messages while driving
- Wear your Personal Protection Equipment (PPE) including your high-visibility vest

**NC:** Safety is always important. Making sure that safety is top of mind every day. There may be a greater tendency to relax after a long run of no incidents or with growth in your business resulting in new employees, or with a change in business processes. During these situations getting the safety message out and reminding folks of their role in maintaining a safe workplace is especially important! | **WA**

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# Don't Waste the Opportunity to Prevent Backover Accidents

Brian Diehl

**While many waste management companies are embracing backing safety with various combinations of spotters, rear-facing cameras and obstacle detection systems, STATISTICS SHOW THAT CONTINUED IMPROVEMENTS ARE IN ORDER.**

**EARLIER THIS YEAR, THE U.S. DEPARTMENT OF Labor** hosted a Stakeholder Meeting on Preventing Backover Injuries and Fatalities in Washington D.C. Now, don't go to sleep. If you know the importance of keeping people from finding their way under your trucks' tires, skip down to the "Backup Cameras" header.

According to the Bureau of Labor Statistics, 79 workers were killed in 2011 when backing vehicles or mobile equipment crushed them against an object or rolled over them. The meeting's eight-page summary mentions the waste industry no fewer than 14 times. Waste truck backup accidents are so common, dozens of lawyers have posted Web pages dedicated to this issue.

A quick search on the Internet showed that this year alone, a grandmother in Hawaii, an elderly man in Florida, a woman in New York, two sanitation workers in Indiana and another sanitation worker in South Carolina were all killed by collection trucks backing over them.

Waste trucks have become part of life's daily fabric. "Garbage trucks" are in every corner of every neighborhood—often with a swarm of bike-riding boys in tow, waiting to see things hydraulically crushed and swallowed by the truck's gaping mouth. These trucks are so ubiquitous, people fail to recognize that they are, in reality, 25- or 30-ton monsters with huge blind spots and minimal stopping power. Unfortunately, those who work around these trucks must be reminded frequently as well.

The safety meeting explored backup hazards, measures to reduce them, whether cameras and other technologies are being used as well as driver, spotter and pedestrian training. I was drawn to the report's technology section mainly because I've been working with hardware and software companies since I started with NEC in 1992.

## Backup Cameras

Only 10 percent of construction equipment uses cameras or sensors. The immense amount of dust and tight operating conditions onsite can create many maintenance issues. The waste management industry, for the most part, has embraced rear-facing cameras to the point that some companies consider a truck to be out of commission if its camera is inoperable.

Cheap cameras have flooded the market and, though they may look nearly identical to quality cameras, they may not be as waterproof or dustproof as you might want them to be. When shopping for cameras, there are a few basic parameters you should look for:

- *Is the system ruggedized?* Was it designed for commercial use and the day-to-day road vibrations it must endure?
- *Is it a color system with nighttime video capabilities?* Color can be an important factor in helping a driver quickly recognize obstacles. While night vision is always black and white, collection trucks should be ready to safely handle early-morning and late night maneuvering.
- *Guarantees.* Is the system backed by a company that has a history of excellent service? A guarantee is worthless if the company doesn't stand behind their products.
- *Ease of Installation.* Sure, every company boasts "easy install," but who translated the manual? Can you call them with questions?
- *Flexibility.* Can you add more cameras or a recording system at any time or do you have to purchase a whole new system? Can side-mounted, blindspot cameras be added without a hassle? How about a digital video recorder?



The Mobile Awareness VisionStat Plus® system can support 4 cameras with obstacle detection sensor systems accurate to the inch. Photos courtesy of Mobile Awareness.

## Backup Sensors

Some companies don't want the distraction or the

expense of an in-cab camera. For these organizations, obstacle detection sensor systems come into play. These bumper-mounted sensors operate just like the ones you see on the bumpers of luxury cars. A display shows the driver exactly how many inches their bumper is from any obstacle when backing up. Some systems use radar, while other systems use sonar to accomplish this. Just make sure that, if you purchase a sensor system, it offers a warranty of at least two years—backup sensors are often mounted where they can come into contact with collectors throughout the day.

### Combined Systems

While it is possible to combine camera systems and backup sensors in a cab, multiple displays will have to be installed on, or in, the dashboard. A single-monitor, ruggedized camera and sensor system should be capable of displaying a 120 degree view behind a truck, while simultaneously showing on-screen, exactly how close the rear bumper is to any person, pole, wire or wall.

### Radio Frequency Identification

Radio frequency identification (RFID) tags were also discussed in the report; however, this would require the company to tag any possible backover hazard—including people. Of course, with the public involved, this solution is more applicable to construction sites, scrap metal companies and, possibly, post-collection facilities (though public access to these facilities can be hard to control).

### Cost of Technology

It was pointed out that vehicle cameras are becoming smaller and cheaper. In addition to this, installation costs for fleets can be exorbitant if the camera or sensor system was not designed properly or if installation instructions are vague. Short antennas on cheap wireless systems can cause mounting problems and add hours of maintenance department frustration.

Wired cameras are still your best bet for a good signal in the cab and for fewer upkeep issues. A fleet of 20 trucks can be outfitted with a professional, color, single camera system for under \$315 each. However, wireless obstacle detection sensor systems are the way to go for easy installation and fewer wires to run to the cab. For a fleet of 20 trucks, a quality sensor system should run about \$250 and offer a warranty for at least two years. Careful with bargain-basement pricing—you'll get what you paid for!

### Unique Solutions

Since many workers—and even pedestrians—have become numb to the sound of a truck's backup alarm, some technology companies have instituted variable beeping for obstacle detection systems. The closer the object becomes, the faster the beeps are played. Other companies have developed white noise alarms, which are only heard when directly behind the vehicle. These have been installed with great success in post-collection facilities.

In the same vein, to introduce a new sound into the workplace, some organizations issue whistles to their employees. This low-tech solution introduces a new sound into the workplace and, when heard, should halt every vehicle in hearing range.



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## Don't Waste the Opportunity to Prevent Backover Accidents

This brings us to the final challenge for workplace safety: training. But, that's the next chapter in the report and an extensive issue. In the meantime,



This waste management truck in Phoenix has been outfitted with the Mobile Awareness VisionStat® rear-facing, 18 LED cameras.

feel free to visit the report at [www.osha.gov/doc/topics/backover/01082013\\_dc\\_stakeholder\\_meeting.html](http://www.osha.gov/doc/topics/backover/01082013_dc_stakeholder_meeting.html). If you're interested in additional safety ideas, check out [www.avatarfleet.com](http://www.avatarfleet.com), which offers some excellent reading on the topic.

While many waste management companies are embracing backing safety with various combinations of spotters, rear-facing cameras and obstacle detection systems, statistics show that continued improvements are in order. We must remember that people are used to seeing waste trucks and they assume these lumbering giants are safe to be around. By installing cameras and obstacle detection sensors, safety can remain an active priority for drivers and crew. | **WA**

*Brian Diehl is the director of marketing for Mobile Awareness (Solon, OH), a developer and manufacturer of rugged backup cameras (VisionStat®), backup sensors (SenseStat®) and combined video and obstacle detection systems (VisionStat Plus®) for commercial use. To date, Brian has drawn more than 1,344 safety cartoons to help waste management companies improve safety and decrease insurance costs. He can be reached at [bsd@mobileawareness.com](mailto:bsd@mobileawareness.com).*

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# Empower Your Change Drivers: Strategies for Engaging Employees in Safety Culture Improvement

Brett Haskins, CSP

**Understanding how to successfully engage and empower your workforce IS KEY TO ENSURING THAT YOUR ORGANIZATION CAN START AND CONTINUE THE JOURNEY toward safety culture excellence.**

## EMPOWERING FRONT-LINE WORKERS—THOSE

who stand to benefit the most from an effective safety process—is a concept that has been talked about much over the last decade, yet many organizations that start the journey seem to stop abruptly. Regardless of the reason for derailment, a failed attempt can have a lasting negative impact on safety culture. From the front-line employee's perspective, it could appear that another flavor-of-the-month safety program has been whisked away and replaced with more important initiatives (i.e. production, quality, etc.).

Understanding how to successfully engage and empower your workforce is key to ensuring that your organization can start and continue the journey toward safety culture excellence.

## Identifying Cultural Influencers

Stated simply, safety culture is how you do things. It is your walk, your talk, your actions, your beliefs. It is what you do without even thinking about it. Culture includes the norms, attitudes, beliefs and ideas of your

workforce. Understanding these beliefs and perceptions of the workforce is the first step in identifying the areas in which you should focus the improvement efforts.

Imagine, for example, there is an injury at your workplace. The injured worker performed an at-risk behavior that resulted in the injury. As a matter of fact, about 90 percent of all injuries are related to at-risk behaviors. Why is this? Why do people take safety risks? Is it because they want to get injured? Absolutely not! It is because something has created or influenced an attitude, belief or idea that the act will not result in injury or that something else is more important. These influencers can be defined as the “norms” of the culture and include, but are not limited to: pressures to produce more, to be more efficient, to save time, company values and management systems, past experiences that did not result in injury and a lack of risk awareness. Addressing these influencers is a large part of what safety culture improvement is about, and success requires involving all the right people in the building process.

## Involving the Front-Line Workforce

Unfortunately, those most commonly charged with developing and writing standard work procedures and safety policies/procedures are engineers and safety professionals, many of whom have never performed the specific tasks for which they are writing procedures. Further, their experience with the requirements of such documents is limited to regulatory text or incident investigations. The point is that very seldom do we engage the people performing the actual work in the creation and documentation of the work requirements. Failure to do so can create gaps in those procedures, and when those gaps align with influencers, as mentioned earlier, the risk of injury is more likely. Engineers and safety professionals have important roles to play in the workplace, but it is critical that employees who perform the day-to-day front-line activities be involved in developing procedural documents, within

Caterpillar Safety Services facilitates cultural improvement workshops to engage employees in developing solutions that integrate safety activities into daily processes.

Photo courtesy of Caterpillar Safety Services.



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### Empower Your Change Drivers: Strategies for Engaging Employees in Safety Culture Improvement

the boundaries set by the management team and regulations. Additionally, involving the front-line workforce gives these employees a sense of ownership that will result in greater compliance and honest assessment about whether the system truly works.

The most successful organizations employ this employee engagement technique not only in developing improvements to current safety policies and procedures, but also in error-proofing existing safety processes. Employees volunteer to participate on teams that create improved safety accountabilities around these processes, focusing on the things that leaders can control. Such accountabilities must be connected through all employee levels of the organization and must be flexible enough to be applied effectively in each work group or team. These accountabilities then become their own leading metrics. Engaging the front-line workforce in determining what a high quality pre-shift safety meeting looks like, in identifying the appropriate items to be placed on an inspection checklist, in deciding what a pre-task risk assessment should include, in determining what training requirements should be included and what opportunities there are to recognize good performers, helps to show that management trusts the judgment of the front line and, in turn, creates a more positive perception toward safety.

This is not a new approach to managing and improving safety. In fact, it is the same improvement process that has proven successful in other important areas of business. The words “continuous” or “continual” have been used for many years to describe a system for making incremental improvements in business processes over the long term. Why not use the same system to manage safety? The process is not easy, but it is fairly simple. Start by assessing the current state of the safety culture, then build a strategy, develop needed improvements through conducting rapid improvement workshops, pilot those improvements

in small sample sizes, make any necessary adjustments and complete a full roll out to the workforce, then check performance. This cycle continues to be repeated over the long term. Additionally, as new safety programs, policies, etc. are created, the front line should be engaged sooner, rather than later.

### Managing Safety

Traditionally, safety management has been left up to the safety professional and change has been driven by the measurement of things that we did not intend to happen (injuries). Results-based indicators provide some degree of benefit to management teams as such measurements tracked over the long term can provide evidence that a safety system is going in the right, or wrong, direction. However, most employees cannot explain how injury rates are calculated and this management approach provides very little in the way of employee engagement and ownership. Managing safety through the things that people can control and influence (activities) and engaging the right people in designing what those activities look like provides an organization with a better opportunity to measure performance and recognize success (accountability), which leads to the development of a culture of safety excellence.

Changing a culture is difficult and takes persistence and consistency, the same diligence required in other business system improvement efforts. Using proven business management principles, engaging and empowering the workforce, allowing for flexibility where it is needed and holding everyone accountable are the only methods sure to deliver consistent results. | **WA**

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## The Anatomy of a Waste Handler

Rob Marringa

**Tier 4 engine solutions, special guarding packages and application-specific tire options are just a FEW OF THE FACTORS TO CONSIDER WHEN SPECIFYING A WASTE HANDLER FOR YOUR WASTE OR RECYCLING OPERATION.**

### WORKING IN WASTE AND RECYCLING FACILITIES

may be one of the more heavy-duty jobs for the purpose-built wheel loaders that we call waste handlers. These robust machines are outfitted with a number of features and performance enhancers suited specifically for work in these applications. An extensive availability of attachments from forks and grapples to buckets with rubber cutting edges make these machines extremely versatile. The right machine for each application will depend greatly on the available operating space, the type of material being handled and the operational demands put on the machine. In this article, we'll examine key factors to consider when evaluating waste handlers and new technologies that may help your operation run more efficiently.

### Understanding Your Tier 4 Engine Options

The buzz of equipment manufacturers talking about Tier 4 engine requirements is growing to a deafening climax, but there are important things you need to know when considering waste handlers. There are two primary solutions available in this equipment category: Selective Catalytic Reduction (SCR) and Cooled Exhaust Gas Recirculation (CEGR). SCR is an after-treatment system that creates a chemical reaction by adding diesel exhaust fluid (DEF). This transforms NOx into nitrogen and water, which occur naturally in the atmosphere. CEGR operates differently: exhaust gases are cooled, blended with recirculated exhaust and returned to the cylinder, which lowers combustion

temperatures and reduces NOx. Particulate matter (PM) levels are then reduced through the use of an after-treatment diesel particulate filter (DPF) system.

The biggest differentiators in recycling and waste applications come in terms of responsiveness and the heat produced by the engine—and in this application, SCR technology offers distinct advantages. SCR results in lower temperatures in the exhaust system while optimizing combustion with no downtime or extreme temperature spikes (compared to regeneration found on machines outfitted with CEGR technologies). An excellent side effect of this is lower fuel consumption.

SCR is the practical choice for waste handlers because its tasks are variable, which creates inconsistent engine loads and power demands, as well as extended periods of idling. CEGR requires consistent engine speeds and temperatures to burn off the PM. If those temperatures are not met, the CEGR engine requires manual regeneration, which spikes engine exhaust temperatures and requires the machine to run for 10 to 20 minutes (without being operated) until the PM has been burned off. Manual regeneration with CEGR equates to downtime, while SCR lets the engine run at peak performance by using after-treatment, ensuring strong lift capacity and pushing power, as well as consistently fast cycle times and optimal uptime.

Keeping temperatures down in waste handling applications is also critical in order to prevent thermal events from occurring. These machines often work in tight quarters with excessive amounts of loose and potentially flammable material. While the machines often come with cooling and fire suppression features, SCR engines inherently keep the average operating temperature lower than CEGR engines. Engine sealing and cooler areas need to be inspected often, especially if coolers are stacked and advanced cooling packages haven't been installed.

### Taking the Environment Into Account

Size is important because many of these machines work in relatively tight/enclosed areas. Bigger is not always better—much of the waste material in transfer stations and recycling centers can be relatively light (when compared to other common applications, such as

Size is important because many of these machines work in relatively tight/enclosed areas. Bigger is not always better — much of the waste material in transfer stations and recycling centers can be relatively light. Photos courtesy of CASE Construction.



aggregate mining). Machine size should be dependent on a careful study of the physical size of the facility and the expected volume of material to be handled. Lift capacity becomes more of a critical factor when dealing with heavier waste materials, such as scrap metals, glass recycling and high-density materials such as asphalt shingles.

Potential buyers should examine the total length and width of the waste handler, as well as test it to see how it operates with short, quick cycles in a tight envelope. Understanding its turning radius and the pocket it can operate in is important.

Key things to look for in the cab are the visibility from the operator's seat down to the bucket and to all sides of the machine, as greater visibility allows the operator to identify potential safety hazards. Some models offer sloping rear hoods that further improve visibility. Rearview cameras are also excellent additions. Joystick controls provide a significant advantage over a steering wheel, as joysticks allow the operator to execute short cycles much more effectively than with steering wheels and with less effort by the operator. Joysticks also improve overall machine responsiveness.

### Customizable Guarding Packages Offer the Right Amount of Protection

Waste applications are nasty on equipment. That's less of a comment on stench and decay and more of a comment on the odd shapes and sizes of objects found in waste handling operations, and the uncanny ability of those objects to get stuck in critical operating areas. Guarding packages are an important component to any waste handler for absorbing impact and ensuring equipment

uptime, and most manufacturers allow you to customize that guarding package to meet the demands of each application.

While all guarding options are valuable, including those that protect the drive train and other critical systems, a few important guarding options to consider are:

- *Material ejectors:* These ejectors protect the cylinders and hoses critical to bucket lift and operation by ejecting materials that could otherwise gather in the cylinder pockets between the handler's arm and the main frame of the machine.
- *Metal-wrapped hoses:* If one of the hydraulic hoses that controls bucket operation becomes punctured or damaged, that machine goes down for repairs. Metal hose guards help prevent damage to these hoses and the associated downtime.
- *Windscreen guard:* Operator safety is of utmost importance. A caged windscreen guard helps protect the cab from debris that could potentially break the window and enter the operating space.
- *Fire suppression systems:* A must-have in some waste applications, especially tight quarters with flammable materials, these systems are often built in to the machines and provide operators with a quick and easy way to extinguish fires that may occur due to the accumulation of debris in the machine.

### Solid Tires Provide Durability, Added Strength

Standard radial tires found on most wheel loaders are prone to puncture in waste applications. Solid tires—both of the slick and treaded varieties—are common in waste applications to prevent puncture damage. Slick solid tires are more common in indoor applications on cement surfaces, while treaded

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Metal-wrapped hoses and windscreen guards are just a few of the guarding options designed specifically for waste handling applications.

solid tires are more common in outdoor applications. It's important that waste handlers with solid tires also feature a more robust axle design. A waste handler, for instance, that offers a heavy-duty axle design is capable of withstanding 60 percent more load than standard models.

One of the biggest advantages of a solid tire and the more robust axle system is the added weight on the back end of the machine. This added weight serves as ballast that significantly improves pushing operations, improves lift capacity and can allow for the use of larger buckets/attachments.

### The Advent of Telematics Modernizes Equipment Maintenance

A telematics system communicates critical machine data via GPS to a Web-

based software program. This simplifies storing, organizing and reporting that data. Originally made popular in on-road trucks and commercial vehicles, telematics has found a niche in heavy equipment operation for its ability to modernize machine maintenance practices and improve overall fleet management. It is also a critical tool in monitoring Tier 4-related data (DEF fluid level, CEGR regeneration information) and helping fleet managers identify operator inefficiencies such as excessive idling.

As a Web-based system, telematics requires no expensive upgrade to a company's IT infrastructure and can be implemented almost immediately upon a piece of equipment being put into service. Maintenance intervals and key machine health indicators can be monitored, and alerts can be set up when a machine approaches a scheduled maintenance session or exceeds a desired operating parameter (such as excessive engine temperatures)—all helping to prevent failures and downtime before they occur. Bottom line: technologies are now available on waste handlers that arm fleet managers with actionable data to make smart business decisions regarding equipment performance and use. Most importantly: it helps keep operating costs down.

These are just a few of the considerations that should go into your waste handler purchase. Always consult with your local equipment dealer/sales representative and carefully weigh your options based on the physical space you are working in, the material you are working with, and the production demands of your operation. | **WA**

*Rob Marringa is Brand Marketing Manager for CASE Construction (Racine, WI). He can be reached at robert.marringa@cna.com.*



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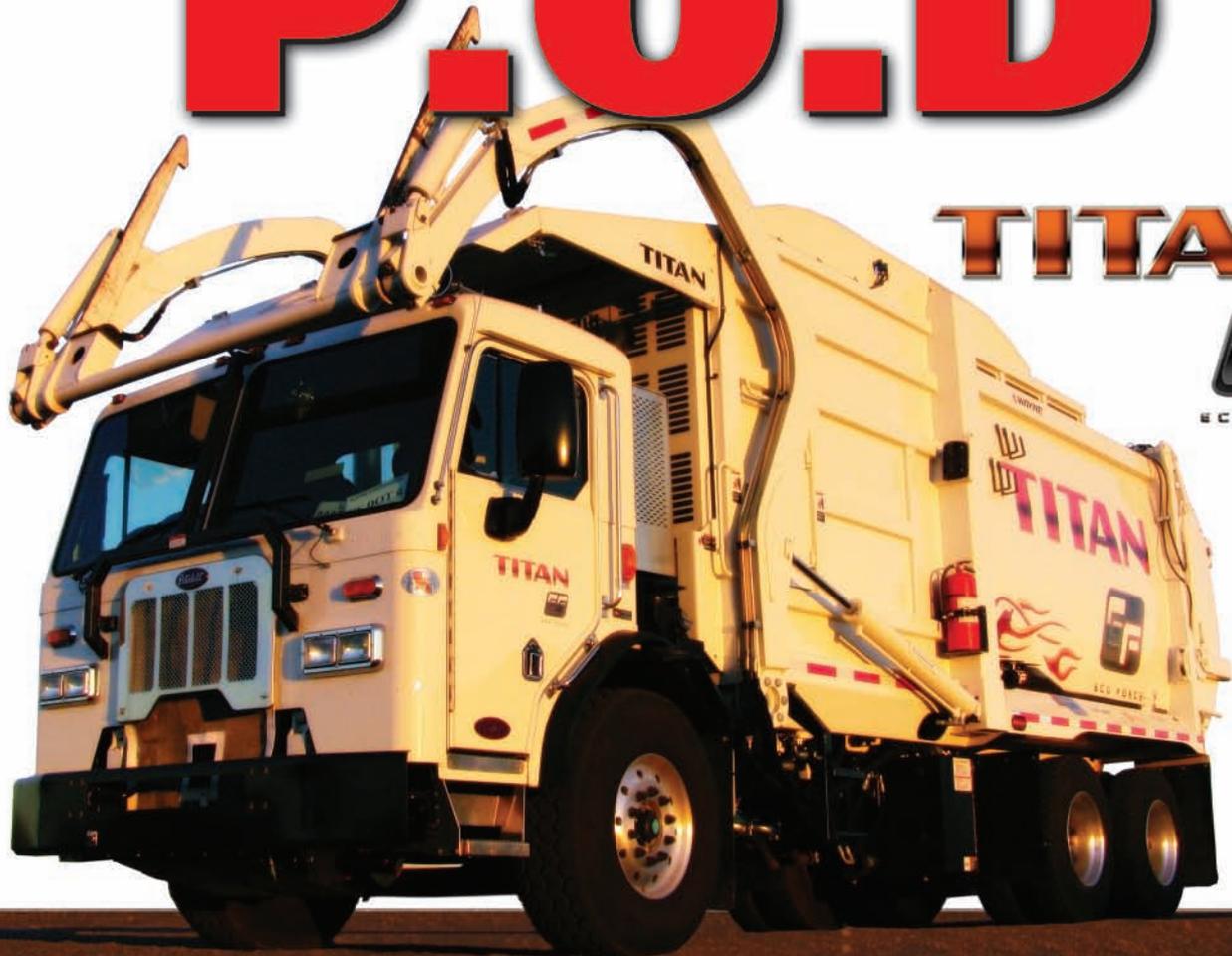
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# The Garbageman's Guide: Letting the Inner Garbageman Take the Wheel

Norm LeMay and Steven Kaufman

**GETTING RID OF YOUR MENTAL CLUTTER is mission-critical to keeping a clear head and an open mind.**

**IF YOU WANT TO READ ABOUT ALL THE BASICS OF** garbage like routes, landfills and trucks, this is the article for you, because we're going to cover all of that and more—but from a totally different perspective.

You see, when we hear the word garbage, most of us think about the physical kind—what gets tossed into the can, dragged to the curb and hauled away to the landfill. However, there's another kind of garbage that can cause just as much trouble if you don't manage it well. We're talking about mental trash.

If you step back and look at it, mental garbage affects your entire life, from the way you make business decisions to how happy you are. It's not a topic most people talk about—but neither is garbage. Yet, trash collection is indispensable to society. Imagine what things would be like if no one picked up the garbage anymore. In the same way, getting rid of your mental clutter is mission-critical to keeping a clear head and an open mind.

So why call it mental trash? You already know about garbage. You've been dealing with it your whole life. Though it might sound strange, the skills

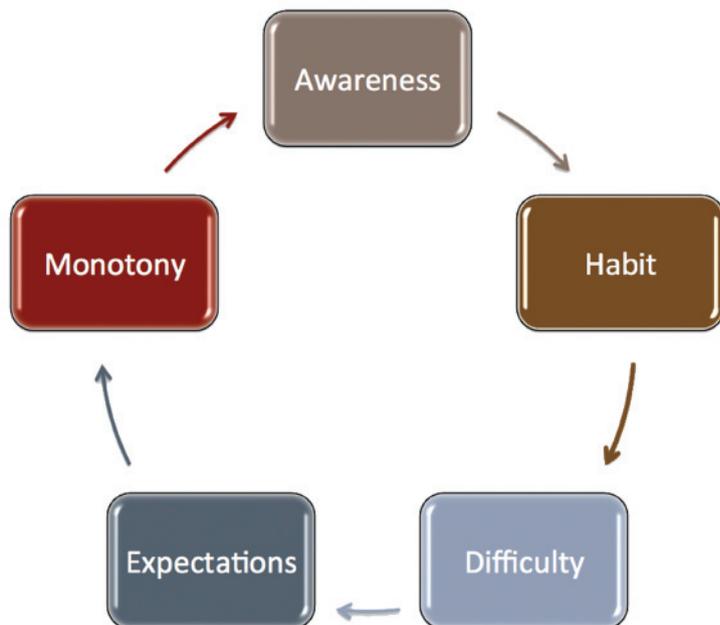
you use to get rid of physical garbage are the exact same skills you can use to get rid of the trash in your head. That makes you a garbageman. Sure, you may not drive a truck from house to house, but you already know about trash and how to manage it. What if you took those skills and really put them to use for you, clearing out the junk in your head that you don't need anymore? What would change for you? What would open up if all of that old stuff were no longer blocking your way?

## Where Does Mental Trash Come From?

We all start collecting mental garbage from the time we're little kids. We got in a fight or someone called us a name and our mind made up Thoughts, Beliefs, and Opinions about what happened—what we call TBOs. Here's the problem: most of us were never taught how to get rid of these. Over time, these TBOs dictate how much risk we'll take, how much love we'll let in or the kind of job we think we deserve. That's where it goes sideways.

If we told you that you had to redo all of your routes using 20-year old maps, or put in a new accounting system using software from 2002, you'd tell us we were nuts. All that information is outdated. Well, if the decisions you're making now are based on TBOs you formed 20, 30 or 40 years ago, isn't that the same thing? The problem is that we're not taught to sift through the contents of our head and ask ourselves, "Am I operating on old data?" So we go on our merry way, making decisions and dealing with people without realizing that there may be garbage in the middle of all of those interactions.

Time is one of the key culprits that create mental trash. We don't get picked last for a third grade recess activity, so we make up a TBO like I'm no good in sports. Then, years pass by and we don't try out for the high school swim team. As an adult, we go to the gym but we never attend a class. Then, a friend asks us to do a 5K run or join the company softball team and our knee-jerk reaction is to say, "No thanks" even though the event sounds like a lot of fun. We reject it without even questioning where the reaction comes from. It's old trash, and you can learn how to get rid of it. Let's take a look at how.



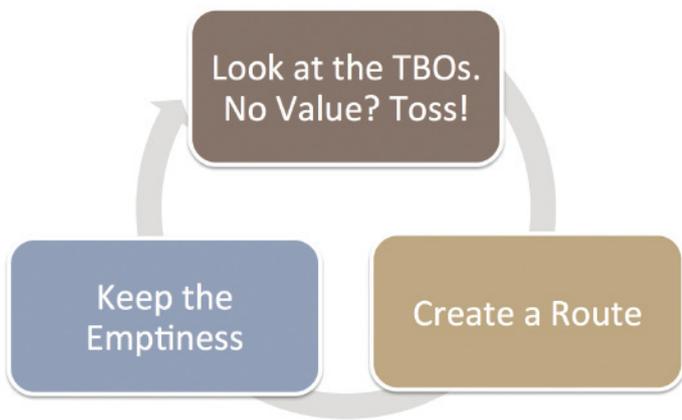
Images courtesy of The Garbageman's Guide, LLC.



The five challenges of regularly dumping mental trash.

## Steps 1 – 3: The Trash Tossing Cycle

We can hear it now. Not another list! Not another set of things to do every day! Well, don't cringe because the



The three-step cycle for tossing mental trash.

eight steps to clearing your head are based on something you already know how to do: take out the trash.

Let's say you're deciding whether you want to keep something or toss it. If you had to boil it down, what's the one piece of criteria that you use to make that decision? We think that's value. If it has value, you'll keep it. If it doesn't, it's in the can. That's why the first step of tossing your mental trash is learning how to work with value. If you examined the TBOs floating around your mind and asked yourself, "Does this have any value to me?" you would be surprised how often the answer comes back, "No."

When a hauler dumps your can and you look inside afterwards, what's in there? A whole lot of nothing, right? That's called emptiness, and it's exactly what happens in your mind when you toss out an old TBO. What's left in its place is emptiness; a little bit of mental breathing room. Now, instead of telling yourself you're bad at sports, you have the space to create an entirely new opinion about

yourself—one that's a lot more up-to-date about what you're actually capable of accomplishing. That's the second step: keeping your can empty.

The third step is to create a route. Break your life into segments like work or family or hobby and ask yourself, "What do I really want for myself in this area?" You turn those answers into goals, and any TBO that doesn't line up with those goals is garbage that should be tossed into your personal landfill.

These three steps act like a cycle. Every time an old TBO trips you up, you ask yourself if it has any value. If it doesn't, you toss it and hold open the emptiness you just made until you create a route for that area of your life. Then, you fill up the emptiness with new TBOs that help you finish your route and hit your goals.

### The Remaining Steps: Caution Signs Along the Road

When we get behind the wheel, we can all use a little help. There are bumps, hairpin turns and sudden drop-offs that can really throw us off. That's what road signs do. They warn us about the dangers that can affect our driving. Mental trash is no different. Your ability to toss garbage out of your head can be affected by some internal road conditions. Here are a few of the most common.

The first is your ego, the part of your mind that loves to hold onto trash. Ego hates change. It thrives in the comfort zone—the boundary that defines what it knows and what it doesn't. Whenever it can, it'll slip into the driver's seat and work like crazy to have you hold on to your old, outdated TBOs. Learning to park your ego is a big step towards dumping your mental trash.

Most of us don't go chasing after the garbage truck in our slippers, shouting, "No! Wait! I didn't mean to get rid of that banana peel!" We dump and we're done. Mental garbage doesn't work like that. A song or a smell or a snippet of

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## The Garbageman's Guide: Letting the Inner Garbageman Take the Wheel

conversation that you overhear triggers something in your mind and the next thing you know, a TBO you threw away works its way out of your landfill and you're right back in the dumps again. It may take you several trips to the can before you can get that trash out of your life.

Toxic waste can also be a problem. Whether it's low-level waste like credit card debt or high-level like addiction or abuse, we all run into toxic situations and hazardous relationships. Here's the great news. Your garbageman skills can help you manage it, whether you're cleaning up the mess yourself or you're calling in the professionals to do it for you. Learning to spot toxic waste in your life and having a plan to get rid of it is the best way to avoid being contaminated by this nasty kind of garbage.

Sometimes, there's an issue that gets stuck in your mind like a nail in a tire. You get so caught up in what's going on that your mind can't figure out what has value and what doesn't, so it starts hoarding all the TBOs around that issue. If you've ever seen a TV show about hoarding, you know that those houses are so full, you can't get a stick of gum inside. Well, that's what your mind is like when you're hoarding. To control it, you first acknowledge that it's happening, then you isolate the TBOs that you're clinging to and you get rid of them. When you start cleaning out your mind like that, you won't believe how much mental breathing room you free up for yourself.

The last caution sign is taking care of your truck—the one with two legs, not four tires! It's a lot harder to get through your route when you're driving a hundred miles an hour and screeching around corners with nuts and bolts flying everywhere. Do the same thing garbage companies do: take great care of your truck. Eat well. Take a break every once in a while. Don't go to bed mad. Remember: you can't toss your trash if your truck is in lousy condition. Maintain it and you'll maximize the amount of time you're on the road and traveling your route.

Here's a brief summary of the eight steps to getting rid of your mental trash:

- Step 1: Find the Value and Toss the Trash
- Step 2: Keep Your Can Empty
- Step 3: Create Your Route
- Step 4: Park Your Ego
- Step 5: Leave It in the Landfill
- Step 6: Get Away From Toxic Waste
- Step 7: Stop Hoarding
- Step 8: Take Care of Your Truck

### Think Like a Garbageman

A garbageman doesn't go out and pick up any old can that he sees. He follows his route, does an audit, makes improvements and runs the route again—only this time, better than before.

What pushes that driver to improve his performance is the fundamental concept of change: thinking as if you've already reached your goal—even if you haven't done that yet. If the garbageman, at the beginning of his route, believes with every fiber of his body that he's going to finish on time and get every can, is he going to waste time on side trips? Is he going to take extra long breaks or not really care what he's doing? Of course not! He's going to get that route done. He's efficient, he's driven, and he's got energy and focus. When problems come up—and they always do—he handles them and keeps moving forward.

Managing mental garbage works exactly the same way. Once you start thinking as if you've already accomplished your goal—earning enough money for that new car or getting a promotion—your belief system seizes on that goal and starts

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flooding your subconscious with a simple, consistent message: "I am that person!" When you do that, everything starts to shift around that goal. Pretty soon, you start acting like the person who's already achieved it—even if you haven't yet.

Think about the last time you really wanted something. Nothing got in your way, did it? If a negative TBO like "You can't do this" popped into your head, did it stop you? Heck no! You blew right past it! Then, when you reached your goal, you probably said to yourself, "Wow. That was a lot easier than I thought." When it's that important to you, you're not going to let a pile of old, outdated garbage stand in your way. You're going to throw it out and keep charging forward. That's what it means to think like a garbageman.

## The Challenges

When you first start dumping your mental trash, you're going to run into some common challenges. It's hard to tune into the thoughts running through your mind. You have habits that make you hold onto your old trash. Dumping mental garbage is tougher than you thought, or you have unrealistic expectations of how fast life will change, or you find the whole process a little monotonous.

Don't worry about it! Every one of these challenges has an answer. You can learn how to break old habits or manage your expectations by enlisting the help of your Inner Garbageman™—that little voice inside of your head that always steers you in the right direction. When you let your Inner Garbageman take the wheel, life gets so much easier. The chaos and the drama start to disappear and you see new possibilities that the old garbage blocked out.

Imagine if all the clutter in your head were gone. What could you accomplish? What amazing things could you do? Now is the time to find out! Start throwing out your mental trash and see what starts to open up for you.

## Bringing It Home

Pretend you have a garage that's an absolute mess. There's stuff everywhere in it. One morning, you walk out there, turn on the light, and take a long, hard look around. That's when you realize that the garage could be so much more than what it is. You can turn it into a workshop or a home gym or a space where you can actually park both cars inside. Once you see that vision of what that garage could become, your mind is going to move in one of two ways.

In one instance, you're going to get caught up in all the garbage: all the work it will take to clean the place out, whether you can find the time, and so on. In the other instance, you'll be so fired up by your vision that the garbage won't even be a factor. Guess which way of thinking will transform that garage?

When your vision is more important than your trash, you become virtually unstoppable, no matter what you're up to. And that's the choice! Are you going to clear the garbage out of the way and focus on the end point that says, "This is where I want to be," or are you going to let the garbage win? No one says you have to hold on to your old TBOs. So throw them out, just like you would an old light bulb or a broken mug. Then, go on and live an extraordinary life! **WA**

*Norm LeMay and Steven Kaufman are co-authors of the book, The Garbageman's Guide™ to Life: How to Get Out of the Dumps. Through video, speaking events, seminars, and coaching, The Garbageman's Guide teaches individuals and companies how to get clear out the waste that blocks productivity and confidence so they can hit goals, be outrageously happy, and keep on growing. For a free three-part video course expanding in this article, or to learn more about how The Garbageman's Guide can help you or your organization, please visit [www.TheGarbagemansGuide.com](http://www.TheGarbagemansGuide.com) or contact Steven Kaufman at (503) 203-1200 or via e-mail at [Steven@TheGarbagemansGuide.com](mailto:Steven@TheGarbagemansGuide.com).*



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## Three Steps to Help Ensure that Your Emergency Plan Will Not Fail

Lucien Canton

**The success or failure of your plan does not depend on how well it is written or conforms to an external standard. IT DEPENDS ON YOUR UNDERSTANDING OF THE NATURE OF CRISIS and the level to which you have integrated your plan with your business processes and workplace culture.**

### WHEN THE EXXON VALDEZ RAN AGROUND IN PRINCE

William Sound in 1989, it was one of those extremely rare occurrences where the conditions of the crisis almost exactly matched the planning assumptions in the company's emergency plan. The weather conditions, the size of the spill—it was as if the plan had been tailor-made for this specific event. Nevertheless, the response was characterized by confusion and delays and it soon became obvious that the plan was a failure. The planners had created what sociologist Lee Clarke calls a “fantasy document”—a plan that ignores potential consequences and the capacity of the organization to implement it.

Unfortunately, the Exxon Valdez is not an isolated case. Your organization may convince itself that the mere fact that you have a plan is sufficient to keep you from harm in a crisis. But without addressing three critical elements, your plan will fail.

### #1: Don't Misunderstand the True Cost of Crisis

It is surprising how many organizations fail to understand that the true cost of a crisis can be both tangible and intangible and can occur on both a micro and macro level. Most focus on the obvious tangible costs: damage to property, lost productivity, etc. But failing to fulfill commitments may also carry

reputational costs that can affect future business. Your ability to continue

to meet their needs will be a primary consideration to your customers. The way you communicate with your customers, staff and the public can affect future business. How you deal with employee issues at the time may affect your employee's willingness to return to work.

There are also macro effects. Large crises can

generate dramatic population shifts that may eliminate the need for your products and services or change the demographics of your labor pool. Conversely, you may also see an increased demand for your products and services or the emergence of potential new lines of business. You may or may not be able to anticipate these macro changes but your plan should allow you to recognize when they are occurring and the flexibility to react to them.

### #2: Treat Your Plan as External to Your Business

To many organizations, a plan is little more than a fire extinguisher—a necessary expense that no one ever really expects to use. But treating your plan as external to your business means that there is no connection between how you deal with day-to-day problems and what you will do in a crisis. Ideally your plan should be scalable. It should be integrated with your business and allow you to ramp up as situations become more complex. The same people you turn to for help on a daily basis will most likely be the core members of your crisis management team and they will default to their normal roles and responsibilities. The closer your emergency plan aligns with these established roles, the easier it will be to implement.

Plans that are not aligned with your business will fail. Disaster researchers have found that even in the best run organizations, few people consult their plans at the time of crisis. If your planning process does not provide a close integration between day-to-day problem solving and crisis management, your staff will either forget that a plan exists or completely ignore it and default to the roles they fulfill on a daily basis.

### #3: Consider the Human Factor

A common failure in planning is to use a template or sample plan without considering the effect of your workplace culture on your plan. Factors such as risk tolerance, decision making strategies and team cohesiveness will affect the implementation of any plan. For example, organizations where decisions are made



by consensus don't always do well with plans that enforce a rigid hierarchy. Similarly, companies with strong hierarchies don't do well with plans that rely on decentralization.

Taking this further, you need to consider how your workforce will react in a crisis. Different people respond differently to certain types of crises based on their culture and experience with past disasters. Parents may want to leave to take care of their families. The one thing people will not do is panic. There are only limited situations where this occurs. Instead people are resilient and extremely creative in solving problems. This is a resource that can reap dividends at the time of crisis if your plan takes into consideration the needs and strengths of your staff.

The military has a maxim: "No plan survives contact with the enemy." This is true of emergency planning as well. Ultimately, the success or failure of your plan does not depend on how well it is written or conforms to an external standard. It depends on your understanding of the nature of crisis and the level to which you have integrated your plan with your business processes and workplace culture. Only by considering these basic factors can your plan be truly realistic. | **WA**

*Lucien G. Canton, CEM, is a consultant specializing in preparing managers to lead better in crisis by understanding the human factors often overlooked in crisis planning. A popular speaker and lecturer, he is the author of the best-selling Emergency Management: Concepts and Strategies for Effective Programs. For more information, e-mail [info@lucienanton.com](mailto:info@lucienanton.com) or visit [www.lucienanton.com](http://www.lucienanton.com).*

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# Driven By Data

Monica Truelsch

### Casella Waste Systems uses maintenance data TO BOLSTER ITS WASTE SERVICES.

**CASELLA WASTE SYSTEMS (RUTLAND, VT) WAS** recycling long before it became a household word. In 1975, Doug Casella began collecting waste with one pickup truck. His brother John joined the company in 1977, and they opened the first recycling center in Vermont that year. The two brothers expanded the company's waste disposal and recycling operations across the New England States using a combination of organic growth and strategic acquisitions. In 1997, the company held its initial public offering of stock.

Today, Casella owns or operates 13 landfills, 38 solid waste collection businesses, 32 waste transfer stations and 38 recycling facilities. Its fleet consists of approximately 1,800 pieces of equipment with a fairly standard mix of on-road tractors, trailers and waste collection vehicles as well as off-road equipment such as trash compactors and excavators. Just as it was the first waste company to open a recycling center in Vermont, it recently became the first waste company in the State to deploy CNG vehicles. "We have been trying some pretty innovative stuff, especially in terms

of maintenance," says Terry Reil, Maintenance Systems Manager of the Rutland, Vermont-based company. "We are always looking for what is the next, right step."

### Maintenance Software

Sustainability is always broader than what steps a company can take to reduce its environmental footprint and those of others. Sustainability is an ongoing financial concern, especially during the past few years of anemic growth in the U.S. economy.

One of the silver linings of a weak economy is that it forces businesses to become stronger and more focused. Vehicle maintenance is one example of how Casella has used its own resources and technology to sustain its business model. "We've left no stone unturned to become a more responsive and efficient company. Whether through more efficient scheduling and planning of repairs, improved inventory management and use, increased technician productivity or more effective PM schedules, we have a lot of things cooking and are optimistic," Reil says. In fleet maintenance,



A Casella front load truck.  
Photos courtesy of Casella Waste Systems.



A Casella mechanic does maintenance work on one of their trucks.



A Casella truck unloads material to be recycled at one of the Zero-Sort® MRFs.

the primary objective is uptime. To this end, all of the company's systems and processes are geared towards maximizing uptime in the safest and most cost efficient way possible, he says.

Until several years ago, Casella lacked fleet maintenance management software to efficiently and effectively manage maintenance data. Daily transactions in the form of repair orders were taking place in each maintenance facility, but most were being recorded manually on paper forms and later keyed into the system. "If you had to find information it was very laborious," Reil says.

Many facilities used the maintenance system that was included in the company's operational software. This was an improvement from paper records, but the system lacked the features and scalability needed to manage all aspects of a fleet maintenance department. "It was easier to extract information but it was primarily a recording tool to record repairs in terms of compliance," says Reil.

Casella's first attempt to convert the fleet to a single maintenance management system soon proved to be limited in its capability. Management then selected an Internet-based asset management system that was difficult to use and required extensive implementation and ultimately just didn't fit the needs of the department.

Finally, management selected TMT Fleet Maintenance from TMW Systems (Beachwood, OH). TMW is a leading provider of enterprise software to fleets, transportation and logistics companies, whose more than 2,000 diverse customers manage over 500,000 power units and maintain more than 1.2 million assets worldwide. The TMT software has been the company-wide platform ever since. "It is a more robust system, but it is actually easier to use. It's also much more comprehensive in relation to all the pieces that you'd want for a fleet maintenance software," Reil says.

### Bringing it Together

Casella immediately began to use its new platform to comply with Department of Transportation regulations for maintenance records of inspections and repairs. In short order, the system helped the company standardize its maintenance practices fleet-wide. "For us, being a mid-size waste company, it is very easily scalable to what we wanted to do," says Reil.

Management, both at the corporate level and at each facility, have standardized parts purchasing and inventory



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## Driven By Data

controls as well as preventive maintenance (PM) schedules and services. Its repair orders were standardized to capture maintenance data in the same, consistent manner. As users became familiar with the system, especially with the reporting and database utilities, they began to accelerate the pace of cost savings and equipment uptime. Before using the software, for example, management did not have visibility over purchasing activities and the parts inventory at each facility. "Inventory is a huge expense. It is an asset sitting on the balance sheet that often is unused," Reil says. "We are not just putting parts on shelves. We have a lot of visibility for how long they stay there—the turn rates—and who our better performing vendors are."

Casella has implemented corporate parts buying programs by identifying vendors with the best prices and lead times. Having a well-managed inventory has also reduced equipment downtime and increased the productivity of mechanics, he says.

### The Bird's Eye View

As the Maintenance Systems Manager, Reil is responsible for fleet-wide compliance, safety and training. From Casella's home office, he uses various reporting features in the TMT system to manage maintenance at a high level, primarily with respect to cost control and compliance with PM schedules. Inventory is one area he monitors closely to control cost. The software identifies if facilities are participating in the parts programs to maximize savings and performance.

For compliance, he uses the software's reporting features to monitor if the

fleet is completing PM services in a timely manner. One metric shows the percentage of PM repairs out of the total work. A high percentage means that maintenance work is being performed in a more proactive fashion than in reaction to breakdowns, a practice which leads to reduced repair costs and shorter downtime. Monitoring equipment use (in terms of miles, engine hours or both) is another useful report. Underused equipment can be identified quickly and moved to other locations where needed.

Reil says he uses these reports and others in daily, weekly and monthly management meetings. Ultimately, the information from the TMT platform is what helps him determine how to improve the maintenance department in order to accomplish the ultimate objective for Casella—service the customer.

After a few false starts, Casella Waste Systems has finally found the fleet management platform that fits its innovative culture and relentless need to improve responsiveness and operational efficiencies. With TMT Fleet Maintenance Software, Casella is poised for its next stage of growth and increasing market leadership in a highly competitive industry. | **WA**

*Monica Truelsch is Director of Marketing for TMW Systems (Beechwood, OH). With a background in technical and engineered products, including capital equipment, engineered materials and industrial laboratory software, Monica joined TMW in 2004. She has held positions as Sales and Marketing Manager for the "High Tech High Temp" business group of GrafTech International and Vice President of Software Sales for the Americas at Alpha Technologies LLC. She can be reached at (440) 721-2260 or via e-mail at mtruelsch@tmwsystems.com.*



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# Railcar Supply: Planning for the Future

Julie Mink

**Securing the railcars you need for today and in the future WILL HELP YOUR SUPPLY CHAIN TO THRIVE.**

**WE'VE ALL HEARD IT SAID BEFORE—"FAILING TO plan is planning to fail."** As well understood as that is, life tends to get in the way. Things happen. Superstorm Sandy brought a larger supply of debris and waste into the market most companies were not expecting. Undoubtedly the devastating tornado that hit Moore, Ok in May 2013 will make the same type of impact to local markets. Your business success is dependent, among other things, on your logistic chains ability to stay malleable.

## Things to Consider When Planning Your Fleet

As you begin your search for rail equipment, take into consideration several key factors that impact your business. A good starting point is to forecast how much waste volume you expect to ship per month and from there calculate how many tons per car you'll need to ship. This will greatly depend on the type of car you are loading as well as the capacity—both cubic foot capacity for lighter products and the gross weight on rail per car that you can ship per car. It is a good idea to check with your rail carriers to ensure that you do not have any weight restrictions (think bridges) or height restrictions (think tunnels) set in place within your route or you can expect to see some loaded cars rejected and returned. Plan to sit down with your rail carrier and calculate your turn around time (how many days it will take to load a car or multiple cars, move the cars from their loading point to their unloading point, how long it will take to unload the cars and how long it will take to return the cars from their unloading point back to their loading point) so that you can determine how many cars you will need per month. Finding the balance of enough railcars to meet your day-to-day or month-to-month shipments is as fundamental as is understanding that rail service may encounter a few snags along the way. Planning for Mother Nature's events such as hurricanes, tornadoes, earthquakes or floods is critical when considering your supply chain. Planning for the smaller things (such as schedule delays caused by 4th of July) are more predictable.

Figure 1: GT gondolas.

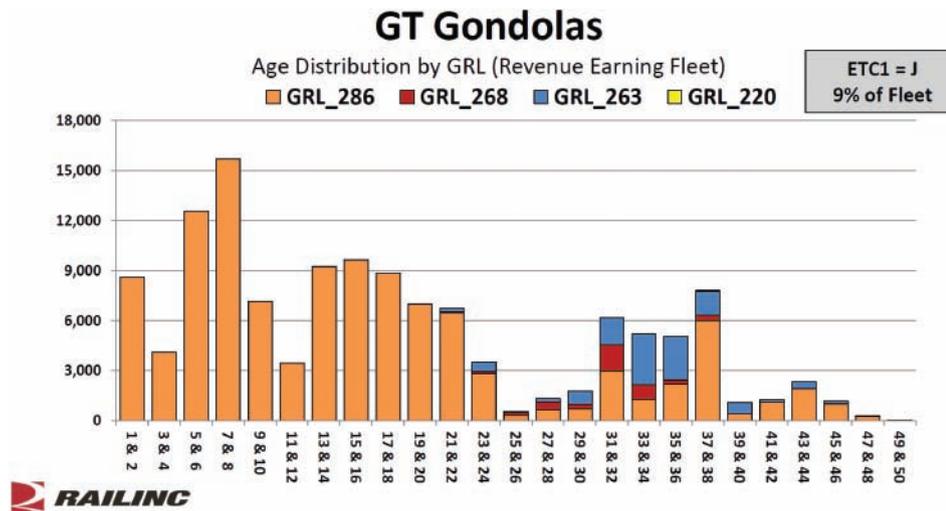
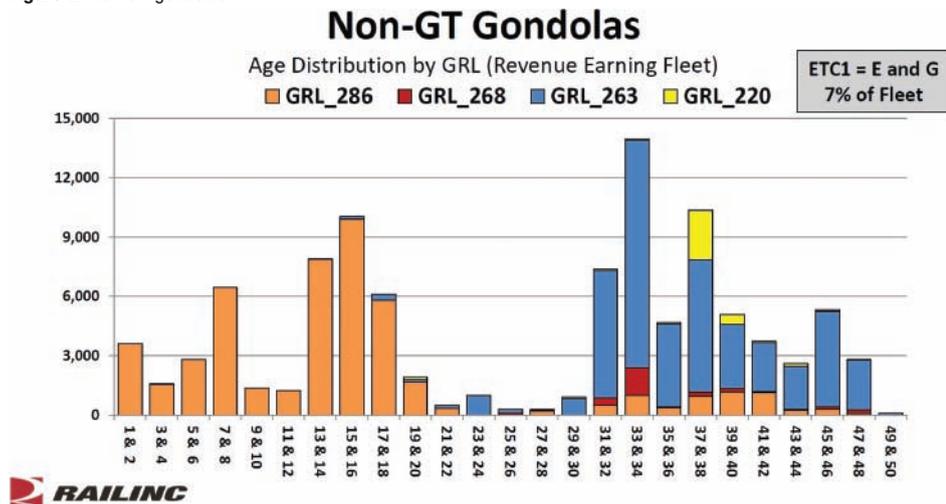


Figure 2: Non-GT gondolas.



## Identifying Desired Railcar Type

In our article "Railcar Design and Use" (*Waste Advantage Magazine*, June 2012), we focused on which railcar is most suitable for you. To refresh your memory, the three most common equipment types to move waste-by-rail are steel built gondola railcars (mill gondolas or modified coal/C&D railcars), intermodal flatcars and articulated bulk commodity railcars.

Railcars used for moving waste are generally used to move other products too and higher earning products at that. Both mill gondolas and their higher capacity sisters are generally used in the steel scrap industry to move either steel scrap or finished products and they are also used in the aggregate business to move

Figures courtesy of Tealinc.

rock, sand and gravel, and maintaining the railroad, such as by moving railroad ties. Flatcars (intermodal and ABC railcars) can be used for most any containerized shipment; intermodal shipments remain the leading growth carloads for the railroads. Finished steel products can also be moved on flatcars, making their availability harder to rein in.

## Long Term Railcar Supply

As most of the industry will agree, today's railcar fleet is rapidly aging. The Association of American Railroads (AAR) mandates that a railcar built after July 1, 1974 has 50 years of interchange life before it must either be retired (used for in-plant service) or disposed of (scrapped.) When one studies the demographics of rail equipment used for moving waste (see Figures 1 to 3, pages 44, 45), the availability of suitable railcars can be a bit concerning. Figure 1 shows the age demographics of what Railinc considers the GT gondola fleet. This fleet is comprised of gondolas with the equipment type code (ETC1) of "J" typically built with an approximate 4,000 cubic foot capacity and either flat bottom or tub bottom for use in the coal industry. Railinc reports that as of 2013, this fleet consists of 9 percent of the entire North American rail fleet. Notice that the majority of cars in this fleet have a gross rail load (GRL) of 286,000 lbs. and make up the majority of the newer (less than 20 year old) fleet. It is safe to assume that most of these 286,000 lbs. cars are aluminum built and are not ideal for transporting waste products. One can expect that the railcars shown with a GRL of 268,000 lbs. or 263,000 lbs. are steel built and do work well in the secondary market to haul waste, C&D and scrap; however, the demographics show that this fleet is rapidly aging with the majority of these steel cars ranging in age from 21 to 45 years old.

Figure 2, as reported by Railinc, shows the breakdown of the Non-GT gondola fleet with the ETC of "E" and "G". Data supports that these gondolas make up only seven percent of the entire North American rail fleet. You will notice that the majority of this fleet is between 31 and 48 years old with a gross rail load of 263,000 lbs. Figure 3 provides a breakdown of these car types reflecting that nearly half of this fleet (46 percent) consists of 52' mill gondolas and the remainder of the fleet consists of 66' mill gondolas (approximately 13 percent) and the larger capacity woodchip gondolas (approximately 6 percent). The remainder of the fleet consists of ore gondolas, covered gondolas and coil gondolas.

## So How Do You Secure the Right Supply of Railcars for Your Needs?

Freight railcars are much like trucks in that you have several options—many of which attract investors. Understanding the demographics of today's railcar fleet can help you understand the importance of planning to secure railcars for your supply chains future. For shorter term business (maybe a single trip or less than a six month move) negotiating with the railroad to order in railroad supplied equipment may be a possibility. If you need railcars for a longer time frame, you may want to consider leasing, purchasing or even ordering newly built railcars. Of course the economics must make sense so a comparison of the rate differential between privately marked and railroad supplied equipment

Car Type Code	Description	Percent of Gondola Fleet	Approx. Cube	Inside Length	Outside Length
E531	Mill Gondolas	3%	1995	52' 06"	56' 05"
E534	Mill Gondolas	35%	2494	52' 06"	57' 02"
G516	Mill Gondolas	4%	2494	52' 06"	57' 02"
G519	Mill Gondolas	4%	2743	52' 06"	56' 11"
<i>52' Mill Gonds</i>		<i>46%</i>			
E735	Mill Gondolas	7%	3300	65' 07"	71' 00"
G719	Mill Gondolas	6%	2564	66' 00"	71' 04"
<i>66' Mill Gonds</i>		<i>13%</i>			
E507	Woodchip Gondolas	3%	6007 - 7452	59' 06"	63' 10"
E707	Woodchip Gondolas	3%	7526	68' 09"	70' 07"
<i>Woodchip Gonds</i>		<i>6%</i>			
<b>Subtotal</b>		<b>65%</b>			

Figure 3: Gondola fleet breakdown.

should be evaluated. Start by requesting pricing options from your rail carrier. When ordering cars from the railroad, count on receiving less than the requested number of cars as railroad supplied equipment will most likely be shared by multiple shippers and, depending on your particular region, other users in your pool may be your competitors. In order to secure private railcars, consider working with a railcar leasing company to lock in a monthly rate for a defined time frame. The commitment can be relatively short ranging from six to 12 months or it can stretch longer into the future with three, five, seven or even 10-year terms. In some cases, you may be able to lock in a purchase option which will give your company the ability to purchase the railcars at a pre-agreed amount following termination of the lease. It is also possible to purchase your own fleet of private railcars.

## Tips for Leasing and Buying Private Railcars

Once you have identified the quantity and type of railcar you require, before contacting a private railcar leasing company, railcar builder, supplier or broker, you will want to understand the condition of the railcar. As identified, much of the existing railcar fleet is aging. Before accepting railcars into your service, it's a good idea to inspect the railcars to identify any required repair or maintenance items that will be required before receiving your railcars for their first load. Hiring a qualified railcar inspector can ensure that you are aware of any repair issues before signing the lease or purchase contract and can potentially save you from both surprise and unforeseen service expenses. In the event you have a loading or unloading situation that warrants a modification program to the cars, you may also reach out to a railcar repair shop or engineer so that you can incorporate a modification plan that best fits your budget.

When leasing railcars, it is essential that you understand what the lessors' expectations are. A thorough lease document will provide you with guidance on your responsibilities as a lessee. The same can be said when you are purchasing railcars. Recognize that once you sign a lease or purchase contract, you assume all responsibilities for the railcars and leasing or owning railcars that you are comfortable with both contractually, mechanical and structural is paramount.

As with any good plan, expect to see challenges and hurdles as the plan is executed and presume that your plans may need some tweaking along the way, but securing the railcars you need for today and in the future will help your supply chain to thrive. | **WA**

*Julie Mink is vice president of Tealinc Ltd. (Forsyth, MI) and is located in Tealinc's Elizabeth, CO office. She can be reached at (720) 733-9922 or Julie@tealinc.com.*

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**WARREN & BAERG's** (Dinuba, CA) Model MSB6-20-0 Metering-Surge Bin can be used in the Agricultural, Biomass and Waste Industries. This latest generation of Metering Bin allows you to load fibrous materials with a front-end Loader. The Metering-Surge Bin provides a consistent, positive and even flow of material for various applications. It provides cost-effective metering of shredded or ground woods, stover, grasses, paper, cardboard, plastics, carpet and other similar materials from low rates to well over 100 tph. The Metering-Surge Bin is built with straight sidewalls or can have flared front and back walls for additional capacity and loading room. The flared back is gusseted and supported. There are two doffers up front and a V-Level rake before the top doffer. Depending on the out flow tonnage required, the floor drive motors are 2 horsepower or less and 7.5 hp or less on each doffer. The differences between this bin and existing models is its opening for loading with a front-end loader, flared sides for more capacity and loading room, and higher discharge flow rates.



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**PC SCALE, INC.** (Oxford, PA) announces the release of their newest innovative mobile solution, Tower iSales™, a mobile sales application for the iPad designed specifically for sales within the waste and recycling industry. This easy-to-use application provides your sales force with immediate access to prospective and customer accounts, service activity and more. PC Scale's Tower iSales mobile sales application integrates directly with their Tower 7™ customer and route management software. Tower iSales uses interactive maps to identify nearby customers and prospects and facilitates closing sales by allowing users to create contracts directly from their iPad. The company's PC Scale WR 5 software for scale management can be installed alone, or along with their

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## EVANS



**ALCOA WHEELS** (Pittsburgh, PA) announces it has bolstered applications for medium duty truck segments, Classes 3-6, with the introduction of its M-Series™ line of aluminum wheels. Each wheel in the M-Series collection features the same benefits Alcoa forged aluminum wheels provide to heavy duty (Class 7 & 8) customers, but are now customized to fit medium duty applications. Alcoa's M-Series wheel collection is designed for straight trucks, cab-overs and low deck trailers in many industries, including refuse. M-Series wheels resist corrosion and there is no need for sanding, refurbishing, painting or touch up. Therefore, the new Alcoa wheels virtually eliminate wheel maintenance costs and maintain the clean bright look that fleets deserve. Additionally, at nearly half the weight of a steel wheel, Alcoa M-Series aluminum wheels improve fuel economy, reduce carbon emissions and are infinitely recyclable.

M-Series aluminum wheels for medium duty applications are loaded with the same money-saving, environmentally friendly, good looking and productivity increasing advantages as any other Alcoa truck wheel—just in a smaller size. The wheels provide customers with brush and polish finish options. Select part numbers are also offered with Alcoa's patented Dura-Bright® surface treatment option. Alcoa Dura-Bright wheels require no-polish and are the easy-maintenance way to bright, shiny wheels that will last. The Dura-Bright production process penetrates the forged aluminum, which holds the shine—even after hundreds of washes and thousands of miles. Since Dura-Bright wheels rinse easily with mild soap and water, they eliminate the need for caustic cleaning products, further protecting the environment and reducing maintenance costs.

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**VISIONAIRE INC.** (Grand Prairie, TX) announces the Model 7060DD low profile roof or wall mounted self-contained air conditioning system for heavy duty off-highway equipment cabs. This rugged air conditioner ships fully assembled, pre-charged with refrigerant, features a low overall height of approximately 8", and a rated output of 25,000 BTU/hr. The 7060DD has an internal, hydraulic driven compressor that requires minimal flow (6-10gpm) to operate. Quiet and compact, the 7060DD uses vibration damping pads and fail-safe mounts. Used in conjunction with properly secured and isolated plumbing, it greatly reduces noise, vibration and harshness. Service ports located on the outside of the unit allow for quick servicing.

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Pioneer, Wastequip's (Charlotte, NC) brand of tarping systems for the waste industry, announces its Electric Side Roll (ESR)-1000 tarping system for waste and environmental haulers. Pioneer designed the ESR-1000 to help haulers eliminate waste debris blowing from trucks. The ESR-1000's proprietary electric roll design provides a tighter fitting tarp than traditional manually operated waste tarping systems. With its wireless remote control, the ESR-1000 allows a driver to stand off to the side of a trailer or even remain safely inside the cab to tarp and un-tarp his load. The ESR-1000 can quickly be converted from electric motor control to a manual operation in the field, eliminating the downtime associated with other systems that may require a trip to the maintenance shop for repair.

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The **GOODYEAR** (Akron, OH) G289 WHA DuraSeal tire has been specifically designed for waste haul industry trucks. The G289 WHA contains Goodyear's exclusive DuraSeal Technology, a gel-like substance built into the tire that instantly seals nail-hole punctures of up to 1/4-inch in diameter in its repairable tread area in order to keep waste industry trucks up and running. Available in size 315/80R22.5, the G289 WHA DuraSeal also offers extended tread life, all-season traction and other benefits to help deliver outstanding overall performance in waste haul applications.

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**AIR FILTER BLASTER** (Spencer, IA) is a new patented method for air filter cleaning that dramatically reduces air filter replacement and fuel usage on motorized equipment. The technology has been proven in extensive field trials. The system requires no expensive add-ons or external devices—it requires only a simple source of compressed air. Ports within the Air Filter Blaster's centrifugal forced air induction chamber create a shaft rotation that uniformly vibrates and discards dirt and particles from the inside of the air filter outwards. Although the process is simple and direct, cost savings for a single application upon even small sets of equipment may well pay back the acquisition cost in a single application. By reducing fuel usage, filter replacements and landfill charges, Air Filter Blaster generates significant ongoing cost savings while helping your company achieve green fleet goals.

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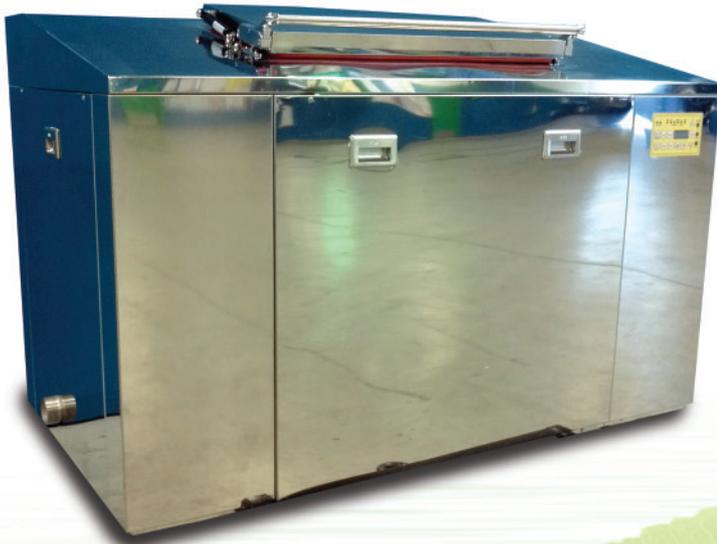
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# WasteAdvantage<sup>magazine</sup>

The Advantage in the Waste and Recycling Industry

 Recycling  Transfer Stations  Landfills

## Contents

- 50** **Landfills**  
First of Two Parts  
Biogeochemical Clogging of Landfill Leachate Collection Systems: Why is it Occurring, How can it be Cleaned, and What can be Done to Prevent It  
NATHAN P. MAYER, MANUEL J. HERNANDEZ, ABDUL MULLA SALEH, S. STEVEN CARL AND RALPH CALISTRI



- 56** **Recycling**  
First of Three Parts  
Implementing a Pay-as-You-Throw Program  
JOSHUA KOLLIN-PERIN



- 58** **Compactors**  
Cleat Types and Patterns: What Works Best for Your Location?  
WHITNEY BROCKWAY



- 62** **Products/Services**

*Waste Advantage Magazine's* Recycling/Transfer Stations/Landfills (R/T/L) section has become a very important part of our readership. Our timely, relevant editorial in this section—products/services releases, statistics, short tips, etc.—provides you, our R/T/L professionals, with the useful information that you need when making that important purchasing decision. By making this important move, *Waste Advantage Magazine*, provides something for everyone in the waste and recycling industry and makes it the most complete one-stop-shop publication available today. We look forward to expanding our coverage of this segment of the industry and hearing your feedback.

## Landfills

### First of Two Parts

# Biogeochemical Clogging of Landfill Leachate Collection Systems: Why It Is Occurring, How It Can Be Cleaned and What Can Be Done to Prevent It

Nathan P. Mayer, Manuel J. Hernandez, Abdul Mulla Saleh, S. Steven Carl and Ralph Calistri

#### CHAPTER 62-701.500 OF THE FLORIDA ADMINISTRATIVE CODE (F.A.C.)

requires that existing leachate collection systems (LCS) “be water pressure cleaned or inspected by video recording at the time of permit renewal.” Additionally, operations permits with the Florida Department of Environmental Protection (FDEP) require an annual demonstration that the LCS is functioning and operating properly as designed. To fulfill regulatory and permit requirements, landfill operators use water jetting and/or video inspection to confirm that the LCS is functioning and operating as designed. Annual inspections have shown that landfills, including municipal solid waste (MSW) landfills, ash monofills and commingled MSW/ash landfills, are experiencing biogeochemical clogging in their LCS, creating regulatory compliance and operational issues for landfill owners.

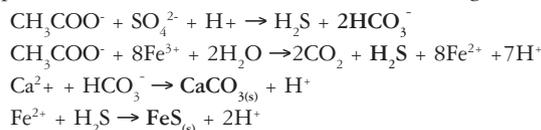
For multiple landfill facilities in Florida, CDM Smith evaluated the conditions of the LCS, conducted precipitate mineralogy and chemical composition analysis to determine how and why precipitate is forming, outlined the pipe cleaning technologies available, provided pilot testing for the proposed technologies, and determined the technology best suited for the particular system. This article discusses the reasons for precipitate formation, the cleaning technologies employed and operational changes that may help to prevent formations of precipitate.

### Clogging Mechanisms

A landfill LCS can consist of aggregates, geocomposites, collection trenches, pipes, cleanouts, pumps, lift stations, storage tanks, wet wells, etc. Clogging of any portion of the system can lead to higher hydraulic heads within the landfill, increasing the potential for leachate outbreaks over containment berms and/or leakage through the liner. Studies have shown that clogging is widespread and its occurrence can attributed to several factors including sedimentation and deposition of fines, biological clogging, and chemical and/or biogeochemical precipitation. Typically, clogging is caused by the formation of biofilms and

insoluble mineral deposits that fill the void spaces within the drainage layer and/or perforated collection pipes within the LCS.

Biogeochemical clogging can be attributed to thermodynamically favored precipitate formation influenced by supersaturated conditions based on saturation indices of calcium, sulfide, iron and other species. Furthermore, clogging may also be attributed to the presence of large numbers of microorganisms in landfill leachate. Sulfate and iron reducing bacteria (SRB/IRB) play a major role in forming biologically induced calcium carbonate (CaCO<sub>3</sub>) precipitate in a reduced environment. The decomposition of waste involves the fermentation of primary substrates to sugars and alcohols. Volatile fatty acids (VFAs), primarily acetic acid, are converted to substrate by SRB/IRB, which is then consumed by methanogenic bacteria to produce carbon dioxide and methane. Consumption of VFAs and hydrogen causes the local pH to rise, increasing the total carbonate in the system. In the presence of calcium, these reactions allow for and accelerate the chemical precipitation of calcium carbonate, the dominant inorganic species in the “slimes” found in LCS. These “slimes” are waste products from bacteria metabolism, which provide a protective environment and nutrients for bacterial growth and nucleation.



### Characteristics of Leachate and Precipitate

#### Leachate Analyses

The chemical composition of leachate is influenced by a variety of factors including waste characteristics and age, the quantity of liquid that has percolated through the landfill, the biological activity of the landfill, and the status of chemical complexation and solubility reactions. In addition to



Clogged landfill systems.



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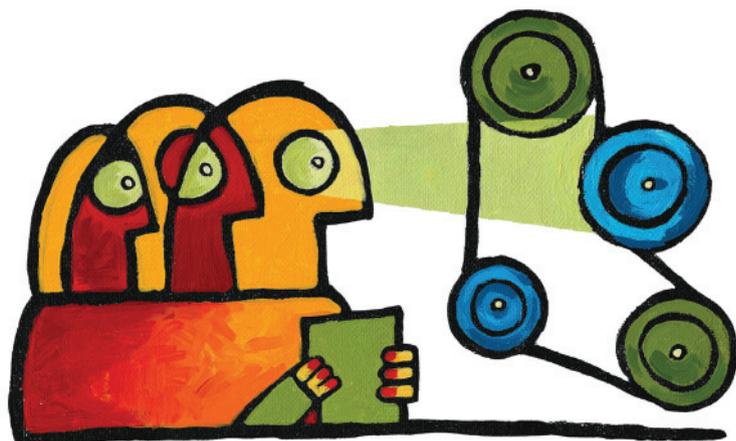
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Parameters	Units	MSW/Ash 1	MSW/Ash 2	MSW/Ash 3	MSW/Ash 4	Ash Mono 1	Ash Mono 2
<b>Inorganics</b>							
Chloride	mg/L	18,000	14,000	760	12,000	41,000	44,000
Sulfate	mg/L	630	570	560	990	280	240
Total Alkalinity	mg/L	6,100	780	2,700	9,900	330	330
Total Organic Carbon	mg/L	4,200	390	2,100	12,000	7.0	7.9
<b>Metals</b>							
Calcium	mg/L	920	1,300	34	1,400	6,000	7,600
Iron	mg/L	75	13	3.0	270	0.05	0.6
Magnesium	mg/L	150	110	29	230	30	23
Sodium	mg/L	5,600	4,500	500	5,400	12,000	13,000
<b>Metals, Dissolved</b>							
Iron	mg/L	65	6.0	3.2	21	0.02	0.06
Silica (SiO <sub>2</sub> )	mg/L	93	38	70	170	141	15
<b>Volatile Fatty Acids</b>							
Acetic Acid	mg/L	2,700	1.8	3,500	8,700		
Propionic Acid	mg/L	940	-	810	3,000		
Butyric Acid	mg/L	1,200	0	1,400	4,000		

Figure 1: Leachate parameters table.



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MSW landfills, many landfills accept residuals from combustion processes, and from water and wastewater treatment facilities. Collectively, the relative amounts of MSW, process residues, and other waste materials disposed of in a landfill impact the short-term and long-term composition of leachate and the biogeochemical reactions that result from waste degradation during the life of the landfill.

To gain a better understanding, leachate chemical composition and precipitate mineralogy analyses were conducted at several landfill facilities in South Florida (both ash monofill and combined ash/MSW) to determine how and why the precipitate is forming. Results showed high concentrations of calcium, chlorides and sodium. Moderate concentrations of sulfate, organic carbon and silica were also present. Similar studies show that leachates from ash monofills are dominated by high concentrations of dissolved calcium (see Figure 1).

### Geochemical Modeling

Geochemical modeling was performed using the Reaction Module (REACT) of The Geochemist's Workbench®, Release 6.0 (GWB) to simulate the reactions that might occur in the leachate environment. The model simulation begins by calculating the initial equilibrium state of the geochemical system that contains the aqueous fluid. The model then calculates the equilibrium distribution of aqueous species in the fluid and the fluid saturation state to predict possible reactions and precipitate formations based on field and laboratory test results as input parameters.

The results of the analysis conducted on leachate from a combined ash/MSW landfill showed the predominant

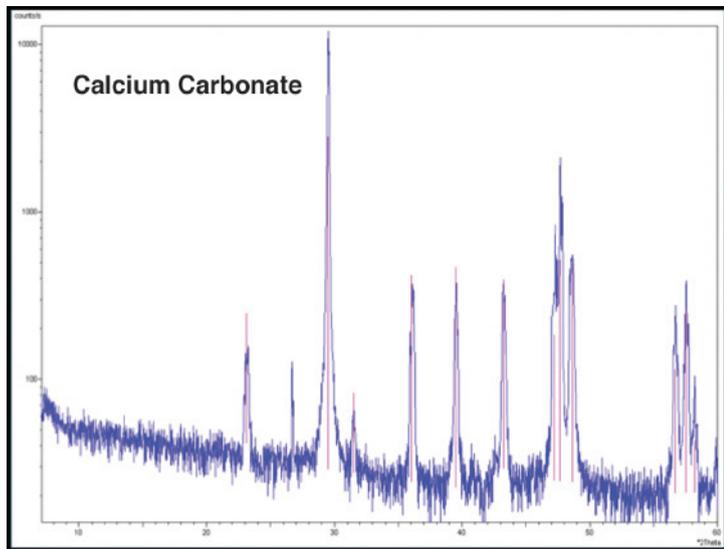


Figure 2: X-ray diffraction results – Calcium Carbonate.

precipitates are calcite (calcium carbonate,  $\text{CaCO}_3$ ) and dolomite (calcium magnesium carbonate,  $\text{CaMg}(\text{CO}_3)_2$ ) with trace amounts of hydroxyapatite (a complex of phosphate and calcium,  $\text{Ca}_5(\text{PO}_4)_3(\text{OH})$ ), quartz ( $\text{SiO}_2$ ), and siderite ( $\text{FeCO}_3$ ). Similarly, the results of the analysis conducted on leachate from an ash monofill showed the predominant precipitate as calcite with trace amounts of hydroxyapatite and quartz.

### Precipitate Mineralogy

In addition to liquid phase testing and geochemical modeling, precipitate mineralogy was also performed on samples collected from the LCS. Samples were analyzed using X-Ray Diffraction (XRD) to identify the dominant minerals present in the precipitate material. Results indicated that calcium carbonate was the predominant precipitate with traces of both brushite ( $\text{Ca}(\text{HPO}_4)_2 \cdot \text{H}_2\text{O}$ ) and gypsum ( $\text{Ca}(\text{SO}_4)_2 \cdot \text{H}_2\text{O}$ ) present. Finding calcium carbonate in these samples is consistent with the geochemical modeling results and the results found in similar studies (see Figures 2 and 3).

### Cleaning Technologies

After conducting precipitate mineralogy and chemical composition analysis to determine how and why the precipitate is forming, CDM Smith was tasked with outlining the pipe cleaning technologies available and setting up pilot testing. The following methods for removing precipitate material were evaluated.

#### Mechanical Methods

Mechanical methods include high-pressure water jetting and milling cutters. Various nozzles and cutters can be used on the end of high-pressure hoses to remove precipitates and flush debris from pipes.

#### High-Pressure Water Jetting

Removal of the precipitate material requires high pressures, typically between 4,000 and 10,000 psi. Equally distributed, high-pressure water jetting is used to distribute the pressure along the surface of the precipitate without creating a point pressure on the inside wall of the pipe itself. This method reduces the likelihood of damaging the pipe. Penetrating (point-focus), flushing (equally distributed) and rotating nozzles have been used successfully at other landfills to remove precipitate formations. A maximum applied pressure of 7,500 psi is typically established to protect the integrity of LCS pipes (see Figures 4 and 5, page 54).

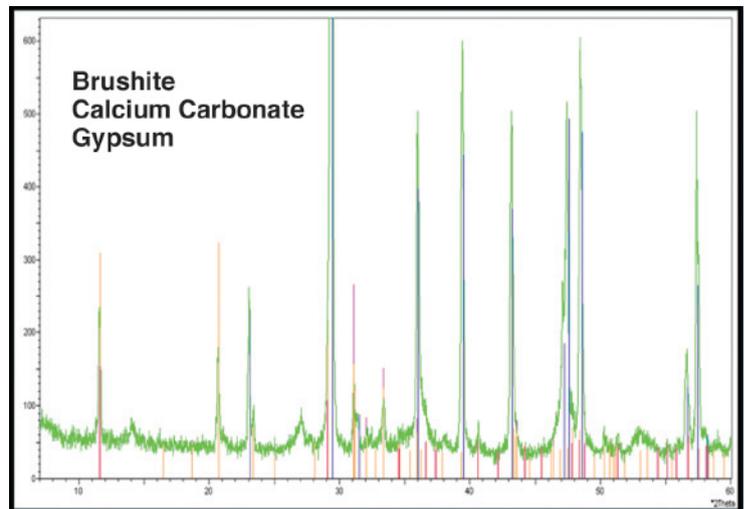


Figure 3: X-ray diffraction results – Brushite, Calcium Carbonate, Gypsum, etc.

The pressure and volume of water used when jetting can have varying results on the removal of precipitate in a pipe. Increasing the pressure tends to dislodge precipitate in the pipe, whereas increasing the volume of water assists with moving the dislodged material through the pipe, downstream for removal. A combination of high-pressure and high-volume water jetting can be used to clean the LCS.

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Images courtesy of CDM Smith.  
**Figures 4 and 5:** High-pressure water jetting nozzles.



**Figure 6:** Milling cutters.

### Cutters and Milling Machines

Cutters and milling machines are also used to remove precipitates from pipes. This equipment is typically attached to the jetting hose and the water pressure from the jetting equipment drives the cutter or milling machine. This option requires the use of jets to remove the material that is loosened by the milling machine. Milling cutters are designed to align themselves within the pipe; however, they can potentially cause damage to the pipe walls, especially near transitions, changes in pipe material and welds within HDPE piping. Additionally, consideration must be given to explosion potential, due to the presence of landfill gas (see Figure 6).

### Chemical Treatment

Chemical treatment includes recirculation and/or resurgence of a chemical, typically an acid blended with specialty chemicals to enhance activity, within a pipe segment. The chemical is allowed to sit in the pipe for a period of time, depending on the chemical used, to provide adequate contact time between the precipitate material and the dissolving chemical. Large quantities of chemical may be required depending on the configuration of the LCS.

### Cleaning Demonstrations

Cleaning demonstrations were used to evaluate both the effectiveness and cost of the cleaning technologies discussed above. Each technology was given three days to clean a specified section of LCS piping. Daily video inspections were used to assess the progress of each technology and confirm that they were not negatively affecting the LCS. Due to the risks involved with properly sizing the milling cutter, it was recommended that this technology be used as a last possible option.

Both chemical cleaning and high-pressure water jetting were successful at removing precipitate from the demonstration areas. High-pressure water jetting was successful at removing several large, intact pieces of precipitate from the LCS. However, debris buildup at pipe transitions and intersections was a constant issue. Transitions made it difficult to flush dislodged debris. As one piece of precipitate was flushed, another followed, creating a problem with continuous removal of fractured precipitate. The removal of heavy precipitate requires a slow, staged cleaning approach, significantly increasing the time and

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cost of this cleaning technology. High-pressure water jetting also requires access points for removal of larger dislodged precipitate material, and most LCS designs do not always allow for this.

Chemical cleaning was successful at removing most of the precipitate formation, especially in the lower lengths of the LCS. Video inspections confirmed that this technology was successful at removing heavy buildup and restoring flow in areas that were clogged and/or appeared stagnant at the beginning of the cleaning demonstration.

Based on the results of the demonstration, the cost and effectiveness of the two technologies evaluated were compared. This evaluation showed that high-pressure water jetting is capable of cleaning up to 1,500 feet of pipe per week, depending on how heavily deposited with precipitate it is and how easily the dislodged precipitate can be removed from the system. Chemical cleaning is capable of cleaning over 2,000 feet of pipe per week. This equates to \$20 to \$40 per foot of cleaned pipe.

**Conclusion**

Based on the results of the demonstration and an evaluation of cost, chemical cleaning was determined to be the best technology for removing heavy precipitate buildup, especially in the lower lengths of the LCS, pipe sections with multiple access points, and non-perforated piping. The chemical cleaning technology was provided by Progressive Environmental Services (PES) (Norfolk, VA). PES's proprietary products are designed to penetrate, disperse, dissolve, and remove scaling and corrosion by-products, biofilm and all other existing microbial activity. | **WA**

Part 2 of this article will discuss the full-scale chemical cleaning projects, including the methods employed and results of the cleaning.

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## Recycling

### First of Three Parts

# Best Practices for Pay-As-You-Throw—Understanding the Options

Les Evans

#### MUNICIPAL SOLID WASTE AND PUBLIC WORKS OFFICIALS AROUND THE

country have been hearing the term “pay-as-you-throw” (PAYT) for years, but it may not always be clear just what it means, how it works, and how to put it in place effectively. When it comes to pay-as-you-throw, doing what it takes to get the program right is just as important—if not more so—than making the decision to adopt the program in the first place. With that critical need in mind, this three-part series of articles will aim to fill in those gaps, sharing details about the best practices for PAYT programs.

This month, we will explore the various options for PAYT that communities should consider. Next month, we will address the key planning steps municipal leaders need to take to make their PAYT programs as effective as possible. Finally, in September, we will look at the key success factors among well-implemented PAYT programs, and common pitfalls to avoid.



For all their benefits, tag-based pay-as-you-throw programs can pose enforcement challenges.

Photo courtesy of WasteZero.

Under the traditional MSW payment model, residents pay a flat fee to dispose of their waste. These fees can often be “hidden” in utility or property tax bills. This system gives residents little incentive to reduce the volume of their waste and divert items from the waste stream toward productive uses such as recycling and composting. By contrast, PAYT programs are “unit-based,” allowing residents to pay for the amount of waste they dispose of. Making people aware of—and responsible for—the cost of their garbage gives them incentives to throw away less, recycle and compost more, and make purchasing choices that reduce their waste volume.

Because “pay-as-you-throw” is an umbrella term for programs that can take

many different forms, the first step for any community weighing the decision to move to this system is to understand the different options available to them. We will discuss five: cash, overflow, variable-rate carts, tags and bags.

### Cash

Programs that ask residents to pay a set fee in cash for each bag they dispose of at a convenience center or transfer station were the original PAYT system. Cash-based programs certainly offer equitability to residents—people who create less garbage pay less to dispose of it. And because there is a cost associated with each bag, these programs also give residents incentives for waste reduction and diversion.

Cash programs can be effective, but they do have their drawbacks. They have inherent operational and accounting inefficiencies, as cash—often in the form of coins—must be collected, counted and deposited. They also put convenience center attendants at risk of theft due to the often large amounts of cash they have on hand. In addition, there have been cases of attendants themselves stealing as much as several thousand dollars from the cash collection.

### Overflow

Another approach to PAYT that many communities use is the overflow program. In this system, residents’ municipal solid waste fees cover everything they can fit into a certain size cart, and they have to pay extra to dispose of anything that does not fit into the cart. Overflow programs can be useful in collecting revenue from the minority of residents who regularly fill their carts beyond capacity, but given the large size of many carts (often up to 96 gallons), many residents do not often reach the point where they need to resort to overflow—making it difficult for overflow programs to achieve their waste reduction and diversion goals.

### Variable-Rate Carts

Variable-rate carts are another pay-as-you-throw option that communities can consider. Under these programs, residents choose from among different sizes of carts—frequently 35, 65, and 96 gallons—paying more for the larger carts and less for the smaller ones. One benefit of this system is that it offers some of the inherent equity that is a hallmark of PAYT. However, variable-rate cart programs can be expensive, with high start-up costs to purchase new equipment, and they can be operationally complicated as communities deal with the ongoing logistics of distributing different cart sizes, accounting for them and maintaining multiple sizes of carts.

Perhaps most important, variable-rate cart programs often do not achieve communities’ waste reduction and diversion goals. This happens in part because residents usually opt for the cart size that fits their existing waste disposal patterns rather than changing their habits to further reduce waste. In addition,

the units of measurement across multiple cart sizes are too large to capture even some meaningful changes in waste volume.

Another side effect of some variable rate cart programs that can limit their effectiveness is the phenomenon of “snow-coning.” In an effort to save money, some residents will opt for the smallest (and lowest-priced) cart and then overstuff it, with bags of trash piled on top like the scoop of ice on a snow cone. Some municipalities combine an overflow program with variable rate carts to alleviate this problem, but that often adds greater complexity and still usually fails to meaningfully reduce waste volume.

**Tags**

Tags or stickers are another PAYT option for communities. These programs measure waste by the bag, with residents purchasing special stickers or twist ties that they affix to garbage bags in sizes and weights specified by the municipality. Tag-based systems provide equitability for residents, and they do a good job of measuring waste in small units that more accurately reflect residents’ disposal patterns, creating incentives for waste reduction and diversion.

The main challenge with tag programs is that enforcement can be challenging, which limits their effectiveness. For one thing, communities with automated collection cannot practically use a tag-based system, due to the need to closely inspect each bag as it is collected. In addition, it can be difficult for collection crews to detect bags that are larger or heavier than permitted, that have split stickers, and that are untagged but hidden beneath bags with the proper tag. With tag-based systems, collection crews are often left with a choice between collecting slowly and detecting non-compliance or collecting quickly but letting unpaid-for waste get collected.

**Bags**

Bag-based pay-as-you-throw programs generally offer the greatest range of benefits with the fewest drawbacks. In the bag-based system, residents dispose of their waste in specialized bags approved by the municipality and clearly marked with the municipal seal or other unique instructions or information. These programs are fair, with residents paying only for the trash they dispose of without having to subsidize the habits of their more wasteful neighbors. As a result, they provide the necessary incentives for residents to reduce, reuse and recycle.

Bag-based programs are operationally simpler than other programs, requiring no changes to existing collection systems. They are less expensive because they do not require the purchase of new equipment. They are also easier to enforce, due to the readily identifiable nature of the bags, even in communities that use automated collection systems. Perhaps most significant, they can be highly effective in reducing waste and in driving up recycling rates, provided they are implemented correctly.

Selecting the right kind of PAYT system to match a community’s unique needs is the first step toward putting a successful program in place. In the next two articles in this

series, we will discuss the other key elements of planning and implementation.

**| WA**

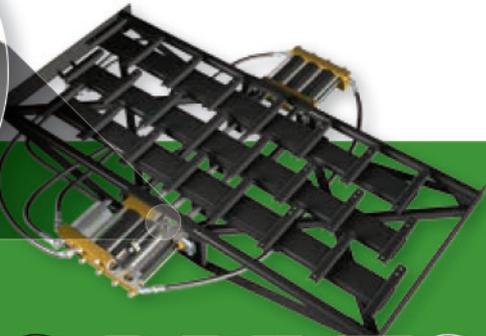
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## Compactors

# Cleat Types and Patterns: What Works Best for your Location?

Whitney Brockway

**YOUR LANDFILL COMPACTOR IS ONE OF YOUR LARGEST AND MOST** important investments. Protecting it against premature failures due to daily wear and tear is crucial. Choosing the proper cleat and wheel pattern along with machine guards and wire wrap protection, enhances your compactor's ability to perform to its optimal potential. Unit guarding also protects your machine and extends the life of critical drive components at a fraction of the cost to replace and repair these items, not to mention unnecessary down time.

### Factors that Affect Your Compactor Wheels

Don't let just anybody tell you what you should be ordering. Every site is different. Be sure to consider: soil type (clay, gravel, sand, etc.), waste stream intake (sludge, MSW, C&D, etc.), cover material(s), regional climate and geographical

location. There are just a few important factors that affect the efficiency and desired performance that you should expect from your wheel investment.

Many cleats reduce traction due to plugging, which causes loss of the wheels' ability to sink to the outer drum face. Compaction takes place at the drum from static weight supplied by your machine's total weight. If the cleats don't penetrate to full depth while reducing material size, your compaction is reduced dramatically. Not enough cleats per wheel or cleats that are wider than 6" to 8" at the cutting face also cause loss of compaction along with increased wheel spin. These factors increase fuel consumption and raise unit operating temperatures, decreasing drive train life and allowing fluffing or too much rebound of the working face. More daily cover is then required, which also increases your operating costs. Single cleat contact at the 12 o'clock position during wheel



HDT standard cleat.  
Photos courtesy of Terra Compactor Wheel.

rotation is also important. Twenty-five percent of the machine's weight is transferred through one cleat contact patterns; two or even three cleat contact patterns reduce penetration by two or three times respectively. Daily cleaning and removal of wrapped debris from critical drive components is expensive and even dangerous at times. Cleats and the pattern they are welded in help your machine place as much trash as possible into every cubic yard of air space.

### Cleat Patterns and Types

Recommendations for pattern types should be determined through proper questions that pertain to your landfill specifically. Not all landfills are the same. The correct pattern will provide you with the right tool to help your machine compact to its maximum potential. Some sites are so specialized due to material type that very unique, customized patterns are necessary. Cleat patterns include, but are not limited to:

- *Cleat Combination Patterns*—Preferred for high volume MSW and C&D sites. It annihilates construction materials and provides optimal traction performance in solid terrain and frozen conditions. Highly effective in reducing side-slip for those performing a lot of slope work. The cleat combination pattern improves traction and compaction. It can be offered with 8.5" cleat height to extend cleat life, increase penetration for aggressive traction and decrease wheel spin.
- *Collateral chevron*—Directional primary left and right hand cleats provide exceptional traction and size reduction while enhancing site appearance and finish.
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Top: A full 836G underbody Guard kit (belly pans).



Bottom: Twist torque cleats in a transverse traction pattern with oscillating guard.

- *Transverse traction*—Cleats are mounted radially and horizontally for enhanced traction and slope stability.
  - *Chevron standard*—The primary, introductory industry standard pattern with directional right and left hand chevron rows. Offers favorable tractive effort and size reduction.
  - *Advanced Chevron*—Aggressive pattern using a combination of cleats: twist-torques and scissor tips. Providing on-contact, full depth, size reduction. Preferred for high volume MSW and C&D sites.
  - *Dual helix*—The only true uni-directional pattern. There is no specific wheel position assignments on machinery. Supports size reduction and enhances self cleaning in severe sludge conditions for continuous tractive effort and compaction.
  - *Inverted chevron*—The most efficient general purpose pattern. Paired with left and right hand twist-torque cleats for the most tractive, equally spaced, waste reductive support a pattern can provide.
  - *Kentron pull*—This farm tractor tire pattern pulls waste to the center of each wheel and provides great traction.
- Cleat types include:
- *Twist torque*—Extended puncture points create extreme ground pressure and size reduction upon contact. Mirror image, left and right hand, twisted bases create a lateral torque that no other cleat can accomplish. This tip uses the machines weight to force out any trapped air to pack waste tight. High carbon steel, along with additional height, ensures the long wear life of twist-torque cleats. Preferred site type: C&D or MSW.
  - *HDT Wedge*—The wedge shape provides excellent wear life, traction and size reduction for all site conditions. It is designed to get the job done. Preferred site type: C&D or MSW.
  - *HDT Wedge Narrow*—Narrow version of the HDT Wedge is 6.5" wide. It provides clearance for machines with cleaner bar assemblies. Similar in shape to the HDT Wedge, but a little heavier at the upper end. Preferred site type: MSW.

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- A *static fixed rolling guard* keeps wire and other types of debris from the inner axle brake and seal area. These guards work well in most MSW landfills where the waste stream lends itself to a higher intake of wrapping materials such as: wire, carpet cut-offs, bed springs, plastic slittings and hosing.
- A *segmented weld-on static rolling guard* is the same as the standard fixed guard but has replaceable sections to make it easy to repair or replace segments as required. They are designed for onsite field installation.
- An *oscillating rolling guard* is a specialized guard system that freely moves within the wheel body's inner edge. This type of guard works great for standard service MSW debris. This guard is always flush with the bottom of the outer drum at the twelve o'clock position allowing full cleat penetration at all times

as the machine moves back and forth over the working face. It is virtually free of edge wear and eliminates the required hard-facing (that other guards need) maintenance to retain guard height.

- A *segmented cleat rolling guard* is a combination guard that includes a segmented wall with distinct sections connected by a radially installed steeple cleat. They are easy to repair and replace individual segments as required. They are also designed for onsite field installation.

### Enhance Your Compactor's Performance

Your landfill compactor is one of your largest, most important investments: protect it, guard it, maintain it. Use your complementary site visits to educate and discover what options are necessary for your specific location. Remember: not every site was created equal and there are solutions out there. Choose the proper cleat, cleat pattern, wheel and machine guards to enhance your compactor's performance, increase wear life and protect your investment. Forget about unnecessary down time—no one has a budget or a clock for that. Save yourself some money and get what works best for you. | **WA**

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