Process Improvement for Waste Facilities: How to Increase Efficiency, Save Money, and Improve Worker Safety By Mastering The Science of Operations by Neal Bolton Copyright 2023 Blue Ridge Services Montana, Inc. www.blueridgeservices.com

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## **Executive Summary**



Since 1988, my company, Blue Ridge Services Montana, Inc. (BRS), has been changing the way the solid waste industry thinks about operations. We have led a transformation in solid waste operations management, helping owners and operators increase efficiency, save money and improve worker safety. Many of our clients are saving millions of dollars per year based on our Comprehensive Operational Review (CORE®), focused training, planning, performance tracking and related services.

# Learn more about CORE<sup>®</sup> at **blueridgeservices.com**.

As a team, we approach solid waste consulting from a different perspective because of my unique background. I grew up hearing my grandfather talk about his experience operating heavy equipment for the County and remember watching him push trash at the local landfill. I began my career as a heavy equipment operator, working for a family-owned construction company. I still hold a contractor's license and a Class A commercial driver's license.

So, when I became an engineer and began working in the waste industry, I was actually engineering things that I knew something about. With many years of practical, operational experience in one hand, and the technical capabilities of an engineer in the other, I've been able to build a company that fills a critical gap in the waste industry: **Operational Consulting.** 

You may be most familiar with our contributions to landfills. That's no surprise, because much of our work has focused on that part of the industry. In that realm, I am recognized as a world expert in landfill operations. In fact, when it comes to landfill operations, I wrote the book: <u>The Handbook of Landfill Operations</u>. Most landfill engineers have a copy on their bookshelf.

Learn more about the <u>Handbook of</u> <u>Landfill Operations</u> by visiting **shop.blueridgeservices.com.**  Using the same common sense approach that we've applied to landfills, we've consulted at hundreds of other waste operations as well, including transfer stations, recycling facilities, organics processing facilities and collection operations.

The demand for our services is extremely high. Most of the work we do is sole-sourced – for two reasons. First, our operations-based consulting fills a very unique gap in the industry. Second, we are well-known for providing value for our clients – in an industry where reputation and word-of-mouth references trump everything else.

# Learn more about our clients by visiting **blueridgeservices.com/client-testimonials**.

Over the years we've also worked with a number of large, solid waste consulting companies. These have been very good relationships, because the things we bring to the table compliment the typical services offered by traditional design engineers. We don't do design ...and design engineers don't do operations.

Through our trademarked CORE® process, we have helped hundreds of solid waste operations dramatically improve their efficiency. To read stories about the facilities we have worked with, I invite you to read through this booklet. Start at the beginning, or jump to chapters that most apply to your facility.

If you have questions or comments as you read and process this content, I welcome your feedback. You can email us directly at **info@blueridgeservices.com** or call 406.370.8544 to speak with a member of our team.

# Chapter 1 The State of the Industry



The solid waste management industry is under intense, on-going pressure to do more with less. The traditional funding model, where disposal fees pay for every post-collection activity, is outdated. As recycling and economic factors reduced the quantity of solid waste disposed, revenue also declined. Surprisingly, those declining revenues continue to be tapped to pay for more recycling, which further reduces disposal revenue. And now, on top of that, China's National Sword and Blue Sky 2018 have sent the entire industry into chaos, with uncertainty about what the future holds.

# Yes, the model is broken.

## The Impact of Recycling

From 1960-2000, municipal solid waste (MSW) tonnage generation increased at a steady, predictable rate (Fig. 1, below). People paid for what they threw away, and thus, revenue received in the form of disposal tipping fees increased. Year to year, as disposal volume increased, so did revenue. Landfills consistently made money, with net revenue often reaching 40 percent or higher. Other waste-handling operations, such as transfer stations and collection services, were profitable as well.



(Fig. 1) MSW Generation vs. Recycling Rates

## **Times Are Changing**

Things changed after recycling took hold around 1990 (Fig. 1, previous page). "Reduce, Re-use and Recycle" became the industry's new mantra. Today, transfer stations, recycling facilities, landfills and even collections operations are all integral parts of solid waste management. But many stakeholders have yet to adapt to the economic impact of recycling. This is because as recycling gained momentum, few leaders recognized this problem: that the solid waste disposal system is funded by fees based on what people throw away. The industry's traditional revenue stream decreases as more waste is recycled.

# FREE RESOURCE



View a Webinar on Reducing Landfill Operating Costs. Visit **blueridgeservices.com/reduce-landfill** and use password *Reduce*.

While solid waste operations were making less money, municipalities continued to increase funding for recycling programs. This further decreased revenue generated by disposal fees and waste collection. Increasingly, states and municipalities began mandating recycling. This forced some in the solid waste industry to recycle items that did not generate self-sustaining revenue. Finances went into a downward spiral followed by a virtual freefall in 2008 when the Great Recession reduced the average disposal tonnage by another 30 percent.

And now, in the latter part of 2018, the waste industry is facing a new set of challenges. As China's National Sword and Blue Sky 2018 take effect, many municipalities are left wondering how to continue with "business as usual." And the reality is: we can't. It's time to take a good, hard look at what we've been doing, and find a better way to handle recycling and diversion.



(Fig. 2) Number of Landfills in the United States

## The Landfill Landscape

During this same time period – starting around 1990 – the number of landfills in the U.S. decreased from around 8,000 to less than 2,000 (Fig. 2, next page). Two primary factors led to this decrease: more stringent environmental regulations and increased competition between landfills.

As the EPA intended, small, local dumps were replaced with larger, more sophisticated landfills. Today's landfill is on average four times larger and infinitely more environmentally secure than landfills of previous years.

With many of the environmental issues effectively handled, landfills still face a major challenge. The current solid waste management financial system is not working. Many facility owners and operators are struggling to maintain services in an environment of declining revenue. As the political and social pressure for recycling continues to build, so too does the need to find more money. This can be mitigated to some degree by changing the financial structure to require recycling to fund itself – often by charging additional user fees, because in reality, recycling is seldom a self-sufficient business. It must often be subsidized. Ultimately, though, what we're talking about here is a money problem, and the underlying issue is not solely related to recycling, nor can it be blamed entirely on the recession.

## Background

For many facilities, the pre-recession boom in the solid waste management business has become a post-recession bust. Before the recession, many solid waste operations were plush with staff and equipment. In time, this excess became the status quo. Over-equipping and over-staffing was most prevalent in municipal operations. Perhaps this was due to the, "We don't have any competition" belief held for so long by municipal management. Or it may have been based on the misconception that good customer service requires abundant staff and equipment. In any event, this pattern extends beyond those basic resources – impacting many other aspects of many municipal landfills. This also impacts private landfills, though typically less severely.

This same phenomenon is also seen in other types of facilities, even in those relatively recent players on the solid waste management team – transfer stations. When the number of landfills began declining in 1988, many of them were replaced by transfer stations and MRFs, because, of course, waste was still being generated in those same locations. With three out of four landfills closing, transfer stations took their place. These facilities allowed small loads of waste to be consolidated into larger transfer trailer loads that could more economically transport waste from where it was generated to larger, regional landfills. And in order to decrease transportation costs, many of those transfer stations began implementing various types of recycling programs. Remember as the number of landfills decreased between 1988 and 2002 waste tonnage continued to increase. As a result, the remaining landfills grew (in terms of inbound tonnage) by approximately 300 percent.

Initially, those solid waste facilities – such as landfills and transfer stations – were operated by non-technical tradesmen. To their credit, many made up for their lack of formal education with above-average doses of common sense, hard work and practical experience passed down from one generation to the next. More recently, an increasing number of technically trained individuals have taken on management roles within these operations. But industry-wide, the operational problems linger.

#### The answer is: Operations Must be Improved.

Beyond all the planning, designing, engineering and investment, the success of your solid waste system depends on the skill and effort of your front-line, blue collar crew. This book addresses the importance of training and equipping them to do the job.

Now more than ever it's time to look at how we are running waste management and start making some innovative improvements to every stage of the process. We need to look at operations, safety, economics, and training through the lens of process improvement with the goal of running a leaner, more efficient, and safer system.

# The recent tumultuous changes facing our industry provide an opportunity to innovate and regenerate solid waste management.

# Chapter 2 Process Improvement: Taking Operations to Top Performance



We hear one glowing report after another of manufacturing giants such as Motorola, Toyota and General Electric, and their ability to implement a continual series of process improvement strategies. Six Sigma, Lean, Value Stream Mapping, Customer Experience Management (CEM) ...the list goes on. And with every new analysis comes a report of processes improved and millions more dollars saved. This is all good stuff, but if you don't work for one of those companies, do you really care? Probably you should.

You might think that these kinds of analyses are geared toward the repetitive tasks associated with assembly-line manufacturing or document processing ... and you'd be right. But you might be surprised to learn that those same tech-

niques that create Wall Street Journal headlines for international mega- corporations are also used to improve the performance of NASCAR pit crews, basketball teams and sandwich factories.



(Fig. 3) Video analysis is one of our most-utilized process improvement tools.

They're also used to increase efficiency and reduce costs in another often-ignored industry – **the Waste Industry.** 

That's right. Those repetitive tasks such as picking up trash cans on a residential collection route, pushing waste through a transfer station or hand-picking recyclables at a MRF can be analyzed. We've been doing it for years and yet are constantly learning new ways to analyze the same old day-to-day tasks. And of course, those process improvement tools also apply to landfill operations.

So, how exactly is this applied to the solid waste industry? Quite well, actually, but in case that's not enough, here are some details.

On a recent project we evaluated the flow rate of waste through a large transfer station. Based on a detailed video analysis, we determined the production rate (i.e., flow) at each of several individual steps. Common to most transfer stations, these steps included:

- Scale
- Spotter
- Unloading Area
- (Recyclable) Sorting Area
- (Waste) Staging Area
- Load-out Area
- Transport (to the Landfill)

Once the flow rate and processing cost has been calculated for each step in the process, it was relatively easy to combine those steps into a flow model of the facility. And when this site-specific model was completed, we applied the inbound tonnage, created a longer (i.e., weekly) iteration, and then saw what was working ...and what wasn't. **Ever wonder why your transfer station has to work on the weekend because it falls behind during the week?** Well, it's because some portion of your system's flow rate is creating one or more bottlenecks. Every system has at least one bottleneck – or constraint, as it's referred to by the process improvement crowd.

Think of the overall system as a pipeline, with the daily waste tonnage flowing



(Fig. 4) Think of your overall system as a pipeline, with the daily waste tonnage flowing through it.

through it. Each step in the process has a certain flow rate (i.e., the pipe gets smaller or larger). When viewed as an entire system, this type of model can pinpoint the constraints and help identify solutions for increasing production ...or changing the system to work around the constraint.

At the heart of process improvement is the ability to model a current process or activity, identify – in detail – what's working and what isn't, and then come up with ways to improve the system.

If you think there are opportunities for improvement in your current system, chances are you're right. After conducting these types of assessments at waste facilities across North America and abroad, we have found that **every operation** has room for improvement – every single one.

Your operation is a process made up of a series of steps. When we evaluate waste facility operations, we analyze the process, not the people and we call these processes "systems." And we analyze these systems through a variety of process improvement tools. Below is a brief sampling of some of the various tools we utilize.

#### Time Study

A "Time Study," sometimes referred to as a Time-Motion Study, breaks simple, everyday tasks into their basic components, and then measures the time spent performing each one. Doing this provides us with a new perspective in regard to the importance (or insignificance) of specific tasks.



(Fig. 5) Unit changing can help us identify inefficiencies (i.e., specific activities that are chronic time wasters).

#### Unit Changing

The unit change approach takes basic tasks or cost items and converts them to units that are different than those typically used. Again, this can provide managers with a fresh perspective. For example, the time required for a loader to thoroughly clean the tipping pad at a transfer station may only take 10 minutes. But when this process is performed 20 times per day, it begs the question: "Does the pad need to be cleaned 20 times ...or is the operator making work to simply keep busy?" Thus in this example, by thinking about inefficiencies (i.e., specific activities that are chronic time wasters) in terms of daily effort (or annual cost) – we can more effectively move toward a means of identifying cost-reducing solutions. A 10-minute task doesn't seem too important, but 20 of them, 260 days per year, represents 867 loader hours annually ...something close to \$100,000. In that context ...10 minutes is a big deal!



FREE RESOURCE

View a Webinar on Process Improvement. Visit **blueridgeservices.com/ProcessImprovement** and use password **ProcessImprove.** 

#### Six Sigma

Six Sigma is another process improvement tool that was originally developed by Motorola in the mid 1980's. The primary goal of Six Sigma is to minimize variation in repetitive tasks by eliminating defects (i.e., errors or mistakes). The primary steps for Six Sigma follow the acronym DMAIC, which stands for:

- Define
- Measure
- Analyze
- Improve
- Control

#### Time-Lapse Filming

Time-lapse filming begins by recording a specific work area or activity for a period of time. This film is then compressed into a few minutes (sort of like "fast-forward" on a video). Viewing the film in this compressed format will often show inefficiencies in traffic flow, material management, equipment work patterns, etc.



#### **Activity Sampling**

Activity sampling starts by selecting a specific worker or machine that is to be evaluated. Then, at regular time intervals (i.e., every 1 minute) a snapshot of the worker's (or machine's) activity is recorded. A specific activity might be measured over a period of several hours or days. From this data, we can determine how much time an individual or a machine spends actually working, waiting, wandering, creating work to keep busy, idling, looking for tools, etc.

Of course the ultimate goal is to understand where time and effort are actually being spent. An example of this is the use of a loader. The primary goal is to carry a full bucket, and then return for the next one. All other activities contribute to inefficiency.

#### Lean

Lean – also known as Lean Manufacturing – focuses on the basics. For example, once we've identified the basic goals of a specific task, we can work to eliminate

every other (non-contributing task). Sometimes workers or managers can get so caught up in the activity, that they forget the goal... and that there may be another way to get the job done. For example, when you go to a hardware store for a 1/2" drill bit ...you don't really want the drill bit ...you want a 1/2" HOLE. Don't get sidetracked on the tool...remember the goal. While on a camping trip, my dad – a gunsmith by trade – needed a 1/4" drill to make a hole in a board ... rather he needed a 1/4" hole. Not having a drill handy – and not one to waste time – he propped the board against a log, took careful aim...and shot it with a .22. There it was – a 1/4" hole!

In the same way, a transfer station may not want 2 loaders, an excavator, and a stationary compactor ...what they really want is to put the waste in a transfer trailer quickly and economically, while optimizing payload and cycle time. Lean helps us focus on achieving the goal, to the exclusivity of everything else.

The City of Helena, Montana's commercial and residential collection trucks had traditionally delivered waste to the City's Transfer Station, rather than hauling directly to the local landfill. Those trucks would dump waste at the transfer station, where it would be reloaded into larger transfer trucks, then hauled to the landfill ...sometimes driving back through the same areas the route trucks has serviced just hours before.

This, despite the fact that the landfill was often closer to some of those routes ...and offered a disposal (tipping) fee that was 56% lower than the transfer station's rate of \$70.75 per ton. This practice had become so normalized over a period of 20 years that nobody even questioned it. It had become, "...the way they'd always done it."



FREE RESOURCE Read an article by Neal Bolton on the theory of constraints.



(Fig. 6) City of Helena's transfer station.

We helped identify \$138,000 per year in potential savings by outlining a directhaul policy. Not only was this extra waste handling costing the City – and their customers – more, it created a barrier to the City's ability to competitively price their collection services.

Additionally, we identified a number of problems that had simply evolved from historic practice. One was to close an administrative loop-hole and increase the minimum disposal fee for residents from 71¢ per load to a more realistic rate.

Our review went on to identify additional legacy habits – inefficiencies that represented another \$150,000 per year in operational savings by reducing loader and transfer truck costs. The reduction in tonnage processed by the transfer station also identified a opportunity for the City to defer a planned \$1 million capital improvement project.

#### Machine Utilization

The utilization of a machine is simply a ratio of the machine's time spent working, compared to the total time available to work. For example, if a machine actually works 12 hours out of an available 40-hour week, then its work efficiency is 30%. Similarly, if there are two similar machines working a total of 24 hours (adding both machine's hours) over a 40-hour work week (i.e., 80 total available work hours), then the overall work efficiency for that machine type is still 30%. (See more about equipment utilization in Chapter 8 of this book).

#### Value Stream Mapping

Value Stream Mapping is used to identify the current state of a multi-step material flow process, identifying individual tasks as either value added (i.e., contributes to the desired end-result) or non-value added (uses resources but does not contribute to the desired end-result). Value Stream Mapping is commonly used in the manufacturing industry where streamlined material flow is a critical part of an efficient operation. **We often use a hybrid of Lean and Value Stream Mapping to identify problems and solutions for waste operations** that have repetitive, factory-like processes.

### Theory of Constraints

The theory of constraints is a management tool based on the assumption that all processes are limited by one or more constraints in the system. In the context of a landfill's waste handling process, the constraint (i.e., bottleneck) is often the individual step of compacting waste with the landfill compactor. Other types of waste facilities have their own "common" constraints, but as an example, let's look at a typical landfill.



(Fig. 7) A bottleneck is often the individual step that can prevent the entire process from being efficient.

If we were to look at the landfill's waste-handling process as simply a pipeline, it would have throughput (i.e., flow) that varies from one point to another. One way to measure this throughput is in Tons/Hour. Please note that the flows shown in Figure 8 - while typical for some landfills – are shown as examples only. Also, this example is based on a single bulldozer and a single compactor, but in a real analysis, multiple machine configurations could be considered.



(Fig. 8) Identifying the Constraints

By optimizing the flow rates that make up your facility's systems, you have the potential to save a lot of money within your operation – often millions of dollars. In fact, some facilities have saved more ...a whole lot more. As a result of our conducting a CORE® Assessment, one of our clients reported an increased landfill life of 19 years ...with an accompanying increase in gate revenue of \$338,000,000. Yes, that's \$338 million!

According to the Solid Waste Association of North America (SWANA), most of a landfill's cost is spent on operations. This holds true for other types of waste facilities as well, where individual operations can represent well over 80% of annual costs.

National polls indicate that **70% of waste facility managers think their opera-tion is inefficient** – mostly as a result of doing the same thing – in the same way – for the past 30 years.

Let's do the math: If 70% of managers think their operations are inefficient...

If most operational inefficiencies result from facilities doing the same thing they've done for the past 30 years... And if operations accounts for most of a facility's cost... Where do you think you'll find the most opportunity increase efficiency and reduce costs?

That's right: OPERATIONS.

In our hundreds of reviews of waste facilities, we have always found ways to reduce costs, improve safety, and increase efficiency. When managers are willing to take the lid off their operation and drill down to analyze even the smallest parts, there is always room to grow and improve.

Our team has helped hundreds of waste facilities streamline their operation and drastically increase efficiency, cut costs, and improve safety. Email us today at info@blueridgeservices.com to find out how we can help your facility.

# Chapter 3 Comprehensive Operational Reviews (CORE®)



**Comprehensive Operational Review** 

More than 70% of waste facility managers say their facility is not as efficient as it could be. In fact, while consulting and conducting **comprehensive operational** reviews (CORE®s) at hundreds of waste facilities worldwide, we have found

70%

In national polls, more

than 70% of waste

facility managers polled

say their facility is not as efficient as it could be.

that every facility's operation has room for improvement... every single one.

And the #1 cause of inefficiency? **Tradition.** 

Yes, the "We've been doing it the same way for 30 years" re-

sponse is the root cause of most inefficiency and runaway costs.

According to the Solid Waste Association of North America (SWANA), the typical landfill spends more than 63% on operations (see Fig. 5, below). And other waste facilities spend a similar percentage on operations ...some exceed 80%.



## **Operations: Ignored and Poorly Understood**

(Fig. 9) The typical landfill spends approximately 63% of its annual budget on operations. This is where a CORE® review can find tremendous savings for the municipality.

Over the years, solid waste operations received minimal technical support. Oh, the facility itself got plenty of technical support ...but not the operation. The support they did receive typically involved design engineering, permitting, or

legal work. After all, operations only had to pass a simple performance test: garbage and recyclables had to come in, be processed and go away without regulatory violations or serious environmental issues. Facilities also had to make money. Aside from that, they were for the most part on their own.

Thus, while engineers and regulators focused on environmental, regulatory, and social issues, **operations was generally ignored and poorly understood.** This is not to say there were not environmental performance standards, because there were. But productivity or operational stan"But that's how we've always done it. It's been working for 30 years." Yes, that's how they've always done it, but it is **not** working.

dards were seldom used. For the most part, this phenomenon occurred because most engineers simply do not understand solid waste operational issues. Many treat operations as a black box – determining their effectiveness by analyzing input and output.



(Fig. 10) After performing detailed production analysis, the BRS team determined the San Diego Landfill could eliminate 2 D9 Dozers from the operation. This, along with other critical changes resulted in a \$3 million per year (ongoing) cost reduction, and an increase in lifetime revenue of approximately \$50 million.

For example, the San Diego Environmental Services Department hired our team to assess its landfill operations. There were many areas for improvement. One of the most significant was related to bulldozers pushing trash. We found operators using multiple bulldozers to move waste (Fig. 10, previous page). But were they all necessary? In the landfill pictured, they were not.

To conduct the CORE®, our team spent several weeks observing, filming and evaluating the landfill operation. Using a variety of process improvement tools, such as: LEAN; Six Sigma; and Value Stream Mapping; the entire operation was analyzed, including the dozer's work flow. After determining the maximum

"Blue Ridge Services helped us cut our costs by \$3 million per year. Our AUF increased from 0.5 tons per cubic yard to 0.8 tons per cubic yard. We estimate this will make our landfill last longer ... and help us generate an additional \$50 million over the increased life of our landfill.

> -Stephen Grealy, Former Deputy Director City of San Diego's Environmental Services Dept., California

production rate of a single dozer, we compared it to inbound waste tonnage. Finally, this production rate was extrapolated hour-by-hour, across the varying tonnage of an entire week, resulting in a balanced, optimized schedule for dozer usage.

Once the proposed (improved) work flow had

been presented to the City's management team, our training staff spent several weeks on-site, working with the landfill crew to apply those improvements to the operation.

This analytical process was the result of detailed analyses including computer modeling and use of differential equations, combined with practical operational procedures developed through the experience we've gained by working at nearly 500 landfills.

The review found the facility could eliminate two of its five dozers. These D9 dozers equipped for landfill operations cost \$1 million each! The reduction in the number of dozers was only one of many significant improvements the BRS team brought to this facility.

That, along with other critical changes resulted in a \$3 million per year (ongoing) cost reduction, and an increase in lifetime revenue of approximately \$50 million. There is little chance landfill management would have identified this significant cost savings without a CORE®. After all, they had been doing it that

#### way for years. Engineers seldom give advice to operators regarding operations. And operators are - for the most part - not asking for it.

This example of a full CORE® Assessment yielded great savings, but sometimes we do a lighter version to meet the financial limitations of a facility.



# FREE RESOURCE

View Stephen Grealy's full interview to learn about his facility's operational challenges and improvements. Visit **blueridgeservices.com/Client-Testimonials**.

### Lewis and Clark County Landfill and Compost Operation

We were hired to conduct an operational review of the County's landfill, with goals of increasing efficiency and reducing costs. This landfill, while owned and operated by the county, is also in the interesting position of having to compete with a nearby private landfill. In the waste industry's current environment, this is a common scenario.

The review we conducted was high-level. It did not include time-motion studies or detailed process analyses often done as part of a CORE®. However, highlevel did not mean light-duty. During this project, we did identify a number of operational improvements, estimated to produce approximately \$747,000 in immediate savings and deferred capital costs, as well as \$190,000 in annual savings – ongoing. Some changes were as simple as changing daily waste-handling processes (reducing compactor costs by \$78,000/yr) and eliminating an inefficient compost operation (saving \$39,000/yr). Other recommendations to eliminate free disposal of selected materials and reduce operating days per week identified additional savings.



(Fig. 11) Lewis and Clark County Landfill and Compost Operation

If you are serious about cutting costs - you will find a way to do it.

## How To Cut Costs

When the solid waste management budget gets tight, facility owners and operators look first at raising tipping fees. However, except in isolated markets – or those protected by some form of flow-control – raising rates in order to increase revenue may actually backfire, pushing customers elsewhere to find lower cost disposal options.

Improving operational efficiency is a much better option than raising rates.

# Let's Look at an Example

The problem is really big, but hardly anyone sees it. Here is an example (Fig. 12, next page). This photo below shows trash that has been dumped by self-haul (non-commercial) vehicles. There is \$260,000 per year of wasted resources hidden within this particular photograph. See if you can find it.

Our CORE® process found that wasted money by carefully analyzing the operation.



(Fig. 12) A strategic change to guide vehicles to the appropriate area based on the type of waste they are disposing could save this operation more than \$260,000 per year in operating costs.

Every day, the landfill's traffic director, or "spotter," pointed the way for scores – sometimes hundreds – of self-haul customers. Like the parking lot at Walmart, the customers and the spotter expected each arriving vehicle to take the next most convenient space. As a result, loads of waste were dumped randomly – a load of brush here, some shingles there.

Periodically, perhaps every hour or so, a bulldozer pushed the trash toward the active fill area (at the rear of the photo). In order to make a clean push and remove the pieces of drywall, tile and shingles, the dozer's blade had to penetrate a few inches into the soil. Otherwise those flat, heavy items would have been left on the ground, making the next round of drivers hesitant to back up for fear of getting a flat tire. Also, if any debris remained at the end of the day the landfill would be violating state "daily cover" rules.

So the dozer operator dropped the blade into the dirt and pushed. But in the process, some soil was removed from the unloading area and pushed into the active fill. The stripped soil consumed valuable airspace that was intended to be filled with trash, not dirt. And it also meant a scraper or dump truck had to replenish the removed soil to maintain a solid driving surface for customer vehicles. Based on an operation where the value of airspace was \$10 per yard<sup>3</sup>, and which required five loads of new soil each day (at 20 yard<sup>3</sup> per load), the removed soil cost approximately \$1,000 per day. Repeated every weekday, this added up to unnecessary spending of \$260,000 per year!

The solution was simple: have the spotter specifically place the heavy, flat, hardto-push items near the active face, and place all loads of brush out near the end. Then, when the dozer operator pushed, he was able to keep the blade a few inches off the ground, which allowed the mass of brush in front of the blade to act like a broom, effectively sweeping the ground clean with every push – while leaving the soil intact.

Finding a way to leave the soil in place saved \$260,000 per year! It was simple and easy, but had been previously overlooked. Why? Because operators were accustomed to seeing soil removed - so it looked normal. Engineers may have noticed too much soil being used when they reviewed the annual airspace report, but they didn't see or understand how it correlated to day-to-day operations.

Why do these types of inefficiencies persist? Because facility operators accept the status quo and do not take time to think about how to cut costs. I teach a number of classes each year for clients and at conferences and webinars. During these classes, I often ask waste facility managers, "Do you have eight hours per week to simply sit and think about your operation?" This will get a good laugh. Then I'll ask again, "Four hours per week? Three hours? One hour per week?" Occasionally, someone will admit to taking an hour per week to think about their operation, but not very often. My next question is not nearly as funny, "So, if you're the manager and you aren't taking time to think about your operation, who's thinking about it?" Of course the answer is "nobody."

# The Value of Airspace

Most of the cost of solid waste management is related to the products sold. Farmers spend money to grow wheat, auto makers spend money to produce cars, and solid waste landfill managers spend money to create landfill airspace. Airspace is the invisible capacity of fillable space – the space that can be filled with revenueproducing trash.

Along that line, smart operators strive to compact trash as much as possible as it is placed in a landfill, and they work hard to minimize the inclusion of any other (non-paying) materials, such as daily cover soil. It follows that many of the money-related problems in solid waste management regarding landfills are related to poor utilization of airspace. By the way, it usually costs between \$5 and \$15 per cubic yard to produce airspace. Airspace is a landfill's only commodity!

State and federal regulations require landfills to cover waste at the end of every operating day with soil or some viable alternative. Alternative daily cover (ADC) material may include certain manufactured products such as plastic film, spray-on foam or removable tarps.

Getting the "daily cover" process dialed in is an important step toward efficient and cost-effective solid waste operation.

## Let's Look at An Example

This landfill (Fig. 13) was historically using too much soil for daily cover. Instead of placing just enough to thoroughly cover the waste, they were using excessive amounts of soil to the point where soil represented 46% of airspace consumption.



(Fig. 13) (BEFORE) Historical practices regarding placement of daily soil cover at the Merced County Highway 59 Landfill resulted in 46% of the landfill's airspace being consumed by soil.

In part this was due to poor preparation of the waste surface before placing daily cover soil. As when painting a house, having a well-prepared waste surface is an important step toward efficient covering. Additionally, this landfill had too many scrapers, and as a result, **they put workers on those scrapers and they all hauled dirt.**  After this landfill changed their operation by applying our CORE® findings and recommendations, they were able to reduce the number of scrapers and other types of machines by an amazing 16 units! After selling them at auction, this facility realized a one-time windfall of \$886,000. Other one-time savings were also produced along with significant ongoing savings.

They also reduced their labor force from 43 employees to 30 and made a number of operational changes to increase efficiency and save money. One of those changes was to reduce the amount of soil used for daily cover.

The historic numbers for this landfill indicated that an incredible 46 percent of the landfill's airspace was being filled with (non-revenue generating) soil. After implementing improved operations, soil use decreased significantly. Now, soil consumes less than 10 percent of the landfill's airspace.



(Fig. 14) (AFTER) Using time/motion analysis, proprietary computer models, and focused on-site training, the BRS team optimized the placement of daily waste cells to increase waste compaction and reduce consumption of daily cover soil to approximately 10% of airspace. As a result of this and other changes proposed by BRS, the Merced County's Highway 59 Landfill reduced annual operating costs by \$2 million per year, ongoing.

Before applying the CORE® recommendations, this landfill spent \$11 million per year. The efficiency review we conducted resulted in a \$3.9 million in savings the first year. Ongoing savings are estimated at well over \$2 million per year.

"The BRS team helped us eliminate unnecessary equipment, reduce staff from 43 to 30, and cut our annual costs by approximately \$2 million per year ...on-going."

– Brooks Stayer Merced Highway 59 Landfill, California Things change and over time, your facility must change too. Processes that worked last year may not make sense this year. Consider for example, a recycling facility that targets specific materials – materials that are dependent on a very fickle recycling market.

Remember, at one time, telegraph stations were traditional communication centers. Today – Not so Much... Tradition is fine, but when things change, you may need to adjust.

One of the ways that tradition can begin to strangle the operation of a waste facility is when conditions change ...but the facility does not. For example, when a community decides to implement an aggressive recycling program, the local transfer station is often the first to feel the impact – often in regard to crowding.

Most transfer stations were designed primarily – even exclusively – for transferring waste. So when we attempt to add voluntary recycling bins and floorsorting, then squeeze in a pickline, a baler and storage area for recyclables, the operation chokes.



# FREE RESOURCE

View Brooks Stayer's full interview to learn more about his facility's operational challenges and improvements. Visit **blueridgeservices.com/Client-Testimonial**.

This same result can also occur at any facility that is attempting to provide some level of recycling, because over time, tonnage may increase – along with our desire to recycle a wider range of materials.

Even before I started Blue Ridge Services, I was directly involved in recycling since 1983, when I worked as the project manager to enlarge and modernize a large paper/cardboard recycling facility. And as the recycling industry matured, the BRS team has continued to provide operational efficiency for recycling operations. One of our first operational assessments (CORE®) of a MRF was in 1998, when our team evaluated the Mammoth MRF in Madera, California.

The Mammoth Material Recovery Facility (MRF) was one of the first MRFs constructed in California. It was built to help Madera County comply with California's assembly bill (AB939) – which set goals for 25% diversion (by 1995) and 50% diversion (by 2000).



(Fig. 15) Our team evaluated the Mammoth Material Recovery Facility in Madera, California, to help them identify inefficiencies.

Shortly after it began operation, our team was hired to evaluate the facility – which operated as a dirty MRF where loads of waste (including recyclables) were dumped and processed through the system. We conducted a detailed assessment of the operation and provided recommendations to optimize diversion while reducing costs. Our recommendations included:
- 1. Targeting high-grade loads to run through the MRF to achieve State-mandated diversion goals;
- 2. Adjusting collection routes to produce selected loads that contained more high-grade material;
- Identifying which types of recyclables were cost-effective to extract ... and which were not – and then using that information to;
  - Reduce labor costs at the pick-line where workers manually pull recyclable items from the waste stream; and
  - Focus on extracting those materials that could produce the most diversion; and
  - Extract materials that generate the most (resale) revenue;
- 4. Reducing machine costs by upgrading older, more costly machines;
- 5. Establishing maintenance protocols to reduce MRF downtime.

Identifying and fixing crowding problems comes back to a need for well-defined goals and the concept of material flow. First, what is the goal of the recycling program? Is it to maximize diversion, regardless of cost ...or to focus on recycling those commodities that make the most economic sense? In many cases, these two goals may be mutually exclusive.

Once the recycling goal has been defined, the entire process can be reduced to material flow. Then it's simply a matter of maximizing that goal in the most efficient manner.

Email info@blueridgeservices.com to schedule a FREE 30 minute webinar session with Neal Bolton. After receiving some basic information about your facility's operation, he will walk through an overview of how you could reduce costs and increase efficiency.

### YOU CAN'T MANAGE WHAT YOU DON'T MEASURE.

Our team has created benchmarking to track your progress and a robust dashboard system that pulls data from several sources to give you - at a glance - a full picture of your entire opera- tion. Interested in learning more or seeing a demo? Email us at info@blueridgeservices.com.



# Chapter 4 On-Site Training -The Missing Link



### Got Training?

The majority of workers in the waste industry learned by doing. It's called On-The-Job (OTJ) training. Most OTJ training was received directly from someone who was already doing that same job. The existing spotter, retiring operator or the previous manager likely did the hand-off. Yes, OTJ training is the most common form of training, and there is nothing wrong with that – as long as the person doing the training is a good communicator, has no bad habits, and fully understands how to do the job safely and efficiently.

Unfortunately, most OTJ trainers do not meet these criteria – and **so bad habits** and unsafe practices get passed down and new workers inherit those bad habits from previous workers. If you don't think work patterns get passed down like freckles and blue eyes, then you haven't been paying attention. More than 70% of waste industry managers (in National Surveys) indicate that tradition is the most common contributor to inefficiency. And you know where those traditions come from...

The problems associated with OTJ training – things like inefficiency and unsafe practices – can persist for years undetected because they just look normal. They look normal because that's the way you've always done it. But those problems can backfire very quickly if/when someone is injured or killed. When that happens, every Standard Operating Procedure, the Safety Plan, all Training Agendas ... right down to every single sign-off sheet will be reviewed ...in detail.



(Fig. 16) On-the-job training can have its benefits... and its downsides

# Unfortunately, that's where OTJ falls short because while OTJ training may be long on personality ...it's generally short on standardized procedures and documentation.

In the sections on process improvement and comprehensive operational reviews, we talked about tradition. Tradition can be a rut that keeps us doing things the way they've always been done... with little thought to "why?"

When it comes to performance at your facility, tradition might be the driving force... and that might not be a good thing.

### How Does Your Crew Learn?

As our team conducts training at waste facilities across the country and around the world, we often see a mix of training styles and learning tools being utilized. These might include:

- Learning from the person they replaced
- Bringing skills from a previous job
- Tradition: doing things the way they've always been done
- On-the-job training
- Peer-to-peer training
- Trial and error
- Training from a machine vendor
- Training from human resources representative

While learning from others can be very positive and beneficial, it can also lead to bad habits being passed on. Regular, comprehensive and practical training is imperative to running a safe, efficient facility.

Most waste facility directors and managers have some kind of formal education. Most also continue to pursue opportunities for continuing education. From a management standpoint, our industry is fairly well-trained. **But when it comes to waste facility workers, many are not receiving regular, comprehensive training.** 

### How Do You Know if Your Crew Needs Training?

#### Hint: Most Solid Waste Crews Need Training!

Every waste facility is different, but there are some factors that are common to

all under-trained crews. If you facility is experiencing any of these types of issues, it may be worthwhile to review your existing training program... or implement one if you don't already have one in place. Issues to watch out for might include:

- Financial issues
- Safety problems
- Compliance problems
- Variability in performance
- Low employee morale
- Recurring machine damage
- Lax or negative team attitude

### FREE RESOURCE



View a webinar on the value of on-site training. Go to **blueridgeservices.com/services/training/on-site-training.** 



(Fig. 17) Blue Ridge Services President Neal Bolton conducting training in Alabama.

### Of all of these factors, the most significant - in terms of performance - is variability.

If your AUF, your diversion rate (if you are running MRF), or your transfer truck cycle times are varying widely, it indicates that there is a problem. Variability is always a tell-tale sign of inefficiency. If variability is impacting your operation, it's time to integrate standardized training to rectify the issue and regain consistency in your operation.

In terms of productivity, we've seen instant reductions in airspace consumption of more than 30% by improving cell construction and waste compaction techniques through comprehensive training programs. By adding improvements related to the use of cover soil and ADC, we've seen long-term airspace consumption drop by nearly 40%. MRFs can see dramatic reductions in operating costs by focusing on the right processes for the right materials, and transfer stations can save money by revisiting how, when and where they receive, process, sort, load and transport waste.

Imagine how these kinds of improvements would help your bottom line.

### Start Right, Finish Right: When Training Pays Off (Literally!)

#### Example 1

The average automated side loader driver makes 950 lifts a day... or 247,000 lifts per year. That's over 6 million lifts in a 25-year career.



(Fig. 18) Automated side loader

Reducing a career driver's "per lift" average cycle time by just 1 second would save nearly 1,715 hours of route time and nearly \$214,000... for every route.

Do you think there is room to shave 1 second from each lift?

#### Example 2

Based on the hundreds of hours of video analysis we've performed, the average bulldozer pushing trash at a landfill makes 2-3 inefficient pushes for every productive push. If you could eliminate those inefficient pushes – and you can – dozer hours would be cut by 2/3, dozer costs would go down by 2/3, and the life of the dozer would increase by 200%. I was at a landfill recently and we were able to reduce pushing hours from 12+ hours per day ...to 4 hours per day.

That means less cost for maintenance, fuel, machine replacement, etc.

#### Example No. 3 - The Six Million Dollar Driver

It costs around \$125/hour to operate a modern garbage collection route truck – including capital, operating, overhead and labor costs. Multiply that by 8 hours/ day ...5 days/week ...52 weeks/year ...and over the 25 year career of the average driver, you'll spend \$6,500,000 to have that truck/driver on your team.

Don't forget that you are also expecting him to drive over a million miles, pick up over 6 million cans, and do it without hurting himself, his truck or anyone else. **In other words, don't bring home a lawsuit.** As a point of reference, on a recent trial regarding an injury, the jury came back with a \$13 million judgment – against the garbage operator. A very unfair decision as far as I am concerned, but \$13 million none-the-less.

So, how much should you spend on training?

#### Example 4

It costs around \$160/hour to operate a large landfill compactor – including capital, operating, overhead and labor costs. Multiply that by 8 hours/day ...5 days/ week ...52 weeks/year ...and over the 25 year career of the average landfill operator, you'll spend \$8,320,000 to have that machine/operator on your team.

But that's just the appetizer. You haven't even seen the main course. If you are managing an 800 ton/day landfill, with a tipping fee of \$50/ton, that same operator – the one that costs you \$8.32 million – will also be managing the consumption of **\$300,000,000 worth of landfill airspace!** Or **if big numbers make you uncomfortable, we could simply call it \$0.3 billion.** So how much training are you providing for your operators? These numbers are so big, they almost seem unreal. In any other industry, we'd expect anyone managing that kind of money to have a college degree, be bonded and certified, and attend regular training to make sure they didn't miss something.



(Fig. 19) Landfill compactor

But at most landfills, we just throw someone into a compactor, watch him drive back and forth for 30 minutes ...say, "Hey, you've got it." And that's it ...That's it? ...Seriously?

#### Who is Running the Show?

You spent millions to site, design, and permit your waste facilities. You spent millions more on a liner, then even more on equipment, engineers, geologists, planners, MBAs and attorneys... it takes a lot of expertise to create a modern waste facility.

Contact us and we'll set up a 15 minute review of your current training program. Email us at info@blueridgeservices.com or call 406.370.8544.

# So, who is running this massive investment and how much specialized training do they have?

Our experience with hundreds of solid waste workers each year, shows that frontline employees receive less than a week of initial training ...and less than 1 day per year of ongoing training ...and with that limited training, they are expected to successfully manage some of the most valuable resources in the waste industry!

#### What are we thinking? Are we thinking at all?

Good training takes time. Our experience shows that to change traditional (inefficient) work patterns



takes 3-4 weeks of focused, hands-on training. Typically we'll accomplish this with 1 week per month over a period of several months. It then takes at least 1 week per year of refresher training. And that's for your existing crew, assuming you have a management team that is continuously monitoring performance. New hires also require a period of orientation and several months of close monitoring/observation to make sure they develop good work patterns and habits that are efficient and safe.



### LINK

Join us for a live webinar. Visit **blueridgeservices.com**, and navigate to Products, Webinars for a schedule of upcoming live sessions.



(Fig. 20) Blue Ridge Services Operations Consultant Jason Todaro training in Papua New Guinea. Our team helped the local contractor prepare a bid, get the contract to operate the landfill and then we trained the crew.



### FREE RESOURCE

For a free trial of Waste Compaction: Training Tools for Peak Performance, visit **blueridgeservices.com/** safety-dvd-preview-page and use password *Preview2016*.

If you aren't providing this minimum level of training, you're operation is leaving millions of dollars on the table ...period.

In case you're one of those people who needs to see the numbers, here are some

good ones. Caterpillar – arguably a world expert in the productive use of heavy construction equipment – describes factors that impact machine performance. While noting that a skilled operator may get close to 100% productivity out of a machine, CAT goes on to say that a **poor (or unskilled) operator may only get 60% out of the same machine.** That's 40% less production! What percentage of \$300 million are you willing to give up?

40% of \$300 million is \$120 million. So how much are you spending each year to train your operators?

### We Can Train Your Crew!

Developing a training program doesn't have to be rocket science. Starting small is better than not starting at all.

### The bottom line is, no matter how good your crew is, they can always learn something new.

The following components are what we typically use when creating a hands-on, on-site training program:

#### Customized for On-Site Issues

Every facility and every crew is different, and will require different approaches to training. When creating a training program, it's important to identify and address specific issues that are unique to your facility. **Often, a one-size-fits-all approach to training will leave your crew un-engaged and ill-equipped** to manage the day-to-day challenges at your facility. The key is to get your staff involved by addressing the safety risks and operational inefficiencies they face every day. We can design and present a training program that intentionally addresses those issues.

#### Include Site-Specific Videos and Photos

By customizing your training program with specific videos, photos, and scenarios from your facility, your training program will be more likely to grab the attention of your crew in a way that a generic training program never will.

#### Balance Classroom Training with In-the-Field Application

Classroom training is a great way to introduce operational concepts, go over safety guidelines, and utilize media such as videos, photos, slide shows, etc. But it's imperative that classroom instruction be taken into the "real-world." We can't just talk about how to improve compaction; we must take your operators to the actual job, and have them practice new techniques. Implementing new safety guidelines? Consider developing a regular safety meeting before your facility opens in the morning... or after it closes.



(Fig. 21) In-the-field training

#### Other Types of Training

While the most successful training programs we conduct are based on optimized, site-specific procedures, there are a number of different types of training programs we provide.

The most basic type of training is webinar training, where we will present a specific topic via the internet. These types of training programs are the lowest cost option. But low cost certainly doesn't mean low quality. We've presented webinars to well over 1,000 waste industry laborers, operators, managers, engineers and regulators. Some of our webinars require a fee, but a good number are free. In addition to sponsoring scores of our own webinars, we've also conducted webinars for Forester University, SWANA, and a number of municipal and private waste facility operators and design firms.

We also offer a number of video training programs. Most are related to safety training, but we also have operations topics. One of our most popular training videos is <u>The Science of Waste Compaction</u>. This is a 2-hour long video – and offers the industry's most comprehensive training on (landfill) waste compaction.



### LINK

Sign up for a free preview of our on-demand training program. (It's like Netflix... for waste facilities). Visit **on-demand.blueridgeservices.com**.

We've also conducted more than 30 classes for various State (Solid Waste) agencies. Most often these are presented to facility operators and regulators – and are intended to improve communication between these groups, while raising the bar in terms of operation and safety.

Our team has also conducted a number of training programs for private waste companies, often presented at annual meetings for managers, engineers or operators. Typically, these are integrated into the overall program and focus on a specific topic or theme. Regardless of where your facility fits into the training matrix, the key is content and consistency.

Another aspect of our training library includes a collection of heavy equipment training booklets. These can be purchased and used to train your crew. We also often use these booklets when conducting on-site training.

Sometimes we're hired to train workers based on what might loosely be described as industry standard procedures. More accurately, these are procedures that we've determined to be especially safe and productive based on the more than 150,000 hours of experience our team has in heavy equipment and solid waste operations.

Increasingly though, we find that as the industry is coming to understand the value of training, we are asked to provide more comprehensive training services.

A rapidly growing segment of our training curriculum follows the completion of a CORE® Assessment. CORE® is an acronym we coined for Comprehensive Operations Review. A detailed explanation of CORE® is provided in Chapter 3 of this book. CORE® follow-up training is obviously the most effective, because it is based on the most efficient site-specific operating procedures.

A number of our staff participates in training events for trade conferences, and local associations, as well as national events for the Solid Waste Association of North America (SWANA), National Solid Waste Management Association (NSWMA), the Waste Management Association of Australia (WMAA) and at other national and international events.



### **LINK**

To view a full list of our safety training topics, visit **blueridgeservices.com** and navigate to Products, Safety DVD Training Program.



FREE RESOURCE

To view free samples of Blue Ridge Services safety videos, visit blueridgeservices.com/safetydvdpreview and use password **BRSpreview** or scan the QR code below.

# Chapter 5 Fill Sequence Plans, Airspace Management Plans, and Drone Mapping: Plan for the Future



It was Yogi Berra who said, "If you don't know where you're going, you might just end up there."

I'm not sure, but he may have been talking about landfill fill sequence planning.

### The Good News: Everyone at your site has a plan (in their head).

### The Bad News: Everyone at your site probably has a different plan.

In terms of fill sequencing, every person at your landfill has a plan in their head. That's good. But every person at your landfill has a different plan. That's bad. A good comprehensive fill sequence plan gets everyone working from the same plan.

### So, What Is a Fill Sequence Plan?

Our definition of a fill sequence plan (FSP) is this: **It is a practical, step-by-step operations plan in an engineering wrapper.** A well-crafted FSP provides detailed, step-by-step guidance for filling your landfill. In most cases a fill sequence plan is relatively short-term, covering perhaps a period of one to two years, and it answers a number of critical questions, such as:

- Where will your next tipping pad be located?
- If you need a surfaced wet weather tipping pad (WWTP), will it be built in time for wet weather? And will it provide access to enough fill capacity to last through the wet season?
- Just as importantly, will the underlying foundation of your WWTP be constructed early enough to allow your customers to dump rubble there during the dry season... rather than stockpiling it somewhere else, from where you'll then have to pay to haul it to the WWTP? In some cases, getting this right has more than paid for the cost of a landfill's fill sequence plan.
- Will your current lined area last until you are able to design, permit,

and construct the next one?

- Are your access roads, stockpiles and haul roads in the best locations to provide the longest use?
- Have you provided a protected area where you can fill during severe storms or high wind events?
- Are you effectively strategizing the placement of roads, stockpiles, drainage systems and other critical improvements based on where you'll be next month ...next year?

Your landfill's annual fill sequence plan provides answers to these and other vitally important operational questions. But it does more than just show a sequence of filling - it shows an "optimized" filling operation. By optimizing your landfill's sequence plan we ensure the overall operation is as productive and cost-effective as possible. An optimized sequence plan also provides a basis for budgeting and scheduling major landfill projects.



(Fig. 22) Fill sequence plans

You wouldn't set out on a cross-country road trip without GPS, would you? Or at least a map. So why try to operate your landfill without a detailed plan?



### A fill sequence plan is like a road map for your landfill. It guides your entire operation.

#### Let's Look at An Example: When a 1,400-Ton Per Day Landfill Got Caught by a Wet Year

When questioned about preparing for the wet season by developing a comprehensive Fill Sequence Plan, one landfill manage said he wasn't worried. Nor did he care to go through all that "planning stuff." He'd just come through a very wet year, and was able to make it just fine – thank you – by simply spending \$60,000 on gravel. "Sure," he said, "lots of trucks got stuck on those wet days, but that happens every year. There is no reason," he said, "to plan for something that's working just fine." It's hard to convince someone they need something when they've never had it …and when they don't really know what they're missing."

Sounds like that guy whose 16-year old daughter had just learned to drive. Then one day she came home with the right (passenger) mirror gone – knocked off on the neighbor's mailbox while she was backing out of the driveway. "But," she told him, "It's no problem, Dad, because I never used that mirror anyway."

National surveys indicate that most landfills (over 72%) do not develop a comprehensive fill sequence plan to address important issues such as: access, drain-

age, fill capacity, litter control systems, daily cover soil, timing for the next liner construction, location of temporary soil stockpiles, etc. Though it may sound like a country-western



song, it's a fact that **these folks don't know what they don't know.** And what they don't know is costing them money.

Most landfills have a rubble stockpile area where customers dump rubble all year. Then, just prior to the wet season, the landfill crew picks it up and hauls it to the location of the wet-weather tipping pad. It's no problem because it's the way we've always done it. It's no problem, except that the landfill is paying \$10,000 ...or \$20,000 to move material that the customer could have put there in the first place ...if they'd had a plan and if the wet weather tipping pad location had been identified ahead of time.



(Fig. 23) Fill sequence plans

We regularly find that a well-crafted annual fill sequence plan will pay for itself many times over by keeping work spaces organized ...and avoiding costly mistakes ...like re-routing last year's access road because it's in the way ...or having to move a stockpile of soil multiple times.

So, how much does an annual fill sequence plan cost? Probably much less than you think. One recent client who was shocked at how much operational information he'd been missing by not having a fill sequence plan, ended up shocking us when he asked, "So, how much will an Annual Fill Sequence Plan cost, around \$50,000?" "Well no," we replied. "A comprehensive Annual FSP will only cost around \$15,000." He then went on to sign up for 5 years' worth of plans.

Every landfill has a phase (development) plan created for the permit. This plan is:

- Generalized
- Intentionally vague
- Developed to address environmental and regulatory issues

This is NOT a fill sequence plan.

A fill sequence plan addresses:

- Drainage
- Access
- Stormwater
- Cell Geometry
- Optimum dozer push distance
- ADC/soil considerations
- And dozens of other operating criteria

Our team has developed hundreds of Fill Sequence Plans for landfills throughout North America. With that experience, we can very quickly identify major problems (...spelled O P P O R T U N I T Y) with your operation, often by simply reviewing aerial photos of your site (i.e., Google Earth) – and reviewing key operational benchmarks against what we've seen at hundreds of other landfills.

When we look at aerial photos of your facility, we see things that you don't see, because our experience has taught us to look at operations differently – like the \$260,000 annual savings identified in Chapter 3. From the standpoint of operational efficiency, many landfill operators and managers often don't know what they don't know. But there's a good chance that we do.

Contact us and we'll set up a 15 minute review of your facility and look for some: Opportunities! Email us at info@blueridgeservices.com or call 406.370.8544.



FREE RESOURCE

To view a free webinar on fill sequence and airspace management planning, go to **blueridgeservices.com/fill-sequence-webinar**.

### It's a Bird... It's a Plane... It's a Drone!

Unmanned aerial vehicles, also called drones, have become part of our sky's landscape. From casual amateurs and professional video shooters to the U.S. military and even Amazon, drones have a wide range of uses.

Blue Ridge Services Montana, Inc. received one of the earliest FAA 333 Exemptions in the waste industry, which gives our team the ability to provide drone mapping ser- vices to waste facilities. When used wisely and strategically, drones can help im- prove many aspects of waste facility operations. And there are benefits to work- ing with the experts in operations.

While other drone services can fly a road, gravel pit, amusement park ...or even a waste facility site – and provide general data – our team can interpret the highquality data we gather and provide an operations-oriented perspective based on our decades of consulting at hundreds of waste facilities throughout the U.S., Canada, and abroad.



(Fig. 24) Flying our drone at a landfill.

Most companies that develop landfill topographic maps do a good job ...at mapping the facility. But we go further, often using those maps for:

- Planning
  - ° Fill Sequence Plans
    - (faster turnaround, less expensive, high detail)
  - ° Airspace Management Plans
  - Settlement Analysis for Active Closed Landfills (affordable, fast turnaround)
  - ° Topographic Mapping
  - ° Site Planning
  - Emergency Response
- Thermal Imaging
  - <sup>o</sup> Subsurface Hotspots (fires)
- Operational Assessments
  - Production Rates
  - <sup>o</sup> Traffic Flow Modeling
  - ° Safety Studies

We also go through a 65-point Operations Review every time we fly an active landfill. (For closed landfills, we have a different checklist). Based on our experience, this list highlights potential areas of improvement in operations, layout,

process and safety. And the results of the 65-point Operations Review is yours – for free! It's included in the mapping project.

So, why is this important? Well, 80% of landfill managers surveyed say that airspace and compaction are their most important operational issues. Tracking that airspace is one of your most important jobs.

There are many factors that affect compaction, including:

- Working Slope
- Machine Speed
- Machine Type
- Wheel Style
- Number of Teeth
- Design of Teeth
- Size of Teeth
- Tooth Pattern
- Length of Run
- Cell Geometry

- Operator Skill
- Machine Weight
- Depth of Layer
- Type of Waste
- Blending of Waste
- Moisture Content
- Use of Added Moisture
- Type of Blade
- Support Equipment
- Weather Conditions



### FREE RESOURCE

To view a free webinar on drone mapping for waste facilities, visit **blueridgeservices.com/drone-mapping**.

Just for reading this book, we're giving you a link to a 4-part webinar that's based on The Science of Waste Compaction. This is based on a video that cost nearly \$100,000 to produce and is the industry's most comprehensive training video on landfill compaction ever created.

After you watch this webinar series, ask yourself:

- 1. Did my current topo map/AUF provider know this stuff?
- 2. What else didn't they know?



### FREE RESOURCE

To view this webinar series on waste compaction, visit **blueridgeservices.com/waste-compaction-webinar**.





To view a video on drone mapping for waste facilities, visit **blueridgeservices.com/drone-mapping.** 

# Chapter 6 SHERPA Docs: The Backbone of Your Operation

# Critical Waste Facility Plans SHERPA

SAFETY + HEALTH + EQUIPMENT + RESPONSE + PRODUCTIVITY + ADMINISTRATIVE

If your facility is like most others, you do not have all of your critical facility documents in place and up-to-date. In fact, national surveys found that more than 90% of waste facilities do NOT have comprehensive critical documents -

like safety plans, emergency response plans, equipment maintenance plans, and standard operating procedures (SOPs) - in place.



Over the years, we've been

asked to develop virtually

every type of operational document you can imagine ... and a few you can't.

#### What's the Big Deal about Safety Documents?

You probably already know that the solid waste industry is in the top 5 most dangerous in the United States. According to the Solid Waste Association of North America, by May 2018, there were already 60 fatalities in the solid waste industry. Of those, 38 involved members of the public and 22 were waste industry workers.

One fatality is too many; 60 is unbelievable. We can do better.

Our experience consulting at hundreds of facilities around the world shows that your facility cannot operate at peak safety and efficiency without having the proper facility documents in place. We can affirm their importance after serving as an expert witness on more than 50 civil and criminal court cases related to solid waste facilities.

### If your facility has an accident or a fatality, your critical facility documents - or lack thereof - can play a huge role.

If you are having difficulty managing efficiency and promoting a safety culture, it could be the result of having outdated, insufficient, or poorly communicated critical facility documents.



**FREE RESOURCE** 

View a Webinar on SHERPA Docs. Visit **www.blueridgeservices.com/SHERPA**.

### What's the Solution? SHERPA Docs

We have come to call these critical facility documents by the acronym SHERPA. SHERPA documents are:

- Safety Plans
- Health Plans
- Equipment Plans
- Response Plans
- Productivity and Operations Plans
- Administrative Plans

All the different plans and programs a waste facility should fall into these categories. The acronym also has another meaning. One climber that made it to the summit of Mt. Everest 6 times called the Sherpas the "backbone" of each expedition. Not only did they help carry the load and burdens of the journey, but aided in the planning as well. An experienced Sherpa is able to provide valuable guidance in the best and safest way to proceed. They have also planned in advance for how to get out of difficult situations, should they arise. That's called proactive ... rather than reactive.

Every waste facility needs documents that do those same things. It can be difficult to navigate through compliance issues and still walk the line between efficiency, profit, and safety. When unexpected scenarios arise, it's better to have a plan already in place than to scramble for a foothold. And finally, many of those plans are actually required for regulatory compliance.

### Safety Plans

One of the most important facility documents is your safety plan. The solid waste industry is the 5<sup>th</sup> most dangerous industry in the United States, yet as previously noted, more than 90% of waste facilities do not have all of their documents in place!

The problem is obvious. So too is the solution.

Your job is to make sure you that your team is trained for safety. Developing and implementing a strong safety plan can literally be the difference between life and death. The frequency of your safety meetings and training programs are critical not only to worker health, but liability protections as well. OSHA requires ongoing training on a number of broad general safety categories, but there are

additional topics specific to the waste industry that should regularly be covered as well.

When it comes to protection from unfair liability, remember, "If it's not written down, it didn't happen." In our experience, when an incident occurs, one of the first things asked of facility management is, "How was this person instructed and trained to perform their job?"

You may think everyone "just knows" the correct way to do things. But this is not the case. Having documented plans is essential to ensuring - and later proving – that everyone has been properly trained to handle specific scenarios in the safest manner.

If you're involved in collections, does your facility have a written protocol for what to do if a container falls into the truck, how to handle missed cans, or when to operate a truck that shows a problem in the pre-trip inspection vs. when to park it?

For your transfer station or public drop-off site, what documented plans do you have to provide supervised customer fall protection, deal with emergencies and maximize bin payload to reduce the number of pulls per day?

When a bulky or hard-to-handle load comes into the landfill, how do you handle it, how is it documented, and what kind of PPE is required to do it safely?

#### You Need a Plan!

Having a safety plan that is up to date and addresses industry standard issues, facility procedures and OSHA requirements, is critical to maintaining a safe facility. The things listed in your safety plan are not just things on a list. They are supposed to be implemented as Standard Operating Procedures (SOPs).



(Fig. 25) Are your safety plans gathering dust on a shelf? Or are they actively integrated into your operation?

#### **Standard Operating Procedures**

Your facility has at least some Standard Operating Procedures (SOPs). Yes, in order to obtain your landfill permit, someone – maybe you …maybe a consultant – established some basic safety/operations criteria.

As previously noted, more than 9 out of 10 facilities do not have all of the necessary documents, but most facilities have some of them. And therein lies the problem. After working as an expert witness on more than 50 solid waste cases – most related to injuries or fatalities – one common theme emerges. And it is common to nearly all facilities. Here it is:

Most facility workers – and a surprising number of managers – do not know what their written procedures require. As a result, workers do things they are not supposed to do …and don't do things they should. This leads to problems in regard to safety, performance, compliance and overall teamwork. But this really shows up when something bad happens and the facility gets sued.

When that happens, all those problems are exposed. It's hard to claim that your crew is doing things right when they didn't read the facility's instructions. Or even worse, when there were no instructions at all.

There are other documents that may not be required by regulation, but are common industry standard practice ...not to mention just a good idea. One of the most important group of documents is related to equipment maintenance.

### **Equipment Plans**

The average facility – likely including yours – has several million dollars invested in equipment and trucks. Your equipment maintenance program is the glue that holds the en-

tire fleet together. Missed service intervals, excessive repair costs and overlooked warranty work can be costing you a lot of money. Downtime is another hidden cost that many managers do not understand. When your landfill compactor goes down for a week while you wait for a computer board or a new starter, **the down-time cost is not just the cost of the repairs, goodness no.** 

Working without that compactor for a week could cost you several thousand dollars in lost airspace.

Are your operators/drivers conducting regular walk-around inspections? Do you have a solid equipment maintenance plan in place? Equipment purchases, maintenance, and loss of revenue from down-time during repairs can add up to huge costs for facilities. A documented equipment maintenance plan can save your facility hundreds of thousands of dollars over the life of your facility.

(Fig. 26) Example of Standard Operating Procedures Manual





FREE RESOURCE

View a webinar on equipment maintenance. Visit **blueridgeservices.com/equipment-maintenance** and use password **equipment**.

#### Succession Planning

Written documents systemizing every little detail of a routine process may seem stiff and rigid. These documents aren't meant to make robots out of workers though. Instead, they eliminate the trial and error process of finding the best way to do things. Procedures eliminate wasted effort, increase efficiency, bring your entire crew onto the same page ...and in the process, improve safety. And with increasing turn-over rates of key employees becoming more likely, having clear, written procedures can help new people get up to speed quickly.

If you haven't yet felt the impact of the Gray Tsunami, you've been lucky, because it's on its way. This term refers to the massive exodus (from the work-place) of baby boomers. This will have a huge affect on the solid waste industry. The large wave of workers that entered the industry in the late 1980's and 1990's following the implementation of Subtitle D are approaching retirement age. These key people have decades of invaluable experience and knowledge.

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FREE RESOURCE

Read an article by Neal Bolton on equipment maintenance. Scan the QR code below for instant PDF download. A recent survey found that 87% of municipal managers are over the age of 40. A more specific survey we recently conducted indicates that more than 79% of key waste facility managers will retire in less than 10 years ...with 62% leaving within 5 years! And the kicker is: It takes more than 1 ½ years for a new manager to get up to speed. Why? **Because the old manager took the filing cabinet with him when he left – the knowledge was all in his head!** 

Succession planning is the critical process of preparing now for the future transition of key employees. Generally, we speak of this in terms of facility managers or supervisors, but it really applies to any worker that would be difficult to replace. In one company, Sal, a seasoned equipment operator retired after 55 years on the job. There is simply no way to replace that kind of history, experience and wisdom. But a formal set of written operating procedures can minimize the impact.

Here's an example of how one of our long-time clients handled this transition from old manager to new manager.

The assistant public works director informed us that his facility manager of nearly 30 years was retiring in 6 weeks ... Yes, 6 Weeks! They had 2 internal replacements lined up, but for different reasons neither was able to fill the position. Because of the timing any outside hire would not be able to have any face to face time with the current supervisor. And anyway, what could we do to help??



### **FREE RESOURCE**

View a webinar on succession planning. Visit **blueridgeservices.com/succession-planning-webinar** and use password **succession**.

We sent one of our key SHERPA docs consultants to the facility in order to accomplish one critical task: Shadow the manager for his remaining time, to observe and document everything he did. This included many processes that the assistant public works director didn't even realize the supervisor had been handling. Over a 5-week period, we ended up creating a 100+-page Supervisor Operations Manual.

This site-specific supervisor's manual – Really it was a Book! – provided clear and concise instructions on how to handle everything from regulatory compliance, scale database software, health and safety meetings, etc. It even included references to all of the supervisor's vendor and professional contacts that he had made over the years.

The best part is that this is now a living document, to be reviewed and updated on a regular basis.

How important would it be for your facility ... to have a written summary of all the things the manager does?

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### FREE RESOURCE

Download a checklist to help you review your current critical facility documents, and update or add as necessary. To download, visit **blueridgeservices.com/SHERPA**..

Complete and carefully prepared SHERPA documents are a critical part of operating every waste facility. These documents ensure the safety, efficiency, profitability, and liability protection for your operation.

Email info@blueridgeservices.com for more information on how to join the top 10% of waste facilities who have those critical "SHERPA" docs in-place.
## Chapter 7 How To Develop a Stellar Safety Culture



In our industry, approximately 40 workers are killed every year. That's 40 devastated families, 40 facilities rocked to their core, and 40 managers who have to make that phone call. How do those accidents happen? Why do they happen?

Well, there are often lots of reasons, but in most cases, the cause can be traced back to people.

# Fatalities don't "just happen". In most cases, they are caused by people.

So, how do we prevent fatalities, injuries, and damages from occurring?

It starts with training. And to be effective, it must be relative training. That means it applies to the kinds of on-the-job risks that solid waste workers are exposed to every day. No more bootlegging a lawn mower safety video from Parks & Rec. Forget about using the high-voltage safety video from the local utility company.

No, we're talking safety videos created for solid waste workers ... by solid waste workers.





Visit our online store to view our full library of training DVDs, manuals, webinars, and books. Visit **shop.blueridgeservices.com**.

Above is a link to the most comprehensive library of landfill and transfer station videos in the world ... period. And you can order them directly from Blue Ridge Services.

Or you can order them from the SWANA store. Yes, that's right. SWANA not only endorses these videos ... they sell them!

Most accidents and fatalities are not the result of just one event – such as someone not wearing their hard hat or proper PPE. They don't result solely from someone who is in a hurry or who skipped their walk-around inspection. Nor do they result from meteor strikes or lightning bolts. But rather, accidents occur when a combination of many events all line up into a "perfect storm." After years of participating as an expert witness on solid waste cases that involved an injury or fatality, it has become clearly evident that there are multiple causes that contribute to them. Here is a typical and a hypothetical incident.



(Fig. 27) Is your safety culture protecting you from liability and lawsuits?

A landfill spotter was run over by a garbage truck – what was the cause? Or rather, what were the causes?

Note: Again, this is a hypothetical scenario but it is based on things that we have seen happen in the real world and something maybe some of you have seen happen as well.

#### Contributing Factor #1:

There was an unplanned staffing shortage, so the new spotter was rushed into the field. Typically, new spotters were supposed to go through a set of training procedures, including a safety orientation, video safety training, and job-specific training. But this time, all of those procedures were skipped because of the staffing shortage. It was an emergency!

#### Contributing Factor #2:

There was a **No Scavenging** policy at the facility, and whether he knew about it or not, the spotter was scavenging.

In the majority of fatalities and serious injuries that have occurred at waste facilities, scavenging is usually a contributing factor.

Scavenging is one of those things that we all know is not supposed to happen but often it does, and there have been lives lost and careers destroyed because scavenging was allowed. Don't risk a life by scavenging. It's not worth it!



(Fig. 28) Don't risk a life - yours or someone else's - by scavenging. It's not worth it.

#### Contributing Factor #3:

The truck driver did not follow standard operating procedures. He knew there was a spotter somewhere in the vicinity, but when he didn't see the spotter ...he kept backing anyway. This is a basic rule for anyone operating a piece of heavy equipment or driving a truck: If you know there are workers on the ground and you cannot see them, always stop until you know where they are.

Often this comes down to an attitude issue. Someone will be in a hurry, and they have a "look out for me but I don't need to look out for you" kind of attitude, which is often a contributing factor.

#### **Contributing Factor #4:**

There was no standard work pattern or set procedure for trucks to dump left Blue Ridge Services Montana, Inc. | 72 to right or right to left ... or any other pattern. It was essentially a free-for-all, with trucks pulling into whatever slots they wanted to pull into whenever they wanted to. Not having a pattern was also a contributing factor to this accident.

#### Contributing Factor #5:

The worker was not wearing appropriate PPE. Even though there was a written policy and a cabinet full of PPE, there was a breakdown in the translation of those policies ...and he went to work without it.

#### Contributing Factor #6:

The backup alarm on the truck was broken. This is a common problem – but one that is easy to spot during the pre-trip (walk-around) inspection.

Note: our team was recently conducting an operational review at a transfer station when we noticed that the backup alarm on one of the tractors was not working. So we immediately pulled the operator aside and told him. He informed us that it wasn't really broken, but that he had simply forgotten to plug it back in. Somewhat confused, we asked him to explain. Apparently he had unplugged it early that morning because the "neighbors complain" about that "beep, beep, beep" backup sound early in the morning. Here we are back to the human factor.

#### Contributing Factor #7:

The driver was a known speeder. He would come on-site and ignore the speed limit signs – disobey the rules – and was widely known as a "cowboy." But, because of limitations within the progressive discipline policies, the managers' hands were tied in regard to dealing with this troublemaker.

Whew! As you can see, safety incidents and accidents are not simple events. They are often complicated and involve many factors. The solution might seem just as complicated, but in reality, it's quite simple. Safe facilities have strong, thriving safety cultures.

#### What is a Safety Culture?

In a safety culture, everyone recognizes that they contribute: Either to a safe workplace ...or to the problem.

So, are there any key factors that if eliminated could have prevented this previ-

ously-described accident? Of course. Every contributing factor was a key factor, and if any one of them had been eliminated, the accident probably wouldn't have happened.

Who contributed to this? Everyone did. Management and human resources, the spotter, the foreman, the driver – everyone contributed. Who could have prevented this accident? Again, anyone …everyone. Had any of the key players in the accident made different choices, the accident might well have been avoided.

This fatality was caused by a lazy culture, and the problem starts at the top. Now

we can talk about grassroots safety starting at the bottom and everybody doing their job and that's all good and well. **But the overall safety culture has to start at the top.** Managers have to set an example for working safely – they have to go the extra mile to do things the right way every time to the best of their ability.

I have a friend, Ron, who is the safety manager for a large waste company. I spoke with him just a few weeks ago and we talked about something that had happened many



(Fig. 29) When it comes to promoting safety at your waste facility, are you willing to put your money where your mouth is?

years ago. I was, at the time, visiting the landfill where he was the safety manager. He had a very robust safety plan for his crew – and demanding expectations as well. He wanted his crew to be safe and made no "bones about it." He was leading by example because he knew that it started at the top and trickled down.

Ron is the kind of guy who puts his money where his mouth is. He told the crew that he would follow the rules and he expected them to follow the rules as well. He went so far as to tell his entire crew that if they ever spotted him driving without his seat belt that he would pay that person \$100 – out of his own wallet. I asked him if he had ever had to pay that the \$100 and he said no, but that the crew knew he was serious because he had made that commitment.

Are you willing to make that kind of commitment to safety at your waste facility? Your very life - and the lives of your crew - might depend on it.

#### Don't Forget about Your Customers!!

In 2017, there were 132 recorded fatalities in the waste industry, 94 of which were members of the public. Most waste facility employees receive regular safety training. But most customers do not. And yet, customers are the least experienced and knowledgeable about heavy equipment and the risks present at a waste facility.

Here's the tricky thing: waste facility customers can include a wide range of people. They can include a typical family dumping a pickup of trash at the landfill on a Saturday morning or a collections contrac- tor coming to unload

at a transfer station several times a day. Customers might include a young child curious about the side



(Fig. 30) Your customers might be curious but don't know about the risks of heavy equipment.

loader picking up yard waste in front of their house on a Friday afternoon or the mom dropping off a load of cans and bottles at the recycling facility. They are contractors, landscapers, and self-haul residents.

While the demographics can differ, the similarities do not. Most customers have very little experience being around heavy equipment and most do not know the safety risks inherent at waste facilities. These are just a sample of some recent (very real) news headlines:

- 1. Man killed in accident at landfill. Truck driver failed to properly park his truck and it rolled forward, pinning another man between two trucks. The pinned man died.
- 2. Customer dies after accident at recycling plant.
- 3. 66-year-old man killed in dump truck rollover accident at landfill in Franklin.
- 4. Man dies after being hit by car at transfer station.

And these are just the fatalities! They don't include incidents of non-fatal injuries, property damage, traffic incidents, and customer vehicle damage. This is exactly why customers need safety training.

#### Why Do We Need to Train Our Customers on Safety?

The most obvious and urgent answer is that we are dealing with human lives and families. We have a moral responsibility to make sure that everyone who visits our facility goes home safe at the end of the day. Another reason to prevent customer fatalities is liability. Waste facilities have spent hundreds of thousands –or even millions –to deal with a customer fatality. On top of the emotional cost, a fatal accident could financially break a waste facility. Wouldn't it be easier to just implement a safety training program for customers?

#### What's the Solution?

In our experience working at hundreds of waste facilities throughout North America and abroad, we have found that the number one factor when it comes to improving safety is having a comprehensive, actionable plan. This is the same whether that plan is for your employees or for your customers. For most waste facilities, customer safety is a secondary priority. There is rarely a clear plan that incorporates the entire crew and facility. Customer safety must be a part of your overall safety culture and all employees need to recognize that they are responsible for helping to educate customers about safety.

- 1. If you require safety vests, make sure very customer wears one... no exceptions!
- 2. If you have speed limits at your facility, have consequences in place for those who don't adhere to them.
- 3. Make sure your employees know the rules... and then make sure they know how to enforce them with customers.

#### What Do Your Customers Need to Know?

Safety education has to be an ongoing, ever-evolving practice, but there are some basics that every customer should be educated about. These topics include a general description of your facility, include traffic flow and overall safety rules. Customers should know where and when to dump and what to watch out for at the tipping face. If you require PPE, don't allow cell phone usage, and require that all passengers, pets, and children remain in the vehicle, make sure you communicate that clearly, to every single customer. For customers who might interact with your collections drivers, focus on issues like distracted driving, slow down to get around, and general waste collection safety.

#### Do Your Research: You Need to Know How to Reach Your Customers

Before you implement a safety education program for your customers, start with some basic research. Do your customers prefer a printed brochure? Do they want a video? Are they active on social media and want to get information from your Facebook page? Video is a very effective tool to communicate with your customers. A customized video can essentially "walk" your customers through your site before they even arrive at the front gate. Here are some other ideas on how to reach your customers:

Face-to-face (i.e., at the scale house or from another employee)

- In an email
- On signage
- Advertising in local newspapers
- Grade school demonstrations and events
- Public events and exhibitions

Before you launch a safety program, set some goals. Remember to keep them very specific and measurable. "We want to reach X number of customers with our safety video." "We want to reduce close-calls by 50%." Then, test your safety program, get feedback from your customers, and make changes. Improving our industry must include all involved stakeholders, including customers and contractors. We all play a part in improving our industry's safety, and customers are a very active part of solid waste. Don't forget to include them in your overall safety culture.

Email info@blueridgeservices.com to find out how we can help improve your existing safety plan or create a new one customized to your facility and your crew.



## FREE RESOURCE

Learn more about customer safety by visiting **blueridgeservices.com/customersafety**.

## Chapter 8 Equipment Essentials



Every year, heavy equipment and truck manufacturers produce scores of different types, sizes and models. This means you have choices. That's a good thing ...but it can also be very confusing.

Even when it comes to the seemingly simple task of pushing trash, do you prefer a track-loader, wheel loader, wheel dozer or track-dozer? Oh, and was that narrow, traditional or wide-track grousers ...with street pads, single grouser or demolition pads? Did you want smooth or traction tread, conventional, solid or foam-filled tires?

## Or maybe you just said, "The heck with it," and decided to push with the compactor.

Collection, recycling, and organics processing facilities face the same plethora of choices.

Selecting the right equipment for your waste operation is important. But the fact is, most facility managers/operators do a better job of choosing the correct machine ...than using the machine correctly. You don't have to be a Michael Jordan to know what kind of ball is needed on the court. But are you able to use it to the same level of effectiveness?

Yes, that ultimately is the question – and it's a big one. But we still need to start with the basics of size, type and numbers.



## FREE RESOURCE

Watch a free webinar on right-sizing your equipment. Visit **blueridgeservices.com/sizing-equipment** and use password *Right*. While performing a CORE® Assessment (see Chapter 3), we look very closely at these factors. And one of the first things we'll look at is how your facility compares to other similar facilities. Naturally, you would expect the number of machines to vary, based on the size of the facility – and generally it does. But the range of variation is quite dramatic The wide degree of variation in fleet size and configuration goes beyond personal preference of the manager.

As an example, Figure 25 shows the number of machines at landfills of various sizes. And, while larger facilities (i.e., more tonnage) tend to have more machines, note also the variation. Often, we find that municipal operations tend toward having more equipment than private operations... but not always.



(Fig. 31) Number of Machines vs. Daily Tonnage

## But remember, problems are problems only if left alone. Once you decide to fix them, they become opportunities.

One of our clients – a 900 tpd landfill – was able to reduce their heavy equipment/truck fleet by 16 pieces ...and in the process, generate nearly \$900,000 in auction revenue. This change, along with several others, allowed them to reduce staff by more than 30% - and slice more than \$2 million from their annual budget year after year! Another 1,500 tpd (landfill) client was able to decrease the machine hours spent pushing waste from 12 hours per day ...to 4. And in the process, re-assign a full-time employee to another vital task, while saving nearly \$250,000 per year.

At a large, urban transfer station, we helped one of our clients avoid purchasing an additional 14 transfer trucks/trailers by streamlining key steps in the wastehandling process and integrating a yard truck into the operation.

So it's no wonder that making improvements to the equipment/truck fleet can produce huge financial savings. Machines are very expensive – much more expensive than many purchasers realize.

On average, the lifetime cost of a machine will be 3-5 times the price you pay for it. Savvy managers know that price and cost are not the same thing – not even close, so they focus on productivity criteria and things that impact long-term value.



(Fig. 32) Machines and heavy equipment are very expensive. Are you maximizing your fleet?

But, if you are stuck – as many municipal managers are – between wanting the best machine and having to accept the lowest bid, you must find ways to shift your purchasing perspective. Rather than basing everything on a low bid, consider basing it on performance. Require machine/truck vendors to establish a cap on machine/truck downtime ...and make them pay if their machine isn't performing. Along that same line, you can ask them to pre-establish a guaran-

teed buyback price, and have the dealer perform all maintenance/repairs ...even beyond the standard warranty period. Bid out your route trucks in multi-year blocks to reduce the likelihood of adding different makes of trucks to your fleet every year.

One memorable example with a government entity – one that will remain anonymous – put us in direct contact (did I say, "conflict"?) with an acquisition manager who was appropriately named, "LaLa." When we tried to explain the difference between various vendors ...and suggested that she take into account simple things like experience, skill, long-term cost, reputation and integrity, LaLa famously announced that aside from purchase price, there is no difference between vendors! I suspect we may have found a clue to the origin of the term LaLa-Land. Fortunately, more and more equipment/truck buyers are finding ways to focus on value ...rather than just on price.

Absolutely there is a difference between vendors …even between different machines from the same vendor. Manufacturers have estimated that as machines evolve from one model to another, they become – on average – more productive. One Caterpillar sales rep suggested that machines tend to increase in productive capability by an average factor of approximately 1 percent per year.

Accordingly, a new D8T would be 93% more productive than the first D8 dozer I ever operated: a 2U cable dozer manufactured around 1950. Too bad, because that old D8 had lots of personality. We called it the General and it even had a black star stenciled on the side of the fuel tank.

This makes an important point: That there is a limit to the useful life of every machine, and knowing when to upgrade is just as important as buying the right machine in the first place.

#### Maintenance

Machine maintenance is like politics – everybody talks about it, but few really get involved and do something about it. But if you don't decide to have a pro-active maintenance program ...you've decided to have a reactive program. All machines need regular services, and all of them will periodically break down.

A recent poll indicated that many facilities use some type of computerized maintenance tracking program, followed closely by those that use a paper file system. Others use a whiteboard, while some even use the classic cardboard box method. Regardless of your system, the goal is to track services, schedule repairs and project the cost and timing of major rebuilds.

But there is still room for improvement. 78% of managers surveyed indicate that their system is, "working OK, but could be better." But more alarmingly, when it comes to estimating next year's equipment budget, only 20% make an estimate based on current machine condition, while 80% base their estimate on last year's expenditures. **This is like driving to work using only the rear-view mirror!** 

In our experience working with hundreds of managers, we find that most of them

- the front-line decision makers – do not have the information they need when it comes to understanding their machine's Owning and Operating (O&O) Costs. When we ask, "How



much does that machine cost per hour?" the most common response is: "Well, the machine is paid for, so I guess it's really just the cost of fuel."

Of course the cost is more than just the fuel. Otherwise how would you pay for the next service, the next rebuild or the next machine? Machine costs can be subdivided into two parts: Owning Costs and Operating Costs.

Owning Costs are those costs associated with owning a machine, things such as purchase costs, interest, insurance, etc. In a very simply example, if you spent \$1 million for a tractor, and used it a total of 8,000 hours, its hourly owning cost would be \$125/hour (total cost ÷ total hours).

On the other hand, Operating costs include services, repairs, rebuilds ...and of course fuel. These costs are directly related to machine use. These costs can vary widely depending on the type of machine, how it is used, and many other factors.

The late Peter Drucker, a guru of business management, said, "You Can't Manage What You Don't Measure." To effectively manage your waste facility, you've got to know your equipment costs.

Another factor that you, as a manager, must understand – and one we always consider during a CORE® Assessment – is the machine/truck utilization rate. This is simply the percentage (or ratio) of time that a machine or truck works ... compared to its maximum potential work hours. For example, a machine that works 4 hours out of a potential 8 hour day, has a utilization rate of 50 percent. Similarly, a transfer truck that works 6.5 hours in a 10-hour work window has a 65% utilization rate.

Evaluating utilization rates can be tricky. In the first place, we are generally looking for machines that are fully utilized, because a fully utilized machine indicates fulfillment of a need. Unlike that dusty exercise gym in your basement – the one you purchased 3 years ago when you were going to get into shape – fully utilized machines are used to their maximum potential.

When we consider that all machines require a warm-up and cool-down period, and also that the folks who operate them need breaks and lunches, most machines are fully utilized at around 85-90 percent utilization.

Sometimes a high utilization rate can indicate that another machine is – or soon will be – needed. In the case of a dusty landfill where one water truck is working at 88% utilization – and still not keeping up – a manager might logically deduce that another water truck is needed.

However, this where a bit more experience is needed. First, check the numbers to affirm that the utilization rate is accurate. If it is, then move on to evaluating what the machine/truck is actually doing. At this point, you're moving into the realm of a CORE® Assessment (See Chapter 3).

Often ...very often, we find that machines are working hard and show a high utilization rate, but they aren't accomplishing much in the way of meaningful work. One example is the large wheel loader that was loading C&D into a large transfer trailer – to transport it to a recycling facility. Based on an 85% utilization rate, the loader appeared to be at full capacity and there simply weren't enough hours in the day for it to do any more work. A classic example of machine overload ...until we conducted some video analysis and quantified what it was actually doing. Use the link on the next page to see what that loader was doing.

Other times we'll see several machines of similar size/type – each with a very low utilization rate. We first saw this phenomenon more than 20 years ago, when we began measuring machine utilization. A large, regional landfill had 4 late model

scrapers, each with a utilization rate of less than 20%. In essence those 4 machines were doing the work equivalent to 1 machine at 75%. We began asking questions: What happened? How did we get Here?



It turned out that the landfill had added three additional scrapers two years ago in anticipation of doing a large (liner) excavation project. But instead, they'd hired a contractor to do the work, so their crew simply rotated through the scrapers, using each one an hour or so each day.



(Fig. 33) That equipment utilization is only one piece of the puzzle, and the other part - having the right machines and using them effectively - is both art and science.

At a transfer station, 4 individual transfer trucks ran the same route to the landfill – and overall they averaged 4 loads per day. Initially, we accepted the manager's idea that another truck might be required, because the transfer station waste was backing up and they ended up working most Saturdays – just to catch up.

But then we dug deeper. And in the process, we discovered that 3 of the 4 trucks were consistently averaging 3.7 loads per day, while the 4th truck – driven by Charlie – was averaging 4.9 loads. What was Charlie doing? What did Charlie know?

Well, Charlie was a worker, and he was aggressive. He had memorized the stoplight patterns through town, and so would speed up or slow down just enough to avoid having to make a full stop at most of the lights. He didn't stop to visit with the guys at the landfill. Instead he just weighed in, dumped his load and headed back to the transfer station. When he got there, he pulled into position to be loaded ...then took his break while the transfer station crew loaded his truck. Charlie had very little wasted effort – and as a result, he got nearly 25% more work done than the other drivers.

The other drivers worked the system ...backward, in order to get Saturday overtime. They fought the stoplights ...and lost. Upon returning to the transfer station they would park and take a break. Then they'd pull in to the loadout area, and have another break while their truck was being loaded. In essence while Charlie maximized his effectiveness, the other drivers were dragging their feet.

What's the point? That equipment utilization is only one piece of the puzzle, and the other part - having the right machines and using them effectively - is both art and science.

Email info@blueridgeservices.com to learn more about how our team can help you maximize your equipment fleet and your operators' effort.

## Summary



If you have made it to the end of this book, congratulations! This is a lot of information to digest.

Whether you feel that your facility has a long ways to go in terms of increasing efficiency and safety...or whether you think a few specific areas of your operation could be improved... the key is to be willing to take a good, hard look at what's working and what's not.

Our industry is facing many challenges and changes for the future. The question to ask yourself is this: Is my facility and my crew equipped to deal with the changing landscape of the solid waste industry? Is my operation running as lean as it could be? Is my crew safe?

Several years ago, I used to ride my bike to work quite a bit. I often stopped along the way at a coffee shop to get breakfast and take some time to sit and think. One morning, I parked my bike, pulled off my bike helmet, and walked up to the counter. After ordering breakfast, and having a few moments of conversation with the waitress, I found a seat. It was only after I had been sitting at the table for quite a while that I noticed that I had a large piece of foam from the inside of my bike helmet stuck to the middle of my forehead. The worst part? No one told me.

When it comes to your operation, there may be some very blatant issues that no one is telling you about.

That's where our team comes in. We aren't afraid to ask the tough questions, and tell you the truth about your operation. Our team helps uncover the "unknown unknowns," and we can help your operation run safer and more efficiently than you ever thought possible. The time is now.

Email info@blueridgeservices.com today to schedule a FREE initial assessment of your facility.

## **Process Improvement** for the Solid Waste Industry

## **Services and Team**



#### Our Team

**Neal Bolton** has more than 38 years of experience in heavy construction, landfill, and recycling operations. In 1988, Mr. Bolton formed his own consulting company – Blue Ridge Services. His team provides operational consulting services for a wide range of private and municipal solid waste/recycling facilities, landfills, transfer stations, surface mine reclamation and construction projects throughout North America and abroad.



**Jason Todaro** has 22 years of varied experience in the heavy construction, utility and solid waste industries. As a solid waste operations consultant, he has worked and trained on-site at over 50 solid waste facilities. He has been a key team member on numerous additional projects that did not require his on-site services.

**Troy Kecheley** is an Engineering Consultant III/ CAD & GIS Manager with over 25 years of experience using and instructing on the use of Computer Aided Design (CAD) software with extensive expertise in Autodesk civil design software.



We have additional experienced team members who provide engineering, writing, consulting, and safety support to our core team. To learn more about our team, visit **blueridgeservices.com/about/our-team**.

> Browse our Menu of Products and Services on the following pages.



#### Management Consulting

Managing a waste facility is a challenging job. You have to constantly juggle budgets, staffing, regulatory changes, and competition from other facilities. Sometimes, you need a helping hand.

#### That's where we come in.

We can provide management consulting and support during times of transition.

In addition to the wide range of consulting services offered by BRS, our staff can also provide interim management services at a wide variety of facilities. With the help of our proprietary efficiency tools and combined experience of our consultants, we can provide organizational training, improve efficiency, assist with interviewing/hiring new management, and improve overall operations.

 $\rightarrow$  Interim Management

- → Comprehensive Operational REview (CORE®)
- $\rightarrow$  Planning
- → Budget Review
- → Training (Field, Classroom, Online)

#### About Our Team

Our staff has more than 75 years combined experience in operations, safety, monitoring, training, and expert witness. We can provide a wide range of operational reviews and assessments for waste facilities of all types, including landfills, transfer stations, organics processing facilities, recycling centers, and more. Our team has consulted and trained at hundreds of waste facilities around the world.

#### Get in Touch

T. 406.370.8544 info@blueridgeservices.com



#### www.blueridgeservices.com

Blue Ridge Services Operations and Efficiency Experts Since 1988



#### Blue Ridge Services Menu of Products and Services

Landfills | Transfer Stations Recycling | Collections Organics Processing



Neal Bolton is on £: !e industry's most recognized and respected writers and speakers. Based on over three decades of experience, hehas provided expert research, opinion and testimony in regard to landfill operations and safety on a variety of cases - both civil and criminal.

#### "- Expert Opinion Research and Reports

- "- Expert (Plaintiff/Defendant) Court Testimony
- "- Arbitration/Mediation Assistance
- "- Mock-up/Model/Evidence Preparation

### Operations Review & Assessment

Our staff has more than 75 years combined experience in operations, safety, monitoring, training, and expert witness. We can provide a wide range of operational reviews and assessments for waste facilities of all types, including landfills, transfer stations, organics processing facilities, recycling centers, and more.

- "- Comprehensive Operational Review (CORE)
- "- High Level Operations Review
- "- Focused Review (i.e., Compaction)
- "- Competitive Bid Preparation
- "- Operations Contract Preparation/Review
- "- Equipment/Fleet Analysis

#### Safety

Neal Bolton and the team at Blue Ridge Services has created the world's most comprehensive and only industry-specific safety training program for waste facilities. And our team members have consulted and conducted training at waste facilities around the world on issues related to safety.

- Safety Audit
- Create/Review Health & Safety Plan
- Safety Training for Landfills and Transfer Stations (DVD or On-Demand Online, Spanish Versions Available)
- └• Safety Training Materials/Resources
- Safety Training for Landfills and Transfer Stations (DVD or On-Demand Online, Spanish Versions Available)
- Handbook of Landfill Safety

#### Training

Our training programs are specifically customized to your facility, your team, and your unique needs. Our training topics include heavy equipment operations, safety, improving efficiency, planning, and more. And we can create training materials on any topic related to waste facilities.

- └• Webinars (Live and On-Demand Online)
- Operational Training (DVD and On-Demand Online)
- In the Handbook of Landfill Operations
- Custom Video Production
- On-Site/Field Training
- Classroom Training
- Equipment Operator Training

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#### Landfill Maintenance/ Field Services

With a strong focus on safety and environmental awareness, we provide low impact work such as fire protection, groundwater/landfill gas system monitoring, erosion control, support for biological studies, construction preparation, trail construction and agricultural clearing, and field support for active and closed landfills.

- "- Landfill Gas Monitoring & Reporting
- "- Groundwater Monitoring & Reporting
- "- Landfill Site Maintenance Services
- "- Vegetation Management
- "- Site Construction Services

#### Planning

When it comes to your waste facility, you probably already know that planning - whether it's soil management planning, fill sequence planning, or safety planning - is absolutely essential to running an efficient, safe operation. Whether you are preparing to open a brand new facility, or just need help getting on track at your current facility, we can help.

- "- Operations Planning
- "- Soil Management Planning
- "- Fill Sequence Planning
- "- Budget Preparation and Review
- "- Performance Benchmark Development/ Tracking







ces <u>om Blue Ridge Servi</u> perations Now, you can provide high-quality, practical training on a wide variety of topics for your staff... when and where you need it. W and Handbook of . Another first Facility Training On-Deman thor o , au Bolton and Néal

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Which Product is Right for You?	Monthly On-Demand Training Library \$159	Annual On-Demand Training Library \$1,500	Single Safety DVD Topics \$250	Annual Safety DVD Program \$2,500	Entire Safety Training DVD Program \$20,000
Online Access 24/7	Yes	Yes	No	No	No
Electronic PDFs of Training Booklets	Yes	Yes	No (topic includes limited number of printed booklets)	No (topic includes limited number of printed booklets)	No
Access to Entire Training Library	Yes	Yes	No	No (Annual DVD program limited to 12 topics)	No
New Content Monthly	Yes	Yes	No	No	No
Lifetime Access to Purchased Training DVDs	No	No	Yes	Yes	Yes
Content Included:	<ul> <li>Landfill Safety Training (70 topics)</li> <li>Transfer Station Safety Training (30 topics)</li> <li>Equipment Operation Training Series (9 topics)</li> <li>Webinars (25+ topics)</li> <li>New Content Added Monthly</li> </ul>	<ul> <li>Landfill Safety Training (70 topics)</li> <li>Transfer Station Safety Training (30 topics)</li> <li>Equipment Operation Training Series (9 topics)</li> <li>Webinars (25+ topics)</li> <li>New Content Added Monthly</li> </ul>	<ul> <li>Customer chooses 1 Landfill or Transfer Station Safety Topic</li> </ul>	Customer chooses     12 Landfill or     Transfer Station     Safety Topics	<ul> <li>Landfill Safety Training DVDs (70 topics)</li> <li>Transfer Station Safety Training DVDs (30 topics)</li> </ul>

Do you need on-demand access for multiple facilities? Are you looking for a customized DVD package? Contact us! We love to help our customers find exactly what they need to train their employees. Email Andria Radmacher at andria@blueridgeserivces.com or give us a call at 406.370.8544.

## **Drone Mapping** and Monitoring for the Solid Waste Industry

Let the leading industry operational experts provide fast, inexpensive, and accurate drone mapping at your waste facility.

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Blue Ridge Services, Inc.

7 -----

# Schedule your FREE customized

## consultation, and get 30 minutes one-on-one with Neal Bolton

#### core@blueridgeservices.com



Improving **OPERATIONS & EFFICIENCY** since **1988** www.blueridgeservices.com



## **90% OF WASTE FACILITIES**

DO NOT HAVE UPDATED, COMPREHENSIVE PLANS IN PLACE FOR SAFETY, OPERATIONS, EQUIPMENT, AND HUMAN RESOURCES.

That means only...

## **10% OF WASTE WORKERS**

HAVE THE APPROPRIATE TRAINING, PLANNING, OR KNOWLEDGE TO PERFORM THEIR JOBS

No wonder

WASTE IS THE **5TH MOST DANGEROUS INDUSTRY** IN AMERICA!

Documented, up-to-date, and practical plans and programs are the way to make our industry safer. Safety is the priority, but many don't realize that these same documents can be used to make your operation more efficient as well.

We understand that creating these critical documents while running a waste facility is a big job. We want to help make your job just a little bit easier. We will use our decades of experience developing these documents to create plans and programs tailored to your facility.



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Ask us for a checklist of the critical documents your facility needs.



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## Want your crew to excel in their field? Give them the industry's most comprehensive field training program.

Hands-on training provides your crew with real-world lessons. We translate vital operational and safety techniques directly into the field, giving them an understanding that simply cannot be offered in a strictly classroom setting.

So, just how important is training? It's very important. Many equipment operators will work at a solid waste facility for many years ...with little or no formal training. No, it doesn't make sense to us either. Every other profession requires continued training. So why shouldn't this apply to the professionals at your landfill, transfer station, composting/greenwaste or MRF facility?

It's all about safety and productivity – and yes, you can have both. Neal Bolton has worked as an expert witness on dozens of solid waste cases – most involving serious injury or accident. In many instances, the turning point for assigning fault was related to the level of training provided ...and documented.

In terms of productivity, we've seen instant reductions in airspace consumption of over 30% by improving cell construction and waste compaction techniques. By adding improvements related to the use of cover soil and ADC, we've seen long-term airspace consumption drop by nearly 60%. **Imagine how these kinds of improvements would help your bottom line.** 

Our on-site training courses are geared towards operators and usually consist of 1-2 days of in-classroom and field training. Below is a list of some of the on-site training topics we offer. Every topic can be fully customized to fit the unique needs and operation of your facility.

Our instructors have more than 50 years of combined experience in engineering, field operations, expert witness testimony, and safety training.

Contact us today for a personalized proposal.

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Blue Ridge Services...Serving the Solid Waste Industry Since 1988

