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Cutting Landfill Costs - Not Capabilities

Operational changes can reduce costs.

By Neal Bolton

The garbage business is generally a good indicator of the economy's strength. And while the bad news is that waste tonnage is down at most landfills, the good news is that there is a bottom. Most of the drop is due to a slumping construction industry, compounded by less consumer buying.

But the garbage business—like taxes and death—is relatively constant. Some landfills are fortunate enough to have a stable income and, in fact, some municipal landfills derive much of their revenue from property assessments, whereby revenue is fixed regardless of tonnage. But most facilities, to be sure, are feeling the pinch.

There are two ways to survive during recessionary times: Decrease costs or increase revenue. With landfill tonnage rates down 10%–20% or more, most landfill managers are looking for ways to do both, with the best results directed toward cutting costs.

In the remainder of this article, as we look at ways to cut operating costs, we'll discuss some workable compromises between what we want to do...and what we have to do.

Finances May Limit Choices

When I was in high school I had an old Jeep. For anyone who cares to know, it was a 1949 Willys CJ3A. Sometimes it would start, and sometimes it wouldn't. One cold morning as I was cranking on the starter, my grandfather, an old equipment operator and mechanic, suggested I give it a shot of ether. "Not too much," he said, "just a shot...and only when it won't start with the normal way." So I tried it. Wow! This was ether stuff was great, the miracle cure for a sick engine. So every morning thereafter, when the old Jeep wouldn't start right off the bat, I'd give it a shot of ether. And as time went on, it required a somewhat bigger shot than it had the previous morning. Finally it seemed that old Jeep reached a point where it would only run on ether—at least until it got good and warmed up. That went on for a few short months, until finally I saved enough money to rebuild the carburetor, to grind the valves, and to get that old Jeep to a point where it would start like it was supposed to—with just a couple of pumps and a bit of choke when it was cold. Hmm, I wonder if its rapid decline in performance those last few months was somehow related to my overuse of ether. Looking back, of course, one might say, "In the long run, it would have been best to simply perform the carburetor and engine work rather than use all that ether." True enough, except for one small issue: I couldn't afford the \$250 necessary for the carburetor rebuild and valve job...but I could swing \$1 a week for a can of ether. I was caught between what I wanted to do and what I had to do. As with most things related to my grandfather, there was lesson in that story: Sometimes your first choice isn't the best choice, because sometimes you don't have a choice. I needed to get back and forth to school. That old Jeep was my only outfit and starting it with ether was my only option. There are plenty of landfills in which a new liner is needed, an area is scheduled for closure and one or more machines must be repaired, rebuilt, or replaced...but limited finances mean limited choices. As a result, we often have to shift our business model from what we'd like to do...to what we have to do, and an ever-increasing number of landfill owners and operators are finding themselves caught in that double bind.

Cutting Costs

The primary option for a struggling budget is to cut costs. You know: Fill the gap, plug the leak, trim the fat and stop the bleeding. Without question, cutting costs is the most effective way to balance the books, but it just sounds so painful. And it typically is, because it usually means delaying such vital investments as equipment repair or liner construction.

But sometimes, bolstering short-term cash flow by cutting costs through such delays is simply a matter of working smarter with what you already have. Yes, I know, we've all been trained to use the Net Present Value approach when making economic decisions—that in the long-run NPV is the answer. But when budgets are tight, short-term cash flow becomes the top name on your dance card.

When it's a choice between gutting your operation or borrowing blindly against the future, maybe you need to consider a third choice: Re-evaluate the operation, see what's working and what isn't, then redirect your effort to save money through greater efficiency and improved performance. Then, once the operation is running as lean as possible, you move back to long-range planning.

Review Your Budget

Give it a try. Open up your annual budget, go down the right-hand column and look for the big numbers. At this early stage of the game, we're following the money. Chances are you'll be looking at some or all of the following big-ticket items:

- (old) landfill closure payment
- new liner construction and airspace
- diversion programs
- capital investment—facility
- capital investment—equipment
- closure/postclosure funding
- labor

Equipment Operating Costs

Some of those costs are fixed and offer little opportunity for savings. Like the money, for example, you borrowed to close those old, burning dumps several years ago. Now it's being repaid in a fixed loan payment—and there's no slack...no way. It simply has to be paid every month.

With other costs though, such as for the new liner construction and airspace, or capital investment—equipment, there may be some opportunity for adjustment. But in order to affect change in any area, we first must thoroughly understand the performance factors that drive the cost. As an example, let's first look at the performance factors related to new liner construction and airspace.

Benchmarking

Often, we hear the word *performance* and we think *benchmarking*. Benchmarking is a common buzzword for landfill managers. Most managers track data on things like cover soil use, waste compaction, labor hours, or regulatory compliance. This is an important and vital first step. As management guru, the late Peter Drucker once said, "You can't manage what you don't measure." Drucker's statement was right on.

Yet, too often, we track the numbers but don't know what to do with the results.

In other words, we know that the effect is high costs. What we're really looking for, though, are the causes, because when we understand where those costs come from, we greatly improve our chance of reducing them. Seeing the effect is good, but solutions always result when we deal with root causes.

Okay, once you've tracked that data, and perhaps identified that some parts of the operation aren't measuring up, then what? Look for root causes.

Liner and Airspace Cost

Let's start with a cause-and-effect chart (Table 1). Some may refer to it as a *fishbone diagram*. This is just one of many analytical tools used for process improvement. It's simple to create and can help identify potential root causes of any specific effect.

Developing a chart like this begins with a list of the potential causes of an effect—in this case, excessive cost for liner and airspace. This is brainstorming pure and simple.

In this example, we've listed eight of the many potential causes ranging from "Filling the Landfill with Recyclable Materials" to "Not Achieving Optimum Waste Compaction." Each of these describes a category of potential causes. Then, within each category we list specific reasons (causes) that could contribute to the problem (effect).

Now suppose we determine that in this example, "Not Achieving Optimum Waste Compaction" is one of the underlying causes of excessive cost of liner and airspace. What next?

Well obviously, once we've hit pay dirt we'll continue digging. Perhaps we'll create another cause-and-effect chart, this time to identify the potential causes for "Not Achieving Optimum Waste

Compaction.” At some point in this process, we’ll be able to identify the specific reasons why we aren’t getting good compaction, and then we can start making changes. You may find it interesting that as we examine the question of why landfill airspace is so costly, we often find ourselves looking at waste compaction and cover soil. For savvy managers, this is no surprise—the rate of airspace consumption is a major factor in how we can amortize the tremendous cost of liner construction. And the more we can extend the life of the current fill areas, by optimizing waste density and cover soil use, the lower our resulting cost per ton or cost per year. Focusing on these issues usually makes sense, because for most landfills they have a more significant impact on the financial bottom line than any other factors.

Reducing Liner Costs

Want to save lots of money on your liner construction project? Fill your current liner...slowly. This concept provides a double-barreled advantage in reducing costs.

First, as compaction density goes up and soil use goes down, you’re able to place more revenue into every cubic yard of airspace.

Second, by filling your current area slowly, you postpone construction of the next lined area. If we assume interest costs of 4%, deferring a \$1 million expense saves \$40,000 per year. Increase the expense or delay for a longer period, and the savings increase accordingly.

Looking for Root Causes

As we bore down into “Not Achieving Optimum Density” as a key root cause of excessive liner construction and airspace costs, we find several sub-factors, including:

• compactor too small

- need more compactor hours
- compactor teeth worn
- poor compaction technique

An expanded list may also include:

- lack of training
- wastestream variations
- inadequate support from dozer and spotter
- poor use of settlement
- many other factors

The point is: The further we go, the more obvious our choices become. If the compactor is too small, we need to shift our schedule, so it spends more hours each day compacting trash, or replace it with a larger unit. All manufacturers have responded to the increased value of airspace by making larger machines. Your local equipment dealer can provide detailed cost information for virtually any landfill scenario.

Some items on the cause-and-effect chart may require us to go a step or two deeper, but every potential cause can eventually be narrowed down to specific choices. And then, at that point it becomes a true cost-benefit question: yes or no?...do or don’t?

You may be surprised to find, when performing this type of analysis, that sometimes the obvious answer isn’t all that clear. It may require a paradigm shift. Cutting costs in one area (Liner and airspace) may actually require you to spend more money in another area. But you need solid information in order to make those decisions.

We’ll look at five of the more common ways to immediately begin reducing the cost of your landfill liner.

Because so many managers are currently faced with tough budget decisions right now, perhaps reviewing some of those “spend to save” scenarios will be useful. As an added incentive, the slowdown in the construction industry has forced machine costs lower. If there was ever a time to find a deal on a machine, it’s now.

Increase Compactor Hours for Greater Waste Density

There’s no question that by compacting trash, a landfill can extend its life. But there is still a question: Where is that optimum point—that sweet spot—where just the right amount of compaction saves just the right amount of airspace, resulting in minimum overall costs? Most landfills use compactors, but many of them don’t use their compactors enough.

By running the numbers, you may find that increasing the compactor’s hours, or even purchasing a larger (or additional) compactor, you will improve your overall bottom line by slowing your airspace consumption rate.

Similarly, if the compactor’s teeth are worn, they should be replaced. The condition of the compactor’s teeth is the most significant factor when it comes to achieving good compaction. Investing in a new set of teeth will often result in net savings by increasing waste density and postponing the move into a new lined area. Most machine manufacturers offer more than one type of tooth, and there are companies like Caron Compactor Co. or Terra Compactor Wheel Corp. that manufacture a wide range of wheel/tooth combinations.

Think you’ve seen it all in regard to waste compaction? Not likely. In an industry where manufacturers already produce a wide range of tooth shapes and sizes, innovation continues to be the name of the game. One of the newest looks in compactor teeth comes from HJ Industries of Avon, OH. It’s recently released TRAC-PAC cleat has an unusual shape and includes what the company calls a “traction pocket.”

Another relatively new company, GR8GET, has developed a new type of replaceable tooth that’s held on the wheel with a simple spring. Manufacturers are constantly searching for ways to fill a need. And in that search, the ever-critical need to compact waste has not been overlooked. The bottom line here is that need fuels innovation, and as long as there is a need, creative manufacturers will keep coming up with new ideas.

Purchase a Small Dozer

Excessive use of daily cover soil is one of the most common problems at landfills. One of the easiest ways to minimize soil use is to place daily cover soil with a small, maneuverable dozer.

Consider this example: Every cubic yard of cover soil you place in your landfill costs you money (i.e., airspace). Conservatively, we could place a value of \$5 per cubic yard on that soil (\$4 for airspace and \$1 for hauling). A 400-ton-per-day landfill could easily use 200 cubic yards of cover soil—at a cost of approximately \$1,000 per day. A small bulldozer such as a Cat D5 or John Deere 650, preferably with a six-way blade and slope board, might cost \$80 per hour. Based on the half-hour per day you’d use it to place soil, it would cost approximately \$40 per day. If you are currently placing daily cover with a large dozer, compactor, or scraper, switching to a smaller dozer could reduce your soil use by 30% or more. In this example, using a small dozer to save 60 cubic yards of soil per day could provide net savings of \$260 per day, or somewhere in the range of \$70,000 per year.

Purchase ADC System to Reduce Soil Use

Airspace, airspace, airspace—I just can’t get it outta my mind. No wonder. It’s often the biggest single line item in the budget. If you aren’t using some form of ADC, you’re wasting airspace, pure and simple. Sure, there could be a landfill, someplace, where it doesn’t pay to use ADC...but it’s a rare bird indeed.

This is another area where spending some money can actually save even more. With the tremendous cost of producing airspace, virtually any type of ADC could reduce your overall operating costs.

When selecting an ADC system for your landfill, consider how you might use it to save money in other ways. For example, the Finn Corp., creator of the first hydroseeding unit back in the 1950s, now manufactures a unit, the Landfill Solutions LF 120, which can be used to apply ADC, to control dust and odor, or to power-wash machines. Oh, yeah, it also works as a hydroseeding unit.

It’s important to match the type of ADC to your landfill. Are you trying to minimize infiltration, control odors, provide fire prevention, or simply cut costs? These questions, when answered, can direct you to the best choice for your unique situation. Manufacturers of various ADC systems can provide good information regarding performance and cost.

Haul Soil In-House to Minimize Contractor Fees

A significant portion of your liner construction costs may be spent on the removal of massive volumes of soil. Instead, by modifying the fill sequencing and reducing the size of the next liner footprint, perhaps the landfill crew could excavate that soil, eliminating double-handling and reducing costs overall.

Many landfills have equipment for excavating soil. Companies such as Volvo, Caterpillar, and John Deere manufacture durable machines, capable of maintaining very high production, yet at many landfills these machines work only a short time each day or week.

Significant cost savings may be achieved by putting them to work, hauling that excess soil and thereby reducing the likelihood of additional contractor fees.

The manufacturers of that equipment can provide detailed production analysis to help you select the best machines and schedule the project. You’ll want to evaluate how this will affect your cash flow and determine if the initial cost to move that dirt brings enough short-term savings to make it worthwhile.

Reduce the Size of the Next Liner Project

Another way to reduce the effective cost of your liner is to build it in smaller increments. Under most conditions, and certainly when cash flow is vital, it makes sense to construct your liner in the smallest practical pieces. Very often, this means building enough for one year at a time. Is there risk? Maybe. Does it mean more work for you? Probably. Will it save money? Almost certainly.

Finally, we’re back to a basic time value of money analysis—one that makes sense in this economy because it also reduces the drain on short-term cash flow.

Another Angle on Cost Cutting

Okay, so far we’ve been focusing on ways to cut airspace costs by reducing the rate of fill placed into the lined area, with the primary goal being that of increasing short-term cash flow. In the right situation, these ideas will do just that.

But now let’s rattle one of those traditional landfill cages. As an industry, we’ve accepted the idea that airspace conservation trumps everything else, and over the long-term it generally does. But when faced with an economic situation where short-term cash flow is the top priority, some of our airspace conservation programs must be challenged.

Evaluate Diversion

Technology-wise, the diversion industry is advancing quickly. More and more landfills are developing woodwaste and greenwaste programs that range from grinding this material for use as ADC or onsite mulch to creation of compost stock or fuel for a cogeneration plant. When it comes to diversion, we know how to do it. Question is: Should we?

It depends. In states where this type of diversion is mandated, then the answer is, of course, "yes." But if it's more of an economic question, you may want to break down the process into greater detail. It's not unusual, in some woodwaste-greenwaste operations, for workers to handle the material up to 10 times. Keep in mind: The more complex the process, the greater the cost. Thus it follows that simplifying the process, perhaps to coarse-grinding greenwaste for use on-site as ADC or mulch may cost less than fine-grinding, screening, and composting the same material. When assessing these options, be sure to base it on using the right size/type of machine along with appropriate attachments. For example, when handling woodwaste-green waste, a properly equipped excavator or loader can drastically increase production efficiency when compared with a traditional machine. In the same analysis, you might weigh the cost of diverting the material against the potential savings in landfill airspace.

It may not sound nice, but from a purely economic standpoint, sometimes it's best to forget diversion and simply landfill some of those materials.

If, for whatever reason, you simply must divert woodwaste and greenwaste, consider a cooperative effort where several landfills share the cost of diversion.

Combine Programs With Other Facilities

Many diversion programs require substantial capital investment for buildings and machines to sort, process, store and transport recyclable materials. And in many cases, such as with a woodwaste-greenwaste operation, those expensive machines spend more time parked than working. It's simply the nature of the business and was probably justified by the argument that since we must divert, we must have the necessary equipment.

It does not, however, mean we should have the same machines, duplicated at every landfill in the region. Many farmers grow wheat, but very few of them have their own mill. Perhaps a cooperative effort between several adjacent landfills could minimize the overall cost for each one.

One example is to purchase a single grinder and then transport it from site to site, grinding woodwaste or greenwaste at each location three to four times per year.

If you've been putting off development of a woodwaste-greenwaste program, now might be a great time to consider a co-op arrangement. You could share costs and yet take full advantage multiple benefits: 1) keep the woodwaste or greenwaste out of the landfill, and 2) use the processed material as ADC. Any opportunity where a shared cost results in multiple benefits is worth a closer look. The word "change" has taken on a new meaning in the landfill industry. We're being forced to adjust our traditionally long-range models to provide a short-term look at cash flow.

Diversion programs and other services are being placed on the table, and every part of the operation is under review.

Yet in the midst of these challenging economic times, there is a bright spot: Landfill managers are focusing on core operational issues. As always, increasing efficiency and performance offers the best opportunity to reduce costs and get the job done.

Topics: [Landfill,Management,Operations](#)