

Achieve a Well-Oiled Machine With Modern Materials Management

BY ANDY HOLTSMANN



Construction projects are often compared to manufacturing assembly line operations—inasmuch that they are nothing alike. The typical construction project has so many moving pieces being assembled in unique ways and in varied locations, making no two projects exactly the same.

Yet, certain aspects of the construction process, such as aggregate and material hauling operations, can be run more like an assembly line. It means looking at these operations a bit like a manufacturer would—managing repeatable processes and defined workflows. From the bulldozers and backhoes in the pits to the crushing and processing

machines in the plants to the haulers and trucks rolling in and out of the scale houses, equipment keeps the materials cycle moving. If any one link in this chain breaks, however, that whole cycle—and the construction projects it services—can come screeching to a halt.

Thankfully modern technology solutions are aiding in keeping

these virtual assembly lines rolling by generating real-time data and producing critical business intelligence that allows material and equipment managers to stay on top of their machine maintenance and material costs, avoiding costly delays, equipment breakdowns, inefficient use of equipment, lost or damaged materials data and much more.

A Methodology to Hitting

The Equipment Management Sweet Spot

The way to keep a fleet working efficiently is to find the equipment management “sweet spot.” Mike Vorster, construction and engineering management professor emeritus at Virginia Tech, has been a long-time advocate of contractors taking a harder look at their equipment life cycles and measuring efficiency.

In his teachings, he has urged equipment managers not just to capture equipment usage and maintenance data, but also to have a working plan in place and know how to put that data into context so that it drives action. Following are three key takeaways to maximizing equipment efficiency that Vorster has noted over the years.

- **Capture and understand both ownership and operating cost data.** Many ownership costs, such as interest, financing and lease payments, are incurred every month regardless of whether a machine works or not. These are considered fixed costs, or ownership costs. Others, such as depreciation charges, overhead and indirect labor, vary a little from month to month but can, for all practical purposes, be considered as fixed. Variable or operating costs include fuel, ground engaging tools, field labor, repairs and routine maintenance. The majority of these costs are proportional to the number of hours each piece of equipment works. The

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more hours worked, the more revenue is ultimately generated through completed projects or partial payments. However, more hours worked also means more variable costs. There is a break-even point where revenue produced from jobs covers fleet expenses. If equipment costs are higher, then more work will be needed to reach that break-even or profit mark.

- **Apply all equipment costs to jobs for accurate, up-to-date job cost information.** Equipment managers (and in

many cases project managers) need to be actively involved to ensure that the jobs are properly billed for the equipment assets they use. To do this, managers need to stay on top of all of the data collected and ensure that it is recorded correctly to accurately reflect all the fleet revenue due.

- **Create performance benchmarks to guide equipment use and understand true equipment life cycles.** To gain control of equipment costs, managers

must know when equipment assets—whether old or new—have the potential to negatively impact the bottom line. Too many new pieces and contractors must account for extremely high fixed costs. Rely too much on older equipment that constantly needs repairs and extra maintenance to keep running, and it will lead to high variable costs.

The sweet spot is achieved when the bulk of contractors' fleets are operating at peak performance levels, yet are not burdened by high capital expenses. That means performing regular maintenance, keeping equipment in regular use, not pushing machines beyond their limits and constantly assessing the data produced.

Thankfully, the days of not knowing or accurately collecting costs per hour for a piece of equipment, classes of equipment, and entire fleets are (or should be) long gone. Many of today's construction ERP software platforms come with powerful, cloud-based equipment management tools to ensure data is easily collected and that detailed analyses can be extracted with ease. These solutions range from full-scale equipment management solutions to handy mobile apps that can capture fuel consumption, detailed meter readings, maintenance logs and more.

Maximizing Material Management

While heavy equipment is among the costliest expenditures contractors have, materials are also

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expensive, yet vital, components of the construction process. Materials collected from pits or quarries need to be processed for quick use in projects. Overproduction due to imperfect project data or forecasting can lead to wasted materials, while underestimated material amounts or errors in material collection can lead to project delays. Either of these cases can negatively impact the contractor's bottom line and overall profitability.

Most quarries and aggregate plants have strict processes and workflows in place that help them process materials in an efficient, assembly line-like fashion—from digging raw materials out of the ground, to processing them into usable materials like concrete or asphalt, to transporting materials to scale houses and loading them into trucks for delivery to jobsites. It is this latter part where material tracking and costs can sometimes go awry, and the biggest culprit is the traditional method of issuing paper material tickets in scale houses.

Often, a single truckload of materials can result in multiple tickets for varied quantity measurements. These tickets have to be collected, transported and maintained until they are checked against upon delivery to the jobsite. Contractors' accounting departments also need to cross-check these tickets to ensure accurate material usage and costs on projects are being recorded.


Handwriting on paper tickets can be hard to decipher, and the tickets themselves can get lost or



damaged, leading to errors and inaccurate material costs being recorded on projects.

In response, integrated materials management solutions now provide real-time data input, document imaging for tickets and enhanced reporting tools to ensure accuracy and timely billing. This keeps the materials “assembly line” moving efficiently and dramatically reduces human error.

When combined—through a single ERP platform, equipment

and materials management technologies can provide much more streamlined, accurate operations—improving projects' bottom lines and reducing excess capital expenditures for the construction organization. 

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