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Midwest Construction

GOING LEAN

Lean, the philosophy and practice of eliminating waste, was proven successful first by Toyota Motor Corp. Now, companies in all industries are seeking to adopt this strategy that helped the Japanese company succeed.

Today, the process is even influencing the construction industry, where the techniques are called Lean Project Delivery.

One Midwest frontrunner is the Boldt Co., an Appleton, Wis.-based firm that in July hired Todd Brink as director of continuous improvement. He's charged with boosting productivity by applying what he calls "Toyota techniques" on jobsites.

To start, Brink and his staff are focusing on eight current construction projects.

"I go out and spend time with those doing the work," he says. "I watch them, talk with them and get an understanding of where the waste is showing up."

Brink says that, often, the techniques can boil down to better sequencing. "It can be something as simple as not making 20 trips back to the trailer to get tools," he adds. "It seems like common sense, but it's not always common practice."

Another process adjustment can be a change in the layout of materials. These small improvements to the work environment, done continuously, yield large results, Brink says.

Brink, who also draws from his manufacturing background, already credits lean techniques with shaving a few weeks off the schedule of the St. Elizabeth's Hospital South Addition in Appleton.

"Once the project manager gains this new problem-solving knowledge, the hope is that he takes it with him to the next job as well," Brink adds. "We focus on organic learning throughout the organization rather than forced from the top down through group seminars. We'd rather go out and have one-on-one conversations with the superintendent on what we can do to improve. We're engaging them to solve problems themselves."

Measuring Defects The small adjustments not only save time and money; they also make the job easier, Brink says. "Before, we'd always start doing work just to keep guys busy, when sometimes we were doing work that didn't need to be started," he says. "We need to start the correct work at the correct time or start no work until its time."

Another fault of the construction industry is that it usually measures progress by overall project results rather than the process.

"Lean techniques are based on PDCA (plan, do, check and act)," Brink says. "You look at a process, put a plan in place to eliminate waste, do it, check to see if it worked and then adjust or tinker with it to improve the process."

James Adrian, professor in the department of civil engineering and construction at Bradley University in Peoria and a consultant and frequent speaker on lean construction, sees a lot of room for improvement in increasing the amount of productive time workers are putting in permanent material.

"On average, about 50% of time is spent putting in permanent material and the other 50% we're not," Adrian says. "The construction process is flawed in many ways."

Typical "defects" that curtail productivity during the workday include the following: waiting on materials, late starts and early quits, unnecessary material handling, craftspeople waiting for an assignment from a foreman or supervisor, redoing work, time spent finding things, theft, clean-up and accidents.

"In our industry, we prepare a budget that has nonproductive time built into it," Adrian says. "We put too much focus on results rather than the process. We don't measure the defects. If we don't measure it, we can't improve it."

Minutes Matter One of Adrian's mantras is "minutes matter." For instance, on a typical project, onsite labor is about 40% of the total construction cost, which would be \$400,000 for a \$1 million project. Profits are often calculated at around 2% or \$20,000 on the same project. A small increase in labor and/or equipment productivity can have a huge impact on profitability. On a \$1 million project, a 5% increase in labor productivity can decrease labor cost by \$20,000, which would be equal to the initially planned profits.

Thus, given the potential increase in profits that can result from just a small increase in labor and equipment productivity, it

follows that "minutes matter."

To track those minutes, Adrian advises supervisors to rely on tools.

One is a wristwatch. With this tool, supervisors can measure defects such as wasted minutes and the cause of the wasted minutes. The wristwatch can also be used to measure something such as how long it takes to put up concrete forms from one hour to the next, or the number of picks a crane makes each 30 minutes and the reason why one time period performed better than the next.

With this information, ideas can be generated to improve project time, cost, quality and safety.

The second tool is a small notebook and calculator. With this tool, the supervisor can:

- Prepare a reminder list of things to do.
- Plan today the labor, material, tools and equipment needed for tomorrow's work.
- Prioritize time commitments by focusing on tomorrow's vital activities versus the useful activities to be performed.
- Document nonproductive time and the cause.
- Document productivity variation from one time period to the next to aid in focusing on causation and continuous improvement.
- Documenting best and worst productivity practices observed.
- Do calculations to determine costs of alternative work methods.

"Last year, nationwide we had a productivity jump of 6%, which means we're making 6% more widgets per person per hour," Adrian says. "But, when you break it down by industry, construction is one of the lowest in productivity gains. Construction has its unique challenges, but it's more alarming that we're not getting better at the same rate."

One of the other culprits is the lack of education, Adrian says. "We spend less money per dollar of revenue educating our workers," he adds.

He suggests requiring managers in the construction industry to put in 40 hours of education per year, such as reading a book on management or evaluating the processes of successful construction companies.

Adrian estimates that in the construction industry, less than 5% of firms have a formal ongoing education program in place. For larger firms, that percentage could be from 10% to 15%.

"There are more and more firms realizing this is a marathon not a 100-yard dash," Adrian says. "Firms have to invest in employees and formalize education. We measure success or failure job by job, which leads to short-term decisions rather than long-term changes."

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