Photo: PCI.

# Throughput is not the measure of efficiency

## Study what is real efficiency and streamline every step to make ABC our new bridge construction norm

William Nickas, *Editor-in-Chief*

Throughput time is a measure used at every jobsite and manufacturing plant to track the time needed for an element to pass through the assembly process. It can vary depending on how many yards of concrete had to be placed or how much reinforcement needed to be tied. Other indicators of productivity used by a plant may be the amount of payroll attributed to placing a cubic yard of concrete, or equipment utilization rates for a given measurement period.

Indicators and measures of quality control influence many aspects of our inspection processes, which also impact throughput time. Time for the owner's inspector to check for contract document conformance or create test cylinders relate to the efficiency of the job. Suppliers, contractors, and owners all have to coordinate to make the total system work effectively. We know what influences efficiency, but how do we measure real efficiency on a project?

The old adage "we are all uniquely doing the same thing" has been stuck in my head for a longtime. I shared that with my neighbor Frank Boerger, who is a manufacturing database consultant. The conversation drifted into how corporations routinely measure the wrong thing.

Adding contractors to the focus article rotation of this magazine has allowed our readers to look at what some of the traits are that separate the best builders from some very good ones. It is all about resource allocation and reducing nonvalue-added processes. Let's start really studying efficiency.

While everyone has company secrets on means and methods that lead to competitive advantages, let's all agree on a few long-term improvement goals that new technologies may help us work toward the following goals:

- Zero queue time on our job sites; no crane delays, no idle crews, no wrong or missing materials, no misaligned connections, no prior stage construction out of theoretical position/tolerances.
- In our bridge supplier plants, zero queue time between work stations within the manufacturing facility.
- The duration of holding inventory to be reduced to avoid excess capitalization and yard and jobsite storage costs.
- A business environment at all stages promoting the goal for zero defects thus minimizing rework and nonvalue-added project costs.
- Product and system inspections that are embedded in the process to reduce repeat issues. Quality assurance testing and compliance testing that also identifies root cause issues.

### *Let's first look at four critical time intervals:*

**Process Time.** The period needed to create something from raw ingredients. This includes several activities for bridge construction such as the time to assemble the processed materials into the bridges manufactured components or the time for the contractor to assemble components and systems into the final bridge.

**Inspection Time.** This is the time used to inspect the raw materials, including the work-in-progress and the finished bridge.

**Move Time.** The time to get the raw materials to the processing plant followed by the period of time when the product is moved from the plant to the manufacturer or site. This also includes the effort between manufacturing stations including the post-processing and rework area.

**Queue Time.** This is the time spent waiting for one of the above three activities.

Accelerated bridge construction (ABC) requires a new set of efficiency measures. Designers and contractors are communicating better to streamline ABC installations with minimal end-user impacts as an external measure of efficiencies. It is time to rework our internal bridge industry tenants to lower ABC costs, while increasing quality, and start measuring real internal efficiencies. Perhaps our contractors and concrete bridge suppliers and manufacturers should take a fresh look at these past successes and details.

Now, here is your assignment, read a short synopsis of the book called "The Goal" by E. M. Goldratt and J. Cox. You can find a summary by Chris Hourigan of the University of South Florida on synchronized manufacturing. It speaks to this concept of real measures of efficiencies. See: www.maaw.info/ArticleSummaries/ArtSumTheGoal.htm.



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