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# Insights

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# AGILE *Construction*<sup>TM</sup>

(Impact of Project Resource Management on Profits)

*By Dr. Perry Daneshgari*

**A**gile Construction<sup>TM</sup> is profitable construction. A construction jobsite is a very fluid work environment, in a state of constant change, both planned and unplanned. Customer needs and requirements change, often frequently. Resources and experience levels change with every personnel reassignment. People learn from ongoing experience. Schedules change.

Agile Construction<sup>TM</sup> adapts to change, allowing the contractor to react to jobsite changes rapidly in order to complete each project both profitably and efficiently. Agility (responsiveness) of the contractor at the jobsite will improve their profits.

Recently, Lean Construction has been celebrated as the new fad among construction management gurus. In reality, it is not the leanness of the construction that matters but rather its agility and responsiveness to change.

Agile Construction™ exemplifies the following characteristics:

- Visibility
- Responsiveness
- Productivity
- Profitability

And uses tools and processes such as:

- Real Time Productivity Measurements – Job Productivity Assurance and Control (JPAC®)
- Short Interval Scheduling (SIS)
- Vendor Managed Inventory
- Project Planning
- Project Monitoring with Field Feedback
- Procurement Planning

One of the most misunderstood concepts in the construction industry is the difference between profitability and cash flow. Due to the nature of accounting principles used to manage company profitability, most measurements of job progress actually are measurements of production, not productivity. This distinction has a direct impact on the cash flow of both the project and the company.

Recognition of the distinction between production and productivity will help contractors become much more agile in their responses to a jobsite's changing needs.

In Agile Construction™, a tracking system that is driven by jobsite dynamics and compatible with building information modeling (BIM) systems supports progress billing based on actual construction-put-in-place (CPIP). **Figure 1** depicts application of BIM for avoiding pipe and ductwork interference, which is used to report observed

to effectively apply BIM as part of its daily project operations. Responsiveness to the changing jobsite environment is the key to profitability for any contractor. Profitability results from operating as a low-cost-provider. But to be a low-cost-provider, contractors need to know the situation, its cost drivers, and its productivity. To manage profits, the

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percent completion.

Until recently, CPIP measurement was not easily achievable but the new methodology called JPAC®, based on the application of statistical process control, is now available and is the basis for a draft standard practice on Job Productivity Measurement (JPM) for American Society of Testing & Materials (ASTM). Agile Construction recognizes the bottom-line impact of three sources of cost drivers: Money, Materials, and Manpower.

Visible means of measuring job progress, labor productivity, profitability, cash flow, and material handling enable an Agile Construction™ company

costs need to be visible. Contractors that apply daily or weekly, agile job tracking will be able to improve their cash flow and profitability.

Managing projects based just on accounting costs results in unpredictable outcomes. Contractors often have to wait until the end of the job to find out whether expected profits will be earned. As a result, using accounting data without really knowing project productivity does little to help contractors improve their cash flow and profitability. Billing based only on costs, and cost estimates, leaves productivity on the table. Correctly measuring the job allows the contractor to switch from using only the rearview mirror of cost accounting to using the rearview mirror in conjunction with the full front view through the windshield of JPAC®.

The bottom line is that the only useful measurement of productivity is the one that will allow instantaneous correction in the field, hence the development of JPM for ASTM as a standard practice.

Agility in construction requires a thorough understanding of resource management and usage. Many different factors with various levels of uncertainty constantly influence the ambiguity on the jobsite. Factors such as weather, change orders, labor quality, physical space, material flow, trade interferences, absenteeism, and many others create a very uncertain environment, which requires quick response capability to change.

### Time to Detect – Time to React

True agility requires careful management of the window of opportunity: the time between one event and the next. Every “fire” or urgency, and jobsites do have many, requires a certain amount of time to identify (time to detect), formulate and



Figure 1: Application of BIM to avoid interferences

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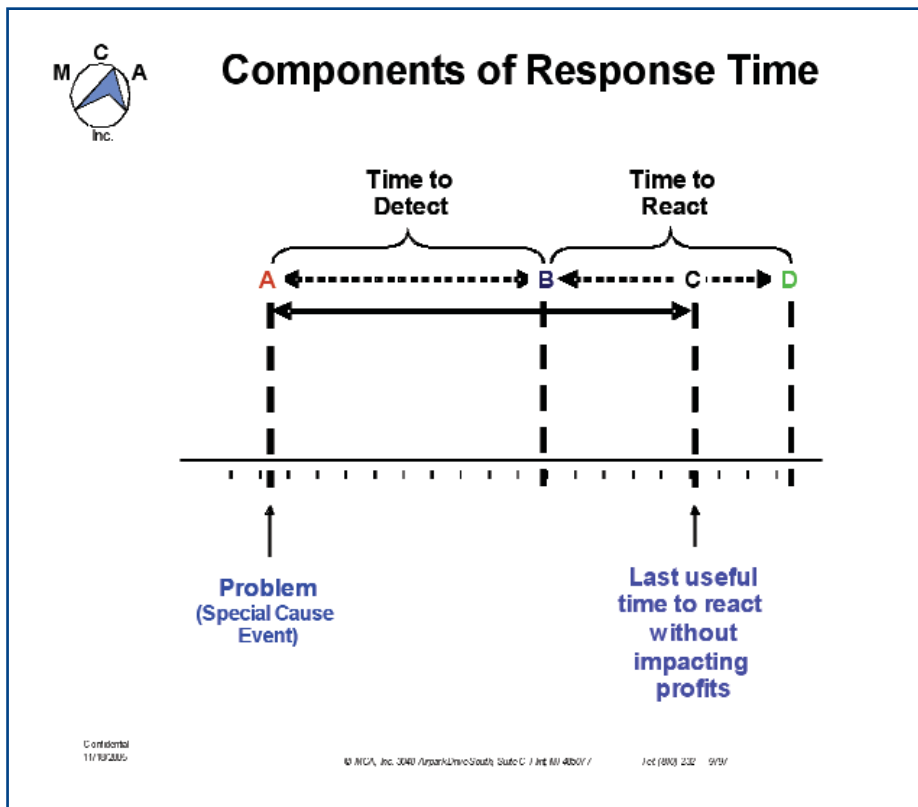


Figure 2: Time to Detect v. Time to React

implement a response. The time required to formulate the response can be referred to as the “time to react.” “Time to detect” and “time to react” are inversely related. The longer it takes to identify a problem, the less time is available to

For example, suppose the excavators are delayed one week due to broken equipment. Every sub waiting on the excavation is also delayed, as is every sub with work contingent on the first group. In some cases this will mean that manpower

**The longer it takes to identify a problem, the less time is available to formulate an appropriate response and the more likely the response will be a costly “emergency.”**

formulate an appropriate response and the more likely the response will be a costly “emergency.”

The earlier a situation is recognized, the more time is available to react to it. **Figure 2** shows this relationship. For example, a General Contractor (GC) needs to coordinate schedules with multiple trades, each of which is coordinating its own materials, manpower, and financial situation. If one sub is delayed for any reason, it will affect several others through a ripple effect.

requests and material deliveries will no longer be timed appropriately, leading to wasted time for all involved. An equipment failure, for example, may not be known in advance, however, providing the information that replacement equipment will be available in one week will significantly improve the other subs’ ability to adjust accordingly and plan alternate work.

**Recognition of the distinction between production and productivity will allow the contractor to become much more Agile in their responses to the job site’s ever changing needs.**

### Conclusion:

Responsiveness to the ever changing environment of the construction job site is the key to profitability of any contractor. Profitability results from operating as a Low-Cost-Provider. It is impossible to operate as a low cost provider without understanding your cost drivers. Recognition of the distinction between production and productivity will allow the contractor to become much more Agile in their responses to the job site’s ever changing needs.

To be a Low-Cost-Provider, contractors need to know the situation, its cost drivers and its productivity. To manage the profits the costs need to be visible. Correct allocation of the contractor’s fixed costs to the customer, project, subcontractor, and resources will enable the contractor to be more agile and therefore more profitable.

### INSIGHTS

*Dr. Perry Daneshgari is the President of MCA Inc. and has been actively helping various industries improve productivity and profitability. He has many accomplishments including publishing three books, conducting 12 research projects for construction, publishing more than 45 papers, and much more.*

*Dr. Daneshgari is the keynote speaker at the 52nd Annual IEC National Convention & Electric Expo in St. Louis, Missouri and will also be presenting a workshop on “Agile Construction™.” For a complete listing of all educational sessions, please visit [www.ieci.org](http://www.ieci.org).*