



THE PROFITABILITY OF

AGILE

CONSTRUCTION



BY PARVIZ DANESHGARI & MICHELLE T. WILSON

A construction jobsite is a very fluid work environment, in a state of constant change, both planned and unplanned.

Customer needs and requirements alter, often frequently. Resources and experience levels change with every personnel reassignment. Schedules change, and people learn from ongoing experience.

Using *Agile Construction*, you can adapt to change, react to jobsite changes rapidly, complete projects efficiently, and capture more profit.

Increased flexibility. Higher margins. Appropriate overhead. More satisfied customers. These are the promises of *Agile Construction*, a type of project planning and schedule management that facilitates rapid response to changes on the jobsite.

Responsiveness to each construction jobsite is the key to the profitability of any contractor. As such, agility in construction requires a thorough understanding of resource management and usage. It also makes a distinction between production and productivity, and allows contractors to respond more nimbly to the jobsite's ever-changing needs.

In this article, we'll discuss the ambiguity of construction, relate two profitability models examined in previous articles to *Agile Construction*, and provide a case study that illustrates these principles.

Three Distinct Ambiguities

Every undertaking has elements that are: **1)** Known, **2)** Unknown, and **3)** Uncertain.

Uncertainties and unknown facts are ambiguities that, if left unchecked, lead to increased risks for contractors. Converting unknown elements into known elements reduces risk, and its associated costs, by allowing time to create and implement a reaction plan.

Many different factors with various levels of uncertainty constantly influence ambiguity on the jobsite. Such factors as weather, change orders, labor quality, physical space, material flow, trade interferences, and absenteeism create uncertain environments and require quick responses.

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Increasing the visibility of all aspects of the project is one method of converting uncertainties into known or predictable results, allowing proactive steps instead of reactive responses.

Situational awareness – or a thorough understanding of the circumstances, the uncertainties, and unknowns – allows contractors to respond as needed to maintain profitability. To manage ambiguity, the PM and CFM must know where, when, and how their resources are utilized. By identifying bottlenecks in resource usage, the PM and CFM can surgically improve their responsiveness to jobsite changes.

Fixed & Variable Costs

Profitability results from operating as a low-cost provider, and it is very difficult to do so without understanding cost drivers. To be a low-cost provider, contractors need to know the jobsite situation, its cost drivers, and its productivity.

To manage profits, costs need to be visible. Through correct allocation of fixed costs to the customer, project, subcontractor, and resources, contractors can become more agile and more profitable.

The first step toward understanding the profit opportunities in any project is closely tied to the basic financial model of

the activity. As discussed in “Customer Positioning Model for Contractors” in the May/June 2005 issue, a contractor’s primary cost drivers vary by the type of operation.

Usually, GCs, construction service companies, and distributors can be classified as *fixed-cost operators*. The majority of their cost structures are fixed costs that typically remain more or less constant throughout the year. These costs include SG&A expenses, salaries, insurance, property taxes, the carrying costs of inventory, and other fixed expenses.

Most subcontractors are *variable-cost operators*. Variable costs increase as sales increase because of the overhead required. This point becomes much more pronounced in the case of unionized subcontractors using labor from union halls.

Higher costs yield lower profits, especially on a hard-bid or negotiated fixed-price contract. Price-based costing allows the market to set the price on the contract. Only by managing and minimizing unnecessary costs is the contractor able to maintain or build the profit margin, because profits are only recognized when the revenues exceed all costs, both fixed and variable.

Two models from our previous articles, *Job Productivity Assurance and Control (JPAC)* and *Customer Positioning and Control (CPAC)*, have a direct bearing on the identification of cost drivers, and contribute significantly to a contractor’s agility.

Job Productivity Assurance & Control

JPAC is a practical approach for variable cost operators to better contain their *primary* variable business risk: labor uncertainty.

JPAC measures productivity as a supplement to the usual measures of production on a construction project. Under this model, CFMs measure a job’s observed percent complete in conjunction with the reported hours to gauge how productively the work was performed.



Here's how JPAC works: PMs monitor the progress of each task by breaking variable costs into cost codes and defining visible, measurable tasks. When a task requires more (or less) time than originally planned for completion, the variance needs an explanation.

To qualify variances, foremen predict, schedule, and track deviations in terms of both labor hours and root causes. As an ongoing measure, JPAC tracks labor productivity by combining the field perspective (the observed percent complete) with the accounting perspective (the hours charged).

JPAC predicts the job's productivity at the end of the job, based on current productivity rates. With JPAC, subcontractors can evaluate the variations in productivity, identify root causes, and determine if a root cause results from a "common cause" or a "special cause" that requires immediate attention. (For details on common and special causes, see "The Impact of Job Planning on Profits" in the November/December 2005 issue.)

Because fixed-cost contractors use resources across various assignments and projects, the application of JPAC is not practical. Other existing methods of cost tracking, such as Activity Based Costing (ABC) and Weighted Average Cost of Capital (WACC), are even more cumbersome and inaccurate for calculating the correct costs and pricing strategies.

However, the CPAC model is a practical, reliable approach. It examines the quality of production by identifying the demands placed on a contractor's fixed-cost resources relative to the value produced.

Customer Positioning & Control

Using CPAC, contractors can convert fixed-cost operational resources into quasi-variables allocated to particular customers, and measure the impact of the performance of customers, projects, and subcontractors, as well as company divisions and resources.

CPAC is invaluable as a model for increasing situational awareness and improving response time. It allows contractors to clearly identify the cost drivers of any particular customer or project. Under CPAC, managers determine a break-even point, establish a goal, and plot the performance of a subcontractor, job, or customer according to situation-specific variables.

With a four quadrant positioning method, managers evaluate such fixed-cost drivers as overhead and salaries to position

customers, projects, and subcontractors according to their resource demands vs. recognized revenue or profits.

A customer or project that falls into the first quadrant generates high profits or revenues with respect to resource investment and allocated fixed-costs. Customers or projects that fall into the second and third quadrants generate lower profits or revenues per resource investment due to higher time or cost requirements.

If a customer or project is positioned in the fourth quadrant, both time and cost are low – and neither generates sufficient profits or revenues for the investment. (For more information on the four quadrant positioning method, see "Customer Positioning Model for Contractors" in the May/June 2005 issue.)

The Bottom Line: CPAC measures how efficiently resources are applied. To better illustrate this point, let's examine project, subcontractor, resource, and customer positioning.

PROJECT POSITIONING

Just like customers, project elements can be positioned in four quadrants and evaluated based on aggregate company resources or on categories of work, type of bid, PM, or company division.

In this case, the project is the customer, placing demands on the resources of the contractor. Failing projects show losses or minimal profits, despite high revenues. These projects lie in the fourth quadrant, with many of the contributing activities also appearing in the fourth quadrant.

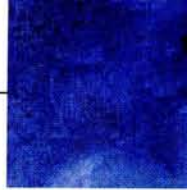
Once managers identify the significant drivers for the poor profit ratio, they can develop a plan to address each driver. By repositioning projects on a regular basis, they can monitor trends to determine whether the implemented plan has had the intended effect.

SUBCONTRACTOR POSITIONING

With this approach, contractors can also position subcontractors – either within a job, job by job, or for the entire company. This approach helps identify preferred subcontractors and enables contractors to create or improve the statement of work for the subcontractor's performance requirement.

By positioning each of the subcontractors working on a particular project, a contractor can easily identify those who provide the best return, as well as those who add significant cost

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to the project. When there is a resource drain, the contractor can help the subcontractor address those issues causing the resource drain or alter contract pricing for that subcontractor in the future.

RESOURCE POSITIONING

Resource positioning compares a company's internal departments, divisions, and branches by evaluating performance and ROI based on resource usage.

- 4) Breakdown expended resources by their activities.
- 5) Identify less efficient activities.
- 6) Identify the waste in low-efficiency activities.
- 7) Eliminate the waste to improve time-to-detect and time-to-react.
- 8) Use the increased capability to improve productivity.

Increasing the **VISIBILITY** of all aspects of the **PROJECT** is **ONE METHOD** of **CONVERTING UNCERTAINTIES** into **KNOWN** or **PREDICTABLE** results . . .

Contractors can improve resource usage by increasing productivity in several ways:

- Improve the first-time pass.
- Remove unnecessary activities and reduce waste.
- Improve the customer point of entry into the process (that is, the point where the customer's needs are first known).

CUSTOMER POSITIONING

A customer who places high demands on a contractor inevitably costs more to service. The most profitable customer is the happy customer who pays his bills in a timely manner. The happiest customer is the one whose work is completed quickly, correctly, and efficiently.

To achieve quality in construction and keep customers happy, a contractor must effectively use all resources on a project, without sacrificing one at the expense of others.

Getting Limber, Lean & Agile with CPAC

Contractors can distinguish high-margin projects, divisions, subcontractors, and customers from less profitable ones with CPAC's eight-step process:

- 1) Establish the frame of reference.
- 2) Position the user of resources.
- 3) Identify the highest user.

Let's look at each step in the process.

ESTABLISH THE FRAME OF REFERENCE

Contractors can establish a positioning baseline against a number of different values, including profit and revenue. However, before positioning anything, contractors must determine the frame of reference for comparison. Possibilities include:

- The company as a whole.
- A division of the company.
- Particular groupings of customers or projects based on similar types of work, location, or job size.

POSITION THE USER OF RESOURCES

To position projects, PMs, subcontractors, customers, or company divisions, it's important to set a breakeven point (or minimum standard of performance). For example, a contractor measuring the net profit of his projects could establish a breakeven point of \$1,000.

Any job that did not create \$1,000 in net profit, compared to cost or resources used, would fall below the breakeven point. Then, the contractor would place each project in the appropriate place on the chart.

Contractors and CFMs can also set goals beyond the breakeven point. After establishing baseline expectations, they can measure a multitude of variables in any desired combination.

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IDENTIFY THE HIGHEST USER

Once the chart is complete, contractors can identify the customers, projects, subcontractors, or departments that draw most significantly on both capital and human resources.

They can also see the elements that require less money or time than the rest of the group. In addition, they can discover those with an acceptable return on either time or cost. The case study on page 15 shows how CFMs can identify profit-generating elements.

BREAKDOWN EXPENDED RESOURCES

CPAC positioning allows each point representing a draw on resources to be broken down further to evaluate the component costs. For example, a customer (or group of customers) may be broken down into individual projects. Individual projects can be further divided according to project resources, including estimation, project management, field supervision, and administrative. A job or the project may also be positioned according to its subcontractors.

IDENTIFY LESS EFFICIENT ACTIVITIES

Each grouping or activity can be evaluated against the resource use. For example, the activity “billing” often involves PMs as well as administrative staff. If the PM tracks down and verifies subcontractor invoices, material purchases, deliveries, addresses, and tax information, the cost associated with billing will be much higher than if an administrative support person addresses those issues.

In another example, an experienced PM may be able to hold coordination meetings in half an hour per week. A less

experienced PM may need two to three hours to receive and relay the same information to his subcontractors. The question at hand is how the difference in cost allows for differences in time.

IDENTIFY WASTE

Each project or customer can be analyzed to determine those that create the most waste. For example, contractors could further categorize project management according to the resources allocated to:

- Labor Planning
- Material Planning
- Jobsite Coordination
- Office Coordination
- Administrative Activities
- Safety

IMPROVE TIME-TO-DETECT & TIME-TO-REACT

True agility requires careful management of the window of opportunity: the time between one event and the next. For every urgency – and jobsites have many – staff requires a certain amount of time to detect the situation. Then, they require time to react, or time to formulate and implement a response to the situation.

Time-to-detect and time-to-react are inversely related. The longer it takes to identify a problem, the less time is available to formulate an appropriate response – and the higher the probability that the response will be costly.

The earlier a situation is recognized, the more time is available to react to it. For example, a GC needs to coordinate schedules with multiple trades, each of which is coordinating its own materials, manpower, and financial situation. If one subcontractor is delayed for any reason, it will affect several others through a ripple effect.

Suppose excavators are delayed one week due to broken equipment. Every subcontractor waiting on the excavation is also delayed, as is every subcontractor with work contingent on the first group. In some cases, manpower requests and material deliveries will no longer be timed appropriately, leading to wasted time.

Though an equipment failure may not be known in advance, providing the information that replacement equipment will be available in one week will significantly

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Where's the Profit? A Case Study

Suppose the CFO of XYZ Construction wants to compare the revenue of the company's top 10 projects. After establishing a baseline for performance, the CFO plots each project's net revenue over cost, as well as its net profit per hour.

First, the CFO learns that Project F brings in the highest revenue per effort and cost (Exhibit 1). Comparing profit vs. cost and hour, the CFO observes that Project F also brings in a high net profit for the expended effort and cost (Exhibit 2).

The CFO then investigates Project F's performance by subcontractor. As Exhibit 3 shows, the mechanical contractor provides XYZ with the most net profit per hour and cost, relative to other subcontractors on the project.

From here, the CFO examines the effort XYZ spends on mechanical contractors across all top 10 projects (Exhibit 4). In this case, the mechanical contractor working on Project F leads all

mechanical contractors in net profit per cost and per hour. This data confirms that the mechanical contractor on Project F is very productive, compared to other subcontractors at the same jobsite and other mechanical contractors overall.

Now, the CFO asks specific questions to learn from XYZ's good fortune. The CFO wonders, "Why is this mechanical contractor bringing in a higher dollar volume for resources used?"

After some inquiries, he learns that this particular contractor consistently turns in accurate, up-to-date schedules and requires the smallest amount of periodic cleanup.

With this information, the management of XYZ has good reason (and substantial motivation) to require all subcontractors to submit correct schedules in a timely fashion and to encourage better cleanup on its jobsites.

Exhibit 1 - Revenue from Top 10 Projects Compared to Company Average

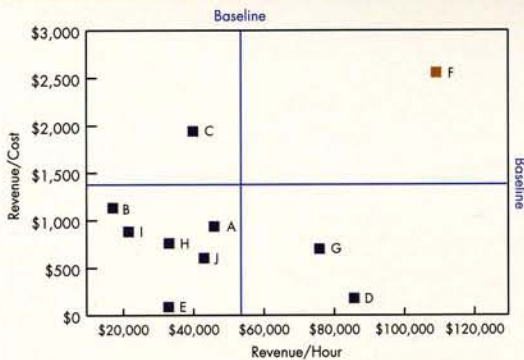


Exhibit 2 - Net Profit from Top 10 Projects Compared to Company Average

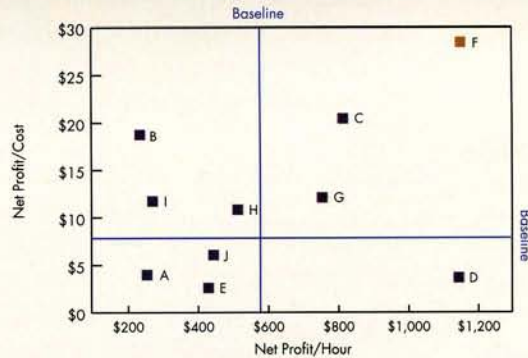


Exhibit 3 - Project F Resources Allocated to Subcontractors

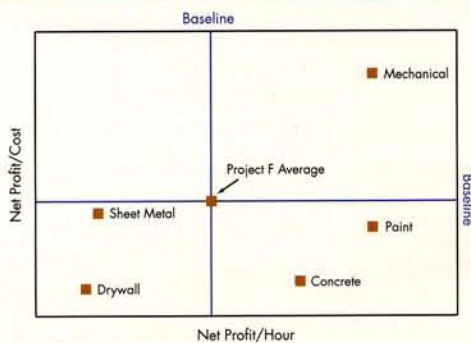
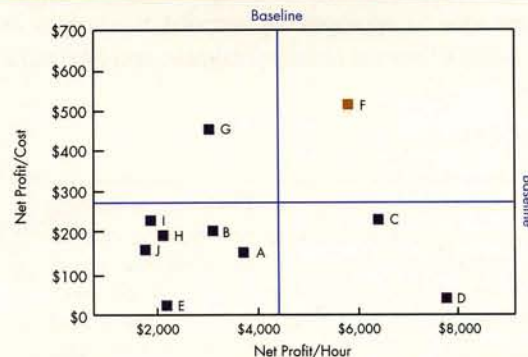
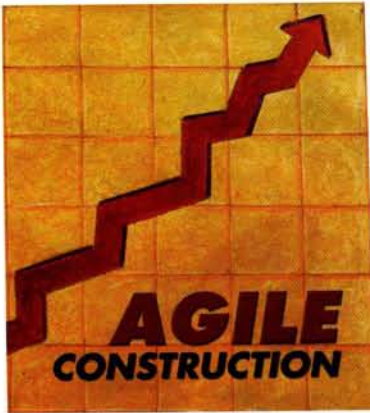


Exhibit 4 - Net Profit of Mechanical Contractors by Project





improve the other subcontractors' ability to adjust accordingly and plan alternate work.

IMPROVE PRODUCTIVITY

Each resource has a different cost associated with both the type of work being performed and who is fulfilling that role.

As waste is removed, the contractor will recognize a two-fold improvement: productivity will increase and capability will expand, freeing the contractor's resources to manage additional projects and operate more proactively.

By improving capability, the throughput increases, resulting in a better pace of work, reduced cost, and increased profits. For example, a contractor reduces the time needed for installation by an hour, without increasing the resources allocated to the work. Faster installation allows the contractor to pursue new work sooner, increasing revenue. Additional revenue without the cost of extra resources increases profits.

Conclusion

Agile Construction is at its best when a contractor is able to bring together diverse elements and create visibility, flexibility, and responsiveness. CPAC and JPAC provide a practical and reliable approach for GCs and subcontractors to examine production quality relative to their fixed and variable costs, and to measure the value produced.

With *Agile Construction*, contractors can clearly identify cost drivers – and opportunities for their improvement. When contractors are able to appropriately respond to changes and urgent situations, they can manage, maintain, and even reduce costs. **BP**

PARVIZ DANESHGARI, President of MCA Inc. in Flint, MI, consults with clients in the construction, banking, automotive, medical, healthcare, and insurance industries regarding process implementation and product development, waste reduction and improved labor productivity, project management, estimating, accounting, and customer care.

He is an established author and researcher for such organizations as the National Electrical Contractors Association (NECA) and The Electrical Distributor (TED).

Perry has spoken at NECA Conventions and the International Project Management Convention in Toronto, taught classes for the Management Educational Institute (MEI), and was interviewed by Alexander Haig on *World Business Review*.

Currently a professor at the University of Michigan-Dearborn, he has taught throughout the U.S. and Germany. His education includes a BS in Civil Engineering and BS in Mechanical Engineering from Northwestern University, Evanston, IL; an MS and PhD in Mechanical Engineering from the University of Karlsruhe, Germany; and an MBA from Wayne State University, Detroit, MI.

Perry is a member of CFMA's Saginaw Valley Chapter. Previously, he served on several national CFMA committees including Education, Construction Industry Liaison, Accounting & Reporting, and Certification Oversight.

Phone: 810-232-9797
E-Mail: perry@mca.net
Web Site: www.mca.net

MICHELLE T. WILSON is an Associate Implementer at MCA Inc. in Flint, MI. As such, she translates and implements system design principles, and streamlines processes to increase client productivity.

Michelle teaches mathematics and statistics at Franklin University in Columbus, OH. A frequent speaker, she has presented at NECA Conventions and MEI seminars, and has been published by the University of Michigan. She was also the owner and COO/CFO of Metropolis Motorcycle Works.

Michelle received her BS in Mathematics from the University of Michigan, Ann Arbor and her MS in Mathematics, from Northwestern University, Evanston, IL.

Phone: 810-232-9797
E-Mail: mwilson@mca.net
Web Site: www.mca.net

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