

Almost Virtual

BY MATT STEVENS

We are on the verge of the Virtual Construction Age. In our lifetime, most of us will experience it—a deep interconnection between construction and high-tech. Virtual construction marries one of the oldest businesses with one of the newest business trends. This marriage has the potential to minimize some long-lived construction problems. To be clear, computers won't build anything (people will), but they can make the process of building more efficient and safer with higher quality results.

If you grew up with computers, you are not surprised by this. For many years, you suspected computers and other technology were a "solution looking for a problem." Why shouldn't you see and believe this? Computers work at the speed of light. They can collect, analyze, and transfer billions of pieces of information, and their cost continues to decrease.

If you are older, you sensed the possibility that technology could give construction a real boost. However, you remember how poorly managed most technology companies were in the past two decades. This is fair. Many broke the most important rules of business and went away. You haven't forgotten about "ghostware," the term for promised new versions of software. The lack of software upgrades several times a year disappointed many contractors.

You may also remember technology companies' poor financial management practices. Venture capital was to be spent at enormous rates. Why? Many of us still don't know. Confidence in tech companies in and out of the construction industry has decreased, not increased. Many contractors I talk to say a wait-and-see attitude is appropriate.

For example, project-specific Web sites (PSWs) were well established by the late '90s. Construction projects that used them benefited greatly. I would have guessed them to be standard on any job by 2008. I'm amazed that PSWs still aren't universally embraced by owners, designers, and funders. Even these professionals share some soberness with construction firms about technology.

It's interesting to note that a large portion of our country's high-tech systems and applications emanate from NASA and the U.S. military. They sponsor and invent most American technology. Other countries applaud us for this. Some countries quietly try to copy it. In any event, American (and other) for-profit companies develop it into commercially usable forms.

Construction companies see the logic of virtual construction and some are practicing parts of it. Everyone understands that the marriage of construction and technology is powerful. Technology integration is now a must for most construction companies, but it is a question of degree. Some technology is a "toy." Some is necessary. Where is the line and at what cost? Construction's profit margins don't allow for grand experiments.

The New Business Model

Changes to the construction business have come in a steady stream, increasing the risk to contractors in the process. Today, in the opinion of many, risk stands at an all-time high. The construction business model has evolved into:

Work Acquisition: Where the business of construction starts.

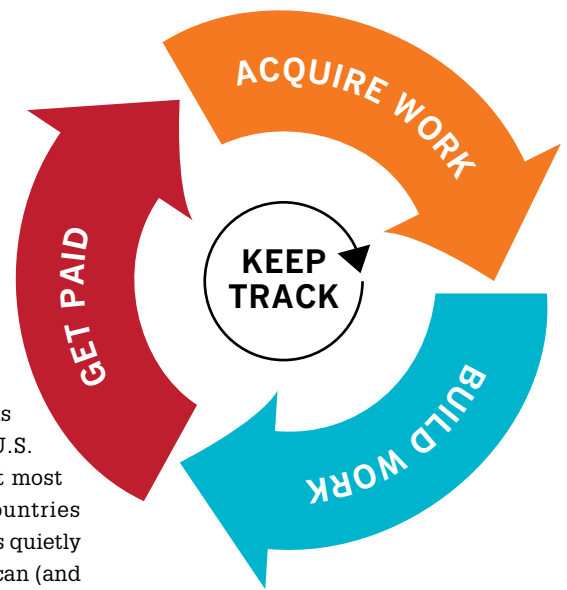
Building Work: Where most people fall in love with construction.

Getting Paid: The largest business risk/focus of all contractors on contracts, change orders, and delays by others.

Keep Track: If you don't keep track of everything, what will happen? Those activities (work acquisition, building work, getting paid) not closely tracked will get away from you. They may become unrecoverable regardless of your fire fighting skills. With risk at an all-time high, it is rational to track more, not less.

Software

As we look at using computer programming to proactively estimate, plan, and build construction projects, it is clear that the platform to facilitate such a huge endeavor



THE NEW CONSTRUCTION BUSINESS MODEL

will be a well-tenured and established firm. I'm software neutral. I don't have a vote and don't want to vote for any one company over another. However, whoever will assume this leadership position must have substantial financial resources and see the significant value of virtual construction.

Virtual construction, at its most basic level, is the collection, analysis, and transfer of numeric, visual, and spatial information in real time.

Typical Collection:

- Material Tracking—on-site and/or installed
- Labor Tracking—by cost code and person
- Equipment Tracking—by cycle time, fuel consumption, and hours used

Typical Analysis:

- Daily production against budget
- Result against schedule
- Function against best practices

Typical Information Transfers:

- Virtually detailed building plans and specifications for pricing and constructability comment
- Extensively detailed plans and specifications for planning and scheduling
- Real-time construction data from field operations to supervisors and executives
- "What-if" scenarios as a way to propose solutions to schedule problems and constructability issues

In these areas, software will perform the calculations of time and cost as well as quality and safety. The supervisors, managers, and executives will then use that result to investigate, plan, and troubleshoot. The computer will assume the role of clerk and do the collection, calculation, and dissemination of data (and faster than any clerk).

Real-Time Tracking

In virtual construction, as we do, we track. Having a current idea of where we are in the process allows for timely completion of tasks. As we stall in certain areas, senior leaders can step in and inject their years of wisdom. When we know the current status of processes/behaviors, cycle times, production, costs, and safety, we are able to affect them quickly before they become unrecoverable. Senior managers continue to assert that we all must “manage by exception” in our overwhelming business. It is a constant theme among the most experienced.

Compelling Business Reasons

There has to be a compelling reason for any major new direction in a business, construction, or otherwise. I have three. All this work and investment can be justified these ways:

- Hardwiring your business processes standardizes and assures timely monitoring of them. As a result, compliance to those predictable processes will increase, meaning greater discipline. My observation is that well-disciplined firms continue to outperform their less-disciplined brethren.
- Taking labor effort out of collecting and disseminating information frees up more time for analyzing it and then acting on it. Approximately 90% of all cost overruns on projects are due to labor. The earlier we know of a problem, the better the outcome.
- The highest and best use of any professional's time is negotiating. It has the highest monetary payoff per hour.

A virtual construction protocol, once set up, frees up more time for each manager, supervisor, and executive in a firm to negotiate more things. In construction, all things are negotiable. This means a higher per-hour payoff of middle managers' and executives' efforts. All this travels quickly to the bottom line.

I have seen and heard proposals of up to \$10,000 for a one-time set-up fee and \$500 per month per employee. This can be prohibitively expensive at today's salaries and wages. Construction's end users and owners may have to help with this expense. However, in a few years, business costs will increase and the cost of technology (predictably) will decrease. The cost/benefit lines will cross.

Further balancing this expense is the potential savings. Taking into account 30%+ wasted labor time in both the field and the office makes the economic model

work better. Also, the “long tail” of safety liability adds to virtual construction's value. The particular financial equation must be calculated by each firm, but these are substantial potential savings.

As qualified craftspeople and managers are harder to find, helping the existing ones be more productive is a rational plan. Virtual construction assists with that.

I can't tell you when the age of virtual construction will happen (“Carnac the Magnificent” retired), but get ready for it. Our younger professionals can see it and older ones sense its power.

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