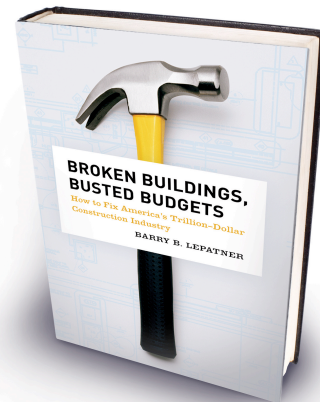


Technology and the Industry That Time Forgot

By Barry B. LePatner, Esq.

The words “technology”, “innovation”, “research and development” when coupled with the term “construction industry” represent true oxymorons of the English language.

The construction industry spends less on technology than any other industry in the U.S. Since 1964 average worker output efficiency for every other non-farm industry has improved by over 120 percent. For the construction industry, average worker efficiency has fallen by over 20 percent! The industry tries to set itself out as one that makes innovation a part of its story of progress. But a recent interview with at least one leader of the construction industry destroys any pretense of such a remote likelihood.¹ In fact, in one interview a construction executive lauded the industry’s move toward innovation by proudly proclaiming that “As many as 27 percent of all construction companies have a functionally operational website”!



Portions of this article are excerpted from LePatner's new book, *Broken Buildings, Busted Budgets: How to Fix America's Trillion-Dollar Construction Industry*.

Mass production of homes once held some promise back in the late 1940s and 50s. The Levitts were spec homebuilders after WWII. Though many major corporations sought to enter the field on a mass building level none succeeded. Today we have Toll Brothers, Centex, Pulte, KB Homes and Lennar. None are in more than 12-20 states.

Fortune magazine knew in 1947 that size mattered. “The search for reform in the house building business”, it noted, “becomes primarily a search for large-scale operations....Efficient house production requires firms big enough to mobilize capital

¹ See interview in *Architectural Record* (October 1, 2007) with Barry B. LePatner. In response to assertions above, Stephen Sandherr, chief executive of the Associated General Contractors stated: “to say that the construction industry has not embraced innovation or collaboration is naïve. Just look at the innovations in the past 20 years: design-build, construction management at-risk, and value engineering. Look at building information modeling (BIM), which embraces new technology and allows for enhanced collaboration between designers, contractors, and suppliers.” For those in the know, Mr. Sandherr’s comments seemed to strongly confirm the *Broken Buildings, Busted Budgets* contentions about the lack of embrace of technology by the construction industry.

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and organize production in systematic, repetitive operations. They must be big enough to assume full managerial responsibility instead of dividing it with subcontractors; to oppose strength to strength in dealing with labor; to buy supplies in quantity; to counter the rapacity of the suppliers of building materials; and to take the responsibility of making a fair price to the customer.”

Even such advances as “prefabrication” regularly met resistance from worker groups who invariably see ideas that improve efficiency as steps leading to their eventual demise. It is the reason why the painter’s union steadfastly insisted that work rules require painters to use 7” rollers when the widespread use of spray paint would speed up the process by 75% or more.

By about 1900, American construction firms employed the world’s most sophisticated building technologies: steel frames, elevators, electrical, plumbing, telephone systems, and central heating. By the 1920s and 30s they the industry advanced to national highways, dams and other major infrastructure projects. By WWII they were doing airports and bridges.

But during the 1980s the industry lost its way, along with a near global monopoly on advanced building skills. By not investing in research and development as they should have, the industry has paid a huge price. In the 1980s, the industry spent about 0.4 percent of sales on R&D, about the same as they spent in the early 1960 and far less than Japanese construction companies and firms in other U.S. industries like automobiles (1.7 percent) or appliances (1.4 percent). Today, the electrical utilities industry invests hundreds of millions of dollars in R&D but only a small percentage of that goes for “ideas applicable to construction”.

When Harvard Business Review touted in the early 1980s that “fast track” was the “Next Big Thing” a third of all large owners began to employ construction managers. The construction manager brought along the advent of the “fast track” process, which called for the inception of construction before the details of the entire building were completed. As the idea was that starting the work four or more months earlier would lead to an earlier completion thereby saving the owner substantial interest costs and gaining occupancy that much earlier, it is easy to see why owners jumped at this new “innovation” and CMs became the darling of the construction world. Over time, few owners ever saw the projected savings as the delays in construction from the resultant change orders and claims that arose as the completed design was promulgated created a spate of cost overruns that threw budgets over by 20%, 30% or more on a regular basis.

Most construction firms are too small to develop breakthrough improvements. Without fixed price contracts that force out the more inefficient and lead to greater profits for the well-managed, the industry will be doomed to remain mired in a low-bid mentality where contractors bid at or below cost to merely win the right to make change orders in hopes of earning a profit on a project.

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But the fragmentation of the industry has, to date, virtually doomed all attempts to implement more modern advances and the industry is as stultified today as it was 150 years ago.

Today collaborative R&D is only performed by an organization called FIATECH (Fully Integrated and Automated Technology). Supported by some major corporate owners e.g. DuPont, Intel, Dow, Procter and Gamble, contractors such as Bechtel and Fluor, and product and material manufacturers, it is trying to assist all participants in the construction process to implement new technologies, improve information accessibility, and decrease engineering, construction and operational costs.

Government has assisted in only limited ways and is, itself, extremely fragmented. In 1993 President Clinton established the National Science and Technology Council which began to try to coordinate and focus construction-related research of fourteen federal agencies. The outcome would not surprise anyone conversant with the history of government construction subsidies which range from compete disasters to bid disappointments.

Today, IT spending by the construction industry investment lags far behind industries in almost every other sector of the economy. The industry is so backward that it recently boasted that 27 percent of contractors currently have a functional Web site!

Only last year, Sir John Egan, former chair of the Strategic Forum of the Confederation of British Industry said: “The construction industry doesn’t use computers enough. The car industry could not deliver its incredible annual improvements without computers. With widespread use of computers, everyone in construction could practice on them, rather than on their customer.”

According to a recent report by the National Institute of Standards and Technology, inadequate interoperability – that is, the inability to manage and communicate electronic project data both internally and between collaborating firms – costs architects and Engineers working on capital facilities almost \$1.2 billion annually in lost productivity.

Ric Johnson, a construction software executive stated: “Builders and engineers welcome change to their industry in much the same way that buggy whip manufacturers helped usher in the era of the horseless carriage.” Phillip Bernstein, an Autodesk executive and expert on construction industry software says: “We’re never going back to the age of the master builder architect because the world’s just too complicated. The replacement of the master builder is going to have to be somebody who orchestrated the process and all the information that technology creates. And who’s going to do that?”

Most construction-related R&D is not and never has been, conducted by companies but rather by professional organizations and universities. Oddly enough, the

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most publicized advance in technology has come from an architect, Frank Gehry whose firm has developed its own proprietary design software based upon one that was used for aircraft design. Another new but untested innovation is BIM, Building Information Modeling, a software that promotes a collaborative process to create a shared 3D and digital model for the building during its design. While this new software holds out promise to implement the needed collaborative input from the design and construction world it is hardly known to the nation's owners who have yet to embrace any software as the tool of the future.

But the real problem here for the construction industry is that the impetus for innovation must, in the long run, come from the owner side. For it is the owner world, the end user in the design/build continuum, which will be the largest beneficiary of the development and implementation of new technologies. The owner/builder has the largest stake in structuring the methodology used for the design, construction and ultimate operations of the facility it will use, lease operate or ultimately sell. To optimize that investment, to maximize its efficiency and to create the most inviting environment for the end user, the owner or today's new structure must insist that its design and construction team commit itself to a design/construct methodology that is flexible and capable of adaptation to meet the multiple uses of the owner over a period of time.

As of today, owners have failed to understand this new imperative. In time, and hopefully sooner rather than later, owners will adopt a workable collaborative computer-based technology into their requests for proposals and require all project members to sign on to achieve the new objectives that will certainly increase the value of every facility in our nation and across the globe.

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