

## Is integrated project design the solution?

While productivity in construction has decreased in last few decades, the industry looks for answers

In the past, there has been significant criticism of the construction industry and, in particular, the number of disputes and resulting costs that have arisen on projects. The industry has proactively addressed these concerns in a number of ways and, to a certain extent, these efforts have succeeded in reducing the number of disputes on projects that proceed to arbitration or litigation and the attendant costs.



**CONSTRUCTIVE  
 ADVICE**

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However, according to some, serious issues linger. According to one recent study, manufacturing industries (excluding farm industries) increased productivity from 1964 to 2003 while the productivity of the construction industry decreased during the same period.

Issue can be taken with the studies and the conclusions drawn from them. Moreover, in some respects, the construction industry is unique. Construction is increasingly complex and subject to global and market factors that are not predictable. However, the relative lack of increased production in the industry may be related to a more systemic issue that is unique to construction. To a large extent, productivity in construction is the result of the combined efforts of a number of parties. The problem is that in the construction industry, those parties, which generally include the owner, contractors, design professionals and others, based on historical perceptions of responsibility and risk, operate at cross purposes. Studies have suggested that, to a large extent, the cross-purpose efforts of these parties resulted in the relative lack of increased productivity in the construction industry.

“Errors, omissions, inefficiencies, delays, coordination problems, cost overruns, productivity losses – the list of complaints against (and often made by) architects and contractors is a long one,” Chris Noble wrote in the *Architectural Record*. “The Construction Users Roundtable (CURT) has characterized the difficulties experienced in typical projects as ‘artifacts of a construction process fraught by lack of cooperation and poor information integration.’ The historical reasons for this dysfunctionality are many, including a multiplicity of participants with conflicting interests, incompatible cultures, and limited access to necessary information.”

The total waste in the industry has been estimated at 30 percent, according to communications consultant and author C.C. Sullivan.

The issue, says Sullivan, is that “information is simply lost because of the nature, of the handoffs between phases. The design work gets ‘dumbed down’ over a set of documents, and handed out to the marketplace for bidding, and there is a big drop-off as that information becomes extracted and handed off. ... Then a whole new set of people work very hard to understand the project as they’re bidding it out. Yet only a small subset of those actually

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end up working on it, and by the time it gets turned over to the people who have to build it in the field, the trade contractors, the fabricators, the suppliers and the contractors who put it together, there’s another big drop-off. That group then builds an enormous amount of valuable information about every small detail of that building as they actually put it together. But then a huge amount of that drops off again when it gets handed over in a simple set of as-builts and some operations manuals to an owner.”

The alternative delivery approach of integrated project design (IPD) may be the answer to this unique systemic construction industry problem.

“In theory, an IPD project is carried out by a collaborative team of owner, architect, constructor, and major consultants who share goals, liabilities, and rewards,” B.J. Novitski wrote in the *Architectural Record*. “Key to IPD is the use of building information modeling (BIM) software, which enables a building to be constructed digitally – and conflicts to be found and resolved – well before construction begins. But constructors must be involved early in design, and traditional notions of design phasing change. All parties must forego a certain degree of self-interest in deference to project goals and create a new system of rewards and liabilities.”

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According to the AIA California Council, “Integrated Project Delivery uses business structures, practices, and processes to collaboratively use the talents and insights of all participants in the design, construction and fabrication process. Beginning when the project is first conceptualized, the integrated process continues throughout the full life cycle of the facilities.”

IPD has the potential to benefit all parties in the construction process by maximizing the likelihood of successful projects. As with all new approaches, owners, contractors, design professionals

and others involved in the construction projects must overcome historical perceptions that focus more on protecting each of the parties in the construction process from liability rather than the more positive focus of working collaboratively toward the successful completion of the project.

IPD is the evolution of a number of other collaborative approaches the construction industry has used over the years to make projects more successful. These approaches include a more fair allocation of contract risk, such as differing site condition clauses, partnering, design-build, CADD, building information modeling and alliance contracting.

The industry understands there are problems, and there is a developing consensus that the collaborative nature of IPD is critical to addressing these issues. "In an annual technology survey of 100 construction industry executives conducted by the magazine Engineering News-Record, about 80 percent of the professionals agree that collaboration among industry players is the most important role for technology for the next five years," reported C.C. Sullivan in 2005.

The industry is embracing the general issue of more collaboration on projects on multiple fronts. The ConsensusDOCS BIM Addendum was released on June 30, and has been widely endorsed. According to the Philadelphia Business Journal, "The American Subcontractors Association, Inc. called the document 'pioneering.' By signing the BIM Addendum, all parties commit to correcting potential clashes in a collaborative way early in the construction process, rather than blaming each other and ignoring the stakes."

The industry in general recognizes that IPD has the potential to cause a seismic shift in the relationships among project participants from adverse to collaborative. The American Institute of Architects, among others, issued in 2008 a complete family of IPD documents. The AIA IPD documents include two approaches. The first is an evolutionary approach that allows the team to work toward collaboration while maintaining a more traditional contract framework. The second is more revolutionary and assumes wholesale collaboration among the team members.

In the second approach, in short, the team develops a project definition, project goals, target costs, a schedule, a risk matrix and related items. Responsibility, coordination, compensation and risk are all structured to promote collaboration and the best interests of the project. The parties generally have no liability to each other for acts or omissions committed in good faith but remain responsible for willful misconduct.

This second IPD approach, sometimes referred to as "alliance contracting," has been tried successfully in other countries and is just beginning to be considered and used in this country. The

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## Traditional vs. integrated

The following chart best describes the comparative attributes of traditional project delivery (TPD) and integrated project delivery (IPD).

### Teams

**TPD:** Fragmented, assembled on "just-as-needed" or "minimum-necessary" basis, strongly hierarchical, controlled

**IPD:** An integrated team entity comprising key project stakeholders, assembled early in the process, open, collaborative

### Process

**TPD:** Linear, distinct, segregated; knowledge gathered "just-as-needed," information hoarded, silos of knowledge and expertise

**IPD:** Concurrent and multilevel, early contributions of knowledge and expertise, information openly shared, stakeholder trust and respect

### Risk

**TPD:** Individually managed, transferred to the greatest extent possible

**IPD:** Collectively managed, appropriately shared

### Compensation/Reward

**TPD:** Individually pursued, minimum effort for maximum return (usually), first cost-based

**IPD:** Team success tied to project success, value-based

### Communications/Technology

**TPD:** Paper-based, two-dimensional, analog

**IPD:** Digitally based, virtual; Building Information Modeling (three-, four- and five-dimensional)

### Agreements

**TPD:** Encourage unilateral effort, allocate and transfer risk, no sharing

**IPD:** Encourage, foster, promote and support multilateral open sharing and collaboration; risk sharing

early returns, however, are promising.

Any new approach including IPD must satisfy three criteria to be successful. First, there must be an industry awareness of the problem. Second, there must be industry initiatives to address the problem. Finally, there must be a mandate from those that drive projects to implement a solution.

It is clear that there is recognition of an industry problem and that there are ample industry initiatives to solve it. What is not yet clear is whether there are sufficient owners (that drive projects) prepared to embrace IPD, with all of its potential and risks, as a possible solution.

In many respects, these issues, like the AIA family of IPD documents, can be addressed in the contracts. To be ultimately successful, however, a project that uses IPD will require exceptional leadership and trust that teamwork and collaboration among all project participants will generally result in a better project than another delivery approach.

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