

August 2006

Integrated Project Delivery Frequently Asked Questions

“...we have a very small window to change the trajectory of the profession, and to best ensure its continued relevance.”

Norman Strong, FAIA

“We need new business models that address optimum ways to deliver building projects in a digitally enabled, integrated way.” *James O. Jonassen, FAIA, MRAIC*

“Architectural practice is entering a new era.” *Jim Bedrick, AIA*

“Technological evolution coupled with owner demand for better, faster, less costly construction projects and more effective processes are driving change in the construction industry. These changes are revolutionary in nature. They will transform practice as we know it today.”

Norman Strong, FAIA



AIA California Council

An Architects Primer for Integrated Project Delivery

What is the future of architecture in the 21st century?

It's an industry where...

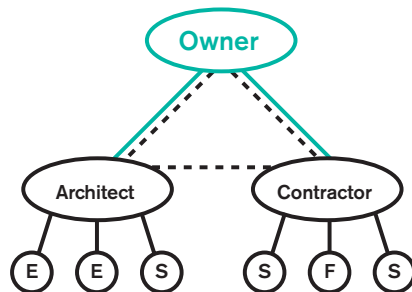
- ...facilities managers, end users, contractors and suppliers are all involved at the start of the design process
- ...processes are outcome driven and decisions are not made solely on first cost basis
- ...all communications throughout the process are clear, concise, open, transparent, and trusting
- ...designers have full understanding of the ramifications of their decisions at the time the decisions are made
- ...risk and reward are value-based, appropriately balanced among all team members over the life of a project
- ...the profession delivers higher quality design that is sustainable and responsive.

The future for the architectural profession is rapidly evolving from traditional design/build and design/bid/build delivery systems to Integrated Project Delivery that requires architects, contractors, owners and all stakeholders in the enterprise take on new roles and competencies. This will necessitate a change in culture, especially for the architect and architectural firms where new methods of learning to rapidly upgrade the industry and move to virtual environments will need to be implemented.

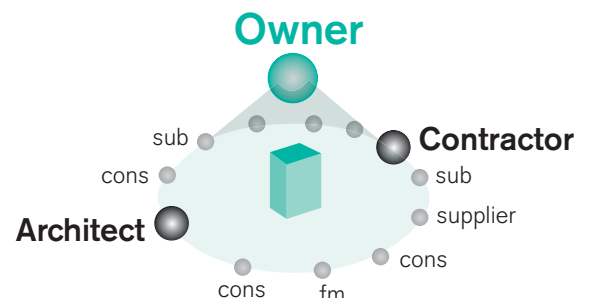
What is Integrated Project Delivery?

Integrated Project Delivery is the general term applied to a new project delivery system that utilizes highly collaborative, cross functional teams composed of all project lifecycle stakeholders including the owner, architect, general contractor, engineers, suppliers and security. Keys to success require the team to be assembled early in the process, that all team members have open and equal access to information, and that they share equally in the risks and rewards of a given project. Relying on technical advances in BIM (Building Information Modeling) software and information sharing through the World Wide Web, empowered teams, often at great geographical distances, work together to create designs, solve problems and complete projects faster and less expensively.

Existing Model (Design-Bid-Build)



Integrated Project Delivery



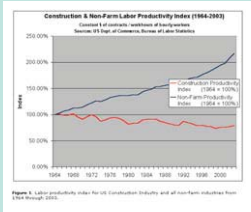
What are the key factors driving change to this integrated delivery process?

Statistics show that construction is the only non-farm industry that has actually decreased in productivity since 1964. Slow to adopt new technology and mired in traditional delivery methods that are often inefficient and can become antagonistic, construction projects too often come in late and over budget. Clients are demanding improvement. By implementing global communication, continuous process improvement and integrated decision making into their own businesses, they have increased their productivity and profitability. They expect the same of their partners.

Other factors driving the change to Integrated Project Delivery are international in scope and will increasingly affect local markets in the future. Diminishing natural resources and expanding world demand for many types of construction create a need for design solutions that are innovative, cost effective, environmentally friendly, secure and sustainable. Crafting and building these elaborate designs will require sophisticated building information modeling and input from a team of experts.

In addition, the time to market has accelerated with shrinking timelines and rising expectations for faster information, decision making and data processing. The days when it was acceptable for a simple design change to take weeks are over.

Tough competition (often international), tighter timelines and the need to stay profitable have forced companies involved in manufacturing, retail, hospitality, medical and all other sectors to respond to changing economic conditions or perish. Today, architects, engineers and general contractors face the same fate. As General Shineseki, retired Chief of Staff, US Army once said, 'If you don't like change, you're going to like irrelevance even less.'



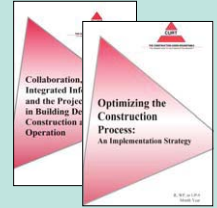
Since 1964, out of non-farm industry, only construction decreased in productivity



Annually: \$15.8B lost due to software communication barriers



Building information modeling is here: data-rich, 3, 4, & 5D



Owners state that they must change organization of projects and teams; behave differently; utilize technology

Why is Integrated Project Delivery important to me?

Owners are driving the move to Integrated Project Delivery. Frustrated by design and construction partners often at odds with one another and faced with delays and cost overruns as a result of poor communication, upfront planning and problem solving, they are demanding that architects, general contractors and engineers work together to meet owner requirements on time and within budget. Architects without the tools or the contacts to meet these expectations will be unable to compete for collaborative bids, and their pool of potential clients will shrink.

Government and the public sector are already setting and enforcing strict environmental requirements, as are many private developers. Creating complex buildings cannot be accomplished by one architect designing alone, but rather requires collaboration among a team of experts, each knowledgeable in specific areas. Experts may be at a considerable distance from one other and must rely on computer generated forms of communication, such as building information models, or BIM. It is clear that architects and firms will need to take on the new skills and knowledge required to participate in such collaborative efforts.

What is the role of the architect in this new collaborative process?

This approach will free architects to truly be designers again. The basic role of the architect will remain the same; to gather and process information to create a unique physical solution in a clear and understandable manner. It is the speed, complexity and delivery process for these services that will, and already has for many architects, changed.

As both the designer and the facilitator of the process, the architect will lead by organizing collaborative teams, enabling communication over vast distances, and structuring interactions and activities to produce desired results. Empowered by technology to develop a model, analyze it, and reevaluate its design in hours, architects will be able to create challenging, innovative spaces. They will be able to expand the use and worth of their knowledge and data beyond construction documents to efficiency and value of the total project.

Although some in the industry forecast an eventual blurring of roles as collaborative teams integrate activities, often at a pre-design stage, and are held accountable for the success of a common goal, others see the role of the architect expanding. Owners today are increasing their demand for specialization and look beyond design to services such as facility management, restoration, programming and strategic space consultants.

Traditional (Today)		Integrated Project Delivery (Tomorrow)
Fragmented, assembled on "just-as-needed" or "minimum necessary" basis, strongly hierarchical, controlled	TEAMS	An integrated team entity composed of all project lifecycle stakeholders, assembled early in the process, open, collaborative
Linear, distinct, segregated; knowledge gathered "just-as-needed"; information hoarded	PROCESS	Concurrent, multi-level, integrated; early contributions of knowledge and expertise; information openly shared
Individually managed, transferred to the greatest extent possible	RISK	Collectively managed, appropriately shared
Individually pursued; minimum effort for maximum return;(usually) first-cost based	COMPENSATION/REWARD	Team success tied to project success; value-based
Paper-based, 2 dimensional; analog	COMMUNICATIONS/TECHNOLOGY	Digitally based, virtual, 4 dimensional; Building Information Modeling
Minimum effort for maximum return; minimize or transfer risk; don't share	AGREEMENTS	Encourage, foster, promote and support open sharing and collaboration, full integration
Individually focused, emphasis on composition	EDUCATION	Team-based, integrated, collaborative; technologically inclusive; materials and methods focus in addition to composition

My clients are pleased with my work so why should I change?

The problems in the industry are well documented and cost the U.S. building industry billions of dollars annually. The need to move toward collaborative efforts, supported by advanced digital technology, is universally agreed and will, within a very short period of time, become the norm. If you want to be in business and profitable 10 years from now, you need to start making some of the necessary changes in your practice immediately. The AIA, at both the national and local level, feel so strongly that Integrated Project Delivery is the best way to insure architects' relevancy in the next decade, they have made it the primary emerging focus in 2006 and 2007.

How difficult will it be for my firm to use Integrated Project Delivery and when should I begin?

To lead in delivering on time and on budget results for your owners, start implementing Integrated Project Delivery methodologies in your firm and on your projects immediately. By taking the following steps you will get ahead of the curve and take advantage of the window of opportunity to create significant competitive advantages.

Eliminating the 'silo mentality' is the first and most critical step to your success. Begin to collaborate with your stakeholders by meeting with current and potential owners, construction partners and suppliers to determine how to work more effectively together. It may be as simple as setting up a team that includes all stakeholders in a current project and making the commitment yourself, or dedicating a staff member, to attend all team meetings and share information in a timely manner.

Assess your current capabilities, staff and projects. Make sure your staff is 'computer savvy' and ready to maximize the opportunities offered by collaboration. The new delivery system relies almost exclusively on digital images that can be created, manipulated, shared and stored on-line. CAD users need to incorporate a BIM system and begin to design using the new capabilities.

Seek out new partners who are already moving toward or involved in Integrated Project Delivery. Join sponsoring organizations to get in on the ground level and participate in new initiatives. Learn from your peers by networking with fellow architects who can share success stories, by attending AIA seminars and accessing AIA materials. It is an industry wide movement and there are multiple resources available to you.

Most importantly, set realistic expectations, establish timelines and make the commitment to meet them. It will take years to move completely to the new delivery process and that is why it is so important that you start now.

I am currently using CAD drawings which are computer generated, so what are the benefits of moving to BIM?

It is a demonstrated fact across a wide range of industries that newer technology enables process improvement that produces better results. Moving from CAD files to BIM (Business Information Modeling) opens up new possibilities in design and construction, and makes it possible to build more efficiently. BIM open interface allows for the production and management of all design information within a single, easily shared, 3D product model that ties all of the design disciplines together from the beginning of the process. This means all stakeholders can view the model to identify potential construction, supply or security issues and through building system coordination make necessary modifications before construction begins. Early collaboration using BIM has been proven to save thousands, even millions of dollars and shorten, or even eliminate, delays on a wide range of projects.

The benefits of BIM are driving a fundamental change in the building industry. The Construction User's Round Table (CURT) and owners such as GSA are already demanding its use, and the AIA is redefining the practice of architecture to take advantage of this technology. Within a few years time, it will no longer be a choice, it will be a mandate.

What exactly is the difference between CAD and BIM?

To appreciate the opportunities, you must clearly understand the significant differences between CAD and BIM.

CAD files are simple data composed of lines, arcs and circles, plus surfaces and solids in some programs. Drawings are two dimensional graphical representations of building components that mirror paper and pencil designs. A line is just a line, and although certain facts may be inferred from the location of the line, such as the line represents a wall, there is no supplemental information about the relevance and building requirements for the wall.

BIM programs close the gap between data and information because the elements are actual simulations of the building components. Designs include critical guidelines such as types and quantities of required materials, fire ratings, sound transmission characteristics, load bearing capacity and response to heating and cooling. Think of them as 'smart designs' that trigger 'what if' kinds of questions among collaborating stakeholders prior to turning the first shovelful of dirt. The ability to share knowledge and expertise, get true cost estimates up front, identify problems and implement solutions based on real information before going to construction offers many benefits such as protecting the original design, saving time and money and most importantly, producing superior results.

"In recapping the recent Australian National Museum project, Steve Ashton (Ashton Raggatt McDougall) and Robert Peck (Robert Peck von Hartel Trethowan) described the traditional design and construction process as follows (I suspect only partially tongue-in-cheek):

- > Designer imagines an idea in 3D to solve a client's program.
- > Designer deconstructs 3D ideas to 2D representations.
- > Designer passes 2D representations to the construction team.
- > Construction team gets fabricators to redraw parts, again in 2D.
- > Construction team attempts to reassemble the 2D information into 3D objects.
- > Designer is often amazed by the outcome!"

Jim Bedrick, AIA – Webcor Builders

What is VDC?

Visual Design and Construction (VDC) is a term used to describe the broad range of new processes made possible by Building Information Modeling (BIM). The ability to couple models with analysis and simulation tools to prototype construction, performance and sustainability on the computer and to share this information with all stakeholders before actual building begins.

Should I wait until there is one consistent BIM software program for all users before I invest in expensive new software and training?

Demonstrated improvements in project management and cost savings realized by using BIM far outweigh perceived risks and associated initial costs. BIM produces higher quality designs and documents, which means risk is actually reduced; quality control is streamlined; communication to all stakeholders is delivered in a timely, easy to understand format over long distance saving time and money; analytic tools are more accessible; and the design intent is safe guarded. Also, many of the lower-level, time consuming tasks such as view coordination, document generation, schedules, and design updates are automated making staff more productive and freeing up architects to concentrate on more important revenue producing and design activities.

An added advantage is that these electronic documents can be stored, shared, reviewed, used, and re-used for future projects. The ability to keep models and design documentation in an historic database allows for easier facility management and keeps the architect involved over the entire lifecycle of the building, opening up new revenue generating opportunities.

The issue being discussed today is the need for compatible software programs and industry wide standards that make it possible to communicate effectively among all disciplines and team members. Vendors and early adopters as well as the AIA and other industry organizations such as the IAI (International Alliance for Interoperability) and Industry Foundation Classes (IFC) are prioritizing research and testing to establish guidelines and provide seamless integration.

In the real world however, the rate of speed at which changes and improvements take place in software packages means that a totally seamless process will most likely never be realized. This is the nature of technology, and is a cost of doing business. If desktop computer users had waited for seamless communication between DOS, Microsoft and Macintosh/Apple operating systems, everyone would still be using typewriters today.

What legal and regulatory challenges and changes can I anticipate with Integrated Project Delivery?

Although it is difficult to determine exactly what effect Integrated Project Delivery will have on legal liability and regulatory issues, we know there will be several areas immediately impacted.

A new business model that provides a collaborative framework to protect both the legal and commercial interests of the major stakeholders needs to be created and managed. The function of the new model is to clearly define new roles and responsibilities of each participant, minimize risk, maximize shared recognition, and provide profit incentives for taking on new processes.

As part of the new management system certain issues need to be addressed; legal liabilities and responsibilities for successful outcomes; information ownership; new contract models and documents; and certifying sustainable design requirements for integrated teams.

How will traditional contractual relationships be impacted?

The traditional contract for services between the client, architect, contractor and others involved in the project, will change from clearly defined individual responsibilities to an equally shared risk/reward format that facilitates collaboration and aligns the teams goals with that of the project. Such an arrangement ties all of the stakeholders together as an integrated whole instead of creating adversarial parties, thus eliminating costly legal disputes.

Since the architect now functions as part of a team, and success is tied to the success of the project, such a contract would most likely define new responsibilities and could require changes to an architect's errors and omissions insurance coverage depending on whether the team approach is seen as increasing or decreasing exposure to risk.

The AIA is currently exploring adjustments in its contract documents to allow architects the option to form integrated teams as a standard legal practice.

How will public client selection be affected?

Current QBS law (Qualifications Based Selection) requires that selection be based on a qualifications and competence ranking. Integrated Project Delivery, by its collaborative nature and focus on overall value, rather than lowest first cost, requires a different set of selection criteria. Given the overall interest level in collaborative working environments and the proven benefits of the process, these changes will most likely be implemented. It is important that the profession be aware of current laws and standards of care, and be in the forefront of advocating change.

Will Integrated Project Delivery be more profitable for me?

Compensation agreements may change based on team accomplishments vs. traditional individual contributions. Rather than contracting for a piece of the project, such as creating a design, and being paid upon its completion, compensation may be computed on final outcome, or in increments as timelines and costs are successfully managed and met over the life of the project. Fee structures will reflect the move to a collaborative effort, integrating activities and being held accountable for the success of a common goal. If the project is successful, all team members will profit.

There are also many new revenue opportunities offered by Integrated Project Delivery. Architects will be able to expand their services and expertise into collaborating on architecture, interiors, engineering and construction. As the keepers of valuable data they will be called upon to consult with owners and facility management through the entire life cycle of a project.

Architects who master and use BIM, and are willing to drive process change, have advantages that will result in superior design solutions. Higher fees will be based on the additional value to owners of showing information trails that demonstrate how design decisions impact long-term goals, rather than simply drafting a design.

Advocating change, educating participants, identifying and documenting success and providing up-to-date information on a timely basis will give you industry support, while conferences, classes and easily accessible resource materials provide individual help.

What are the short and long term benefits to me?

Employing enhanced technological abilities, team collaborations and industry wide standardizations, you will be in a position to offer new services to current customers and receive additional profit from on-going projects through improved efficiencies. In the future, you will also be able to capitalize on opportunities in the industry such as 'green' and 'smart' infrastructure requirements, inner city revitalizations, urban planning and development needs.

Additional benefits include projects being completed on time, improved cost containment, more design options and decreased liability and risk. Warehousing of historical data and schematic design online, available to stakeholders anytime in the future, extends the usefulness of the architect to the owner over the life cycle of the building. These longer term relationships translate into job opportunities and provide a competitive edge.

What are the benefits to owners?

Moving to Integrated Project Delivery contributes significantly to minimizing conflict and maximizing consistency on a project, while creating more harmonious relationships and better relations with clients. Early and open information sharing identifies problems and solutions, minimizes cost over runs and allows projects to be completed on time and within budget.

Since owners are clearly demanding the move to interoperability, and most architects choose their delivery system based on client requirements, the value of Integrated Project Delivery is validated.

Where does the building industry stand on Integrated Project Delivery?

The building industry has adopted much of the recommended technology and is already using BIM. Architects who adopt the new technology and actively seek results oriented collaborative partners should find an increasing number of opportunities both on a local and national/international level. New role definitions and legal changes reduce risk, encourage innovation and create an environment which fosters good relationships, successful outcomes and enhances job satisfaction.

Do larger firms have an advantage?

In the move to Integrated Project Delivery, smaller firms and individuals have an equal opportunity with larger firms. The small firms' ability to react quickly to change, move independently to adopt new processes and technologies, and their close one-to-one relationship with clients and suppliers give them an advantage.

How will Integrated Project Delivery impact on current educational resources and requirements?

As Integrated Project Delivery is introduced into university curriculum, the emphasis on individual contribution will be linked to the ability to perform well as part of a collaborative team. New technologies and BIM, based on open platforms with compatibility to all stakeholders, will become part of the design process, and students will be judged on their comfort level with computers as well as their design skills. These younger members of the profession will help reduce learning curves and associated transition costs and their success stories will motivate their peers.

What is my future if I decide to stay with my traditional practice?

There will be architects who chose not to change their current process, just as there will be owners who prefer traditional methods. The global demand for buildings will continue to support both approaches to architecture for the near future. Eventually, the opportunity to participate in innovative projects will decrease as Integrated Project Delivery and information modeling becomes the standard.

What resources are available to help me make the change to Integrated Project Delivery?

The AIA, at both the national and state level, has been developing and implementing a wide variety of resources to help architects move forward in this process. Excellent publications to get you started, such as the *AIACC White Paper on Integrated Project Delivery*, the 2005 AIA Convention General Session Panel Discussion, *Building Information Modeling* DVD from the 2005 National Convention, *FOCUS* the AIACC Council Newsletter Summer 2006 issue, and the 11 segment *Report on Integrated Practice* are currently available on-line or through the AIA/AIACC.

The AIACC is developing an entire track, discussing Integrated Project Delivery at the Desert Practice Conference November 3-5, 2006 and many resources are available at www.aiacc.org. Also in place is a collaboration with McGraw-Hill Construction to do the following: survey industry participants; develop metrics and objective criteria for evaluating integrated projects; and produce a 'how to' manual for stakeholders.

The AIACC has also formed sub committees to review needs, recommend activities/communications and provide resources in the areas of education, knowledge, policy and practice. Currently under development are case studies, policy standards and regulatory requirements, a quarterly newsletter, website space dedicated to implementing Integrated Project Delivery, firm models and software standardization and training, among others. Many articles and publications on BIM, Integrated Project Delivery and factors driving change are currently available.

For more information about
Integrated Project Delivery
visit www.aiacc.org

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“If you want to survive, you’re going to change; if you don’t, you’re going to perish. It’s as simple as that.”

Thom Mayne, FAIA, during the Building Information Modeling Panel Discussion at the 2005 AIA national convention.

“Evolve or dissolve.” *Kimon G. Onuma, AIA*

“If owners, contractors, and developers see a way to reduce costs dramatically by substituting software for expertise ordinarily supplied by architects during the design development and construction documentation phases of the project, they may very likely conclude that many traditional architectural services are unaffordable if not obsolete.” *Daniel S. Friedman, FAIA*

“There is huge duplication of effort, inefficiency, and waste in the design and construction industry.” *Construction Users Roundtable (CURT)*



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