

Integrated Project Delivery: Not a Panacea for Everyone

J. Mark Taylor, PhD, JD and Darren A. Olsen, JD

Auburn University
Auburn, Alabama

Integrated project delivery, or IPD, has become a popular “catch phrase” in recent literature involving the construction industry. This may be a result of the increased awareness in the design-build (DB) approach to building or it may be a result of the increased use of building information modeling (BIM). Whatever the reasoning, whenever the terms DB or BIM are used, it is often followed by the use of the term “collaboration”. DB and BIM, by nature, help facilitate a collaborative approach to building; and whenever the building discussion begins to incorporate the “collaboration” term, the topic circles back to IPD. As collaborative efforts become more commonplace, building owners and all participants in the process need to be aware of how IPD is different from processes they may be more familiar with, and what should be expected from an IPD project.

On most projects an area of particular concern to the general contractor is that of cash flow. As an industry, general contractors are undercapitalized, work on relatively thin margins, deal in a cyclical market, and work with a retainage system that does not fully pay for their efforts until a project is complete. These factors, in combination, bring about a cash flow situation that is the downfall of many contractors. Poor cash flow is generally referred to as the number one cause of construction company failure in the U.S.

The purpose of this research is to look at a typical construction project and how the IPD delivery method changes the way the parties interact and how this can affect the profitability of the parties involved. A case study approach will be utilized to illustrate some of these differences. The overall objective of this study is to clearly point out the differences that occur from a traditional delivery method versus an IPD contract so that all participants in the project will understand the basic changes that take place and how this can affect your on-going business operations. With this knowledge as a basis, the participants can structure the contract language to best protect their interests. The paper will also provide a brief historical context on IPD.

Key Words: BIM, Cash Flow, Design-Build, Integrated Project Delivery, IPD

Introduction

Integrated project delivery (IPD) has been a frequent topic of discussion in the AEC industry for the past few years. Many consider this a continuation of on-going discussions about exploring different and better ways of working together without truly adding to the effort; while others look upon IPD as a significant shift in the way the AEC industry operates. Those with the former attitude would point to the fact that over the past fifty years or so the AEC industry has seen the introduction of design build, construction management, construction management at risk, prime contractors, value engineering, collaboraton, etc. All of which, to some degree, aim to have the pertinent parties - the architects, engineers and contractors - work more closely together; and work more closely together earlier in the delivery process. Many refer to projects that utilize some aspects of IPD, yet maintain much of the traditional structure or organization as it has existed for many years, as IPDish. As discussed in the next sections, IPDish projects are much more common than true IPD projects.

Those that look upon IPD as a significant shift in the way the building business operates will point to the fact that IPD represents a true cultural shift in the way a project is delivered; primarily where project participants seek to achieve the project goals above their own individual goals and utilize tools that aid in the achievement of that goal.

While building information modeling (BIM) is not a firm requirement of IPD, BIM is a tool that facilitates the achievement of many of the IPD goals.

Whatever one's stance on IPD, an area that has been overlooked in the literature is what effect IPD can have on the cash flow of the participants. One of the main levers which makes IPD work delays the payment of profit to the parties. As many of the participants work on very thin profit margins, a shift in the pay cycle can have a significant effect on the cash flow of a company. Poor cash flow is most often pointed to as the number one cause of contractor failure.

The purpose of this research is to look at a typical construction project and how the IPD delivery method changes the way the parties interact and how this can affect the profitability of the parties involved. One potential side effect of IPD that can be quantified is a change in cash flow (as compared to a traditional project) of the parties involved. By realizing the cost, a shift in cash flow might have on a company, the company is in a better position to modify terms of the contract to protect the interest of those involved. A case study approach will be utilized to aid in the quantification of this effort.

Literature Review - Integrated Project Delivery (IPD)

The American Institute of Architects (AIA) introduced the most quoted definition of IPD in its publication *Integrated Project Delivery: A Guide* (AIA, 2007a). "Integrated Project Delivery (IPD) is a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction."

The AIA goes on to state that "IPD leverages early contributions of knowledge and expertise through utilization of new technologies, allowing all team members to better realize their highest potentials while expanding the value they provide throughout the project lifecycle." And "[a]t the core of an integrated project are collaborative, integrated and productive teams composed of key project participants. Building upon early contributions of individual expertise, these teams are guided by principles of trust, transparent processes, effective collaboration, open information sharing, team success tied to project success, shared risk and reward, value-based decision making, and utilization of full technological capabilities and support. The outcome is the opportunity to design, build, and operate as efficiently as possible." (AIA, 2007a)

This definition and statement of the AIA lays the framework for a process that differs significantly from the traditional design and construction processes. The following characteristics differentiate IPD projects from projects delivered using a traditional approach: (1) a multi-party contract, (2) early involvement of key participants, (3) collaborative decision making and control, (4) shared risks and reward, (5) liability waivers among key participants, and (6) jointly developed project goals (Ghassemi, 2011). All of the above characteristics must be incorporated in a project for IPD to be realized in its purest form (Sive, 2009).

In a traditional project delivery scheme there will be tens, if not hundreds, of traditional, two-party transactional contracts from the owner-architect agreement, owner-general contractor agreement, general contractor-subcontractor agreements, down to the subcontractor-supplier agreements. Each contract is typically between two parties; each party trying to achieve its individual goal, sometimes at the expense of the other party.

IPD contracts are referred to as relational contracts because consideration is given to the process, not just to the end product (Pelberg, 2009). A number of approaches have been suggested and utilized in order to achieve this relational contract scheme. Some advocate forming a "single purpose entity" to plan, design and construct the project. The entity can be a partnership, limited liability company (LLC), or limited partnership (LP), to name a few – with the project participants being partners or members of the entity. This, in effect, makes the participants agents for one another; thereby requiring each to put the other's interest ahead of their own.

The advantage of the single-purpose entity approach is that many of the IPD requirements are simply an integral part of the entity. For example, profit sharing, risk sharing and liability waivers are generally a part of a partnership agreement and are therefore an essential element of the entity. A disadvantage is that it is virtually impossible to get

all parties involved to be members of such an agreement. While the owner, architect, general contractor and major design-build subcontractors are integral parties; other subcontractors might be left out of the agreement. Another problem is that insurers have not yet determined how to measure the risk involved with this scheme and therefore savings in insurance premiums may not be achieved as expected.

Others recommend having a multi-party agreement that includes at a minimum the owner, architect and general contractor; but can also include major subcontractors as parties to the agreement. The major source of our design and construction contracts have provided a multi-party agreement form with the AIA C191 and ConsensusDoc 300 multi-party agreements. These provide a basic framework that appears to work fine at setting the stage for IPD in the private sector. The government sector has not yet embraced the IPD concept as it is not in line with current federal, and most state, bidding requirements.

IPD requires that key participants form a team early in the process to collaborate, set goals and insure that potential problems or inquiries are addressed in a timely fashion. Mutual respect and trust is the single most important principle of IPD (AIA, 2007b). Often the approach is to have a two tier team approach. One team, the executive team, is comprised of the owner, architect and general contractor (again, at a minimum). This team meets regularly and normally must make unanimous decisions. A second team includes the participation of major subcontractors and consultants. This team acts as an advisory group for the executive team.

One inherent problem with the two team approach is obvious, what happens if the executive team is unable to reach a unanimous decision. Some schemes call for the advisory team to make a recommendation to the executive team and the executive team votes again. Some schemes call for the unresolved problem to be broken down into different components in order that unanimous decisions can be reached. One striking realization should be evident at this point. IPD projects are going to take a considerable amount of time on the part of the owner. While owners are always involved in their projects to insure that their needs and desires are met; they often are not involved with the weekly (and sometimes daily) meetings required in order to address all of the details that occur during the design and construction periods. For IPD to work, the owner must be committed to work in this regard.

To determine if a project is truly IPD or not, one only has to look at how the compensation and risk are handled. In a true IPD project, a profit pool is established whereby the participants' profits or fees are placed in a common pool. The profit pool is distributed after the project goals are analyzed with the distribution based upon the achievement of established goals. This, in essence, is a cost-plus basis where the owner guarantees the direct cost, but the participants' profits and potential bonuses are dependent upon the project outcome (AIA, 2007a).

Bonuses may be added to the profit pool by the owner upon the teams' achievement of established goals. The bonus portion is often referred to as an incentive compensation layer (ICL) and is often plus or minus 20% of the profit pool (AIA, 2009). It is in this incentive compensation layer that the participants' cash flow can be changed. Utilizing traditional project delivery mechanisms, participants earn profit with each monthly billing and that profit serves to enhance their cash flow position. In IPD the profit is withheld until the project goals are met which typically coincide with the completion of construction. Additionally, some parties are adverse to profit pooling agreements whereby the project pool can be decimated through no fault of their own. For example, one of the major established goals is generally a specified completion date. If the completion date is not achieved a subcontractor might not realize all of its anticipated profit and bonus even though the delay was no fault of theirs.

Risk sharing is an integral part of an IPD project and, in theory, there should be no legal battles among the participants. The parties are encouraged to agree to liability waivers and thus have established provisions to prevent legal disputes. As such, insurance and bonding requirements should be held to minimum cost thresholds. However, the insurance and surety industries are based upon risk analysis; and IPD does not have enough history to allow the insurance industry to truly reflect the savings that should be achieved. Again, another potential obstacle is that all parties involved in the process are not going to be a part of the IPD team. Should a non-member party bring a claim against the IPD team, some of the team members may be affected through no fault of their own.

Methodology and Results: Case Study

While the literature is scarce on IPD results (i.e., success stories) due to the infancy of the methodology, some is finding its way into the literature. The most comprehensive to date is the report by Ghassemi that provides brief case studies on nine IPD projects (Ghassemi, 2011). Of the nine projects, only five of the projects used multi-party contract arrangements; and only one project reported that the contracts included liability waivers among the participants. Further, only four of the projects reported that surety bonds were not required. None of the reported projects by Ghassemi met all six requirements for IPD as noted above. This illustrates that, as currently practiced; more projects are IPDish than IPD.

In addition to the elements noted in prior literature, one purpose of this study is to investigate the changes that might occur with a company's cash flow on an IPD project. This was accomplished by utilizing the case study approach. Data was obtained from a general contractor (Robins & Morton, 2010 and Appendix A) on an actual project in order to investigate how the cash flow might vary from a traditional contract and billing cycle to a project organized and billed in accordance with the IPD philosophy and contracts in place. While it must be kept in mind that compensation distribution and timing is a key point in contract negotiations, the case study will be used to show possible extremes in the process.

The case-study project is a \$130 million hospital project completed in the third quarter of 2010. The construction schedule was three years. While projects of all size can utilize the IPD methodology, most agree that it is best suited for larger projects. Ghassemi observed in his study projects ranging in budgetary size of \$10 million to \$1.7 billion (Ghassemi, 2011) with the median project size of \$150 million.

With a traditional cost-plus contract or fixed price contract, the fee will be billed and received with each monthly billing. With an IPD contract the fee would be paid by the owner in accordance with the monthly billing, but would be paid into an incentive compensation pool (ICP) which is to be distributed once the project objectives and incentives are analyzed for achievement. Assuming the project metrics are met, the participants (the general contractor in this example) would then receive their fee. While this study focuses on the general contractor, it should be kept in mind that all participants to the contract could potentially be subjected to the same constraints.

The fee received on the sample project was 2.2% or \$2,788,050. This, of course, was received in monthly increments in accordance with the contract documents and is illustrated in Figure 1. The monthly billings are shown for each of the 36 construction months with the final pay period (month 37) required for final billing and payment. The monthly billings are represented in Figure 1 by the "S-shaped" curve, as expected. The revenue received is illustrated in Figure 1 as the stepped curve shown graphically as solid to easily distinguish the two. The area between the two curves indicates the cash-flow deficit to the contractor; or, in other words, the amounts of money the contractor will have to provide for financing the project.

The average age of accounts receivables for the case study project was 47 days which is consistent with a traditional monthly (30-day) billing cycle and 15-day pay cycle. Using a present value analysis and an assumed six percent present value factor, the actual fee received had a present value of \$2,596,099. In an IPD project, the fee would be delayed until the goals of the project were achieved; normally at completion of construction. This delay results in a present value of the contractor's fee in the amount of \$2,300,950 or \$295,149 less than the present value of the fee received on a monthly basis. Again, assuming a 6% discount rate, this amounts to a loss to the contractor of 10.6% of its fee or 0.23% of the contract amount. While this amount may be lessened with a different contract structure, the true IPD contract typically treats the goals as either a "yes" or a "no" and has little room for "partially achieved" goals (Becerik-Gerber, 2010)

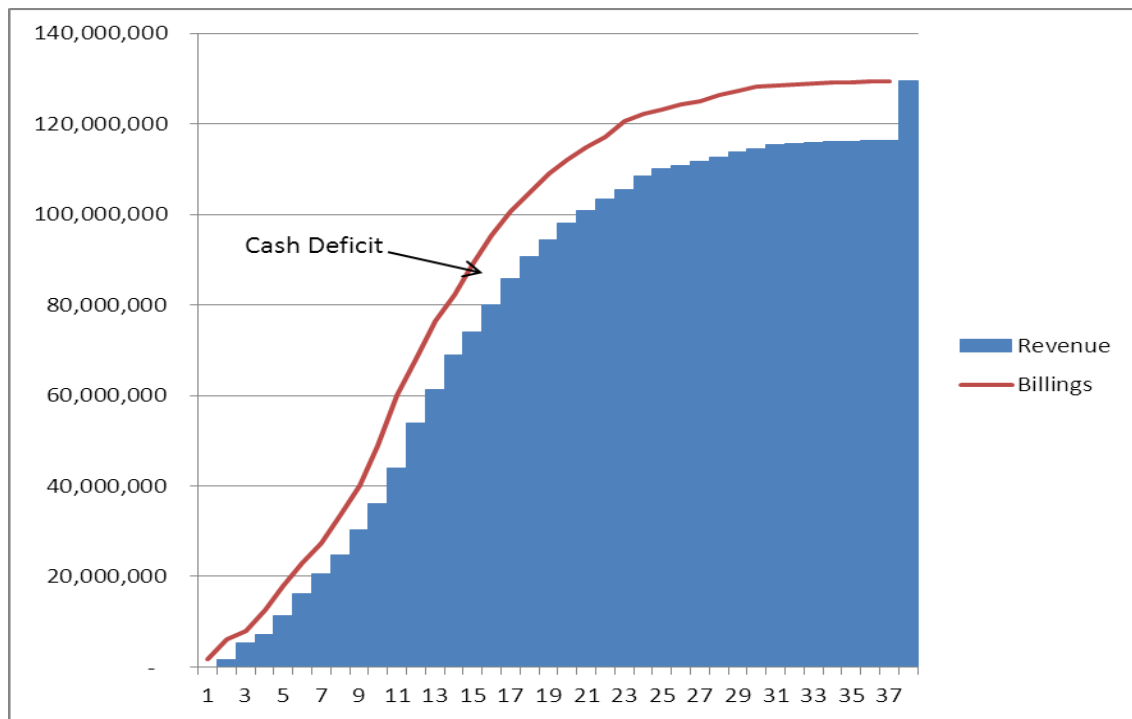


Figure 1: Project Billings and Revenue

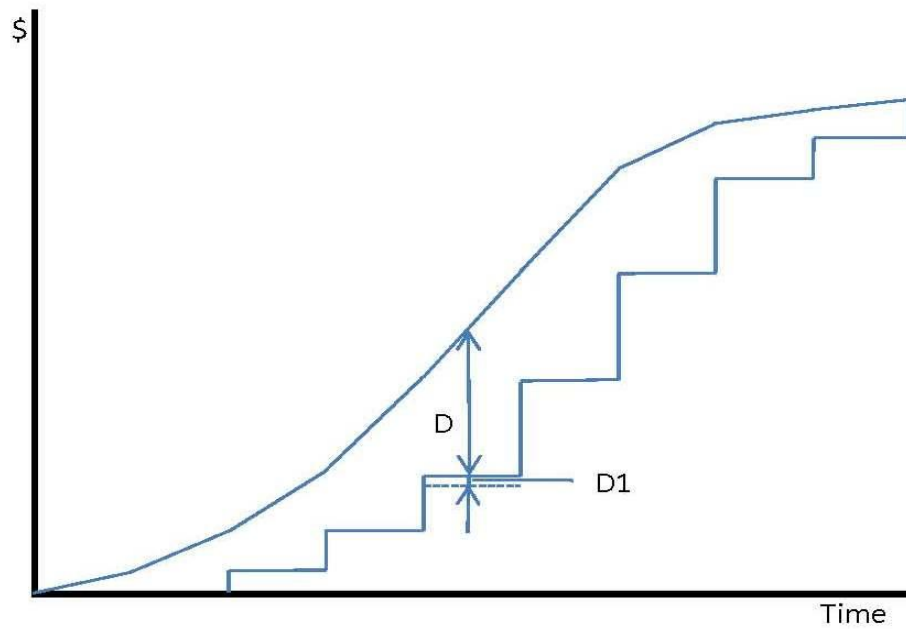


Figure 2: Profit Removed from Monthly Billing

This works to the disservice of the contractor as the IPD contract will generally be looked upon as a “cost plus” type contract where the contractor is getting reimbursed for all costs associated with the project and paid a fee for their work effort. The time and materials that the contractor includes in its billing to the owner generally does not include a cost of “financing” the project. In a lump sum type contract or guaranteed maximum price (GMP) contract, the contractor anticipates the costs of financing the project and should include this cost as a part of his estimate to the owner. This, however, is not a standard practice of cost plus contracts (Autodesk, 2008, NASFA, 2010).

While cash flow curves for a typical project billing and revenue do not graphically appear to be affected very much by this change, it does have a significant impact on the profitability of the project. As can be observed in Figure 2, the cash deficit for any month would be the amount associated with “D”. If the profit is removed from this amount the revenue curve only shifts downward the amount associated with the profit or “D1” in Figure 2. This appears a minor shift; yet, when the entire project is taken into account it does represent in excess of ten percent of the overall profitability of the project.

All contracting parties need to be aware of how this shift will impact the bottom line of the contracting parties. With a properly structured contract, and a budget that takes this into account, all parties can be placed in a position of achieving their goals.

Conclusion

Collaboration among the parties in the building process has received increased attention and emphasis with the gain in popularity of building information modeling. While BIM, in itself, does not require a change in the ways the parties align themselves contractually, it provides an opportunity for forward looking individuals to explore new and innovative ways of accomplishing the goals of a project. One such result is IPD.

True integrated project delivery should result in all participants involved in the building process acting as team members in the truest sense, where the members not only look out for their interests but the interests of the team as a whole; i.e., it should not matter how many touchdowns the quarterback throws, it’s whether the team wins that is of primary importance. While this concept has been around for a number of years, it truly is in its infancy from a practical standpoint. For IPD to reach its full potential successfully, the team concept must include all major participants.

In addition, the parties involved must embrace the six elements discussed earlier for a true IPD project. As Ghassemi, Sive, the AIA and others have stressed, the six elements are: (1) a multi-party agreement, (2) early involvement of key participants, (3) collaborative decision making and control, (4) shared risks and reward, (5) liability waivers among key participants, and (6) jointly developed project goals. All of the above characteristics must be incorporated in a project for IPD to be realized in its purest form. IPD projects will not be successful with half-hearted attempts by any of the participants. The project team must be carefully selected and assembled to have a working relationship that truly represents a team effort.

At the heart of IPD is collaboration, best-for-project thinking, and the quest for innovation. Traditional contracts often tend to discourage this kind of thinking by creating incentives for individual firms to protect their own interests at the expense of the project. However, IPD contracts have been developed that minimizes this protectionism and creates an environment where the individual firms are best served by openly collaborating and innovating. One of the central elements of the collaborative process is the sharing of risk and reward. Each party participating in the incentive compensation pool can have its compensation level raised or lowered according to its performance against predetermined targets. This is considered the most important and effective driver; a monetary reason to collaborate. However, risk and reward need to be balanced. Contracts that focus on penalties alone are not successful at encouraging collaboration for a number of reasons (1) they require participants to include contingencies, which drives up price, (2) they don’t promote relationships, which can be important in solving problems, and (3) without the potential for reward, there is no incentive to innovate (AIA 2009).

One aspect of IPD that has been overlooked in the literature is the change in the compensation schedule of the participants. While this case study has focused on a general contractor, it applies equally to other parties who would be participants in the compensation pool. By delaying ones compensation until definable project goals are achieved,

without the benefit of including this in your contract price, has a net result of discounting your overall profit or fee. In this case study, this amounted to 0.23% of the total project budget; or stated in other terms, about 10% of the contractor's fee would have dissipated by the payment lag.

Participants should keep this in mind when they are entering into an IPD agreement. In an IPD agreement provisions can be negotiated that would alleviate the financial burden that is placed on the participants by altering the terms and conditions which affect their cash flow. Most projects that claim to be IPD are really more "IPDish" than true IPD projects. That is, all elements considered essential to IPD have not been met. However, this should not discourage participants from "testing the waters" in the IPD environment. Efforts of the contracting parties that encourage collaboration and a team approach cannot be dismissed on a philosophical level. Participants that are unable to achieve their desired benefits through such efforts is usually a reflection on their attitude or unwillingness to work within the confines of the proposed methodology than a reflection on the concept. IPD is not for everyone, but everyone can learn something from the process.

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Appendix A – Billing and Cash Flow; Monthly Detail			
Month #	Monthly Billing	Traditional CM Fee Included in Monthly Billing	Present Value of Traditional CM Fee
1	\$1,598,195	\$38,226	\$37,752
2	\$3,814,081	\$91,226	\$89,647
3	\$1,819,314	\$43,515	\$42,549
4	\$4,139,104	\$99,000	\$96,321
5	\$4,756,086	\$113,757	\$110,128
6	\$4,485,508	\$107,285	\$103,346
7	\$4,070,181	\$97,352	\$93,311
8	\$5,521,567	\$132,066	\$125,954
9	\$5,894,718	\$140,991	\$133,797
10	\$7,849,773	\$187,753	\$177,287
11	\$9,964,456	\$238,332	\$223,927
12	\$7,382,208	\$176,569	\$165,072
13	\$7,586,534	\$181,457	\$168,797
14	\$6,806,522	\$119,932	\$111,010
15	\$6,829,206	\$147,008	\$135,394
16	\$6,515,237	\$140,250	\$128,528
17	\$5,228,602	\$112,553	\$102,633
18	\$4,209,283	\$90,611	\$82,213
19	\$4,034,199	\$86,842	\$78,402
20	\$3,227,930	\$69,486	\$62,420
21	\$2,719,641	\$58,544	\$52,329
22	\$2,301,816	\$49,820	\$44,310
23	\$3,448,322	\$73,960	\$65,453
24	\$1,697,340	\$36,538	\$32,174
25	\$822,297	\$17,701	\$15,509
26	\$4,946,925	\$23,591	\$20,567
27	\$809,324	\$17,422	\$15,114
28	\$1,344,821	\$28,949	\$24,988
29	\$823,242	\$17,721	\$15,220
30	\$941,624	\$20,270	\$17,323
31	\$253,594	\$5,459	\$4,642
32	\$2,669,245	\$6,499	\$5,499
33	\$269,524	\$5,802	\$4,885
34	\$98,602	\$2,123	\$1,779
35	\$56,457	\$1,215	\$1,013
36	\$168,965	\$3,637	\$3,017
37	\$400,283	\$4,588	\$3,786
	\$129,504,726	\$2,788,050	\$2,596,099