Integrating Mechanical Contractors into IPD: Does IPD Work for them?

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Abstract

Integrated Project Delivery is a non-adversarial collaborative means of moving the vertical construction industry into the 21st century of team building. This delivery method should be the leading means of construction project delivery; however, it is not. Research on this topic as a delivery method has been largely isolated to architects, engineers, and construction management organizations. In order to establish a team with the greatest opportunity for successfully bringing a project to the market using this delivery method, the major subcontractors need to be invited to the Architect, Engineering, and Construction (AEC) team. Their acceptance to an invitation, as does the project's success, heavily relies on IPD delivery knowledge, experience, and trust.
It appears major mechanical (and plumbing) contractors seem hesitant to participate in this process because of risk sharing, organizational structure, and BIM. The researchers surveyed 32 of the top 64 mechanical contractors involved in construction. The researchers plan to explore further research.

Key Words: Integrated Project Delivery, Project Delivery Methods, Mechanical Subcontractors, Collaborative

INTRODUCTION

The Financial Management Institute (FMI) and the Construction Management Association of America (CMAA) surveyed owners and discovered that when the owners were asked to define the greatest improvement potential for the construction industry, the most popular response included more use of integrated project delivery (FMI, 2009). In response to ownership's desire for more use of integrated project delivery, the construction industry seeks methods to increase collaboration and find strategies to move construction forward in a positive collaborative manner. Thereby increasing productivity while increasing quality and reducing costs. A survey of industry professionals revealed that IPD is perceived to produce fewer change orders, more cost savings, and shorter schedules (Kent and Becerik-Gerber 2010). This has resulted in different construction delivery methods being explored and developed to facilitate this goal. Ultimately, the owner of the project decides the design and construction of a project and its delivery method. Although IPD seems to best fit unique projects that are apt to face changes

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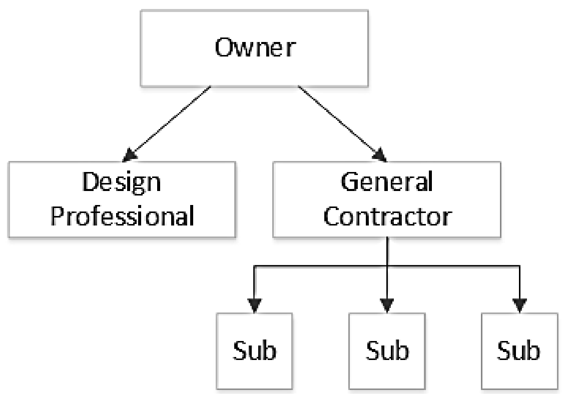
during project delivery, a knowledgeable owner aids in the success of the collaborative relationship. (Thomsen 2009).

Definition of Terms

The researchers highlight four basic categories, which are Design-Bid-Build ("DBB"), Construction Manager at Risk ("CMR"), Design-Build ("DB") and Integrated Project Delivery (“IPD”). IPD will be defined in the following section. Design-Bid-Build, Construction Manager at Risk, and Design-Build will be addressed in this section, as they are the most common project delivery systems used in construction today. (Pocock et al. 1996). The project delivery system has been divided into three basic areas: commercial terms, operating system, and project organization (Smith et al. 2011). The commercial terms alludes to the legal relationships among different parties, the operating system describes the project management techniques used on the project, and the project organization point out how the parties are organized. In short, a project deliver system is a system that determines the relationships among the different project stakeholders and their timing of engagement to provide a facility. El Asmar (2012)

Design-Bid-Build has been the leading project delivery method for the bulk of the 1900s. see Figure 1.

Figure 1: Contractual Relationship for Design-Bid-Build (Iwanski, 2013)

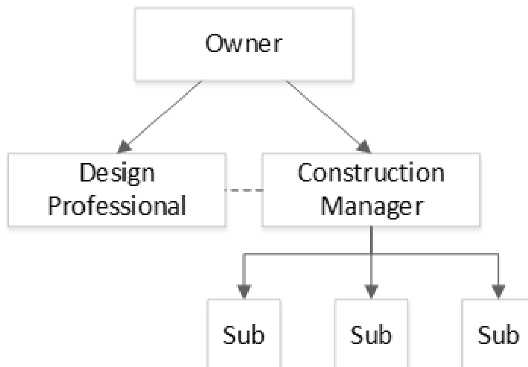


Many have blamed this delivery system for the issues facing the construction industry today (Konchar and Sanvido 1998; Pocock et al. 1996; Rojas and Kell 2008). Design-Bid-Build is often referred to as a traditional project delivery method. It is made up of three distinct and orderly project phases: design, procurement, and construction. (CMAA, An Owner's Guide, 2012). Collaboration is often mentioned in this delivery method, but the contractual structure of this delivery system does more for breading adversarial relationships then collaborative ones. These conflicts tend to increase costs by expanding schedules and and seeking out changes. (Haskel). In this delivery method the designer and the general contractor have little collaboration. The general contractor does not provide input during the design process. That input could potentially increase constructability and reduce costs. The general contractor comes on board after the design is complete, when the influence on cost has diminished. Additionally, the focus on selecting the general contractor for the lowest price disregards the importance of complete life-cycle costs (Ballard 2008). The subcontractors are contracted under the same upstream relationship that as the general contractor and any true chance of partnering in a collaborative relationship is typically lost (Li et al. 2000). Conflicts with in the construction team are more likely to occur because the success of the entire project rests with a single party.

Additionally, these conflicts may leave the owner exposed. (Haskel). . Each stakeholder is encouraged to optimize its own opportunities rather than to collaborate and share good ideas and create innovation through mutual coordination and cooperation (Matthews and Howell 2005).

Globalization's demand for faster delivery systems created the atmosphere for other project delivery methods to develop (Kent and Becerik-Gerber, 2010). These deliver methods developed with the motives of identifying and addressing cost control, safety, and quality while simultaneously reducing project delivery time (Kenig, 2011). Collaboration became the ingredient needed to successfully reach a reduction in waste and to optimize efficiency. This delivery method, CM at Risk, has been around for nearly 40 years. see Figure 2.

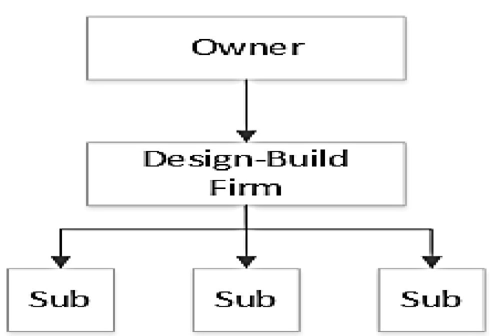
Figure 2: Contractual Relationship for Construction Manager at Risk (Iwanski, 2013)



This delivery method is generally considered to be superior to DBB (Kulkarni, Rybkowski & Smith, 2012; DeBernard, 2007). The CM assumes the construction risk and acts as consultant to the owner during the design and development phase. The risk is contractually transferred to the CM/GC in this method. (CMAA, 2012)

With the purpose of increasing collaboration and to develop a system that outperforms Design-Bid-Build a delivery system named Design-Build (DB) was developed (Ibbs et al., 2003) as seen in Figure 3.

Figure 3: Contractual Relationship for Design-Build (Iwanski, 2013)



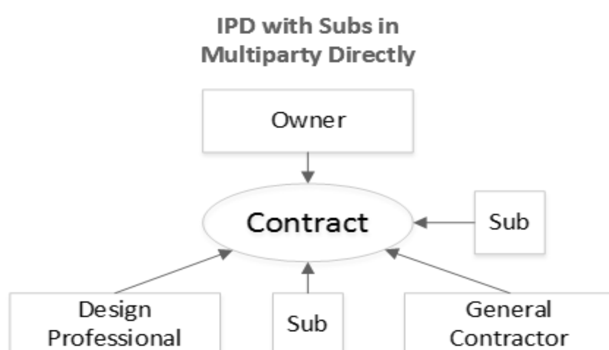
The three traditional phases of the project are combined as the architectural, engineering, and construction are under on contract. (Figure 1-3) Literature surveys and empirical research has shown that time, and potentially, money can be saved by using the DB as a project delivery method. (Songer and Molenaar 1996; Konchar and Sanvido 1998; Molenaar et al. 1999) Two or more firms can work collaboratively or a single entity can function as the design-builder. (CMAA, 2012) This process allows for risk to be transferred from the owner to the design/build team. (Haskel).

Literature Review

IPD has been defined as is a delivery system that is distinguished by a multiparty agreement and the early involvement of the key participants. (El Asmar 2012).IPD is a new approach to project delivery with a focus on an enhanced collaborative contract structure through relational contracting (Smith et al. 2011). IPD as a project delivery method improves project communication by not only allowing, but encouraging all project participants to communicate directly with each other, thus simplifying the complex communication chain of command (Nelson, 2011). An intended consequence of a multiparty contract is to encourage collaboration and coordination throughout all stages of a project (Kent and Becerik-Gerber, 2010). The multiparty contract aims to align the goals of all project stakeholders by awarding financial incentives for overall performance, not individual project performance (Tommelein et al., 1999). Additionally, a multiparty contract is constructed to also share risk as well as is reward. This includes shared contingency pools (Singleton and Hamzeh 2011).

IPD as a delivery method contractually binds the team to each other. Not only the owner, architect, and engineer are bound, but it can reach to the subcontractors and major system and equipment suppliers as well. This team will function as a single entity from the project inception continuously throughout its lifecycle. (Lee, 2013) IPD differentiates itself from the DBB and DB methods by bringing the three main parties together from the beginning of the project in a unique way, see Figure 4.

Figure 4: Contractual Relationship for Integrated Project Delivery with Mechanical Subcontractor (Iwanski, 2013)



The methods to distribute risk, realign working relationships and realize profits is the differentiator for IPD. This delivery mechanism could be perceived to be a project philosophy or a project delivery method (AIA, Integrated Project Delivery, 2010).

Experience and trust are important factor for the success of the project (Kent and Becerik-Gerber, 2010). When parties lack both trust and experience, coupled with the lack of financial incentives or repeat business, collaboration may not be in the party’s best interest

(Tommelein et al., 1999). To execute an IPD as a delivery method, it is necessary that the a Owner, A/E and CM/GC are singularly contracted to share risk and benefits (Singleton and Hamzeh, 2011).

In the effort to experience fewer change orders or change directives, decisions must be made collaboratively, with consensus. One of the positive by-products of an IPD is the contractor is not attempting to take advantage of the owner and conversely, the owner is not attempting to take advantage of the contractor by having the contractor perform changes without compensation (Ghassemi and Becerik-Gerber, 2011). Ideally, this collaborative atmosphere results in a more cohesive unit with the goal of to solving problems and issues prior to construction start (Li et al., 2000). IPD avoids acrimonious project relationships by requiring liability waivers. If the team is on the same side there is a better change of seeking mutual solutions rather than assigning blame. (AIA, Integrated Project Delivery, 2010).

The Challenges of IPD

With regards to the commonly-used (traditional) project delivery systems (i.e., design-bid-build, construction manager at risk, and design-build), significant numbers of studies and research have been conducted. Table 1 provides the details between different delivery methods.

Table 1: Selecting a Project Delivery Method, The Best Solutions

Selection Criteria	Low Bidder	Best Value	Best Qualifications
Project Delivery Method	Selection based solely on Price	Selection a Weighted Combination of Price and Qualifications	Selection based solely on Qualifications
Design-Bid-Build	Most Common	Common; Price evaluation based on construction cost	Rare
Construction Management at Risk	Rare	Most Common; Price evaluation based on CMR, Fees and General Conditions	Common
Design / Build	Common	Most Common; Price evaluation based on Fees and GCs, may not include Construction Cost	Common
Integrated Project Delivery	Rare	Common	Most Common

Source: CMAA Owner's Guide to Project Delivery Methods - August 2012

These studies detailed how risk is allocated and handled between the different delivery methods as well as the advantages and disadvantages of implementing each system, and where the areas of concerns and conflicts lie.

Research has also provided decision support regarding which commonly-used project delivery system to choose based on a given scenario (Konchar, 1997; Konchar & Sanvido, 1998; Luzzatto, Guggemos, & Khattab, 2007; Oyetunji, 2001; and Plugge, 2007). A drawback of IPD is that this same depth of research, especially from the subcontractor vantage point, is lacking (Lewis and Ozbek, 2015).

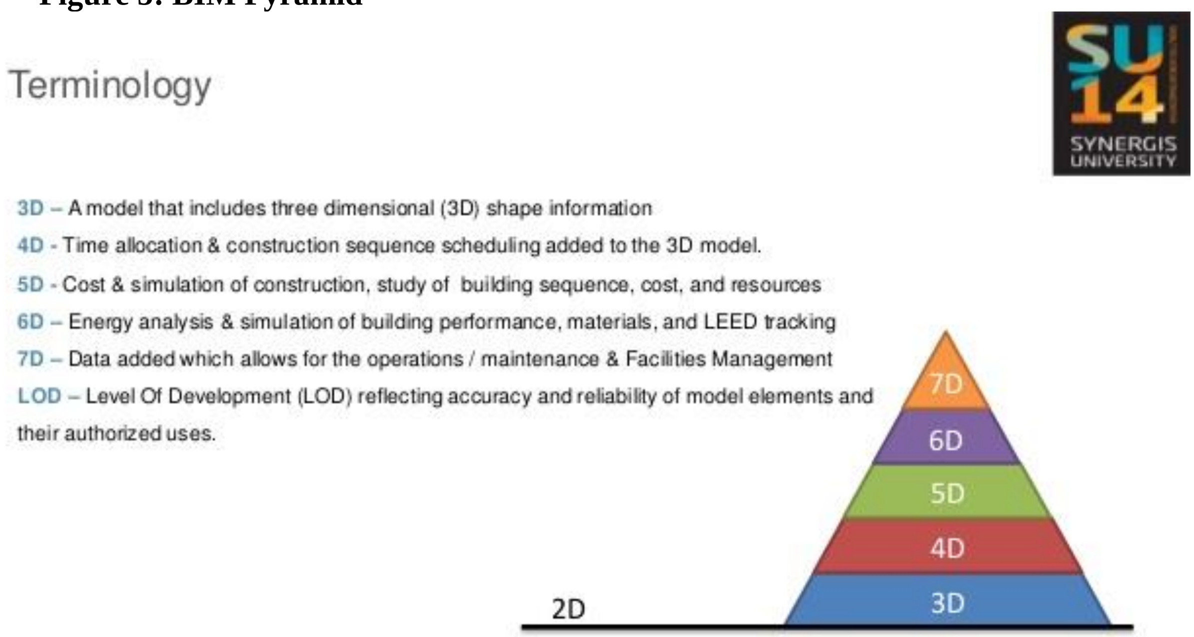
When entering an IPD there are areas of concern which include the careful drafting of a contract to avoid a free-rider scenario, the careful selection of subcontractors, and the waiver of liability (Lewis, 2012). The team would not want to work with an A/E, CM/GC or any other member of the team that barely performs resulting in losses for all. That is what the free-rider scenario addresses. The contract should provide for recourse to guard against this type of behavior. The waiver of liability implies that this issue needs to be addressed (AIA, 2007; Thomsen, Darrington, Dunne, & Lichtig, 2009). The research leads the authors to believe unknowing participates have a lower likelihood of executing a successful IPD. There is not a set number of participants that should be invited to the IPD team. However, it is important that the subcontractors are fully competent and capable of performing the duration of the project. The waiver of liability needs to be constructed, to account for potential construction defect litigation. Insurance provisions should be considered to cover potential losses for all parties and possibly deductible costs that are shared or proportionate to one's project role considered.

Building Information Modeling

Building Information Modeling (BIM) is: (1) an integrated design and construction process that results in better quality buildings at lower cost with a reduction in project schedule, (2) contains precise geometry and data needed to support the construction, fabrication, and procurement activities, and (3) accommodates many of the functions needed to model the life cycle of the building, providing the basis for new design and construction capabilities and changes in the roles and relationships among a project team (Eastman et al., 2008).

The BIM model helps visualize the geometry, geographic information, and spatial relationship of building elements (Bazjanac, 2006). The overall complexity of mechanical systems forces the Mechanical contractor to play an important role during design, construction, and facility operations of projects which places a high impact on the overall project success, see Figure 5.

Figure 5: BIM Pyramid



The effort required and demanded during mechanical construction has increased significantly because of the importance of energy efficiency, compared to previous decades (Boktor et al., 2013). This has encouraged mechanical contractors to become the top BIM adopters within the construction industry (Jones et al., 2008). A study conducted by Hanna et al.

(2013) analyzed the interview results conducted with mechanical contractors in North America in order to get an understanding of BIM practices within the mechanical industry. The findings of their study showed that mechanical contractors believe that the most evident benefits of implementing BIM include effective clash detection and better visualization. This means field conflicts and system deficiencies could be greatly reduced. Ultimately, the bottom line is impacted because of cost savings from the reduced amount of rework (Hanna et al., 2013). Stanford University's Center for Integrated Facility Engineering concluded from its study that BIM reduces up to 40% of change out of the budget and reduce up to 80% of time required to perform a cost estimate. BIM can also be used for scheduling, energy analysis, and facilities management. Finally, the study conducted by Khanzode et al. (2008) reported 5-25% field productivity increase observed by the mechanical contractor as a result of implementing BIM tools.

METHOD

The researchers sought to address the hesitation of mechanical subcontractors to sign up for IPD contracts. To do this the researchers surveyed 32 commercial mechanical subcontractors. These mechanical subcontractors represent the major mechanical contractors of the construction industry in America. The major mechanical subcontractors were chosen because the vertical construction projects that would greatly benefit from this delivery method (such as hospitals, semi-conductor manufacturing facilities, and sports stadiums) attribute a significant percentage of the construction budget to the mechanical contracting (Yoders, 2008). The mechanical subcontractor traditionally has significant involvement from the design stages of a project to facilities management especially those projects that are complex in nature. They are responsible for, and in most cases drive the Building Information Modeling (BIM) process as their design input often modify the overall project design (Boktor, 2013). The mechanical contracting porting of the project is made up of piping, plumbing, and heating, ventilation, and air conditioning.

Of the Top 100 Mechanical Contractors, we eliminated 36 because they are manufacturers and/or supplies and do not do actual field work as vertical constructors. Vertical construction refers to the built environments that we live, work, and play in (Brenner, 2015), namely construction projects that are not horizontal (such as, roads, highways, bridges), but rather vertical such as commercial, office and residential buildings. Of the remaining 64 Top Mechanical Contractors we personally interviewed 32 or 50% of these firms. In particular, we interviewed senior management that would be involved with responding to the owner's desire of more integrated construction teams.

We examined each firm to determine whether they were a supplier or a constructor or an agglomeration of firms. For example, Emcor Group which is number one on the list, is made up of (75) wholly owned subsidiaries. They, Emcor, have been removed from the list because of redundancy. Three companies that included in the Emcor group are also listed individually and represented on the top 100 list. Other reasons for exclusion included, core business is equipment manufacturing, fire protection, mechanical controls provider, residential construction, and underground mechanical. Of the 32 companies interviewed, they reported revenues of $65 million to over $500 million. See Table 2, the companies that were excluded are in red.

Table 2: Contractor's Top 100: Who They Are

Rank	Company	Revenue $ Millions

1	EMCOR Group	$	2,370.00
2	Johnson Controls, Building Efficiency Div., N. American Service	$	2,127.00
3	APi Group Inc.	$	1,358.34
4	Comfort Systems USA	$	1,108.28
5	Service Experts Div. of Lennox Industries	$	590.30
6	ARS/Rescue Rooter	$	527.00
7	ACCO Engineered Systems	$	525.00
8	Southland Industries	$	445.00
9	McKinstry Co.	$	397.00
10	Roto-Rooter	$	354.74
11	TDIndustries	$	324.00
12	Limbach Facility Services LLC	$	300.00
13	Nooter Construction	$	289.80
14	The State Group	$	265.00
15	Hardy Corp.	$	260.00
16	John E. Green	$	250.00
17	Harder Mechanical Contractors Inc.	$	249.00
18	Kinetics Systems Inc.	$	238.40
19	MMC Corp.	$	233.50
20	Murphy Co. Mechanical Contractors & Engineers	$	224.15
21	McKenney's Inc. Mechanical Contractors & Engineers	$	220.00
22	ColonialWebb Contractors	$	209.50
23	Sterling Boiler & Mechanical Inc.	$	201.50
24	Waldinger Corp.	$	201.00
25	J.F. Ahern	$	199.22
26	W.E. Bowers	$	196.50
27	Hill Mechanical Group	$	195.33
28	Clockwork Home Services	$	194.50
29	Critchfield Mechanical Inc.	$	190.82
30	John E. Green Co.	$	189.50
31	Brandt Engineering Co.	$	177.60
32	Harris Cos.	$	176.00
33	P1 Group	$	173.61
34	U.S. Engineering Co.	$	173.00
35	Metropolitan Mechanical Contractors Inc.	$	165.91
36	RK Mechanical	$	164.90
37	Midwest Mechanical Contractors	$	157.40
38	JH Kelly	$	157.29
39	Apollo Sheet Metal	$	150.00
40	Coastal Mechanical	$	149.44
41	Greenstar Services Corp.	$	145.60

42	Fresh Meadow Mechanical	$	144.87
43	Ivey Mechanical Co. LLC	$	140.00
44	Performance Mechanical	$	140.00
45	University Mechanical Contractors Inc.	$	140.00
46	Bahnson Holdings Inc.	$	139.88
47	Worth & Co.	$	139.30
48	Sauer Inc.	$	139.00
49	The Par Group	$	138.96
50	Mechanical Inc	$	136.08
51	John W. Danforth	$	136.05
52	Murray Co.	$	136.00
53	Titan Contracting & Leasing/The Horn Cos.	$	135.50
54	Hooper Corp.	$	135.44
55	CorVal Group	$	130.00
56	Egan Cos. Inc.	$	124.47
57	Fire & Life Safety America	$	123.00
58	J.C. Cannistraro	$	121.00
59	Elkhorn Construction	$	120.00
60	Sanders Bros. Inc.	$	119.00
61	McCarl's Inc.	$	117.19
62	Roth Bros. Inc.	$	114.00
63	CECO Environmental	$	113.90
64	John J. Kirlin	$	113.20
65	Therma Corp.	$	112.70
66	Reedy Industries Inc.	$	110.00
67	Southern Air Inc.	$	110.00
68	Pierce Associates	$	105.00
69	Scheck Industries Inc.	$	104.50
70	Starcon International	$	103.00
71	Lee Co.	$	102.00
72	VSC Fire & Security	$	99.55
73	Joule Industrial Contractors	$	98.60
74	Shapiro & Duncan	$	95.21
75	Yearout Mechanical	$	93.82
76	M.B. Haynes Corp.	$	93.32
77	Foley Co.	$	93.10
78	Letsos Co.	$	91.72
79	Hermanson Co. LLP	$	90.79
80	Dorvin D. Leis Co. Inc.	$	90.03
81	Grunau Co.	$	87.00
82	Herman Goldner Co.	$	86.44

83	CCI Mechanical Inc.	$	85.80
84	Harry Grodsky & Co. Inc.	$	81.43
85	A.O. Reed & Co.	$	81.00
86	Corrigan Co. Mechanical Contractors	$	80.00
87	Pacific Rim Mechanical Contractors	$	77.57
88	Lawman Heating & Cooling Inc.	$	77.41
89	Shoffner Kalthoff	$	76.36
90	KSW Inc.	$	76.29
91	Charles E. Jarrell Contracting Inc.	$	75.50
92	AZCO Inc.	$	72.80
93	McKamish Inc.	$	72.50
94	Interstate Plumbing & Air Conditioning	$	71.58
95	MLN Co.	$	71.00
96	Environmental Air Systems	$	70.00
97	S3H Inc.	$	70.00
98	Entech Sales & Service	$	69.46
99	Mechanical Systems & Services Inc.	$	68.00
100	The Farfield Co.	$	66.70

As these interviews were in person or on the phone the researchers created a baseline of 10 questions to lay a foundation of knowledge and understanding upon which a base for the conversation on IPD as a delivery method and whether it worked for mechanical subcontractors. Additionally, the baseline responses were used to separate the respondents into two categories, those contractors with IPD experience and those without. The baseline questions were intended to offer an insight to the level of knowledge and comfort that these mechanical contractors, which are located all over the United States. The 32 respondents represent the Top 100 Mechanical Contractors in America. All of the 32 subcontractors selected chose to participate in the survey and interview.

The representative respondents for these mechanical contracting firms were mainly project managers. The project management level for mechanical contractors is and has to be comfortable with the contract that sets the parameters in which they will function. Therefore they, project managers, are valuable resources for ascertaining information about the contracts that are common and comfortable to execute for their organizations. The respondents were further questioned in person.

RESULTS

Question 1, asked about the respondent's familiarity with integrated project delivery (IPD) as a delivery method. The value of this line of questioning is to determine if this delivery method is well known by these industry respondents. Only one of the respondents was unfamiliar with this delivery method. That represents 3% of the respondents polled.

Question 2, asked the respondents to rank the types of delivery methods that they use. The number one delivery method used is Design-Bid-Build (78%), followed by Design-Build (19%). Only 3% of the respondents had been involved in an IPD.

Question 3, asked how the subcontractor's services typically are procured, best value, qualifications, or a combination? At 63% (20 of 32) the majority response was that their services were procured by a combination of best value and qualifications. This was follow by best value at 34% (11 of 32) and only 3% (1 of 32) claiming that qualifications alone were the factor for procuring their services.

Question 4, sought to identify the element mechanical contractors were most adverse to. By an overwhelming margin additional risk, especially risk not associated with their scope of work to be performed was identified as unacceptable. Given that as a choice (30 of 32) made that choice 1 and the remaining (2 of 32) made that their choice number 2.

Question 5, explored the comfort level with the respondents in not having a price commitment in place early in the process. The choices were very comfortable, comfortable, uncomfortable, and very uncomfortable. Of the 32 respondents, 38% (12 of 32) were comfortable, 44% (14 of 32) were uncomfortable, and 16% (5 of 32) were very uncomfortable. 60% of the respondents were not comfortable with not having a price commitment in place early in the process.

Question 6, explored the comfort level with of the respondents in not having schedule commitments in place early in the process. None of the respondents were very comfortable, and only 22% (7 of 32) were comfortable. The remaining 78% were not comfortable with not having a schedule in place early in the process.

Question 7, sought to identify an acceptable percentage of accountability and risk the mechanical contractor would be willing to accept outside of their expertise. An overwhelming response was 0%. Given the option of less than 5%, 0% was still the choice of all 32 respondents.

Question 8, explored the respondents familiarity with AIA-141 Design Build contract. All 32 of the respondents were familiar with the design build contract with 44% (14 of 32) responding very familiar.

Question 9, asked the respondents if shared risk in the form of an IPD multi-party contract is acceptable with their publicly funded clients? The response choices were (1) yes, (2) no, (3) unsure. 22% (7 of 32) responded no, the remaining 78% (25 of 32) responded unsure.

Question 10, asked the respondents if an IPD contract could be used in the place of an Design Build (DB) contract with the majority of their clients. 94% (30 of 32) of the respondents responded no.

The researchers wanted to ensure geographical diversity across the USA. The researchers were satisfied that the respondents represent all regions of the United States. On average the conversation lasted an additional 15-18 minutes beyond the survey to ascertain the challenges of mechanical subcontractors and whether they would sign on to an IPD contract.

Mechanical Contractors without IPD experience

After further questioning in person it became evident that the mechanical contractors without IPD experience were cautiously open exploring IPD as a delivery method, but had several hesitations. The common themes were that there was not enough historical data for them to seek out IPDs to pursue. Their individual company business models were not at present set up to take advantage of IPDs as a delivery model and if this project delivery method was not a significant percentage of the projects coming to market, was it really worth a company evolution. BIM would be an important factor for the success of the IPD project, that fact alone can be prohibitive. The issues that arose where that in general IPD did not work, however, it could be made to work if it was the right client, right project, right A/E/C team and for the right price.

The right client is an important factor. In order for an IPD to become more common in the marketplace, the client has to be willing to engage in a contractual relationship that has been rarely used and not widely known by all of the parties. The mechanical sub needs to be invited to be participant on the AEC team. The client needs to trust that the parties will be able to get along and find resolution without additional costs. The client has to be savvy enough to put these building experts in the same room together and not be intimidated by AEC team collaboration. The client has to be a long-term stake-holder.

Mechanical Contractors with IPD experience

Further discussion with mechanical contractors with IPD experience resulted in the following contractor input. Finding the right project is a necessity. As IPD currently exists, it cannot be applied to a wide range and variety of projects. The execution of an IPD contract requires detailed and sustained owner-involvement throughout the design and construction process. Constructing public projects, where regulatory and bureaucratic processes may discourage or prohibit shared decision-making and risk-taking may be an additional hurdle to overcome. An IPD does not allow for a best-value mechanical subcontractor selection, or even a combination of best-value and qualifications mechanical subcontractor selection. A standard cost has not been defined but the successful projects that were examined for the purpose of this paper and that have used IPD as a delivery method have been at least $10 million in mechanical scope. The successful projects that were examined for the purpose of this paper were all health care related, specifically hospitals.

The team needs to be carefully put together. The A/E/C team has several obstacles to overcome. First and foremost, trust that each team member will and can execute their scope without additional cost to the project. Given that profits are shared in a profit pool, a weak team member places additional jeopardy on that profit pot. There is the contract hurdle. The language has to be accepted by all parties. It is vital that the trust hurdle be overcome. The current team has to function for the success of the project and not the success of their respective organizations. The insurance hurdle is an issue to be overcome. Generally, insurance companies, according to one of the interviewees, don't like to hear that none of the parties on the AEC team can sue another member of the team. That hurdle may be the hardest to overcome in order for IPD to become common in the mechanical subcontracting world.

Finally, the price has to be right. This means that in order for IPD to become more common in the marketplace, the client has to get the project that they are expecting, at the price that they are expecting and the contractor has to make a profit at that price. However, even in an environment conducive for the IPD process to experience success, the mechanical contractor has to be willing to accept additional risk. According to Richard Gray Thomas, of Thomas, Feldman & Wilshusen, LLP Dallas, Texas, "The vast majority of commercial construction is performed by subcontractors. It has been estimated that subcontractors accomplish between 75% and 85% of the commercial construction in this country. The role of most general contractors in today's construction industry is that of "brokers of construction services." With the subcontractors having most of the capital invested in the construction project and arguable more attached risk than any other segment. Why should the mechanical contractor take on anymore?

DISCUSSION

IPD is an innovative system, but there are hurdles to overcome and it may not work for most mechanical subcontractors. While IPD is a new and exciting delivery method to be considered that highly encourages collaboration, there are many challenges to overcome. These challenges can be summarized as requiring the right client, right project, a carefully put together team (the right one) and the right price. It seems that this might exist within healthcare and this would be worth further exploring, but baring healthcare it seems IPD does not guarantee success or collaboration. The researchers have some ideas for future research that could change the contractual nature of IPD when it comes to mechanical subcontractors and perhaps other subcontractors. The researchers were fascinated by the concepts of IPD being incorporated into other contract types and believe that a hybrid contract or a different financial structure could be a solution worth exploring to increase collaboration within the mechanical subcontracting world. As IPD type concepts, even if incorporated into other contractual structures could result in increased collaboration, reduced risk and speedier deliveries which is the direction where the construction industry as a whole needs to move in.

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