

# Contractors' Knowledge and Understanding of Design Assist Contracting Risks

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Complex building projects with critical schedule demands call for early collaboration by the building team. Using a form of Integrated Project Delivery (IPD) known as Design-Assist, this collaboration now includes the specialty subcontractor with expert knowledge that provide timely input on a variety of critical factors including key design decisions. Recommendations and decisions pertaining to design by the specialty subcontractor may be placing various forms of risk on the subcontractor. Courts have ruled performing design-assist “blurs the line” between designer and builder. This blurring of the line can lead to the specialty subcontractor taking on design liability. The purpose of this study is to understand how contractors define design-assist and seeks to better understand what scenarios contractors feel represent design-assist. The research utilized a mixed methods approach using an anonymous survey followed by a semi-structured interview process. Results from the sample revealed consistent attitudes towards the definition of design-assist as well as consistent views of what scenarios accurately describe design-assist. Research also showed a difference in attitudes between general contractors and subcontractors with regards to the transfer of design liability. Interview discussions revealed the need to augment contract language and perhaps create a design-assist insurance program on projects which utilize this method.

**Key Words:** delivery method; design-assist; design-build; design liability; integrated project delivery

## Introduction

As construction projects grow in complexity and scale, technology and techniques has led to specialization. A busy construction market, strict organizational policies, governmental demands, and the need for specialization have all contributed to the need for a variety of project delivery methods. Unfortunately, project delivery methods do not satisfy all of the constituents needs. Alternative project delivery options offer the building team a unique set of advantages and disadvantages. These project delivery methods are the industries reaction to the “Need for Speed” thanks to intense global competition in the corporate race to the marketplace (Kenig, 2011).

The three most commonly used delivery methods include Design-Build (DB), Design-Bid-Build (DBB), and Construction Management at Risk (CMAR) (Kenig, 2011). Presuming the construction team’s main goals include schedule, budget, safety, and quality goals, the need to foster early collaboration to leverage the contractors’ knowledge is a key to success. The Integrated Project Delivery (IPD) process was created over the last decade to integrate the Owner, Design Team, and Constructor to foster collaboration. Today, IPD, DB and CMAR delivery methods all offer the ability to utilize the contractors’ knowledge. Unfortunately, the contracts used are not adequately written to properly support these latest delivery methods. With the need to involve specialty contractors due to the project’s specializations, proper subcontracting is vital.

While eliminating waste, the IPD process focuses on team collaborations. Due to project specializations, the project design team has the need to “step away” from the traditional design process methods, i.e. architect designs it, then contractor prices it... This age old method puts complex projects at potential schedule and budget risk. In traditional CMAR settings, “The contractor’s role is to provide input to the designer to increase the constructability of designs

and to decrease schedule durations through overlapping the design and construction phases” (Konchar & Sanvido, 1998). On large complex projects using design-assist, it is now more common to involve several key specialty subcontractors simultaneously. This larger and enhanced preconstruction team is now being used to assist the design team with the design of the project.

This early involvement by specialty subcontractors with the general contractor, design team, various consultants, and Owner has led to what is known as relational contracting. This process of integrated project delivery and collaboration, has led to projects starting with a high level of common goal sharing and trustworthiness amongst the team. Defining design-assist can vary. “The construction industry, like so many other industries, has evolved in so many different directions simultaneously that the meanings of industry terms have become quite diverse... individuals and groups continue to independently decide on their own meanings” (Kenig, 2011). In fact, it is common for many in the construction industry to confuse design-assist with design-build. The main interest and concern and thus the focus of this research is the question, “How are contractors defining design-assist?” Is there a common understanding and level of design obligation in place? Is the industry slowly coming to the conclusion on what design-assist means?

“Design-assist is a collaborative team-oriented project delivery method which capitalizes on the benefits of early engagement by design-assist subcontractors. The process is able to utilize the specialty expertise to optimize project cost, value and constructability efficiency” (Arizona Board of Regents/Alliance for Construction Excellence, 2007). The objective is to maximize overall value, the speed of construction, and the quality of the final product. Because of recent successful project experiences, the advantages DA brings to a project, has become quite popular in the last ten years and is being considered more and more.

At the subcontractor level, it has been customary and mutually beneficial for the mechanical, electrical, plumbing, and fire protection (MEPFP) trades to offer the ability to perform DB services using their own in house licensed engineers to design the systems to the client or owner’s building criteria. This delivery method intentionally transfers design liability to the DB firm. Because many MEPFP firms employ licensed engineers on staff, these types of firms typically carry adequate types and levels of Professional Liability (PL) and Errors & Omission (E&O) coverages which are “a form of malpractice insurance insuring against claims arising from the alleged malpractice of a designer” (Kenig, 2011). Having proper coverages in place, prudently limits financial risk to these firms. Unfortunately, this may not be the case with many structural and architectural specialty subcontractors outside of the MEPFP group new to performing design-assist.

More recently, other trades including concrete, precast concrete, structural steel, and curtain wall / façade systems have experienced an increase in requests to assist with the design of their proposed systems. The early collaboration enable early benefits via questioning and consideration when designing complex systems. This involvement leads to the minimization of delays and costly rework during construction due to a decrease in requests for information (RFI), site logistical issues, constructability issues, as well as operational and maintenance issues. The end result is that the long term stakeholders, the client and persons who manage the building, are left with an asset that is built well and is efficient.

The sample population for this study was mainly US specialty subcontractors who regularly perform design-assist services for commercial type building projects. The sample population also included representatives from the CM/GC who typically are engaged in a subcontract relationship with the specialty subcontractor firms or may have the expertise and ability to self-perform a specific scope of work. It is important to note, it is the CM/GC who typically hold the Contract with the client and may choose to pass down all risks, such as design liability, to their subcontractors.

This paper addresses the following questions:

- (1) Is there an accepted design-assist definition?
- (2) How common is design-assist?
- (3) Is there a need for more adequate contract language protecting those performing design-assist?

Combining the design team and the contractors prior to pricing is the fundamental nature of design-assist (DA). “The rise of concurrent engineering in construction demands early team formation and constant communication

throughout the project life cycle” (O’Brien, Soibelman, & Elvin, 2003). Design-assist has proven to be a successful alternative to traditional DB or CMAR methods. Unfortunately, design-assist also has its risks.

## Literature Review

“Risk has been defined as a combination of threat and vulnerability when the two condition overlap” (Akintoye & Macleod, 1977). Risk can also be viewed as “a difference of actual and expected results” (Peckiene & Ustinovicus, 2013). Risk can be described as “the probability of an event occurring and the consequences of its occurrence. The risk events...will generally have a negative effect on projects...or possibly rendering the project itself impractical” (Shapiro, 2013). Because of the real and therefore, perceived risk on projects, the last twenty years have witnessed the construction industry focus on Lean Construction or Integrated Project Delivery (IPD) as a way to manage and mitigate the events which could go wrong on a project. “Construction projects have an abundance of risk. Contractors cope with it and owners pay for it” (Peckiene & Ustinovicus, 2013). Considering design-assist in particular, the risk has been identified as the transfer of design liability to the contractor or subcontractor.

While there is research using case studies involving contractors during preconstruction as well as the analyzation and comparison of the different delivery methods, there is little to no research focused specifically on design-assist. In 2007, the Arizona Board of Regents/Alliance for Construction Excellence through Arizona State University authored an article entitled *Design Assist: Best method approach to subcontracting*, for the Alliance for Construction Excellence which introduced, presented, and explained design-assist. This article posed thought provoking questions and considerations to consider on this relatively new delivery method.

Relatively recently in 2014, David Kelly P.E. authored an article entitled *Examination of Design-Assist Subcontracting* in the Journal of Legal Affairs and Dispute Resolution in Engineering and Construction. This article discusses at length the design-assist process and enlightens the reader on the perceived risks of design-assist.

Research stresses the importance of design-assist not being confused with design-build. “Significant differences revolve around contracts, design liability, and procurement processes” (Kelly, 2014). The design-build (DB) delivery method is intended to not only hire a firm to perform design and construction, but this delivery method also intends to transfer design liability to the DB firm hired.

The term design-assist may have several definitions. No research was found on this subject. Understanding the industry definition of design-assist may vary from trade to trade. One goal of our research was to ask participants how they define the term design-assist. Recent publications described design-assist as “a process that allows the subcontractor to assist the design team through consultation without taking responsibility for the design” by providing key design direction and services (Kenig, 2011). In most cases, the subcontractor will work as a design assistant to the design team. Kenig continues, “The subcontractor is expected to collaborate and provide full cooperation and information to the design team on details”. This may include but not be limited to system calculations, material sizing and selection, equipment sizing and selection, as well as the preparation of drawings, sections, details, and specifications. The client can be the owner, design team, or the CM/GC.

At the time of this research, there existed very little contractual language intended for the design-assist process. To date, the process of design-assist is considered a preconstruction service which may or may not be covered in a contract. This lack of design-assist contract language along with the perceived financial risk is the genesis of this research. As stated by Kelly in 2014, “... the most commonly used construction documents from the American Institute of Architects (AIA)”, they have “always held a leading position in the construction contractual document marketplace. The A401 does not identify any preconstruction phase responsibilities for subcontractors. The B101 outlines the services architects are to perform during the design phase. Those services are consistent with what most specialty subcontractors provide performing design-assist” (Kelly, 2014). Because of this, Kelly (2014) continues, “Design-assist blurs the line between designer and subcontractor and this is where a design responsibility dispute can start.” There is a possibility without specific design-assist language in place, the design-assist subcontractor performing design-assist services, risks the chance of additional design liability whether intentional or not, putting their companies at contractual risk.

## Method

The research used a mixed methods approach in order to answer all of the research questions mentioned previously. An online questionnaire was developed by the researchers and issued to a sample of contacts comprised of construction managers, general contractors, and specialty subcontractors. Company contact information was obtained through researcher contact lists as well as university advisory council contact lists. In this questionnaire, participants were asked quantitative and descriptive type questions including company type, the responders role, the company annual volume, and if they performed design services as a contractor. Respondents who reported a Yes to performing design services were then asked to answer how these services were rendered, and if they experienced negative results (erosion of earnings) as the result of performing design services.

The second half of the online survey focused on questions related to the performance of design-assist and its relation to accepting design liability, the definition of design-assist, and the representation of design-assist by stating examples. Finally, all respondents were asked if they felt that the construction industry needed improved contract language to properly protect contractors performing design services.

The selection criteria for those invited to conduct interviews included experience with design-assist, experience with a negative or unsuccessful result as the result of design-assist, and experience with an erosion of earnings as the result of the unsuccessful outcome. Questions were developed using the information available on the respondents completed surveys. The interviewees were asked the following:

- (1) As a construction manager/general contractor/specialty subcontractor you perform design services. Can you elaborate on why you render these design services using a 3<sup>rd</sup> party firm, in house designers, or both?
- (2) Do you believe the process of design-assist is slowly transferring design liability from the Architect of Record to the design-assist contractor?
- (3) You have experienced negative or unsuccessful outcomes as the result of your design, looking back, could this have been prevented with appropriate contract language?
- (4) Do you have specific reasons why you feel the construction industry requires improved contract language to properly protect contractors performing design-assist?

## Results

From the 318 invitations sent, 80 respondents provided answers to the survey, resulting in a 25% response rate. The first five questions provided descriptive information of our sample population. The results show the group of 80 was composed of 59 (74%) construction manager / general contractors and 21 (26%) specialty subcontractors. Sixty-eight (85%) respondents declared themselves as a Business Owner/Senior Executive, Operations Executive, or a Senior Project Manager / Project Manager. The remaining 12 (15%) declared themselves as a Superintendent, Business Development/Estimating/Purchasing Manager, or Other. Respondents were asked to declare an annual sales volume. Sixty-three (79%) declared an annual sales revenue exceeding \$100 million dollars. The remaining 17 (21%) declared an annual sales revenue between \$5 million dollars and \$100 million dollars.

Respondents were asked via Yes/No question if they performed design services as a contractor / subcontractor. Forty-six (58%) stated yes while 34 (42%) stated no. The 46 respondents who answered yes to the performance of design were asked how these services were rendered. Twenty-eight (61%) stated 3<sup>rd</sup> party while 32 (70%) stated in house. Because this tally exceeded the number of respondents answering "yes", we can assume 14 (30%) of the sample responded by checking both answers. Respondents were asked via Yes or No question if they experienced negative (unsuccessful) design issues as the result of their design. Thirty (38%) answered yes. Forty-five (56%) answered no. Five (6%) chose not to answer this question. Respondents were also asked if the performance of design-assist caused an erosion of earnings on a project. Thirty-four (45%) responded yes and 41 (55%) responded no. For those 34 respondents who answered yes to an erosion of earnings, we asked if the erosion of earnings was perceived as significant. Eighteen (53%) responded yes and 14 (41%) responded no. Two (6%) respondents chose not to answer the question.

The survey utilized 3 questions to obtain respondents attitudes towards design-assist. Tables 1, 2, and 3 show how the respondents responded to these questions. The second column shows all respondents answers. Columns four and six show responses by the CM/GC group and the Subcontractor group respectively.

Table 1

*Do you agree with this statement? The design-assist process is intended to transfer design liability to design-assist subcontractors.*

Variable	All Respondents	%	CM/GC	%	Sub	%
Definitely yes	8	10.5	5	9.4	3	16.7
Probably yes	10	13.2	5	9.4	5	27.8
Might or might not	25	32.9	19	32.7	6	33.3
Probably not	18	23.7	14	24.1	4	22.2
Definitely not	15	19.8	15	28.3	0	0

Table 2

*Do you agree with this statement? Performing design-assist services without proper contract language in place can lead to design liability.*

Variable	All Respondents	%	CM/GC	%	Sub	%
Yes	73	96	52	95	18	100
No	3	4	3	5	0	0

Table 3

*Based on your understanding of design-assist, do you feel the construction industry requires improved contract language to properly protect contractors performing design-assist?*

Variable	All Respondents	%	CM/GC	%	Sub	%
Definitely yes	23	32.4	17	33.3	6	35.3
Probably yes	36	50.7	24	47.1	10	58.8
Might or might not	10	14.1	8	15.7	1	5.9
Probably not	2	2.8	2	3.9	0	0
Definitely not	0	0	0	0	0	0

Results in Table 1 show a differing opinion when comparing the attitudes of the construction manager/general contractor group against the subcontractor group. Eighty-five percent of the CM/GC group answered in the Might to No side while 75% of the Subcontractor side answered on the Might to Yes side.

Results in Tables 2 and 3 show a consistent attitude when comparing the construction manager/general contractor against the subcontractor. Both parties agree performing design-assist without proper contract language in place can lead to design liability. The CM/GC respondents who typically manage the design liability risk by purchasing the service from a subcontractor, seem to view themselves at less risk than their subcontractors. Both parties also agree the construction industry requires improved contract language to properly protect contractors performing design-assist.

The survey utilized 2 questions to obtain respondents definitions towards design-assist. Tables 4 and 5 show how the respondents responded to these questions. The second column show all respondents answers. Columns four and six show responses by the CM/GC group and the Subcontractor group respectively.

Table 4

*From the options below, choose how you would define design-assist: Choose all that apply.*

Variable	All Respondents	%	CM/GC	%	Sub	%
The process that allows the subcontractor to assist the design through consultation without taking responsibilities for the design.	39	23.8	29	25.0	8	19.5
The process that allows the subcontractor to	16	9.8	9	7.8	7	17.1

assist the design through consultation while taking responsibility for the design.

A collaborative team-oriented project delivery method that capitalizes on the benefits of early engagement of design-assist subcontractors.	61	37.2	43	37.1	15	36.6
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A form of relational contracting. An integrated practice that leverages the knowledge of specialty subcontractors in the design process.	48	29.3	35	30.2	11	26.8
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Table 5

*From the following examples check all that apply if you feel they represent design-assist.*

Variable	All Respondents	%	CM/GC	%	Sub	%
You receive random calls from the Architects/Engineers asking questions related to your type of work.	13	8.9	7	7.0	6	14.3
You are requested to provide pro-bono services to assist the design team with their preliminary design.	27	18.5	17	17.0	8	19.1
You are offered a fee to perform services to assist the design team with preliminary design.	45	30.8	32	32.0	13	30.9
You are provided a written agreement for Preconstruction Services where one of your roles is to assist the design team with preliminary design.	61	41.8	44	44.0	15	35.7

Results shown in Tables 4 and 5 show a consistent attitude toward how both the CM/GC and Sub groups define design-assist. When asked to choose a statement defining design-assist, both groups chose the statement, “A collaborative team-oriented project delivery method that capitalizes on the benefits of early engagement of design-assist contractors.” as the most popular choice. The second most popular statement by both groups was “A form of relational contracting. An integrated practice that leverages the knowledge of specialty subcontractors in the design process.” When asked to choose a statement where respondents felt the statement represented design-assist, the most popular choice by both groups was, “You are provided a written agreement for Preconstruction Services where one of your roles is to assist the design team with preliminary design.” The second most popular choice by both groups was, “You are offered a fee to perform services to assist the design team with preliminary design.” Both groups overwhelmingly agreed with the statement “the construction industry requires improved contract language to properly protect contractors performing design services.”

The final question of the survey asked respondents to provide contact information if they desired to provide additional information related to design-assist. Twenty-eight (35%) of the 80 respondents provided contact information. This information enabled the researchers to solicit interviews based on these survey responses. Interview discussions included two CM/GC respondents and two subcontractor respondents. All four respondents had experience on design-assist projects. Positive comments pertaining to the value of design-assist with regards to problem solving and early collaboration were consistent with all four persons. The CM/GC respondents clearly appreciated the knowledge brought to the table by the subcontractors. Likewise, the subcontractors clearly saw a value on the quality of information they provided to the client, the CM/GC, and the design team. Subcontractors noted that having strong design-assist capabilities is a key factor for business development by the subcontractors. In fact, both subcontractors stated they typically are recommended for design-assist roles by the design team and not the CM/GC. While all four parties recognize the potential risk associated with the unintentional transfer of design liability to the subcontractor, all four respondents also felt strong team-minded relationships coupled with timely and high quality information from the subcontractors forces an environment of the team all wanting to see the subcontractor succeed. The discussions supported the idea that the investment of time spent on design-assist clearly pays off in a better designed and managed project with less work stoppages and disputes.

## Discussion

The anonymous survey results showed inconsistencies when comparing the CM/GC group against the specialty subcontractor group. Reasons for this include almost all specialty subcontractors surveyed perform design services compared to only half of the CM/GC group. When asked if the design-assist process intends to transfer design liability to the specialty subcontractor, the majority of the CM/GC group answered No compared to the majority of the specialty subcontractor group who answered Yes. These responses may have a correlation to the negative experiences and erosion of earnings experienced by the subcontractors compared to the CM/GC group. Further research will be needed to confirm this. When asked if the performance of design-assist services led to negative (unsuccessful) results, all of the specialty subcontractors answered Yes compared to only half of the CM/GC group answering Yes.

When project demands exceed the CM/GC's level of expertise, the CM/GC then typically invites select specialty subcontractors to participate in the design-assist services. Timing of contracts is key at this point. Two potential contract scenarios must be considered. Will the specialty subcontractor accept the terms already in place between the CM/GC and the client? And if not, What contract terms will the specialty subcontractor demand in order to move forward with the project? The interviews indicated that the topic of contract terms cannot and must not be overlooked. It is mandatory the contract terms be identified as soon as a design-assist subcontractor is hired to allow prompt and clear discussions take place which clearly inform all parties what the expectations are.

One subcontractor stressed the importance of project set-up for DA projects from the start and communicating those intentions throughout the DA team. This subcontractor shared an experience where an Owner Controlled Insurance Program (OCIP) was established at project onset for the design portion to provide the owner with the required Errors and Omissions and Professional Liability coverages. These types of programs "assure that the coverage included in the bid meets the standards prescribed in the contract documents." Additionally, "the potential for litigation among different insurance carriers at a job site is eliminated when there is a single carrier" (Lew, 1999).

## Conclusions

This initial study intentionally grouped General Contractors, Construction Managers, and Subcontractors together as one sample. It is the intent to perform additional analysis which further separates the CM/GC group from the Subcontractor group. These two parties do have different levels of concern with design liability and both groups appear to have experienced negative (unsuccessful) outcomes as a result of performing design-assist.

The size of the US construction market and the quantity of CM/GC and Subcontractors completing this work in this market makes it improbable to ever achieve a research sample size large enough to capture the true opinions of the US market. At best the research team can focus on select markets by type of work and location of work. This by nature is a limitation of this study. Considering the sample size we captured, this study supports a definition of design-assist consistent with the principals of Integrated Project Delivery which demands a high level of collaboration by contractors and subcontractors on projects. This collaboration works for the best interests of the project by harnessing contractor expertise in a given area. This is consistent with the most popular definition chosen by the survey respondents which is, "A collaborative team-oriented project delivery method which capitalizes on the benefits of early engagement of design-assist subcontractors." The collaboration process in preconstruction leads to early project goal-sharing and relationship building.

The collaboration process lends itself to early communication and sharing of expectations amongst the team which was noted consistently in the interviews. Communication and the sharing of expectations is achievable when the collaboration produces a team environment. When relationships are not adversarial and conducive to sharing project goals, positive communication and respect amongst the team facilitates negotiating terms of the contract language. Openly discussing and agreeing to contract terms and the sharing of expectations is a necessary goal which must be met to guarantee project success. With the contract terms discussed, understood, and communicated properly amongst the team, executing a contract to mirror those expectations is achievable. Contracts constructed in this manner can be prepared by both parties simultaneously without controversy, rather than by one party in a position to control the contract negotiation.

As noted in the survey, a high percentage of specialty subcontractors perform design-assist services. It also appears the specialty subcontractors perform design-assist services more frequently than the CM/GC's who hire them. Because the specialty subcontractor is contractually tied to all contracts upstream (Contract between Owner and CM/GC), the design-assist process is a significant area of concern for specialty subcontractors. Most specialty subcontractors while possessing the expertise the project requires, also possess the in-house design capability and design experiences (both positive and negative). The issue of design liability is a key concern to subcontractors.

Interview discussions supports the use, value, and benefits of design-assist on projects. The CM/GC's interviewed value the knowledge provided by the specialty subcontractor and feel the process saves valuable time on the project. The specialty subcontractor legitimately places value on the knowledge they provide to the project but seem to unknowingly assume the risk they may encounter in the event of significant failure and subsequent design liability. Subcontractors interviewed believe current contract language requires modification to address design-assist. The contract modifications need to focus on the potential transfer of design liability. The subcontractors also believe the design-assist team needs to find creative ways to provide the client and owner the Errors and Omissions and Professional Liability coverages they require in a design-assist situation.

### Future Studies

Future studies can be broken down into 3 research types; case studies, document reviews, governmental / underwriter concerns. Case studies can be performed analyzing the results of projects where contractors were involved in preconstruction performing design-assist. Other case studies include an analysis and comparison of the various project delivery methods against each other. Document reviews can be performed analyzing contract document language as well as analyzing insurance requirements on projects. A thorough analysis can be conducted on design-assist contractors and their specific insurance coverages to understand the impact design-assist has on these requirements and costs. Additionally, governmental concerns should be researched with the AHJ on projects due to the fact that most AHJ require an Architect of Record on a project regardless if design-assist is conducted or not. Lastly, reviewing insurance requirements with Owners and Underwriters could be conducted. The goal to understand what group policies could be created to properly protect the client using a larger team of designers and contractors for the design.

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