

DESIGN BUILD PROJECT DELIVERY: OPPORTUNITIES AND CHALLENGES

Zuhair Itr

Associate Professor, Southern Polytechnic State University, Marietta, Georgia

Saeid Sadri

Associate Professor, Georgia Institute of Technology, Atlanta, Georgia

ABSTRACT

More Owners are using the Design Build delivery methods while seeking construction services. This paper discuss the legal implication, the difference in characteristics between the Design Build and the traditional delivery methods, and the difficulties created while bidding small public construction projects under the design build delivery methods.

KEYWORDS

Design Build, Bidding Design Build

1. INTRODUCTION

Selection of proper Project Delivery System (PDS) for various projects has been one of the outmost concerns of owners for several reasons; among them is cost overrun and litigations. As a vehicle to control cost overrun and litigation Design-Build (D-B) project delivery system has become more popular and used in variety of construction types. This increase of use has brought several issues to the attention of researchers and practitioners. In addition many barriers by laws and regulations and resistance of various professional and trade association to this project delivery system have been changed in recent years.

History of the tradition of Master Builder has started with civilization and creation of the built environment and continued till mid fifteen century. Master Builders provided a seamless service that included what we now refer to as design and construction. In 1456 Leon Battista Alberti a poet, philosopher, and papal secretary to Pope Eugene IV, convinced the Pope that, by the way of drawings and models, he could direct a master mason to build a new façade on the Gothic church, Santa Maria Novella in Florence. Thereafter, he furnished the plans of his buildings but never supervised their construction. His works did much to establish the art of architecture as a profession distinct from the science of engineering and the craft of building (Beard, Loulakis, Wundram, 2001).

In the United States, starting in late nineteen century with rise of separate professions and vocations following events had a major impact on implementation of project delivery systems in general and design build in particular. During 1910 and 1920's, States started passing Professional Licensing Laws and regulating various trades and professions. Many of these laws prohibits involvement of architects in the process of construction as constructor and all in one form or other prohibit constructors of engaging in design of buildings except power and process industry which continued the use of design build. During world wars congress gave military services D-B authority and in 1946 Navy retains D-B authority for housing. In 1986 Department of Housing and Urban Development (HUD) received legislative approval for D-B. In 1968 Associated General Contractors (AGC) appoints “Turnkey

Committee” to study design build and issues first design build contract in 1975. Till 1978 American Institute of Architects (AIA) would not permit its member to participate in design build project and it would cause loss of status or membership for architects if they were part of a design build team. In 1990 General Services Administration (GSA) issued design criteria project guide. In 1993, Design Build Institute of America (DBIA) was established. In 1996, Congress passed legislation granting broad authority for two-phase selection of Design-Builders on direct federal projects (Performance Specifying, 1999).

Currently lots of work has been accomplished in establishing proper procedures and standards of practice by various individuals and organizations. The most notable of which was the publishing of *Manual of Practice* by DBIA, which explains and establishes many procedures and techniques for implementation of design build projects. Estimates of the volume of construction currently built through the D-B are not accurately available. US Census Bureau of 1997 stated that it is estimated that 30% of all construction work was being performed as design build for that year and AGC reports in 1999 indicated that 26% of all construction projects were done under design Build.

2. CHARACTERISTICS OF AN INTEGRATED PROJECT DELIVERY SYSTEM

In this paper we are looking at two aspects of differences between Design-Build (D-B) or in general Integrated Project Delivery System (IPDS) and traditional or Design Bid Build (DBB) project delivery system. First the legal implication of these methods and then the major characteristics of each delivery system and their differences and at the end we will present a case study which outlines difficulties associated with small projects using IPDS because of lack of clear guidelines and standards of practice for all participants.

2.1 Legal Implication

From legal point of view the major difference is that in “traditional“ design bid build, the owner warrants to the contractor that the drawings and specifications are complete and free from error in the design build system the design builder warrants to the owner that the design documents are complete and free from error [Beard, Loulakis, Wundram, 2001]. For this principle to hold or more important to work several conditions must be met both by the owner and the design builder. While responsibility of providing complete and error free document shifted from the owner to the design builder this implies that owner has clearly stated his program requirements as well as performance requirements for the project. Completeness of Request for Proposal (RFP) issued by the owner plays a major role in the progress and success of the project.

Accepting this principle as a base for interpretation of contracts for determination of responsibilities and authorities will change all established procedures and standards of practice. Also, not having much precedence which many standards of conducts or reasonable care for industries are based on these cases in rulings of trial courts and more important appellate courts, has made it difficult to establish if IPDS has any advantage over traditional PDS in reducing conflict or litigation. A research based on total of 94 cases, based on “Design-Build Lessons Learned: How 1995 to 2000’s Cases May Affect You” by Michael Loulakis studying change in the work in design build project delivery system, states the theory that D-B may be less risky than other PDS is without a high level of corroboration. Thus, although the deduction can be made that D-B is less risky based on the presented evidence, given the corroboration of the theory, the deduction will not allow knowledge of comparative risks in different PDS to be advanced (Solis, 2002).

In conclusion although legal base of two PDS are completely different and general believe is that because of single point of responsibility in DB and reduction of one stakeholder in the process (rather that owner, Designer, and Constructor we have Owner and Design Builder) litigation will be less than traditional PDS. There is not enough data to support this theory.

2.2 Difference in Characteristics

Main difference in characteristics of DB vs. DBB is the process of development of construction documents for each method. For Design Bid Build the process is very well defined and all procedure has been standardized and various tools have been developed. But for Design Build many of the procedures has not been tested and published and accepted as standard of practice or legal base for reasonable care.

Design Build process starts with owner issuance of RFP. While we are not going to get in the detail of RFP requirement in general, it is recommended that requirements be performance based rather than prescriptive. This will give the design builder opportunity for innovation and control of the cost while giving the owner required performance and quality level within the specified budget.

The Construction Specification Institute's (CSI) manual of Practice defines performance specification as a "statement of required results with criteria for verifying compliance" (CSI, 1996) and list the following as its four essential elements:

- Attributes: performance characteristics of a building element, such as heat transmission, water tightness, or stain resistance.
- Requirements: statements of desired results, usually framed in qualitative terms.
- Criteria: measurable or observable definitions of performance, expressed in either quantitative or qualitative terms.
- Test: objective means of confirming conformance with performance criteria, usually involving industry recognized test methods, but some times utilizing calculation, analysis, or professional judgment.

Specifying performance rather prescriptive specification which determines mean and methods of construction will requires design builder to propose systems and materials which respond to the owner requirements. Challenges for specifiers include: first, how to fix requirements clearly, while at the same time providing for Design builder flexibility to meet overall project goals. Second, the Design Builder should have the ability to perform project estimating and economic analysis of various design and construction alternatives at early stages of design (Performance Specifying, 1999).

Another issue in performance specification is substantiation and choosing substantiation requirements. Because it is often difficult to prove that the final design and construction comply with the owner's criteria, substantiation requirements are principally intended to predict the result. Just as in conventional contracting, all substantiation other than tests or inspections of the actual construction represent a statement of intentions or a prediction, both of which are used to identify misinterpretations and errors before they become expensive to correct (McClendon, 1997).

There have been many attempts to develop tools and standards for IPDS and two of those are UNIFORMAT II and PerSpective. UNIFORMAT II is an elemental classification for organizing project information and cost estimate and analysis. The impetus for applying the UNIFORMAT II classification to specification came in 1989 when CSI recommended that projects at the schematic stage be described in a simple narrative form by building elements in lieu of products (UNIFORMAT II, 1999). UNIFORMAT is most suitable for Performance Specification, Technical Requirement and Preliminary Project Description the during Design Development and Construction Document stages Master Format can be adopted.

PerSpective is a software developed in a joint project by Construction Specification Institute and Design Build Institute of America. PerSpective is a single organizational structure that can be used for RFP, proposal and design and construction phases. It uses both UNIFORMAT and MasterFormat at all levels of specifying and can be linked to external databases (Performance Specifying, 1999).

2.3 Challenges while Bidding on a Lump Sum Public Design Bid Project

Bid Documents

DBB: The scope of work is typically identified with a great level of detail by the project documents: consisting of a full set of design drawing including civil, structural, architectural, plumbing, mechanical, fire protection, and electrical work and detailed set of Specifications.

DB: The bid documents consist of a site layout plan with basic information about existing and sought finish elevations, a floor layout plan, a basic building elevation, a program description, and in many cases the design standards for the local county having jurisdiction over the project. The limited information allows great deal of interpretations that have cost implication.

Preparing a skeleton estimate

DBB: The various quantities of material and work activities are generated from the drawings and specifications. Costs for the various tasks can be performed after reviewing the quality level identified in the Specifications, considering man-hours of labor and equipment required to perform the work. Accurate pricing is obtained after consulting with local suppliers, subcontractors, and equipment rental companies about the specific listed in the project documents. Another alternative for pricing the work could be reached by looking at recent historical records in the company database for comparable scope of work done in the same area where the project on hand is located.

DB: While doing his quantity take off, the general contractor has to interpret what goes in every space based on the program requirement presented by the Owner. Therefore there is a potential oversight as to quantities and or cost items. For example,

While pricing the work, the contractor should have a clear understanding of local codes and fire rating requirement while considering the various component of the structure. Since no design information is provided at the program level, the General contractor should anticipate the fire rating requirement for walls and ceiling assembly on the project.

Subcontractor Pricing

Subcontractors in the commercial construction market are very important part of the bidding process as well as the project execution and delivery plan. Most General Contractor nowadays, purchase key material on the job, like concrete, masonry, lumber, roof trusses, doors, frames and hardware and subcontract out the balance of the work. Key materials tend to make up around fifteen percent of the total cost. Labor subcontract to install material supplied by the general contractor account for roughly fifteen- percent of the cost. Turnkey subcontractors that provide their own labor, material, and equipment on the job conduct the balance of the work. Turn key subcontract account for sixty five percent of the cost. The remaining five- percent of the cost is spread between general conditions, field overhead, etc.

DBB: In this case, Subcontractors have enough data to prepare a lump sum bid. Subcontractors consider the bidding process a worthwhile investment for potentially getting more business and knowing the outcome of their bid almost immediately. Qualified Subcontractors, in the public bid process, in general will be offered or at least considered to do the work if they submitted the most competitive prices for their complete scope of work.

DB: In this Process subcontractors do not have the same level of incentive to participate in the bid process for many reasons except major subcontractors including plumbing, heating ventilating and air conditioning, fire protection, and electrical subcontractor.

Knowing that the job is a design build project, subcontractors know already that the project is technically not ready to start as soon as a Notice to Proceed and a contract is issued to the successful general contractor. Therefore, their effort will not lead to a sale that will materialize in the immediate future. As a result, they rather invest their time in bidding on Design Bid Built projects that can secure immediate return for their time invested in bidding.

In the case of Design Build there are no drawings and specifications for the job. Therefore, the various subcontractors bidding on the same scope of work are not at equal footage. Hence, a list of assumptions and bid qualifications may accompany each Subcontractor's bid. The presence of bid assumptions and qualifications make it difficult for the general contractor to package their bid and select a subcontractor early in the process. In many cases, the general contractor may elect to go through the design phase first without committing to any subcontractor. Then, when all relevant parameters are decided on and a set of drawings and specification is available, the general contractor will re-bid the various scope of work among interested subcontractors.

Bid submittal

DBB: In most cases the submittal consists of completing a bid proposal that is established by the Architect and made part of the project specifications. The bid proposal address the bid price, the proposed duration for completion of the project (if no specific duration and liquidated damages are established), and the submittal of an AIA 305 form. The cost associated with the bid proposal in this case is limited to the preparation and delivery of the cost estimate and the bulk of that cost are estimating time, upper management involvement, and blue print and general expenses.

DB: The submittal is a total proposal that includes the following:

- **Design Build Team:** Introduction of the Design Build team. This entity necessitates a teaming up between a general contractor and design consultants. In this section, the resume of personnel, their availability, and their experience together as a team should be explained. An Organization Chart should be submitted showing the chain of command and the flow of information between design and construction execution personnel. Quality control procedure that the team will use at the various phases of the process to ensure best delivery should be laid out.
- **Company Resume:** Experience of the Construction Team and the Design Entity with Similar project in size and complexity and their individual responsibility with doing business with that specific Owner.
- **Cost/Schedule:** A detailed schedule of value should be submitted for the various phases and scope of work accompanied with a Critical path and a detailed schedule presentation of the various deliverable tasks with milestone identification.
- **Financial and Bonding Capabilities:** A letter from a surety company should be accompanied in the proposal detailing the company's bonding capability and its

The cost associated with the bid proposal in this case is more significant. The bid proposal cost include the following: Proposal writing time, assembling of a Design Build team, preparation of a cost estimate, preparation of a schedule and a schedule of values, preparing original and multiple copies with colors, graphics, and quality paper. Even the cost associated with copying bid documents escalate in this process since every Team Member and Subcontractor bidding on the job must have copies of all documents and program and applicable County Design Standards.

The award process

DBB: the selection is purely based on price level. A "responsive" general contractor submitting the lowest bid is typically invited to contract with the Owner. The qualification of the bidder or his "responsiveness" in general is limited to his ability to secure a Payment and Performance Bond from a reputable Surety company.

DB: the selection process is much more complicated since the owner should review the qualification and experience of the team, both at design and construction level. Usually the owner is interested if the Design Build Team have done any previous work together on a prior Job. The problem happens with public job where the criteria on which the selection procedure is made is not very clearly stated and conveyed to the team. The lowest bid tend to still be the driving criteria.

Competition Level

DBB: at the time of the bid, August 2001, The Atlanta construction Market started sensing a slowdown in the local economy and on a Design Bid Built of comparable size and complexity; it was very common to see eight to ten bidders interested in bidding a comparable project.

DB: On this project five bidders were listed as potential bidders. However, only three actually submitted a bid. In addition to the fact that it was a design Build Project, the perception was that the Owner required an excessive amount of paper work. Also, the fact that the Owner and the User are two different entities increase the number of players which slow down the decision making process. Of course, these two issues tend to increase the project overhead.

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