



Design-Build Projects – Engineering Considerations from Concept to Bid to Detailed Design



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Introduction

Design-build is a project delivery method in which the owner contracts the design and construction of a project to a single entity. These types of projects shift the risk away from the owner to the design-build entity. Due to reduced owner risk, this approach is one of the most widely used methods of project delivery in the United States.



A design-build entity consists of a contractor (builder) and an engineer/architect (designer) working together collaboratively. Typically, the builder oversees construction, and the designer oversees the engineering and architectural design aspects of the project.

This article outlines the stages involved in design-build projects and briefly discusses disputes that may arise due to engineering and design issues.

Concept stage - Request for qualifications and request for proposal

The design-build process often begins with the owner issuing a request for qualifications (RFQ). The RFQ documents identify the services needed and invite design-build entities to submit their qualifications to provide those services. The owner will then select the entities that respond to and meet these qualification criteria for inclusion in the request for proposal (RFP) process.

The owner's RFP documents are distributed to the entities that meet the qualification criteria. The RFP includes a summary of work, technical requirements, preliminary drawings and plans, project constraints, reference materials, contractual requirements, and expected timelines.

Bid stage - Scope of work review

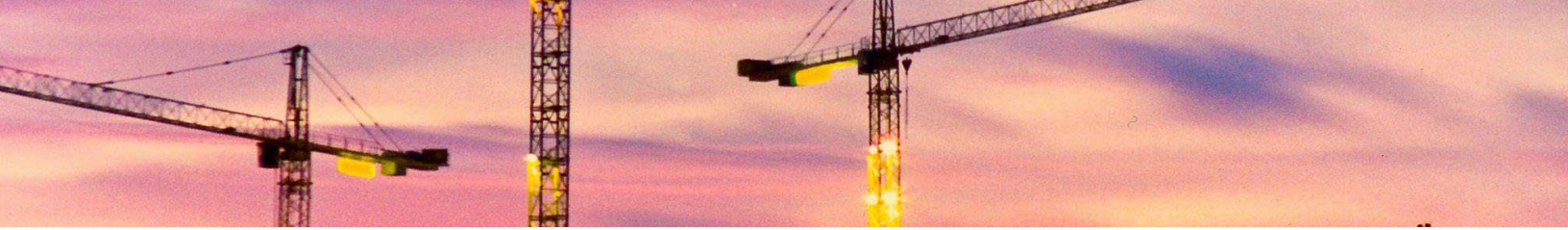
The designer prepares bid drawings and their basis of design using the RFP documents as a point of reference. These documents will establish the designer's understanding of the owner's RFP package.

The design team typically comprises a lead designer and sub-designers for each discipline (e.g., architectural, structural, mechanical, electrical, and plumbing (MEP), site, and civil drawings). The lead designer must coordinate with the sub-designers to establish scope boundaries, ensure consistency in the design approach across disciplines, and verify all RFP requirements are considered and included.

During this stage, the design team should collaborate with the builder and the owner to make sure they understand the scope of the project. If the design-build team finds the RFP documents to be unclear and/or missing critical information, it should issue a request for information (RFI) to the owner prior to submitting its bid.

The level of detail in bid drawings should capture the full scope of work and include the location, quantity, and type of materials needed to complete the project. Because the builder uses the bid drawings to prepare the bid price, any missing scope would impact the project cost down the road. If certain scope items are not shown or clearly defined in the bid drawings due to time constraints or a need for more detail, the designer should clearly communicate this to the builder so a proper contingency can be included in the bid. It should be noted that bid drawings are not meant to provide enough detail to start construction of the project.

When bid documents are incomplete, sub-designers lack proper coordination, or the designer misunderstands the bid documents, builders may underestimate both the bid price and the time required to complete the project. This is a major area where disputes can arise as the project progresses.



Detailed design stage - Issued for construction (IFC) and shop drawings

Once the owner chooses the design-build entity, the designer will proceed with the detailed design and prepare the drawings and specifications necessary for the construction and execution of the project. These documents are a comprehensive set of construction drawings and material specifications that reflect all design changes, revisions, and approvals made during the design phase. If the owner requests any design or scope changes post-bid award, contract change orders should be issued to reflect resulting cost increases and any potential delays not accounted for in the bid stage. This is critical to avoiding disputes between the parties as the project progresses.

Shop drawings are highly detailed plans that describe how components will be manufactured, fabricated, and assembled. They are prepared by the subcontractors, fabricators, and/or manufacturers and issued to the designer for review. The designer's job is to ensure the shop drawings align with the design intent as shown in the IFC drawings. Construction will not proceed until the designer approves the shop drawings. The contractor is also required to review the shop drawings and coordinate with the various trades required to complete the work. The designer's approval of incomplete or erroneous shop drawings or the builder's failure to coordinate with the trades can lead to disputes between the parties involved.

Conclusion

In summary, design-build projects may encounter disputes related to engineering and design issues due to the following factors:

1. Incomplete bid documents, lack of sub-designer coordination, and designer's misunderstanding of the bid documents.
2. Inadequate tracking and documentation of owner's post-bid design and/or scope changes.
3. Designer's approval of incomplete or erroneous shop drawings.



About the author(s)

Author [Rahul Ratakonda](#) is a Director with [HKA](#). Rahul Ratakonda is a professional engineer with more than 15 years of experience. He has been retained as a forensic technical expert on more than 50 occasions. Rahul's technical expertise includes forensic engineering, structural engineering, façades, building code analysis, and emergency response. He has provided damage assessments and repair scope recommendations for insurance claims related to natural disasters, fire events, and construction defects.

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