ABSTRACT

With the Design-Bid-Build project procurement method, it is a common tendency for design Engineers to put higher levels of effort into the design and construction phases of projects. The sometimes less emphasized, or glossed over phase between design and construction, is the bid phase. This phase typically consists of advertisement, response to Contractor questions, issuance of addenda and bid opening, and recommendation of the low bidder. Although the Engineer may view the design and construction phases as the most significant phases to focus their attention, it is the outcome of the bid phase and the awarded construction cost which usually holds the greatest value and priority to the Owner and their capital budget. All of the Engineer’s diligent efforts during the design phase can be diminished when projects come in over-budget or without any bidders. This in turn can lead to redesign or rebidding of the project when there may be simpler solutions available.

There are a wide variety of challenges and issues that can arise during the project bid phase that can negatively affect the bid outcome. These challenges include, but are not limited to, difficult bidding climates, labor shortages, too much available work for Contractors, remote project locations, bid dates conflicting with other projects, unclear specifications, confusing contract documents, limited competition, and limited availability of materials and equipment. This paper discusses the many different design related issues and outside influences that can create challenges during the bid phase. This paper will also present a variety of cases studies that further explore bid phase issues. Finally the lessons learned from the case studies will be discussed, presenting the different opportunities for preventing bid phase difficulties and setbacks.

KEYWORDS

Bid Phase, Project Management, Construction
INTRODUCTION

With the Design-Bid-Build project procurement method, it is a common tendency for design Engineers to put higher levels of effort into the design and construction phases of projects. The sometimes less emphasized, or glossed over phase between design and construction, is the bid phase. This phase typically consists of advertisement, response to Contractor questions, issuance of addenda, bid opening, and recommendation of the low bidder. Although the Engineer may view the design and construction phases as the most significant phases to focus their attention, it is the outcome of the bid phase and the awarded construction cost which usually holds the greatest value and priority to the Owner and their capital budget. All of the Engineer’s diligent efforts during the design phase can be nullified when projects come in over-budget or without any bidders. This in turn can lead to redesign or rebidding of the project which could have been avoided by keeping the bid phase in mind during design.

This paper discusses the many different design related factors, project factors, and outside influences that can create challenges during the bid phase. This paper will also present a variety of case studies that further explore bid phase issues. Finally the lessons learned from the case studies will be discussed, by presenting the different opportunities for preventing bid phase difficulties and setbacks.

COMMON BID PHASE CHALLENGES

There are a wide variety of challenges and issues that can arise during the project bid phase that can negatively affect the bid outcome. These issues can be broken down into three different categories: design factors, project factors and outside influences.

Design Factors

It is important for designers to think through some of the potential bid phase pitfalls during design; as some of these are obvious, while others are not so obvious. The design factors listed below feature issues that often arise during the design phase and what the Engineer can do to mitigate these issues.

- Unclear Specifications can be a common cause for confusion among potential bidders. Engineer standard specifications or Owner standard specifications are commonly used for design projects, but these are often generalized to fit many different types of projects. The specifications should be customized to fit each individual project based on size, scope, and budget for the project. Ambiguity in specifications can create uncertainty amongst bidders resulting in higher bids created to cover unknown contingencies. If project is too complicated or if the specifications are unclear, bidders may not be interested, or the bid prices could increase.

- It is important to verify the availability of specified equipment and materials with the manufacturers before bidding a project. When doing so, the Engineer should also check if it will be possible to supply the equipment with all of the requirements, dimensions, and materials as specified.

- Providing adequate lead time for equipment is an important scheduling detail to determine during the design phase. The Engineer should make sure to consider the manufacturer’s production schedule to see what their lead time is on submittals, production, testing, and delivery to avoid unexpected project delays.
• It is important to coordinate with vendors starting in the early design stages and throughout final design. It is recommended to share the draft specifications with all representatives for equipment that will be included in the specifications, for review and comments. This can help to avoid surprises during construction. For equipment that is designed to work together (e.g. pump, motor, variable speed drive, etc.), it is also important to verify that the vendors have cross coordinated the equipment specifications between the different equipment components.

Project Factors

Project factors are inherent features of the project that cannot be changed. Even though the Engineer or Owner has little control over these factors, awareness is crucial for mitigating potential project issues. The following project factors can have a large impact on project bidding and Owner budgets.

• When a project is small, it can be more difficult to bid due to the lack of interest by Contractors or minimal profit margins.

• If a project is located in a remote area at a significant distance from major cities, the number of Contractors willing to bid on the project can often decrease. Contractors often increase cost for remote project locations due to multiple factors including transportation & mobilization, available worker labor & housing, and access to supplies and equipment. When a project is in a remote and small in size, the number of interested Contractors further decreases due to the inability to make up for increased overhead costs as a result of a lower profit margin.

• Complex projects that may involve multiple stakeholders can sometimes cause confusion among bidders. The bid documents may be unclear which Owner or agency has ultimate contracting authority or who will be funding and paying for the project. It is recommended that these arrangements be clearly described in the bid documents and also explained at a pre-bid submittal conference.

• The Owner’s budget is an important project factor. Determining whether or not the Owner’s budget is fixed or flexible will help in specifying equipment, materials and design approaches for the project. This can also help to keep the opinion of probable construction cost (OPCC) under the Owner’s budget while allowing for contingency for any unknowns that may arise.

Outside Influences

There can be numerous outside influences on a project beyond the control of the Engineer and Owner. Some of these influences may be known, while many are unknown until after bid results have come in. However, there are steps that can be taken leading up to a project bid that can help mitigate potential outside influences. The outside influences listed below can have a huge impact on project bid results.

• There may be multiple competing projects bidding on the same day or within the same week. In this situation, Contractors may be forced to choose which projects they will spend time on, developing a bid proposal. When forced to choose between multiple projects, Contractor often dismiss, smaller projects in favor of larger projects.
- Limited competition can increase bid costs. Projects including specialized work or a remote location with no qualified Contractors in the area can lead to limited competition. Limited competition can also be caused by a difficult bidding climate when there is too much available work for Contractors and they are overextended. If Contractors are aware that there will be limited competition bidding on the project, the bids will commonly be higher.

- Regional labor demands can have a huge impact on bid prices. Oil and gas drilling activity has attracted a large portion of the labor forces from public works Contractors in several regions across the United States. Other labor costs such as taxes and insurance requirements can impact bid prices for projects. As of January 2013, the temporary reduction in Social Security and Medicare payroll withholding expired. This caused a 2% increase on labor and has impacted construction costs across the board on bids in 2013.

- It is important for Engineers to track raw material costs, especially those that are controlled by the global market, such as steel, oil, and concrete, since many construction materials and products are manufactured using these raw materials.

CASE STUDIES

Case Study #1

Case Study #1 is a raw water pump replacement project. The project included the replacement of a small pump and motor, including minor electrical and instrumentation work, in an existing intake pump station. The project was located over 100 miles from the nearest metropolitan city.

Prior to the bid opening, it appeared that there would be four bidders for the project. The Engineer had been in communication with several pump vendors to minimize errors in the specifications and ensure accurate cost estimates for the required pump. However, on the day of the bid opening came, there was only one bidder. The bid amount supplied by this bidder was much higher than both the Owner's budget and the Engineer's estimate.

After consultation with the Owner, it was determined that the one bid would be dismissed and the project would be re-bid. Before the project was re-bid, it was important to determine the reasons for the lack of bidders and elevated bid price. After discussing the project with the originally interested Contractors, as well as the Contractors on the plan holders list, it was revealed that there were multiple, large projects being bid on that same day. This being a smaller project, with a remote location, it was not determined to be a high priority for Contractors.

The standard specifications used for the project were not fully customized for the project, but included requirements typical for a much larger project. The specification requirements led to uncertainty from some of the vendors and Contractors. Many manufacturer exceptions were expected to be taken for the equipment. This uncertainty and the list of exceptions led the Contractor to increasing the bid price.

During the design phase, the pump and motor vendors were given an opportunity to review the project specifications and provide comments. However, after several discussions with equipment vendors, it was discovered that the vendors did not cross-check the pump and motor specifications with the motor manufactures until only days before the bid opening.
Before the project was re-bid, the contract documents were simplified as much as possible for the Contractor, and the Technical specifications were customized for a smaller project. Prior to the bid opening, various plan rooms were contacted to verify that the new bid date did not conflict with other project bid openings. All of the equipment vendors were contacted with the new bid date, as well as a specific list of all changes to the specifications for the ease of re-bidding. All of the Contractors from the previous plan holder’s list were contacted to inform them of the new bid date, and to inquire if there were any further questions or concerns regarding the project, including the new bid date and the specification changes. In addition, many additional Contractors were contacted about the project to help increase interest in the project.

The project was re-bid, several Contractors submitted bid proposals. The winning low bidder was within the Owner’s budget.

**Case Study #2**

Case Study #2 includes the design and construction of a new wastewater lift station and force main. With the initial project bid, the bid results were much too high for the Owner’s budget. Although bid estimates were provided during design, the actual Owner’s budget was not established prior to the bid phase. After the first bid, the Engineer met with the Owner to determine ways in which the Owner would be comfortable with decreasing the construction costs by modifying the project design. The project was then value-engineered in an effort to lower the construction cost. When the project was bid for the second time, there was less interest from Contractors resulting in similar bid amounts as the original design and bid results. The project was then value-engineered again and bid for a third time. Much like the second bid opening, even less Contractors bid on the project and although the bid results came in lower, the cost was still over the Owner’s budget.

Similar to the first case study, during the two re-design phases, the project design including plans and specifications were simplified. Value-engineering the project replaced more costly construction products and materials with acceptable, but lower grade products in an attempt to reduce the cost and fit within the Owner’s budget. If the final budget information had been available initially, these changes could have been avoided by assessing the project’s budget and developing a design and specifications to fit the project and the Owner’s needs.

This case study shows that re-bidding of the project did not solve the budget issues. It appeared that the various Contractors were not in favor of re-bidding the same project three different times and by the end, some of the Contractors stopped bidding the project. By the third and final project bid, the number of bidders decreased by half. In the end, the project was split between two Contractors to provide the Owner with flexibility in funding the projects. This resulted in a savings of approximately $60,000 to the Owner by allowing the Contractors to bid on either a part of the project or the entire project. The intent of this was to encourage local, smaller Contractors involvement by splitting the work into smaller projects.

**Case Study #3**

The third case study involves a water well pump, piping, electrical and instrumentation equipment installation. The project was located in a remote location several hours away from any major cities. When the project was bid, no bids were received.

There were several factors that lead to the project not receiving any bidders. First, the project was located in a region where the well pump drilling Contractors have been over extended due to the booming oil and gas drilling industry in the region. Second, the project location is a
very remote area with limited housing options for the construction workers. Lastly, the pumps and motors were pre-purchased by the Owner. There were many uncertainties regarding the pumps, including delivery dates, liquidated damages, push/pull charges, which ended up playing a factor in deterring Contractors away from the project. After receiving no bids, it was determined that the best solution was to combine and bid the project with another larger project in the area. This revised approach resulted in a successful rebid with the larger construction project.

CONCLUSION AND LESSONS LEARNED

The experience gained through these case studies has resulted in several lessons learned and best practices that can be applied toward future design, bid, and construction projects. Specific lessons learned during the bid phase that can be put into practice by Engineers and Owners include:

• With smaller projects, it is important to ensure that the specifications are customized to provide products, materials, and details appropriate for a smaller project with a smaller budget.

• Early design coordination with equipment vendors is key. It is recommended for Engineers to contact equipment vendors during preliminary and final design and again during the bid phase to ensure that the requirements of the specifications can be met, and if there are not any inconsistencies with the specifications that may cause cost increases or issues with equipment availability.

• If any changes are made by addendum to the project, it is important for the Engineer to verify that equipment changes are made aware of the changes in order to mitigate any confusion.

• Communication with plan rooms and Contractors is important to avoid conflicts with other project bid dates and to assess the amount of interest in the project prior to bid opening.

• When the Owner does have a fixed budget and limited budget, one solution is to implement the use of additives and alternates to give the Owner flexibility with additional project features that may or may not fit into the budget.

• For projects located in remote locations, it is important to recognize this early and work to mitigate this factor. One step that can be taken is to contact vendors and Contractors ahead of the bid advertisement to increase interest in the project. It is also important to recognize the increased Contractor overhead costs associated with the project and including this factor in the project budgeting. Another option is to combine the work from one or more projects to create a larger project that will gather more interest from Contractors to overcome the disadvantages of a remote site.

• It is important to track regional industry trends with labor demands and regional/global trends with raw material costs. These factors can have a huge impact on project bid costs.

• For the Engineer, when these type of project and bidding challenges arise it is crucial to communicate with the project Owner as early as possible. Early consultation with
the Owner about potential bid outcomes may provide an opportunity determine approaches to mitigate issues in advance.