Creating Successful Bid Proposals

An Online Continuing Education Course for Engineers

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CREATING SUCCESSFUL BID PROPOSALS

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Introduction

Engineers routinely investigate and then design projects that are to be bid for construction. These bid documents not only describe the work to be done, but how the contractor will be compensated. The contractor's bid, placed on what is typically termed the Bid Proposal Form, becomes a major factor in the tone for the working relationship between the engineer/owner and the contractor. By considering how items are to be measured and paid prior to finalizing the bid documents, the engineer may create more win-win conditions between the owner and staff, the contractor and the contractor's material suppliers.

Specifications and Methods of Measurement

Typically the specification for a particular item of work includes sections on general information, materials, method of installation, method of measurement and finally method of payment. There are various guides by associations and organizations devoted to development of specifications, but for this course the focus will be on choices made by the engineer when assigning a method of measurement as well as the method of payment.

Execution of the Measurement

The method of measurement should be executable in the field. This is the primary factor in the selection of the method since how staff makes the measurement will influence the success of that operation. Laying a pipeline with alignment changes and corresponding fittings can easily be measured by the linear foot. The plans, especially in electronic format, can easily establish the proposed running length of the system, where in this case

the system is all the pipes and fittings. If a change is required in the field, a simple tape along the top of the pipe will still yield a quick and reliable answer.

Consider that this pipe has obvious overlaps where one section is inserted into fittings or bell joints. The specifications have to be clear what linear footage is being considered for payment. Without specifically calling out that "measurement shall be based on the linear footage as installed in the field and shall not include overlap" a contractor may contest that each section of pipe and each fitting had been measured prior to installation resulting in a significant variation from the quantity on the Bid Proposal Form. A similar situation will arise with the use of area-wide applications, such as filter fabric. Typically fabric is overlapped with adjacent pieces, and if used in channel construction, may include trenching at mid-length, at the ends and along the fabric sides. The difference between the original fabric size and the area covered may be as high as 20 percent. Contractors will argue that they had purchased and installed 1,000 square yards yet the area covered may only be 800 square yards.

Consider the ease by which the fabric example could be measured in the field. For a relatively flat area, a tape or wheel could be used to verify adherence to the contract. I would always recommend stating at least one method of direct measurement even if there's likelihood that the owner's staff may have difficulty performing the operation. If you have a difficult contractor, then the method has been stated and would still need to be carried out.

Verification of the Measurement

If there is little likelihood that there is a significant deviation from the contract quantities, and the method of measurement may be difficult, a method to "verify" the measurement could be placed in the specifications and could serve as the method of measurement. An example would be placement of stone. As stone is delivered, placed and perhaps compacted, the quantity could be based on volume and verified by weight. Volume would match with dimensions from the plans, and could have been checked for consistency throughout placement. Actually measuring the volume after placement could be performed, but would probably involve some expense. In this case, if the final configuration of the rock meets the required dimensions, and the tonnage of stone matches what was expected, payment might be based on performance and the measure of the performance could still be the volume of stone shown on the plans, as verified by weight tickets.

A word of caution is needed regarding delivery tickets. When the stone is being delivered to the site, the trucking company should have delivery tickets that would show the weight of the stone being delivered. If measurement is based on tonnage, care must be taken to insure that the owner is actually paying for the stone. Examples would be a fine road base material, if delivered wet and compacted would result in a higher cost than dry material that is wetted prior to compaction. The weight would have included water weight.

Truckers may also want to prevent damage to the beds of their trucks and quarries would gladly dump some 'bank run" type material in first to cushion the impact from the larger, correctly sized materials. The truck weight ticket would not typically account for this. The material delivered for placement would also be less "correct" than the proposed required gradation.

There is also the obvious concern that materials delivered may not actually have been installed. An example is rock delivered and stockpiled, perhaps multiple times, could result in losses that will be charged to the owner if not challenged.

Care should be taken when using a method of measurement based on volume, and being verified by a measurement based on weight. Besides the saturation issue, the density of the placed material should be established prior to construction. Typically a rule-of-thumb for stone is one cubic yard equals 1.5 tons. But when compacting a finer material, such as road base stone, this ratio may be 1.8 tons per cubic yard. This can cause a significant under estimation, and resulting extra order.

Per Each or Lump Sum

Measurement may also be in terms of "per Each" or "Lump Sum" and usually involve wording related to performance, such as "Measurement shall be made per EACH headwall satisfactorily installed". When there is little chance of variation between multiple items (such as headwalls in this case), this method is easy to measure in the field. If there are significant differences between the items as planned, or a likelihood that sizes may vary based on discovery during construction, it would be better to wrap-up all costs related to the installation in terms of a unit that could adequately compensate the contractor. For example multiple headwalls could be paid by the cubic yard, and would encompass all formwork, concrete, rebar and labor as established by the contractor's bid for expected cost to do the work on a volume basis. Of course the measurement should include the footer dimensions and subtract out the volume of the pipe within the headwall.

Large earthwork projects may have had volumes (in cubic yards) of materials moved established by computer modeling. If the engineer is confident that the initial information from surveying was correct, and the modeling was done correctly, the cubic yardage figure should adequately describe the total quantity of material to be moved. Double handling of the material may not be specifically called out, but if expected, should be considered into the cost of the project. Many times a Lump Sum is specified with the contingency that pre-construction and as-built surveys can be made to establish the actual volume of material moved. Usually as-built surveys are part of a deliverable by a contractor and should be performed by a registered professional surveyor. If the contractor feels the cubic yardage has a significant error prior to earthwork, they could have this surveyor establish the pre-construction condition.

The contractor would typically want the owner to pay for the survey since they will state it is the error on the owner's part to correctly show the existing conditions. In order to "keep the contractor honest", I have agreed to pay for a pre-construction survey on the condition that there had been in fact an error of at least 10 percent in the final earthwork quantities. That condition has caused more contractors to accept the original Lump Sum value, than to proceed with the survey.

One example that demonstrates a contractor's valid point concerning correct existing conditions would be topographic mapping, usually based on aerial photography, that did not include adequate ground shoots beneath tree cover or the sounding of water-filled pits. Although these areas may have been noted as "approximate" at some point, that fact may get lost during a long design, or changing staff, and significant changes are realized during construction.

Some contracts have provisions that allow for renegotiations of unit prices if changes are in excess of a set percentage, perhaps 25 percent. Although this is typically to allow for relief from hardships due to extensions or deletions of work, some contractors use this for purely economic gain and will attempt to direct work to create this situation.

Summary for Win-Win Measurements

Throughout this course it is important to recognize that adopting a win-win attitude with the yet-unknown contractor will result in a smoother, more productive project. The first step to achieving this goal is the correct selection of how the product is to be measured. Usually the method of measurement will relate to the method of payment. Establishing what would be the equitable method of payment for work that may yet change, and therefore how that work should be measured, sets the stage for smoother coordination and cooperation throughout the contract. If the best method for some work would be "Time and Materials", perhaps because of unknown conditions prior to the start of the work, the owner or engineer may need to spend more time monitoring the contractor's workforce to insure correct compensation. The contractor who is bidding the project may recognize previous efforts to be "fair" and would therefore bid lower than others who feel they must 'hedge" their bids.

Specifications and Methods of Payment

A contractor gets a "first impression" of a project, and how compensation may be made, after reviewing the Bid Proposal Form prior to bidding. Some contractors may decide not to bid based solely on the methods of payment on the bid schedule. Others may recognize potential avenues of economic gain purely by manipulating the bid in anticipation of extras and deducts. The engineer that has designed a project has to know what loopholes may exist and how to write the specifications to ensure the project is built to function properly. How a contractor gets compensated will add to the win-win scenario that will lead to the successful project the engineer and owner desires.

Unit Price Items

A typical method of payment is per a unit of a particular item. Examples already noted are linear feet of pipe, cubic yards of stone, tons of stone, or square yards of fabric. If the planned quantity of the item may change due to site conditions, having the payment in units will readily allow the contractor to request an extra, or the owner to recognize the need for a deduct. Although most of the examples relate to earthwork projects, unit items can encompass just about anything. Payment could be per specific type of bolt, per linear foot of wire or per gallon of paint.

This ability to add or deduct also leads to the greater possibility of abuse. A contractor may suggest changes to plans that would ultimately eliminate some items, perhaps items that were bid cheaply, and require an extra for another. The contractor may then prompt to renegotiate the original unit price to something even higher. It is imperative that the engineer of design remains in contact with those overseeing construction to insure that the changes are warranted and compensation is reasonable. Quite a few times I have thanked contractors, and staff, for their suggestions, but then noted I would consider such changes for future projects. There have been times when the changes do have merit, and the flexibility to compensate was then possible. If renegotiation was requested, there had been times when I suggested paying a lower unit rate based on "quantity discount". In some cases this led to the contractor accepting no change.

The engineer has to establish a level of quality for the design and bid package to attempt to identify these potential loopholes and close them before the bid package is sent out.

In some cases, compensation for unit items may begin to reflect lump sum items. This occurs when many items become "incidental" to the unit item. An example would be an aggregate underdrain. The contractor would first need to excavate the trench, perhaps requiring OSHA trench safety measures. Aggregate would be placed for the pipe bedding, the pipe would need to be placed and then the remaining aggregate. There may be filter fabric placed around the stone, or just over the top of the stone, and then some of the soil that had been excavated would be replaced and compacted. This would be a considerable amount of work, with some drastic variations in complexity, if it were just paid at the "contract unit price bid per **linear foot** of underdrain". A smart contractor would base the cost per foot on the more expensive version of what may be expected because if an extra is required, it may require trench boxes and deep excavation. The owner will pay a premium for a bid written in this fashion. A bid that fosters a win-win condition would be to include trench excavation as earthwork paid per cubic yard, the stone under an item paid by the ton, and the pipe paid per linear foot as installed. Filter fabric may be incidental to something like stone or earthwork, as it may increase with increasing amounts of excavation or stone. This only leaves expense related to use of a trench box and could be paid for per liner foot of trench requiring a box. All these items can easily be measured in the field and/or verified with weight slips. Contractors will be

more comfortable bidding lower knowing appropriate means to compensate will be in place.

Many times these separate items are already in a contract, so unless they vary significantly from the other items, the number of line items can still be kept manageable.

Lump Sum Payments

Unlike the trench example, which may vary greatly, work that is not expected to change from the plan, or is not easily measurable, may be made as a Lump Sum. Examples are typically mobilization to a project site. Many contracts will pay a large portion of the mobilization, but not all, to compensate the contractor for gaining access, bringing materials and preparing the site to begin construction. Some contracts may combine "mobilization and clearing", but if there is concern about how much clearing will be required, keeping them separated may be warranted. Site restoration may be also lump sum, thereby reinforcing the contractor's need to minimize damage to an area. Wording such as "no compensation for site restoration beyond the work limits shown on the drawings" sends the message that this is not an item that can be negotiated upwards because of sloppy work.

Some organizations may allow for payment syste 'Lump Sum" item as if it were "1 Each". This is particul onable and the payment system will allo np Sum item is required, the payment s Sum. Check with your accounting offic that the engineer is the ultimate watchd the project, bid it, and supervise const essage that the work described is com es. Confidence in that position should n d. Contractors should not expect variati s.

Too Many Line Ite

If expanding a Lun perhaps everything that can be broken ntractor may have a great time with this will not. Finding a good "middle grou n reason, whereas micro-examination project. Since we are dealing with hur precursor of potential micromanagement c their bids, if they bid, accordingly. Some realize the gol extra orders, looking for many more opportunities to unbalance bids, even if for only a large number of small items.