Ontario Construction Secretariat

PUBLIC SECTOR PROCUREMENT OF CONSTRUCTION SERVICES

A REVIEW OF GLOBAL BEST PRACTICES, LOW BID MODELS AND PREQUALIFICATION

JULY 2012

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INTRODUCTION

The Ontario Construction Secretariat (OCS) supports value added research that serves the unionized construction sector. One important area of research is in public sector procurement of construction services. In 2010, Ontario spent $34.8 billion on non-residential (ICI and Engineering) construction or 25% of all non-residential construction in Canada. Governments and institutions throughout Canada purchased slightly more than 1/3 of these non-residential construction services. This huge segment primarily uses a lowest bid award system. The OCS believes a crucial question to be addressed is whether the public gets the best value through this method.

Over the past several years, OCS has worked with University of Toronto, School of Civil Engineering to explore the issue of public sector procurement of construction services with the goal of identifying unique perspectives and insights to help improve the existing process as it exists in Ontario. This report provides a compilation of the following three University of Toronto studies.[1]

i. *Global Best Practices for Construction Procurement* by Brenda McCabe and Yuehua Helen Zhuang, 2006

ii. *Analysis of the Low-Bid Award System in Public Sector Construction Procurement* by Thomas Bedford, 2009

iii. *Effectiveness of Prequalification Practices in Public Procurement by Payman Berjis*, 2011

The goal for the public sector in procuring construction services should be "value based procurement." Quite simply this means that the cost of a construction project should be evaluated over the life cycle of the building. It also means that to evaluate the "true" cost of a building, factors such as; quality of work, timely delivery of services, costs of litigation, etc. should be folded into the calculation of the cost. What during the bidding stage seemed like the best economical choice may prove to be actually more expensive through cost escalation and missed timelines. The market for construction services in Ontario is competitive and market pressures should create the optimum result in terms of economic efficiency. However some elements of the current public sector procurement procedures do not yield optimal results because they do not consider carefully enough the unseen costs of their bidding procedures and the results that accrue from them. The three papers from the University of Toronto look in depth at this issue and point to directions that can address these shortcomings.

[1] Complete copies of the three technical reports are available from the OCS or can be downloaded at www.iciconstruction.com.

CURRENT ONTARIO PUBLIC SECTOR PROCURMEMENT PRACTICE

Current practice in Ontario is predominantly Design-Bid-Build (DBB). In this method the client enters into a contract with the designer who prepares the design and construction documents, and usually acts as the client's representative throughout construction. After the project is awarded to the contractor, the contractor is responsible for delivering the completed project according to the contract documents. Other models are: Construction Management where the client engages a construction management firm and design consultant early in process and they act either as an agent, who aside from designing and managing , also acts as an additional representative of the client's interests, or they act as a construction manager/contractor providing both general contracting services as well as construction management. There are other modifications on these models including Project Management where the client employs an organization to carry out all the necessary functions to procure a project, or there is Management Contracting where a management contractor is engaged to manage the process on behalf of the client. While the latter models are taking a greater share of the market, DBB is still virtually exclusive in public sector procurement.

THE LOW BID SYSTEM

In tandem with the DBB model is the low bid award system. This just means that the winning bid is the lowest. The advantages of this system are clear for public sector procurement. The simplicity is elegant and can easily be communicated to non-expert stakeholders (the voting public, non-specialist media, etc.) The process is transparent. A well considered specific contract is put out to tender and is awarded to the bidder who can complete the job for the lowest cost. This process is objective and the taxpayer is rewarded by getting the construction service for the lowest price.

While this model should deliver value, direct evidence does not bear this out. The problems with LB rise out of its one dimensional focus in awarding contracts solely on the cost; hence important factors such as time and quality are ignored, raising the possibility of unqualified contractors participating in the bidding process. Some have argued that instead of promoting competition, LB can attract too many bidders which ultimately lessen the attractiveness of bidding for some highly qualified contractors because of the reduced probability of winning the bid. Of course, these issues can be somewhat mitigated through careful drafting of a Request for Tender that craft specific penalties for shoddy work or time overruns. However data indicates that even careful drafting may reduce quality, because highly qualified companies who value their quality work often do not bid on contracts where they perceive that cost is the only consideration. Furthermore timeliness, which is crucial for clients, can be used by the winning bidder to use cost recovery tricks to increase the cost of the construction services, undermining the prime reason for LB -- lower cost. Data in 2009 found that projects with more bidders were more likely to have greater cost escalations. It also indicated that the amount of cost escalation increased as the gap between the median and low bid increases. In other words a project that has a high number of bidders and that has a winning bidder much lower than the median bid will be more likely to experience cost escalation and will not provide value to clients.

Another issue is the question of outliers, or bids that should be too low for a company to be profitable. The problem of outliers is that they are indicative of "predatory" bidding which makes it difficult for high quality providers to compete and subverts the process, by making winning the bid the goal whether it makes economic sense or not, knowing that potential losses will made up through cost escalation.

When Thomas Bedford did an in-depth analysis of public sector construction clients operation in the Greater Toronto Area, he found that the client who did not use prequalification for larger projects was subject to much higher cost escalation than other clients who prequalified contractors on large projects.

LICENSING

Despite problems in practice, the goals of transparency and low cost are still the core values for public sector procurement. Since these goals are not restricted to Ontario construction, for context it is valuable to see how other jurisdictions work. Although other jurisdictions have different organizational cultures which heavily impact on procurement practices and while no other country's system will likely mesh with the culture and business practices of Ontario, insights can be gleaned.

The term culture can be used to describe a whole country's construction business practices and environment, but it can also describe individual business and client cultures. Ontario has been described as having "both intense institutional regulation and strong market competition." This system means that compared to other places there is lack of trust and adversarial relationships among stakeholders. Also in contrast to other jurisdictions, Ontario does not licence its contractors as broadly. For example China, Japan and Australia have a stricter licensing regime for construction firms. This broader licensing is like a more fulsome Tarion Warranty Corporation where all Ontario homebuilders and vendors must be registered with in order to build or sell homes and condominiums. In that system registration fees fluctuate depending on the reputation and risk of the applicant. To register the applicant must demonstrate:

1. Financial stability
2. Business experience, customer references and bonding arrangements
3. Estimate the number and type of homes to built during the next 12 months
4. Document inventories of homes and other information as needed

In other sectors bonds are required by many private sector clients and it is mandatory in the public sector. The bond is reliant on the risk level which is assessed by surety companies issuing bonds.

Other ways in which Ontario has something akin to vigorous licensing is the application of the *Construction Lien Act* which creates a system based on the notion that someone who provides a service or materials that increases the value of the property should be remunerated for the added value they have provided. If they fulfill their contract and are not paid they can register a lien against the property.

These models can be contrasted to Asian systems which have a far greater hierarchical culture. In Japan for example, construction is a closed system with emphasis on long term relationships between contractors and clients creating limited competition.

Japan

Japan uses licensing extensively. The government takes an active role in the orchestration of construction activity at *all* levels. Licensed contractors are not just large companies; in fact 95% of licensed prime contractors are small firms with less than fifty employees. In their model, the detail of the requirements for staffing is clearly defined. For example to apply for an *Ordinary Construction License* the applicant must be able to meet four basic requirements:

1. The managing executive of the firm must have at least 5 years experience in general management control in the relevant work, or have Ministry of Construction approve the experience.

2. There must be a regular staff engineer in every business office with background to meet one of three criteria:

    a) Mastery of his discipline while at high school and business experience of 5 years in relevant construction work, or three years experience in relevant work after leaving a junior college, university, or college.
    b) Business experience in relevant construction work for a period of ten years.
    c) Approval by the Ministry of Land, Infrastructure and Transport and must have passed either the Engineering Test under the Construction Contractor Vocational Training Law, or the Test for First or Second Grade Architect of the Architect's Law.

3. Financial standing or financial credibility sufficient to execute contracts. To achieve this, one of the following requirements must be satisfied:

    a) Net worth: 5 million yen or more
    b) Fund raising ability: 5 million yen or more
    c) Experience: Continuous operation of a construction business with a license for not less than five years prior to the application

While the Japanese model in the context of a pronounced hierarchical culture is not directly applicable to Ontario, it does indicate an example of how detailed requirements for construction contracting can be.

Australia

Australia is a country with a business organization culture similar to Canada's, but it relies on licensing more than Ontario. Home building contractors in Australia are not allowed to do any work over $1000 without a specialist licence. In 2006 licensing was recommended to be extended to all construction areas.

The researchers found that the licensing function in Japan and Australia may increase the entry level to construction, limit the intensity of construction and further ensure construction quality. In Ontario bonding practices work to attain similar goals, but the focus is more on finance than emphasis on staff qualifications and experience.

ORGANIZATIONAL CULTURE

An often overlooked, but important consideration for implementing a process that assists value based procurement is an understanding of the different organizational cultures that interplay between public sector clients and private sector construction businesses. The following framework is a tool used to understand different organizations. It consists of four categories based on cultural characteristics. They are:

Clan – A *Clan* culture is similar to an extended family, where the organization focuses on the long-term benefit of individual development, while high cohesion and morale are also important. Leaders are viewed as mentors. Teamwork, participation and consensus are highly important within the organization.

Hierarchy – A *Hierarchy* culture is governed by formal structure and procedures. Relationships within the organization are formalized. Leaders need to be good coordinators and organizers. Formal rules, regulations and policies are relied upon to maintain the smooth running of the organization.

Market – A *Market* culture is driven by an emphasis on winning. The results oriented workplace requires tough, demanding leaders that are hard-driving producers and competitors. The goals of the organization are defined by market share and penetration.

Adhocracy – An *Adhocracy* culture can be characterized by a dynamic, entrepreneurial and creative workplace. Leadership within the culture relies on innovation and risk-taking. Agility, readiness for change and meeting new challenges are valued within the culture.

No organization belongs to any one category, but not surprisingly construction companies, particularly those involved in bidding for large contracts, had more attributes found in “Market” companies, or in some cases “Clan” attributes. An examination of the organizational culture of public sector construction clients in the GTA demonstrated a particular challenge for these clients and likely public sector construction clients in general. They are operating and dealing with a highly results-oriented industry (Construction) while their dominant organizational culture characteristic is rule and procedure oriented. These competing values across organizational lines can certainly contribute to conflict. Optimistically the data found a correlation (although somewhat thin) between a public sector client who wanted to be more market oriented in its outlook than the others and the achievement of lower cost escalation.

This is useful information, because although it is not likely that public sector procurers will change their culture, understanding the limitations of their culture and shading toward a more market oriented culture will have positive effects.

“Strong results-oriented cultures in public sector organizations can lead to lower cost escalation in construction projects.”

PREQUALIFICATION

Perhaps as public sector buyers of construction services become more "market oriented" and emphasize the *value* of the final outcome of bidding, rather than the *process*, prequalification will become more prominent. Less strict than licensing, prequalification in some form is used in all jurisdictions. Prequalification has become one of the more common ways to deal with shortcomings of LB system. Prequalification is a pre-tender process that aims to assess the capability and competence of potential bidders through screening of contractors according to a given set of criteria. This provides a tool for the owner/client to select from a prequalified group of contractors with the capability and means of successfully finishing the project, ensuring that the winner of the bid has the ability to deliver the contract. If used effectively (i.e. using selection criteria that truly assess the contractors' ability to successfully complete the project), prequalification can assist in reducing the bid cost while retaining the benefits of pure competition.

Prequalification can also reduce the complexity of the contracts, as the early screening of the contractors allows selection of a contractor who is able to execute the assigned project in accordance with all project requirements. On the other hand, poor selection of the contractor can result in magnification of the problems encountered during the project; no matter how carefully the contract has been drawn. This process also has the potential to reduce the number of bidders, without undermining the legality and fairness of the bidding process, through consideration of transparent and predefined criteria that evaluate the candidate's capabilities.

"A well-structured prequalification process can lead to better construction procurement."

Prequalification is a method of reducing the problems associated with too many bidders while still retaining the transparency of the DBB process and the low costs associated with it. It allows contracts to be less detailed by ensuring that contractors are not outliers or are trying to get their foot in the door, planning on cost escalation to recoup their losses.

An example of prequalification in practice can be seen in Australia. The prequalification of constructors based on the National Pre-Qualification Criteria Framework is widely used by the private and public sectors of the Australian construction industry. Their aim is to encourage contractors and consultants to commit to long-term continuous improvement and to achieve outstanding performance on service and work in building and construction related projects. In the state of New South Wales there are a number of prequalification schemes.

1. Contractor best practice accreditation for construction contracts valued over $2.5 million.
2. Contractor Prequalification for contract over $500,000
3. Regionally based contractor prequalification for minor and trade works construction generally valued under $500,000
4. Consultant prequalification for technical consulting engagements.

The key to a successful prequalification strategy is what criteria can be demonstrated by contractors who wish to be prequalified. A literature review found eight broad, common categories used in prequalification and ranked them by how often they appear in literature. Within these categories are the criteria or inputs which can be analysed.

1. Financial Stability
   - Bonding Capacity
   - Financial Statement
2. Experience and Past Performance
   - Has the contractor ever failed to complete a contract?
   - Number of similar completed projects
   - Types of projects completed
3. Company Organization
   - Number of failures to complete a contract
   - Number of years in construction
4. Health and Safety
   - Existence of contractor safety program and director
   - Number of accidents in the last 3 years
5. Capacity of the Contractor
   - Experience of employees (field/labour)
   - Contractor's largest project completed to date
   - Staff available for this specific project
6. Management Capabilities
   - In-house technical ability
   - Qualification of key staff
   - Experience of key personnel
7. Project Control Procedures
   - Appropriateness of scheduling system
   - Appropriateness of safety program
8. Geographic Location

PRE-QUALIFICATION METHODOLOGY

Once the general criteria have been established the difficult statistical evaluation of the contractors begins. The following are some of the popular methodologies for analysis

Dimensional Weighting Aggregation Models simply look at the criteria desired for a qualified contractor, assign a weight to the criteria and add the weighted totals. This model is simple, but

the assignment of values is highly subjective and cannot compensate for the risks in the decision maker's opinions or the inconsistencies in the contractor's data.

Knowledge based systems don't use scores but are based on decision rules to decide on the contractor. The problem with this model is that it cannot account for unknown aspects that this "rule of thumb" process involves.

A *Multi Attribute Analysis* is usually a three stage model, by first evaluating the contractors' attributes and then focusing on specific criteria in the second stage. These stages are then combined with the third Bid stage to come to a conclusion. Again this method is somewhat subjective in the inputs during the first two stages.

A *Systemic Multi Criteria Decision Analysis* uses the simple scoring process of Dimensional Weighting Aggregation with exact probability values for the criteria. This process is very difficult to work with because of its reliance on probability theories and precise valuation.

Models build upon each other to deal with outstanding issues in the previous model, creating a situation where they are based on complex mathematical formulations and are not as user friendly as previous models. Whatever model is used careful application will provide benefits in terms of value greater than relying on a low bid process.

"Prequalification can result in lower cost escalation, higher quality and improved safety, a win-win-win situation for all."

PRE-QUALIFICATION FINDINGS

The 2011 report produced for the OCS analysed pre-qualification practices for nine municipalities in Southern Ontario, a Federal owner and two institutional owners. Using a web based survey as well as a qualitative 30- 40 minute personal interview, inquiries were made toward; the use of prequalification in the procurement process, how the process is implemented, categories used for this process and its benefits, restrictions and drawbacks.

The findings demonstrated that:

- Prequalification is an effective process in acquiring a competent contractor which can result in lower cost escalations, higher quality of the final project and better safety records.
- Projects with prequalification exhibited enhanced cooperation between the contractor, owner and consultants.
- Although prequalification creates an obstacle for newer contractors, this obstacle is necessary to protect the owners. Newer contractors can acquire the necessary experience through smaller and less complex projects.

Overall, the opinions of the owners, contractors and sub-contractors did not vary often, however two differences in opinion were observed.

1. It was observed that for owners, the bonding capacity of contractors is the best indication of financial stability and use of this criterion to establish financial stability is very efficient.
2. Sub-contractors have issues with use of WSIB rate groups in the prequalification process as this criterion may put them in an unfair position.

The best practices that were identified in this research are:

1. Municipalities can achieve a better value by prequalifying contractors on a group of projects.
2. Using electronic documents is an effective method of increasing the efficiency of the process.
3. Using a standardized system is an effective method of increasing the efficiency of the process.
4. Using only a selected number of criteria that bring a high value added to the process has the potential to increase the efficiency of the prequalification process,.
5. Prequalification of subcontractors, consultants and designers ensures competent trades and designers are participating in the project.
6. Of the reviewed prequalification models, none seem to have the flexibility and practicality to be used in accordance to the identified needs of the owners. It is recommended that a more adaptable and custom model should be sought.

CONCLUSIONS

Although DBB and the lowest bid method of procuring construction services delivers the illusion of a transparent process and lower cost for taxpayers, the *empirical evidence shows that the best way to achieve value based procurement is to implement a robust and well considered prequalification process for projects*. Evidence in practice shows that prequalification when well implemented achieves the goals of low bid models. By diminishing the negative effects of predatory pricing, greater transparency is achieved by reducing cost escalation correlated to a high number of bidders. Prequalification also helps to establish relationships between contractors and clients. These long term relationships help to mitigate the problems of distrust fostered by different organizational cultures as evidence from other jurisdictions has shown. As well prequalification benefits both clients and contractors by removing "outlier" bidders. This gives confidence to contractors who know that those who are in the pool are capable of doing the job thereby levelling the playing field. While quality contractors benefit from a level playing field, clients benefit from less cost escalation, once the bid has been signed and can be more confident in receiving a timely and quality end product. *Quite simply, quality, timelines and lower costs can be achieved by the use of prequalification*.

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