Early contractor involvement – South Australian experience

Tony Ma
University of South Australia

Hee Xin

Follow this and additional works at: http://epublications.bond.edu.au/aubea_2011

Part of the Higher Education Commons

Recommended Citation

This Conference Paper is brought to you by the 36th Australasian University Building Educators Association (AUEA) Conference at ePublications@bond. It has been accepted for inclusion in Conference Papers by an authorized administrator of ePublications@bond. For more information, please contact Bond University's Repository Coordinator.
Early Contractor Involvement – South Australian Experience

Dr Tony Ma and Hee Heng Xin
School of Natural and Built Environments
University of South Australia, Adelaide, Australia

ABSTRACT
Construction contractors are usually not invited in design stage before design is being finalized. Therefore, it reduces their ability to influence the project’s specification. Early Contractor Involvement (ECI) is a form of project delivery which provides efficient use of resources; allows innovation in projects and provides for a value outcome. The aim of this paper is to review the circumstances when ECI will be implemented and to determine the strength and issues of this form of procurement. It also attempts to identify the critical success factors of ECI. A case study is conducted. The results reveal that the ECI approach had allowed all parties to work together to provide early innovations and cost savings, and to integrate greater constructability into the design. Overall, the findings from the case studies provide a valuable insight and understanding of the current practices of ECI projects in the South Australian construction industry.

KEYWORDS
early contractor involvement, constructability, South Australia

INTRODUCTION
In traditional procurement system, the process itself does not invite any design contribution from the contractor, as design aspects in this system are the domain of the architect or engineer. Even though construction knowledge is considered as a vital design input, its impact on design is restricted by the designer’s lack of construction experience and limited understanding of construction requirements (Song et al., 2009). Many contractors also argue that designers do not have enough practical experience of on-site construction and construction knowledge to assess designs as to constructability in most cases (Ndekugri & Turner, 1994). As a result constructability problems may occur. Saghatforoush et al. (2009) stated that “the integration of experienced construction personnel into the earliest stages of project planning as full-fledged members of the project team will greatly improve the chances of achieving a better quality project, completed in a safe manner, on schedule, for the least cost.” Contractors make use of their construction experience to assist designers to better designs and increase the
flexibility of the project will help to avoid any later design modifications that require extra cost to the project Early Contractor Involvement (ECI) was first established in 2001 by the Highways Agency for the A500 Stoke Pathfinder Project in UK to overcome problems in delivering major infrastructure projects. According to UK Highway Agency (2009), the project saved two years over the conventional contracting approach. Early Contractor involvement reduces the time taken through planning opportunities for overall project cost, and that reductions through value engineering are maximised where implemented at an early stage of the project (Matheson Ormsby Prentice, 2005).

In Australia, Queensland's Department of Main Roads (DMR) and Department of Public Works (DPW) both use ECI models. DMR reports success with its model contract introduced in 2005 including early completion of projects, improved design, simplified construction and reduced costs. It has used this approach on Maroochy River Bridge, Townsville Ring Road, and North Ward Road in Townsville. DPW released its new Managing Contractor Contract in 2007. It has also been used for the delivery of major public buildings (Whitehead 2008). In South Australia, there has been an increasing use of ECI by the Government in the development of public infrastructure projects (e.g. The Bakewell Underpass in Adelaide, and Tramline Extension).

In order to understand more about the use of ECI contracting, this paper aims to review the circumstances when ECI will be implemented and to determine the strength and issues of this form of procurement. It also attempts to identify the critical success factors of ECI. A case study has been collected through face-to-face interview. The findings shall provide a valuable insight of the current practice of ECI projects in South Australia.

REVIEW OF EARLY CONTRACTOR INVOLVEMENT

In Australia, the concept of Early Contractor Involvement under the principle of constructability is not new. In the year of 1993, the Construction Industry Institute Australia (CIIA) has developed 12 principles of constructability based on the CII constructability concepts (Trigunarsyah, 2004). The 12 principles developed emphasize on the commitment of the project team particularly from the very beginning of the project. Construction personnel are also encouraged to be involved. The best way is to include the actual constructor to the project team from the feasibility stage (Francis & Sidwell, 1996).

Song et al. (2009) define early contractor involvement as a relationship between a contractor and an owner or a designer that engages the contractor from the early design stage and allows the contractor to contribute its construction knowledge and experience to design. Early Contractor Involvement involves contractor to assist in the development of design for the project in the early phases of a project. According to the Main Roads of
Queensland Government (January 2009), ECI is best described as a negotiated Design and Construct (D&C) contract. The contractor, together with the contractor’s designer, can be engaged as early as immediately after a project business case has been prepared. ECI was developed for current market conditions (increased infrastructure programs across transport, water and mining sectors in particular, and a very tight technical skills market). This was done principally to gain the benefits of a D&C approach, and to reduce the significant resource requirement of D&C projects during the tender phase. ECI takes a two-stage approach, the first being the selection of contractors through a non-price selection process based on the capability of the proposed team. It finishes with the contractor submitting a stage 2 offer. In stage-2, the successful contractor works under a service agreement with the government.

Strength of ECI

Early Contractor Involvement contracting has a number of benefits compared to traditional contracting procurement. These benefits include (Whitehead, 2009):

1. **Reduced tender costs and time**
   Mosey (2009) suggested that ‘ECI potentially reduces preparation time for projects by 30-40%, by carrying out some parts of the development process simultaneously rather than consecutively.’ An organization typically has a one in three chance of winning in a traditional tender. Therefore, it would be a waste to spend large sums of their own money on investigation or design being awarded the contract (Edwards, 2009). However, for an Early Contractor Involvement contract, detailed project design and scope of works are not required during tendering process. In an overheated market, this helps to reduce the resources needed during tendering process.

2. **Better team approach**
   ECI provides the benefits from client and supplier to work as a team (Mosey, 2009). With the utilization of Early Contractor Involvement, the contractor is involved in the design phase. Whitehead (2009) outlined that the benefits on relationship contracting will therefore be gained through the close relationship between the owner, contractor and designer. Through relationship contracting, there will be a better understanding of the project through improved communication and an improved work environment.

3. **Increased opportunity for innovation**
   Early involvement increases innovation which was being lost on Design and Construct contracts as detailed design and scope of works is not required to set
out at the beginning of the project. Thus, the design of the project is more flexible and hence allow for options for innovation to be discovered.

4. *Fast decision-making*
The early involvement and collaboration between contractor, client and designer allow for decision-making and approvals. Moreover, decisions can be made very quickly as senior personnel are accessible (Edwards, 2009).

5. *Shortened delivery time*
As Early Contractor Involvement allows work to commence at the early stages of construction while the design and documentation of later trade packages are being finalized, the time and cost restraints associated with traditional tendering methods can be reduced.

6. *Better integration of construction methods/ Constructability*
Through Early Contractor Involvement, the contractor contributes more input in the design process which in turn leads to increased constructability. Besides, the close collaboration and input between all parties assists for better integration of construction methods in the design of the works.

7. *Reduced risk of surprise*
The risk of surprises is reduced during the progression of project because of good communications, good understanding of the project among the contractor, client and designer on the scheme requirements and the associated costs.

8. *Fewer variations during construction*
There will be fewer variations during construction as all parties have a good understanding of the cost required for the project.

9. *Realistic price*
Through ECI contracts, the real costs are highlighted early as a team or alliancing spirit which leads to an open and honest process is provided. The price provided will be much more realistic compare to traditional contract procurement (Whitehead, 2009).

*Issues of ECI*

Ever since Early Contractor Involvement was being introduced in the year of 2001, there have been only a few problems identified. However, there are some issues have to be concerned (Whitehead, 2009):

1. *Involvement of senior staff*
The early stages of the project tie up senior staff for a longer period than traditional form of contracts. This additional involvement occurs particularly in
the design phase when the contractor’s margins are traditionally low. Though, this will have to be reasonable against the cost saved during the tender processes.

2. Potential loss of innovation
For project where construction price can be negotiated, it may be hard to find out when the design has progressed sufficiently as the contractor may want to continue to refine the design to reduce their risk (Edwards, 2009). The designers may then ‘step back’ from design innovation as the contractor pursues constructability and cost savings at early schematic design stage.

3. Going too early
When the contractor is appointed too early, there is a risk that the contractor may not be motivated to provide its best staff. Therefore, the earlier is not necessarily the better.

4. Potentially higher prices
Due to the fact that Risk Adjusted Price is built up in the absence of competitive tension, this may lead to a higher Risk Adjusted Price. Hence, appropriate measures need to be taken into account.

5. Finance
Finance may be not easy to obtain in the circumstances where the project total costs are not confirmed.

6. Uncertainty
The contract (New Engineering Contract) used in the United Kingdom is being criticized due to the fact that it is an entirely new contract which does not have the benefit of years of judicial interpretation (in the case of standard form of contracts). Thus, Whitehead (2009) suggested that Early Contractor Involvement could be used in conjunction with traditional contracts. On the other hand, the Australian models utilize contract that is consistent with the existing standard contracts where the Australian standard contracts have been used as the base for stage 2 contract. It is vital to ensure certainty wherever possible as the existing contracts may simply not appropriate.

ECI EXPERIENCE IN SOUTH AUSTRALIA – A CASE STUDY
The road works projects have traditionally used construct only or Design and Construct, which have largely been successful in meeting the project time, cost and quality. However, it is recognised that these strategies are unlikely to meet the delivery timeframes now expected by government, particularly in complex projects. According to Edwards (2009), there are a number of contracting strategies developed in the road
construction industry that encourage collaboration between the principal, designer and the constructor. These include alliance contract and early contractor involvement. ECI has been selected as the contract delivery strategy for a number of major transport infrastructure projects in South Australia. These projects include:

- The Bakewell underpass
- The South Road Anzac Highway Underpass
- The Air Warfare Destroyer Shiplift,
- Coast to Coast Tramline extension, and the
- Reconstruction of part of the Adelaide metropolitan passenger rail network.

In order to fulfil the research objectives, a project case has been studied in details. Table 1 indicates its brief summary.

### Table 1 – Summary of the Tramline Project

<table>
<thead>
<tr>
<th>Nature of Project</th>
<th>Contract Price</th>
<th>Year</th>
<th>Interviewee</th>
</tr>
</thead>
<tbody>
<tr>
<td>The construction of 2.8 kilometres of double tram track, with substation, overhead catenary system and associated structures, necessary road and bridge works and traffic management measures, an additional four tram stops, and new park and ride facility (SA Government project)</td>
<td>Approximately $100 million</td>
<td>May 2009- March 2010</td>
<td>Project Manager</td>
</tr>
</tbody>
</table>

The aim of this case study is to facilitate the following objectives:

- To understand the reasons for this procurement strategy
- To identify the issues and risks involved when ECI is being chosen.
- To examine the impacts of ECI to the project outcome.

This project is about the extension of tramline in Adelaide. It incorporated the construction of 2.8 kilometres of double tram track, with substation, overhead catenary system and associated structures, necessary road and bridge works and traffic management measures, an additional four tram stops, and new park and ride facility. The extension of tramline was to expand light rail services into the wider metropolitan transport network.

It was quickly recognized in the early planning study that there would be difficulties to construct the tramline. The construction works affected the use of the road network, the rail corridor and the river. During construction, there were temporary impacts on kerbside use. The impact of the tramline on the kerbside activities comprised some minor relocation of bus stops to suit the road widening. Besides, there was some loss of parking on some of the roads. The rail corridor was contaminated and required management during construction.
The project delivery team had to be aware of the requirement to minimise disruption to the city from the construction works due to the fact that the scope of work consisted of various range of activities such as civil, electrical, track engineering, traffic management and urban design. These works were required throughout the whole extension. Therefore, the project delivery team had to complete these works in as short a time as is practical in order to minimise any impact on traffic and events held in the city.

The client recognized the complexity of the project and it required an innovative approach to the project delivery method. With the previous successful experience of adopting ECI in delivering the required infrastructure asset within the budget and on time, the client decided that the project was an ideal candidate for the ECI strategy. By adopting the ECI method, the client engaged a team to collaborate with in order to develop an approved design from conceptual stage, that was then subsequently procured by the conventional design and construct method. All tenders in stage-1 were assessed according to the following criteria:

- Experience in similar works
- Management team qualities
- Appreciation of and approach to tasks
- Financial viability and insurance

Under the ECI agreement, the client was committed to establishing and maintaining a close and cooperative relationship throughout the life of the project. A joint leadership team comprising senior people from the contracting organization and from the client was established. This high level team was responsible for providing the strategic direction of the project and creating, guiding and supporting a culture of cooperation and high performance. The team had also provided organizational support to the project. The whole process is very similar to the alliance contracting but with a smaller scale and it does not have the pain and gain share provision.

In November 2007, the contractor and designer were engaged under an ECI agreement. The contractor and designer were invited to enter into an agreement to undertake Design Development. A project management team consisting of staff from the client, the contractor and designer was formed under the agreement. The agreement had also included the provision for design work to continue up to award of the design and construct contract. The team worked closely with the client for seven months, sharing its engineering design and constructability expertise. The outcome of this process was a design that defined the scope of the works, identified the risks and mitigation requirements, and contained sufficient information for the construction work to be accurately priced.
The client recognized the importance of high quality design development and the project cost savings that can result from high standard design. Therefore, some of the client’s staffs were appointed to the design team during the period of the design development phase. Through the collaboration among the team members, the teamwork was established and it provided joint commitment, integrated approach and innovative thinking for the project.

The contractor had to develop the cost estimate which include the proposed construction activities and cost against other similar projects on a confidential open book basis. An estimator had been engaged by the client to calculate an estimated cost without referring to any of the contractor’s calculations. The parties could negotiate the design and construct contract cost once the cost estimates had completed. The client had the right to seek for other proponent if the parties cannot agree with the price and risk allocation. However, in the case of this project, the same team was awarded the stage-2 contract for this project.

The collaborative approach taken by the parties delivered a number of benefits. The ECI approach had provided the maximum opportunity for the contractor to manage the key areas for innovation and value for money such as track design, construction staging and traffic management. This process provides the maximum opportunity for the contractor to manage this. The client dictated that through the understanding, skill and experience, it enabled the team to deliver a value-for-money project whilst giving proper consideration to the needs of community groups and road users.

During the interview, the project manager indicated that ECI might not contribute huge savings for the project as a whole, but it certainly created huge savings in the tendering process. Calling tenders for a design and construct for high risk projects would result in very high prices and tedious evaluation process. During the stage-1 process, the establishment of teamwork is at risk as it can be very challenging to select the most appropriate approach or solution for the project due to the fact that each team member may have different opinion towards the project. On the other hand, before finalising the stag-2 contract, there will always be tension in the process of negotiating a price for the design and construction. With the lack of traditional competitive approach, the client will never know if value for money tender has been obtained from the stage-1 contractor.

CONCLUSIONS

ECI contracts were seen relatively successful in South Australia in road works projects. However, not every project would be suitable to adopt the ECI approach. Generally, it is not worth to call tender for projects with high risk and uncertainty of scope. It will result in very high tender prices to reflect the uncertainty involved in project delivery. Thus,
traditional contract types are more favourable for straightforward projects. Meanwhile, if the project is very complex or high in risk and there is an ongoing need for collaboration between the designer, contractor and client during construction, the project is better suited to an alliance contract. From the results of the case study through interview, it shows that projects with high risk and uncertainty scope but smaller than a typical alliance project are more suited to an ECI approach.

It is found out that the transition of the first stage to the second stage is the most difficult part of the ECI contract. In the client perspective, termination would only be done as the last resort as there are significant barriers to terminating the relationship with the design contractor. Besides, there would be significant disruption to the momentum of project team and loss of knowledge about the project if another company takes over. To ensure a realistic price is offered by the contractor, the client would usually engage an independent cost consultant to prepare a separate estimate before reviewing the price offered by the contractor. If there is a case where the price could not be agreed, the client would try to negotiate with the contractor in order to get to an agreed price and solution.

REFERENCES