ATTITUDES AND PERCEPTIONS TOWARDS EARLY CONTRACTOR INVOLVEMENT PROCUREMENT

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ABSTRACT

Early contractor involvement (ECI) procurement is a relatively recent development in construction, which allows the contractor to have input into the design phase of a project. In comparison, under traditional construction procurement, the design is completed before the contractor becomes involved in a project. The aim of the paper is to examine the attitudes and perceptions of contractors and architectural designers towards ECI in general and design-build procurement in particular as the most common form of ECI procurement in the Auckland commercial construction market. Face-to-face surveys and semi-structured interviews have been conducted with contractors and architectural designers to gain an in-depth understanding of the different aspects of ECI procurement, in comparison to traditional design-bid-build procurement with regard to Auckland commercial construction projects. The findings of the study indicate that ECI procurement is viewed positively by both contractors and architectural designers. Both parties also consider that ECI provides benefits for them, though each has some concerns in certain areas of ECI that they feel adversely affect their particular role. These areas of concern are where there are differences in the perceptions of the two parties. ECI was found to offer significant advantages over the traditional approach in terms of cost, design and relationship factors, but results were inconclusive with regard to time and quality advantages.

Keywords: design-bid-build, design-build, ECI.

INTRODUCTION

Early contractor involvement (ECI) procurement approaches are an alternative to the traditional design-bid-build procurement method. Under the traditional approach, the design and construction are separate exercises carried out in isolation, whereas under ECI, these exercises overlap and are conducted collaboratively. The major point of difference provided by ECI is that the contractor is able to have input into the early design stages, when the cost implications are at their lowest, providing buildability and value engineering advice. ECI is a key feature of all non-traditional procurement methods, including the popular design-build approach, which is the most common ECI method in New Zealand construction. Under design-build, the contractor is engaged by the principal to both design and construct a building.

As ECI in construction projects is a relatively recent innovation, it has had the effect of completely changing the relationships between some project stakeholders. Under the traditional procurement path, the principal engages the consultants and then

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engages the contractor separately. Under the ECI approach, various engagement scenarios are possible, including where the principal engages only the contractor, who then engages the consultants itself, or where the principal engages the consultants, who are later novated (transferred in terms of responsibility) to the contractor, once the contractor is engaged by the principal. These changed relationships have altered the levels of control, responsibility and risk that previously existed between consultants and contractors, under the traditional procurement approach. The level of interaction between the two parties will also have been greatly altered, as the ECI approach sees consultants and contractors actually working together, rather than almost completely separately under the traditional approach.

Whilst there is no shortage of theory and research describing and examining ECI procurement in terms of control, responsibility and risk, the advantages and disadvantages of the approach are generally stated in terms of the project overall, rather than in terms of how the contractor and architectural designer are actually affected. Therefore, the aim of this research is to examine the views that Auckland contractors and architectural designers hold with regard to ECI construction procurement methods. This examination is in terms of the tangible benefits, such as time, cost and quality, but also of the more intangible benefits, such as those related to teamwork and work relationships. In addition, the research sets out to establish if there are differences between the perceptions of the two participant groups, including the benefits of ECI for members of the other participant group.

The findings of this research add to the body of knowledge on the subject and would be helpful to principals, in understanding how contractors and architectural designers perceive ECI, as well as the benefits and disadvantages that it holds for them. Furthermore, it would help contractors and architectural designers to understand the attitudes of the other party in the design-build delivery relationship and may assist in improving relationships and performance on future ECI projects.

**CONTEXT**

Early contractor involvement (ECI) is defined, in the context of this research, as any modification to the traditional design-bid-build construction procurement process, which involves the contractor in the design process. In the traditional approach, the contractor is generally selected when the design is completed and construction is ready to commence, with the design having been developed separately by design consultants (Love, et al. 2014; Masterman 2002; Mosey 2009). In an ECI approach, the contractor is involved in the design process in order to have input into the design development (Jackson 2011; Scheepbouwer and Humphries 2011). There is a lack of research into the level of use of different construction procurement types in New Zealand, but the most common form of ECI procurement in New Zealand commercial construction is considered to be the design-build approach (personal communication, April 10, 2013). Design-build procurement suits principals who are looking for best value, rather than just lowest bid (Anumba and Evbuomwan 1997; Jackson 2011). Design-build procurement is considered, in the context of this research, to include the ‘turn-key’ option when the contractor is responsible for the complete design; the enhanced and novated variants when the principal commissions the early design work, but at some point it is taken over and completed by the contractor; and the guaranteed maximum price (GMP) option (Martineau 2009; Mo and Ng 1997; Thomas 2006; Walker and Hampson 2008).
Responsibility
The biggest difference between design-build and traditional design-bid-build is the single point of responsibility that exists under design-build. The principal engages with what is sometimes referred to as the design-build entity, so that the principal is not required to act as the middle man between the contractor and designer when a design-related dispute or omission arises, as is the situation under design-bid-build. Any such design issues are exclusively the problem of the design-build entity (International Cost Engineering Council 2004; Jackson 2011) as the architectural designer basically provides design services as a subcontractor to the contractor (Quatman and Dhar 2003). Conversely, under the traditional approach, the principal (owner) has separate contractual relationships with the contractor and the architectural designer and there is no contractual relationship between the designer and contractor (Bunting 2011; Sanvido and Konchar 1999). ECI allows risk allocation with the majority of the design risk allocated to the design-build entity (contractor and designer) (Jackson 2011; Mosey 2009). Liability issues, which are clearly defined under traditional procurement, become less clear under design-build (Levy 2012; Masterman 2002) but nevertheless cause fewer lawsuits than the traditional procurement approach (Jackson 2011). The common goal of the design-build entity results in a significant reduction in contractual claims for time delays or design omissions (Anumba and Evbuomwan 1997; Jackson 2011; Reina 2004; Quatman and Dhar 2003) while under the traditional approach, the two parties often have conflicting interests and responsibilities, which can lead to conflict and blaming of the other party.

Project and construction durations
In terms of project and construction durations, the project in the traditional design-bid-build approach is conducted as ‘a linear process, in which each function typically ends before the next function begins’ (Jackson 2011, p. 43), meaning that there is no ECI and no possible overlap between the design and construction phases (see Figure 1).

Under the design-build approach ‘because of the improved communication that is possible when working as a team, this overlapping design and construction process results in faster project delivery’ (Jackson 2011, p.52), due to construction phase commencing before the design phase is completed (Loosemore 2014; Reina 2004; Walker and Hampson 2008) (see Figure 2).
ECI allows the contractor to have input into the project during the planning and design stages, when this input can have the highest level of influence on the project. Furthermore, ECI leads to reductions in both the overall duration of a project and in the number of man-hours required due to the overlap that is possible between design and construction phases (Loosemore 2014; Mosey 2009; Reina 2004; Song, et al. 2009).

**Project cost**

Design-build has a clear cost advantage over design-bid-build on projects where the principal requires either early cost certainty or pricing input from the contractor to test the developing design against the project budget, both of which are features of ECI (Anumba and Evbuomwan 1997; Bundgaard, et al. 2011; Jackson 2011; Mosey 2009; Love, et al. 2014). Under design-bid-build, the actual project cost is not known until the design is completed and the project has been tendered, by which time, a significant amount of money has already been spent on the production of the design. Overall, design-build offers lower construction costs and design-build projects are more likely than traditional projects to have a completed cost within 5% of the original budget (Chan J.H.L., et al. 2012; Levy 2012; Mosey 2009; Sanvido and Konchar 1999).

**Quality**

Quality assessments of design-build and design-bid-build projects need to consider the overall quality of the finished project (ease of start-up, lack of call backs, low operation and maintenance cost and quality of envelope, roof, structure and foundation) (Sanvido and Konchar 1999), as well as the design quality of the project (aesthetics, capital costs, time to build, lifecycle costs and functionality) (Gunning 2002). There are opposing views in the literature regarding quality due to the perception that design-build delivers lower quality than design-bid-build, although there is no factual evidence to support this (Gunning 2002; Koch, et al. 2010). Some studies suggest that principal’s levels of satisfaction with the quality of design-build projects exceeds that of design-bid-build projects particularly in three main areas: ease of start-up, level of defect remedial work required and reduced operation and maintenance costs (Sanvido and Konchar 1999). Other studies express the view that
design-build projects are less likely than design-bid-build projects to meet the principal’s expected level of quality especially in the case of complex projects (Masterman 2002). Under design-build, the architectural designer receives value engineering and buildability feedback from the contractor, which generally results in a better quality design that is more cost-effective and has fewer documentation errors, than a design produced without contractor involvement (Love, et al. 2014; Quatman and Dhar 2003; Song, et al. 2009).

Benefits of the implementation of ECI
Architectural designers benefit from ECI through improved relationships with principals and contractors, increased profit margins, fewer documentation requirements, reduced construction administration, and reduced claims and lawsuits thus improving their reputation (Quatman and Dhar 2003; Song, et al. 2009). The main benefits of design-build for contractors include the fewer instances of redesign, ‘improved schedule, cost, safety and quality performance’ as well as improved potential for future work, due to the relationship opportunities with principals (Song, et al. 2009, p.13). Furthermore, projects can be won by negotiation, often with increased margins, not just being allocated to the lowest bidder (Levy 2012). The main benefits of ECI and design-build for principals include single source of responsibility for design and construction, quicker project delivery, careful monitoring of the budget throughout the design phase, reduction or elimination of costly re-design, elimination of ‘finger-pointing’ between consultants and contractors when a problem arises and fewer disputes and claims (Levy 2012; Quatman and Dhar 2003).

RESEARCH METHODOLOGY
The chosen research method for this research was qualitative based on comparative primary data collection, using questionnaires in face-to-face surveys and follow-up semi-structured interviews. This approach allowed for the attitudes of contractors and architectural designers towards ECI to be examined in general terms, as well as allowing comparison between the perceptions of the two respondent groups. A short questionnaire comprising seven closed questions was used for the face-to-face surveys. The interviewees were asked to complete the questionnaire during the interviews. The use of closed questions was necessitated by the fact that standardized, pre-coded, quantifiable, comparable data were sought that could be easily analysed. In addition, the questions for this research were pre-tested by industry colleagues (an architect and a construction supervisor) with the aim to receive feedback from the viewpoint of both participant groups. The seven closed questions were of three different types: degree of agreement and disagreement represented by a Likert scale; rating of items represented by a rating scale; and feelings about a topic or a semantic differential scale (Denscombe 2010). The use of questionnaires in the surveys ensured a high degree of comparability in the respondents’ answers and allowed the easy identification of any opinions that were at variance with the literature, so that suitable follow-up questions could be asked in the interviews.

The surveys were followed by semi-structured, face-to-face, in-depth interviews. Semi-structured interviews were appropriate for this study as they allowed the use of a mix of pre-planned questions and unstructured conversations resulting in detailed, complex answers (Morse and Richards 2002). They also permitted a level of flexibility as the interviewees had the opportunity to develop own ideas and speak more widely on the issues and their perception of reality thus contributing additional contextual
information (Denscombe 2010; Burns 2000). An interview question guide comprising seven open-ended questions was used in the semi-structured interviews. The open-ended questions, following the survey part of the interviews, were designed to elaborate further on some of the aspects of early contractor involvement procurement through the opinions, perceptions and experiences of the respondents.

The purposeful sample for this research consisted of five directors or associates in the architects/architectural designers group; and two senior management staff and three project management staff in the contractor’s group (see Table 1).

Table 1 Details of participants in the interview sample

<table>
<thead>
<tr>
<th>Code</th>
<th>Type of firm</th>
<th>Participant’s role in firm</th>
<th>10+ years’ experience in const/design industry</th>
<th>Experience with D-B-B</th>
<th>Experience with ECI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part C</td>
<td>Architecture</td>
<td>Director</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part F</td>
<td>Architecture</td>
<td>Director</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part H</td>
<td>Architecture</td>
<td>Project Manager</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part I</td>
<td>Architecture</td>
<td>Director</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part J</td>
<td>Architecture</td>
<td>Director</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part A</td>
<td>Contractor</td>
<td>Contractor’s Project Manager</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part B</td>
<td>Contractor</td>
<td>Contractor’s Design/Project Manager</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part D</td>
<td>Contractor</td>
<td>Director</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part E</td>
<td>Contractor</td>
<td>Contractor’s Construction Manager</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Part G</td>
<td>Contractor</td>
<td>Contractor’s Project Manager</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The fact that the sample groups were all in management or director/associate roles means that all participants would be party to commercially-sensitive information within their company, which would make them aware of the success or otherwise of different projects and procurement methods. All participants had been involved with both traditional design-bid-build (D-B-B) and ECI procurement method projects, and all had ten years or more experience in their industry, so all would have sufficient background and knowledge to be able to offer informed perceptions for this research.

MAIN DISCUSSION
The collected data explores participants’ attitudes and perceptions towards ECI, with regard to Auckland commercial construction projects and compares the effect of ECI
procurement with that of traditional design-bid-build procurement considering a range of different factors.

**Business relationship-related**

Opinions were divided regarding the effect that ECI has on the number of claims and lawsuits between contractors and architects with 60% of the participants taking the view that ECI results in less claims and lawsuits than under design-bid-build (see Figure 3). One of the benefits from ECI is a reduction in claims and lawsuits between the parties (Love, et al. 2014; Song, et al. 2009).

![Figure 3 ECI claims and lawsuits between contractors and architectural designers](image)

However, the study’s results can be attributed to the fact that there are very few lawsuits between architectural designers and contractors in New Zealand, as Participant F commented, which is why it is difficult to gauge the effect of ECI. ECI was considered as more profitable for architectural designers, because ‘less time is spent trying to find the most-effective solution on your own’ in comparison to design-bid-build (Participant J). However, the contractors’ views were that overall ECI had either no effect on profitability or can be less profitable for the contractor, ‘due to risk and having ownership of the solution’ (Participant D) or that there were too many variables involved and the profitability of any project ‘depends on whether you muck it up or not’ (Participant A). In comparison, design-bid-build can be more profitable because ‘it’s perfectly clear what is and isn’t included in the scope’ (Participant G).

These findings are much less definitive than studies in the literature reporting on increased profit margins for both contractors and architectural designers and design-build projects, in general, being more profitable than design-bid-build (International Cost Engineering Council 2004; Levy 2012; Pearman 2007; Quatman and Dahr 2003). The findings of this research that a good relationship between the contractor and the architectural designer is more likely under ECI, than under design-bid-build, is in agreement with findings in the literature that ECI fosters a better relationship, which reduces misunderstandings and produces better project outcomes (Bundgaard, et al. 2011; Love, et al. 2014; Rahman 2012).
**Time-related**

Participants’ perceptions indicated only a low level of agreement (50%) with regard to ECI’s overall project duration being shorter than under design-bid-build; 30% taking the view that ECI has no effect on duration; and 20% unsure (see Figure 4).

![Figure 4 ECI project duration](image)

ECI’s shorter construction duration was due to the contractor having already put the ‘up-front work in’, such as preparatory work (Participant H). However, it should be noted that no participant believed that ECI actually had longer durations than design-bid-build. Various studies in the literature indicate that ECI has 30% to 33.5% faster project delivery, due to the overlap of the design and construction phases, and 12% faster construction phase duration (Levy 2012; Sanvido and Konchar 1999). There was, however, a high level of consensus among participants (90%) that ECI is more likely than design-bid-build to achieve on-time completion. This finding concurs with the literature that schedule growth is 11.4% less under design-build than under design-bid-build (Reina 2004; Sanvido and Konchar 1999), meaning that design-build is more likely to be completed on-time.

**Cost-related**

The fact that the perceptions of participants strongly showed that ECI reduces construction costs (70%) was as expected (see Figure 5).

![Figure 5 Reduced construction costs](image)
ECI does reduce costs, because it allows the contractor to ‘cost out risk, rather than having to cost it in’ by having better control of risks under ECI (Participant E). This finding is consistent with the literature stating that costs are understood earlier under ECI and this allows any adverse consequences to be dealt with earlier (Bundgaard, et al. 2011; Love, et al. 2014). Design-build offers an advantage with 13% lower construction costs and where the principal requires early cost certainty (Jackson 2011; Sanvido and Konchar 1999). The architects’ view in general was that the reduction of construction costs is ‘not always in a good way’ (Participant C), in reference to the potential for the contractor’s cost-reduction input to negatively affect the design. The participants from both groups strongly believed that ECI increases the likelihood of completion on-budget as a result of monitoring the construction costs throughout the project duration. This finding concurs with the literature that ECI allows better cost control and thereby reduces the risk of the project going over-budget (Chan J.H.L., et al. 2012; Rahman 2012).

**Quality-related**

The findings regarding ECI’s effect on the quality of a completed project were less definitive than for most other aspects of the research. The reasons for this are likely due to the difficulty that is inherent in the definition and measurement of the quality of a completed project, due to the subjective nature of quality (Koch, et al. 2010; Sanvido and Konchar 1999). The majority of participants, 70%, were of the opinion that the contractor’s input into design, under ECI procurement, generally results in a higher level of design quality than design-bid-build. Most participants paused and gave more consideration to the quality questions than they did to other questions, with several participants also commenting that these were very difficult questions to answer, as there were so many variables to consider. Design quality was characterised as ‘budget-driven’ - affected by whether the budget ‘allows for nice things to be kept and lesser things to be altered or whether all things are altered’ (Participant F). Despite the nuances in the perceptions of design quality, the majority of participants from both groups, or 90%, agreed that the contractor’s input into design under ECI procurement generally results in more cost-effective design (see Figure 6).

![Figure 6](https://ics.org/cobra2015)

**Figure 6** More cost-effective design
These findings confirm the assertions in other studies that contractor’s value engineering and buildability inputs result in a design that is more cost-effective than a design produced without the contractor’s involvement (Quatman and Dhar 2003).

Preferred design-build procurement method variant
The overall most-preferred design-build variant from this research, focusing on Auckland commercial construction projects, was the enhanced variant. There were marked differences in the views of the two sample groups with the majority of contractors (80%) in favour of the enhanced variant as opposed to only 10% of the architects. None of the contractor participants in this research indicated a preference for traditional design-build. These findings contradict similar studies which found that the enhanced design-build variant was the least-preferred among contractors whose preferences were for the traditional design-build method (Mo and Ng 1997; Pearman 2007).

Architectural designer’s preferences in this research were less conclusive, but the most-preferred variant (60%) was the novated design-build, which agrees with the findings of Martineau (2009) and Mo and Ng (1997). The reasoning behind this was that ‘novation allows the architectural designer to still have some leverage on the contractor, to push for the principal’s interests’ (Participant I). In comparison, the enhanced variant was perceived as causing a ‘loss of design continuity’, which was to the ‘detriment of the project overall and to the architectural designers involved’ (Participant J). The problem that the respondent identified with regard to loss of continuity was that the architectural designer who is signing off the completed project doesn’t necessarily understand the original design intent.

Some architectural designers’ preferences for the enhanced design-build were explained with the benefits of the method to allow the ‘concept design to be completed involving just the architectural designer and the principal’, with the ‘contractor having input into the detailed design, rather than the contractor influencing the whole design process’ (Participant C). ‘There is an early period when the architectural designer is trying to get the brief out of the principal, during which the contractor should not be involved’ (Participant I). These results seem to show, not surprisingly, that each party preferred the variant that best achieves their own goals, rather than considering which variant provides the best project outcomes.

Perceived benefits and disadvantages of ECI for contractors
The three most important benefits of ECI for contractors identified in this study are: better risk management, improved cost performance and the ability to appoint subcontractors earlier in a project. These findings concur with those of similar studies maintaining that better management and reduction of risks is the key benefit for contractors (Chan J.H.L., et al. 2012; Bundgaard, et al. 2011; Rahman 2012). However, other views in the literature are that the main benefit of ECI for contractors is the fact that projects can be won by negotiation (Levy 2012; Pearman 2007). The ability to secure projects by negotiation was ranked in this study fourth-equal, with improved schedule (time) performance. There was a general perception among contractors that architectural designers are less resistant to change under ECI, than under design-bid-build, which means that the contractor is better able to have an influence on the design (Participant B). The ‘architect is pro-active, not reactive’
under ECI (Participant E). In addition, ECI was perceived to provide an improved teamwork benefit with the contractor and architectural designer ‘working together, not separately’ (Participant A). ECI ‘does away with the them-and-us element’ that is inherent in the design-bid-build approach (Participant D) and is ‘more up-front and sort it out, before it becomes adversarial’ (Participant B).

Perceived disadvantages for contractors were mainly in relation to the design responsibility and the associated risk that the contractor assumes under ECI. Furthermore, the effects of longer involvement in the project were also identified as a possible disadvantage, which agrees with the findings of Rahman (2012). The contractor’s longer involvement can mean that more of his time and money may have to be spent on the design of a project before the project is actually awarded to him or is even confirmed to proceed to construction.

**Perceived benefits and disadvantages of ECI for architectural designers**

The three most important benefits of ECI for architectural designers are: improved design, better communication and improved relationships. ‘ECI provided the benefit of issues getting resolved, rather than being fought over’ (Participant H). These findings concur with the literature that better communication and a better relationship with the contractor are the architectural designer’s main benefits from ECI. Furthermore, ECI provides valuable up-to-date learning opportunity benefits for the architectural designer through the contractor’s greater construction knowledge (Gil et al. 2001; Bundgaard, et al. 2011) and valuable input into the design (Mosey 2009; Song, et al. 2009), although no participant in this research selected that benefit in their top-three.

The study’s empirical data does not provide convincing evidence of major disadvantages of ECI for architectural designers. This could be interpreted as showing that architectural designers have adapted to ECI so well, that they have eliminated any disadvantages that it imposed on them. Some architectural designers expressed the view that the contractor’s design input could be considered as a disadvantage of ECI since the architectural designer develops the design without having to consider this input under design-bid-build.

**CONCLUSIONS**

The literature on ECI procurement generally views it in a positive light and focuses mainly on control, responsibility, risk, and advantages and disadvantages. Most studies examine the project overall, rather than ECI’s effect on the contractor and architectural designer. Therefore, this research was set to examine the perceptions of contractors and architectural designers towards ECI.

The findings generally indicate that the attitudes and perceptions of both contractors and architectural designers on the effects of ECI procurement are positive in comparison to design-bid-build procurement. Although ECI is more likely than design-bid-build to achieve on-time completion, there is no convincing evidence that ECI offers other time-related benefits and reduces overall project and construction phase duration. This could possibly be caused by the relatively small size of Auckland construction projects in comparison to larger projects in international construction markets where there is greater opportunity for the contractor’s influence to have an effect. The cost-related benefits of ECI include earlier establishment of costs, a
reduction in construction costs and the production of a more cost-effective design. There is little agreement among participants on the issues of the standards of quality and design quality under ECI arising from the difficulties in attempting to define and measure quality. Similarly, there is also a lack of consensus among participants that ECI is more profitable than design-bid-build for both contractors and architectural designers. The majority of participants either perceive that ECI is not more profitable or are unsure. A possible explanation is that it is difficult to assess whether a project would have been more or less profitable, had it been done under another procurement approach. The contractor’s design input under ECI is viewed by both contractors and architectural designers as having a positive effect. Enhanced design-build is found to be the most preferred design-build variant. These findings would seem to suggest that both contractors and architectural designers can see a benefit in the clear separation of concept and detailed design that the enhanced variant provides, particularly when compared to the novated variant.

The perceptions of contractors and architectural designers towards ECI are generally found to be similar. The areas where there are differences are in terms of profitability, potential benefits for architectural designers, preferred design-build variant, levels of relationship and teamwork under ECI and the effect of the contractor’s design input being influenced by capability and method of works. The main perceived benefits of ECI for contractors are found to be better risk management, improved cost performance and the ability to appoint subcontractors early while for architectural designers they are better communication, improved relationships and improved design. Overall, ECI has changed the relationship and level of interaction between the two groups. It would seem that both parties have adapted well to the different demands of ECI procurement, in comparison to design-bid-build, and have found enough positives in it to accept and be comfortable with its use in Auckland commercial construction projects. The significance of this research is that it provides contractors and architectural designers with a better understanding of the perceptions of the other party with regard to ECI, both in terms of general attitudes and of specific concerns. The relationship between the two parties is very different under ECI, so an increased awareness of the other party’s perceptions contributes to improvements in those relationships.

REFERENCES


