Efficiency Improvement through Procurement Innovation in the New Zealand Construction Industry

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Key words: construction, procurement, innovation, collaboration, demonstration

Abstract
An initiative engaging clients and the construction industry supply chain has been established in New Zealand, to publicise the benefits and encourage wider adoption of procurement and project delivery innovations throughout the industry. Innovative projects have been engaged as ‘demonstration projects’ to increase the knowledge base in the industry and, to prove the business case for change, a set of industry key performance indicators is being established to measure the benefits of innovation. Research has been carried out to support the initiative, including analysis of the significance of the construction industry to the New Zealand economy and an investigation into the range of procurement approaches currently used in the industry, together with case studies of a range of relevant construction projects.

1. Introduction
The following paper describes an initiative that aims to facilitate efficiency improvements and a culture change in the New Zealand construction industry. The various activities associated with this initiative are described and the results obtained so far are discussed.

1.1 Characteristics of the construction industry in New Zealand
The construction industry in New Zealand is similar to the traditional industry of the UK, in terms of the roles of the various supply-chain members, the forms of contract used, the types of relationships that are formed and the levels of efficiency in delivering projects. Recent research commissioned by BRANZ (2003) shows that the New Zealand industry has a major influence on the national economy. Whilst the construction sector’s direct contribution to GDP is only around 5%, a 10% improvement in construction efficiency will result in a 1% change in GDP due to multiplier effects and gains in related sectors. Despite the importance of an efficient construction
industry to the economy, the government has not intervened to encourage efficiency improvement but sees the responsibility lying with industry.

New Zealand, like the UK, experiences a range of construction procurement approaches, from traditional lowest price, lump-sum, competitive tendering to target cost and alliancing arrangements. The small size of the construction industry in New Zealand has facilitated a greater proportion of cooperative relationships between the various stakeholders to construction projects, particularly in civil engineering. In some cases the cooperative relationships have been formalized in partnering arrangements, in other cases collaborations have been more ad hoc and have been the result of the involvement of enlightened individuals in particular projects. Research undertaken to support the innovation initiative described in this paper (Henderson and Le Masurier, 2005) has shown that traditional contractual relationships are by far the most commonly used in New Zealand construction, with almost three quarters of all construction in New Zealand undertaken using either traditional design-bid-build or traditional design and construct. The use of partnering is however well established in the industry and is used in some form in approximately a quarter of all construction projects, see Figure 1.

Figure 1: Proportions, by number of projects, of the most commonly used contractual relationships in the New Zealand construction industry (Henderson and Le Masurier, 2005)

1.2 Promoting innovation in construction project procurement and delivery

Recently the industry has experienced new levels of collaborative procurement arrangements, adopted by state owned enterprise client bodies as well as local and central government clients. A high level of interest in innovation was demonstrated at an industry conference on new forms of contract and procurement (Henriod and Le Masurier, 2002) and it was clear that there was a movement for change underway in parts of the industry. However, the efforts of a few
enlightened clients and construction companies were dispersed, without a coordinated ‘critical mass’ of innovators or process for knowledge-sharing which could benefit the industry as a whole. It was therefore proposed that an industry owned initiative, similar to the UK’s Construction Excellence, could help facilitate wider adoption of innovation, in particular innovation in procurement which was considered to offer the greatest potential for efficiency improvement.

2. Methodology

2.1 Steering Group

The Centre for Advanced Engineering (CAE) at University of Canterbury has a track record in facilitating expert groups and providing technology transfer and is recognised as an effective independent voice on engineering and technology-related matters. CAE fulfils the role of a knowledge broker and integrator across a number of engineering disciplines and since CAE already had an infrastructure programme it provided the ideal platform from which to establish a construction industry innovation initiative.

Key industry players involved in procurement innovation were invited to form a steering group to guide the initiative. The steering group has representatives from the whole construction supply chain including clients.

The initiative, known as Best Practice in Construction Procurement and Delivery, has a two-pronged approach: bottom-up focussed on processes and top-down focussed on policy, with the former leading and facilitating the latter.

2.2 Demonstration Projects

A fundamental part of the bottom-up initiative has been a programme of demonstration projects. Current projects using innovative procurement approaches (alliancing, partnering, integrated supply chains, etc) have been engaged in a peer review process. The purpose of the demonstration project process is to share experience and knowledge among the teams involved in the projects and to provide tangible evidence of the benefits derived as a result of the innovation. At the end of each project a case study is produced and seminars organized to showcase best practice and innovation to the wider industry.

The demonstration project process is based on that used by UK’s Constructing Excellence, and follows the steps shown in Table 1. The peer review panel is made up of representatives from current and past demonstration projects, so stages 1-5 are confidential among the panel members. This process provides a ‘safe’ environment for panel members to share their knowledge and experience with like-minded people and ensure that the benefits are proven before going out to a wider audience at stage 6.
Stage 1  Outline of the project innovations and anticipated benefits through meetings with the project team and submission of an application form.

Stage 2  Presentation by the project team to a peer review panel where the project is judged on its suitability for inclusion in the demonstration project programme.

Stage 3  Presentation and discussion by demonstrating projects to the peer review panel on the key performance indicators (KPIs) that will be used to demonstrate the tangible benefits specific to the innovation.

Stage 4  Collection and processing of KPI data and benchmarking with other demonstration projects.

Stage 5  Summarising and evaluating lessons learned and evidence of the benefits derived from the innovation in a final presentation to the peer reviewers.

Stage 6  Publication of a case history and dissemination to wider industry.

Table 1. Demonstration project process

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2.3 Benchmarking

Whilst the demonstration projects use project-specific key performance indicators (KPIs) to benchmark internally, much of the evidence of the benefits from innovations is anecdotal. Without standard performance metrics to enable direct comparisons between projects and clear guidance on how to measure performance, it is difficult to prove the business case for innovation. Therefore, another underpinning element of the initiative has been to develop a national set of industry KPIs. A KPI steering group was set up to pursue this particular area and a set of KPIs was chosen based on what were considered to be the main areas for performance improvement in delivery of construction projects. The KPIs chosen are shown in Table 2 and use similar definitions to the UK’s Constructing Excellence (2005) headline KPIs.

The project to establish and run a pilot trial of these KPIs has been carried out with funding from BRANZ and is nearing completion. The pilot results will be presented and the KPIs will be launched nationally at an industry conference in May 2005. Once established the national KPIs will provide a means of differentiating the better performing players from those who rely on traditional lowest price procurement processes and will allow industry players to measure their current performance and gain feedback on the potential for performance improvement. A process for regular industry benchmarking against the national KPIs will help to make the business case to industry and policy makers to do things differently, for the benefit of both individuals and the economy as a whole.
1. Customer Satisfaction – Product
2. Customer Satisfaction – Service
3. Quality – Defects
4. Accidents
5. Predictability – time
6. Predictability – cost
7. Turnover and Profits

Table 2. National Key Performance Indicators

3. Case study – Auckland Airport Runway

3.1 Introduction

Auckland Airport runway refurbishment works is one of the demonstration projects and the description below provides an example of the type of procurement innovation and resulting benefits that are being promoted through the initiative.

The Auckland airport runway was built in the 1960’s and by 2000 was nearing the end of its service life. Whilst the runway has been lengthened to accommodate the requirements of larger aircraft, the concrete slabs under the original central section of the runway were not designed to carry the loads imposed by modern aircraft and needed replacing. The first stage of the refurbishment works required the conversion of the main taxiway into a temporary runway to allow closure of the main runway. The risk of disruption to operations and the thousands of people that travel through Auckland’s airport daily was minimised by thorough planning for the refurbishment, considering an extensive array of potential operational impacts. Planning took two and a half years to complete. Risk in the delivery of the project was further minimised by selecting and partnering with contractors that demonstrated a customer focussed culture and a proven ability to perform well on such projects.

As the runway is critical to the core operation of the airport, the refurbishment works had to be carried out with minimal operational disruption and no delays. All specifications had to be met correctly first time, as passenger safety could not be compromised.

3.2 The Solution

Communication and detailed planning was the key to delivering this project successfully. An integrated delivery team was formed at the earliest stages of the project with the designers and
contractors working together from the start. People working on the project at all levels participated actively in progress meetings. Clear and constant communication gave management the flexibility to optimise the work programme through faster decision making processes and allowed them to “design out problems”. There were daily meetings to discuss past, present and future progress and to ensure all phases of the project were integrated with one another. Planning involved all those actually responsible for the site works together with feedback from extensive stakeholder consultations. A risk consultant was employed to perform a detailed risk analysis involving all stakeholders, as a result of which the project team was able to prepare contingency plans for a wide range of potential outcomes.

3.3 The Benefits

The benefits of the integrated delivery team were measured against the key performance areas of time, cost, quality and safety and the project was a success in all areas as follows:

• Time – construction was completed five days ahead of the tight 30-day planned schedule; this was the result of the extensive planning process and the use of backup plant to speed up construction

• Cost – prices were negotiated up-front with the contractors so there were very few variations and claims

• Client Satisfaction – the client was very satisfied with the end result and early completion was a bonus for the end users

• Work Continuity – there were no programme delays and no accidents.

4. Results

The Best Practice in Construction Procurement and Delivery initiative has developed steadily, from the ‘bottom-up’ over the past 2 years. Several of the larger construction and consulting companies and major clients in New Zealand have supported the initiative both financially and through the steering group. Five demonstration projects have been completed, covering a range of project types, scales and procurement approaches and several further demonstration projects are currently underway. All projects are demonstrating excellent levels of performance in the industry KPI areas. Progress on the initiative overall has been slow however, due to lack of resources. The initiative is beginning to make some headway now in the ‘top-down’ policy area. Once the national KPI project has produced the first round of results there will be an opportunity to demonstrate to policy makers in government the benefits that can be obtained from improved procurement processes. Although applications for government funding to support the initiative have been unsuccessful previously, it is hoped that the government will see the benefit to the national economy resulting from a more efficient construction industry and support this initiative,
in collaboration with industry. A lesson to learn from the experience to date is that establishing an industry-owned initiative is hard work with limited resources and no prime funding. This is in contrast to the initiatives in UK and Australia which have received significant public funding from the start, the former now moving towards greater industry ownership and less public funding. A barrier encountered, due to the lack of capacity of industry to cope with the current workload, has been getting the key people to spend their time in meetings and in the peer review process. The irony is that during the buoyant times when innovation could be thriving, companies do not have the spare resources to consider and implement new ideas. However, the number of new projects using collaborative relationships in the industry is steadily increasing.

5. Conclusions

From a historical perspective, it has been proposed that innovation in construction procurement in New Zealand has occurred organically through the involvement of various enlightened individuals. Though the industry in New Zealand is small and new ideas and ways of working can spread relatively easily, traditional approaches to procurement are dominant in many sectors, with associated inefficiencies often in evidence. In order for innovation to spread more rapidly, a coordinated approach was needed and the paper has described the various aspect of an initiative to facilitate innovation in construction procurement. The initiative was established in collaboration with industry and used as its foundation the evidence available from existing best practice projects. A process has been described by which the learning from such projects is captured. The KPI results from a national benchmarking initiative will further underpin the business case for procurement innovation and help towards achieving the overall objective: improving the efficiency and culture in New Zealand construction.

References


