

COST-CUTTING LEADS TO POOR VALUE

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ABSTRACT

In a recent study, Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) showed a direct relationship between reduced design and documentation quality and increases in project cost and time. Poor design and documentation quality was also shown to be a major cause of construction process inefficiency – leading directly to increased delays, re-work and variations. This in turn leads to lost opportunities to provide good value for money to owners and other project-stakeholders.

While this paper highlights the effects of poor quality design and documentation on project cost, time and efficiency it also puts forward an approach to improve the levels of design and documentation quality through the process of Soft Value Management.

Keywords: Construction process efficiency, design and documentation quality, design fees, soft value management.

INTRODUCTION

As the quality of design and documentation has a major influence on the overall performance and efficiency of construction projects (Burati, et al, 1992; Kirby, et al, 1988), it is vitally important that issues affecting design and documentation quality be identified and addressed. Due to industry concern regarding a decline in design and documentation quality standards in Australia (Syam, 1995), the Commonwealth Scientific and Industrial Research Organisation (CSIRO) recently undertook a national study of designers and contractors to investigate the problem (Tilley & McFallan, 2000a; Tilley &

McFallan, 2000b; Tilley & McFallan, 2000c). The basic aim of this study was to investigate;

- what changes in design and documentation quality had occurred;
- what were the major contributors to these changes occurring; and
- what impact did these changes have on construction process efficiency.

Design and documentation quality however, is greatly determined by not only the level of professional services provided, but also by how these services are selected and how the fees are negotiated (DeFraités, 1989). Where designers are selected only on the basis of their design fees, then the level and quality of the service provided is likely to be limited and generally results in poor design and documentation, which translates into additional project costs to the owner (Abolnour, 1994; McGeorge, 1988). However, the concept of reducing total project costs by increasing expenditure on the design process to obtain improved quality and value, has also been well documented (Abolnour, 1994; DeFraités, 1989), while the principles of value engineering (Green & Popper, 1990) and value management (Barton, 1996) have also shown that additional savings in project costs can be obtained by a proper analysis of a project's aims and objectives, relative to the design solution proposed.

Research Results

Changes in Design and Documentation Quality

To determine changes in design and documentation quality, both designers and contractors were asked to provide their perceptions as to the level of incorporation of a

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number of design and documentation quality attributes at different time periods. Through this method the CSIRO research found that there had been a decline in both design and documentation quality standards over the past 15 years, with the decline in documentation quality being much more significant than the decline in design – which was considered by both designers and contractors to be only marginal.

When considering documentation quality, although there was a high level of correlation between the designers and contractors with regards to the specific quality attributes, the extent of the problem is in dispute. The combined response for all issues provided by contractors indicated a major decline of almost 36.8% over the past 12-15 years. With a current average quality rating of only 3.82 out of 10, it is the opinion of contractors that the current standard of documentation quality is “poor”. Although acknowledging a decline in documentation quality, the designer’s perception was that it has only been marginal. Not surprisingly, designers consider the quality of documentation they provide is still “good”, indicated by a current rating of 7.26 out of 10. Despite this difference of opinion, a decline in documentation quality standards was still considered to be a major problem area.

Changes in Design Fee Levels

The decline in design and documentation quality standards was also shown to be directly related to reduced designer fee levels, which had also declined over the same period. To examine changes in design fee levels, designers were asked to indicate not only the project fee percentage required to provide a proper service, produce quality design and documentation and make a reasonable profit – for projects of differing sizes/price ranges and complexity over the specified time periods – but also the fee levels needed to be submitted to actually win the work. Figure 1 shows that according to designers, the level of design fees required to provide a proper service, have only declined marginally over the past 12 to 15 years, with the decline being mostly due to improved information technologies, which allow for improved efficiencies within the design processes.

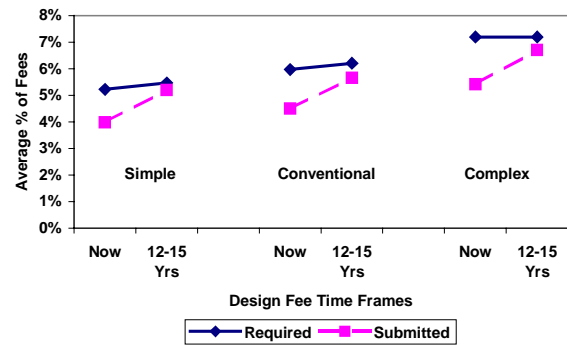


Figure 1. Average decline in design fee levels over the past 12-15 years

However, when considering the fee levels needed to be submitted to actually win the work, the responses revealed an average decline of approximately 21% for all three, project complexity levels over the past 12 to 15 years. Similarly, when comparing the difference between the fee levels submitted now to the fee levels required now, the responses revealed that the disparity between the two fee levels represented an average decline in real designer fee income of approximately 24% for all three project complexity levels. It would appear therefore, that the levels of fees being obtained may well be significantly below those required to provide quality design and documentation services.

Impact of a Decline in Design and Documentation Quality

The survey results also concluded that a decline in design and documentation quality also corresponded to a decline in construction process efficiency, which can be gauged by the extent of occurrence of the non-desirable elements of construction, such as rework, variations, cost overruns, extensions of time, programme delays, contractual disputes and requests for information (RFIs) (Tilley and Barton, 1997). To determine the extent to which these elements have changed over the past 12-15 years, contractors were asked to indicate their perceptions as to their level of occurrence – from *Nil* (0) to *Extremely Excessive* (10) – at each time period.

In Figure 2, the responses show the frequency of occurrence for all issues has risen an average of 46% compared with 12-15 years ago, with RFIs showing the greatest overall increase of nearly 74%. Contractors also

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indicated that design and documentation deficiencies were responsible for almost half of the non-desirable elements of construction identified.

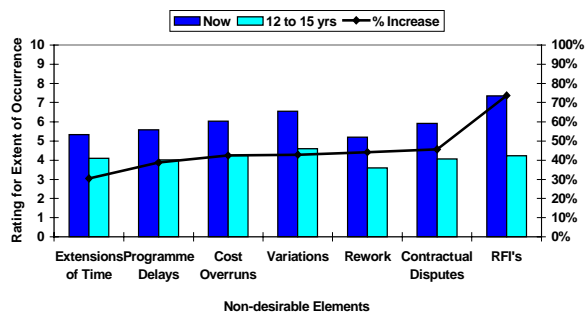


Figure 2 Average change in extent of occurrence of non-desirable construction elements

Contractors were also asked whether the level of design and documentation quality directly influenced project cost and time at tender stage. In response to these questions, 93% of contractors indicated that design and documentation quality did influence the price submitted for a tender, while 75% of contractors indicated that it also had an influence on the time allowed for a project. To determine the extent to which design and documentation quality influences project cost and time at tender stage, contractors were asked to indicate what allowance – either negative or positive – would generally be incorporated within their tenders, based on differing quality levels. As can be seen in Figure 3, when design and documentation quality is considered to be *very poor* an average of just over 11% was added to both the estimated project cost and time allowance. At the other end of the scale, an average reduction of over 1% in the tender allowances is given when design and documentation is considered to be of an excellent standard. However, based on contractors' perception that the current standard of documentation quality is poor, clients are paying an average of around 7% extra on their projects, just at tender time. As the impact of poor quality design and documentation on project costs and durations are almost identical, a table is included with the graph in Figure 3, to show the actual figures.

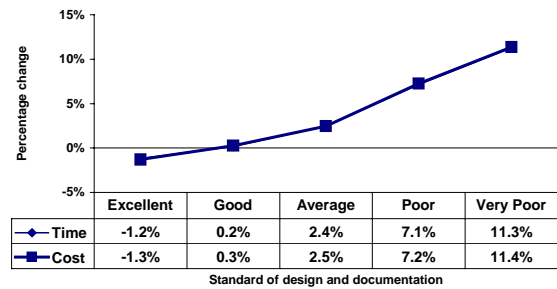


Figure 3 Average time and cost allowance included at tender stage

The survey results indicate that all sections of the industry agree that there are major problems with the design and documentation process in the Australian construction industry and that these problems are leading to construction inefficiencies, increased project costs and hence lost opportunities to enhance value for money.

From a contractor's perspective, the deficiencies occurring in design and documentation being provided by consultants, have been steadily increasing over the past 12–15 years and are causing corresponding increases in the extent of inefficiency within the construction process. As a consequence, decreases in project quality and increases in overall project costs result. Of major concern are the additional costs – which to a large degree end up being absorbed by contractors – caused by the delays and disruption in trying to clarify inadequate, impractical, conflicting or ambiguous design and specification documentation.

The designers, whilst also acknowledging this reduction in design and documentation quality and the services being provided, consider the primary causes to be reducing design fees, decreasing project design and delivery times and an increasing number of clients with unrealistic expectations and an inability to properly define project objectives and requirements. In fact it was the inadequacy and uncertainty of the project brief that many designers felt was the main problem area, due to the amount of design rework that poor project briefs generated.

Both contractors and designers also indicated the increasing use of junior and inexperienced staff to carry out the design function.

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Designers suggested that this was a direct result of reduced fees and inadequate design time, limiting the type of staff available and the extent of supervision and in-house training provided. Concern is raised that if, due to modern design-firm pressures, adequate supervision and in-house training from senior staff is not supplied, the knowledge base of future designers may be diminished.

By reducing design fees to minimise costs, clients and developers were by their own actions, contributing to the problems which lead to inefficiencies in the construction process and increases in overall project costs. The results of the surveys clearly show a need for clients and developers to allocate adequate funds and time to the planning and design phases of a project, in order to maximise construction process efficiency and minimise overall project costs.

A SUGGESTED WAY FORWARD - SOFT VALUE MANAGEMENT

A number of initiatives may be pursued in response to these research findings, one of which is soft Value Management. It is argued that substantial improvement in documentation quality can be achieved through the application of Soft Value Management during project initiation. Barton (2000) describes a model of soft Value Management which has been designed, through an action-research program, to address the complexities of project initiation, and particularly to address the types of problems highlighted in this study. The methodology is defined as, "*a structured, facilitated, process in which decision-makers, stakeholders, technical specialists and others work collaboratively to bring about value-based outcomes in systems, processes, products and services*".

This methodology focuses upon effective communication and learning amongst project stakeholders, designers, technical specialists and others having an interest in the project. It is argued that by enhancing communication amongst all project participants and establishing an effective learning environment, the types of situations which this research has highlighted can be substantially ameliorated.

Each soft Value Management study incorporates a two-day (typical duration) structured, facilitated workshop in which the project owners, stakeholders, project team and others work collaboratively to achieve defined objectives. On major projects, 20-30 people participate, including chief executives or very senior representatives from the owners and stakeholder organisations. The objectives for such studies will depend upon the timing of the workshop, but ideally, the first workshop will be held before a project brief has been prepared, thereby helping to improve its adequacy and certainty. In these cases, the group may work pro-actively to establish shared understanding of the project's primary purposes, project-drivers, core values, "givens", constraints, risks and underpinning assumptions.

A second workshop may be convened during the early stages of design and others convened, where appropriate during the procurement process. In each of the subsequent studies, the purposes and core values established in the pre-briefing study remain as the central focus and the workshop participants continue to work collaboratively in seeking creative ways to fulfill the defined purposes and ensure that the project outcomes reflect the core values. Ensuring value for money also remains a central focal point.

By setting aside this relatively short amount of time, at the commencement of a project, prior to the project brief being formulated, common understanding may be established which has the high likelihood of preventing or at least reducing the incidence of omission and duplication of project information. This in turn has the high likelihood of eliminating or reducing the incidence of rework, variations, cost overruns, extensions of time, programme delays, contractual disputes and requests for information.

The Soft Value Management model proposed by Barton (2000) incorporates a process-content facilitation approach in which two facilitators work together, one focusing primarily on the workshop processes and the other focusing primarily on the workshop content. This co-facilitation approach enables large groups to work together more effectively in pursuing desired outcomes.

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The benefits of using soft Value Management or similar systems may be summarised as follows:

- Clearly defined project requirements and outcomes,
- Project-learning is accelerated,
- Effectiveness of project-communications is enhanced
- Several project-initiating tasks may proceed in parallel
- The project team pursues a common, explicitly defined purpose
- Integration of all project factors is enhanced

CONCLUSIONS

Whilst the research has shown a direct correlation between reduction in design fees and the reduction in the quality of documentation (together with consequential effects on construction) it is *not* argued that simply raising design fees in isolation should be considered as a response. Rather, it is argued that a number of initiatives need to be explored, one of which being Soft Value Management.

Improvements in construction process efficiency will result from creating a cooperative environment, an awareness of the value of quality design and documentation and the introduction of selection criteria that includes consideration of the designer's skills and experience. Once developers fully understand the value of quality design and documentation, they would then ensure that sufficient time and fees are available to allow designers to provide the level of service needed to carry out the design function completely. The benefits would be more projects being completed on time, within budget and with a reduced likelihood of legal action due to contractual disputes. Also, with less RFIs, variations and rework, contractors would be able to minimise the management time and cost spent on non-value adding activities. These benefits would be reflected in reduced project and contractual risk and a higher level of profitability for both developers and contractors. More reasonable fee levels would also enable designers to restore staff training programs – to develop a higher standard of designer – and encourage innovation. Increased fees may also stem the

outflow of experience designers, which has the potential to diminish the knowledge base of the industry.

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