

CONSTRUCTION – A RISKY BUSINESS

Presented at



International Construction Conference 2005

“TOWARDS GLOBAL COMPETITIVENESS THROUGH CAPACITY BUILDING”

SEPTEMBER 15 – 16, 2005

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Mosaic Project Services Pty Ltd

13 Martin Street

South Melbourne VIC 3205

Tel: +613 9696 8684 Fax: (03) 9686 1404

Web: www.mosaicprojects.com.au

Email: patw@mosaicprojects.com.au

CONSTRUCTION – A RISKY BUSINESS

Authors:

Patrick Weaver PMP, FCIOB, FAICD.

Patrick has been a CIOB member since 1970 and is currently Vice President of CIOB Australia and chair of the Victorian branch. Professionally, he is the Managing Director of Mosaic Project Services Pty Ltd, an Australian project management consultancy specialising in project control systems and project management training. Patrick's consultancy work encompasses: developing and advising on project schedules, forensic analysis of project data, developing and presenting project management training courses (including PMP and CAPM courses for PMI accreditation), acting as an expert witness and assisting with dispute resolution and claims management. He is a qualified Arbitrator, Adjudicator and Mediator.

Richard Hyde MSc, FCIOB, FAIPM, FRSA, Immediate Past President CIOB Australia.

Richard is Manager of Construction Risk for Westpac Banking Corporation, Australia's first bank, where he is responsible for managing delivery risk throughout Australia on development projects in a multi-billion dollar portfolio. He has 6 years risk management experience in the finance industry, and over 20 years experience in the construction industry where he worked as a Director for a U.K. building contractor, consultant for an International management consultancy in London and client project manager on new build, heritage and conservation projects.

Synopsis

The Australian construction industry is suffering from low and declining profits. This paper suggests the primary cause is a misallocation of risk within the industry. Whilst the 'pain' of minor problems is primarily borne by contractors, many clients are finding it impossible to escape the consequences of major problems and many of these clients are finding themselves ill prepared to manage the problems when they arise.

This paper identifies some of the factors creating risk in the Australian construction industry and suggests ways to better align risk and reward. We hypothesise, that the efficient management of risk involves both contractors and clients working together to deliver the right project for the right price, utilising modern forms of contract.

The catalyst to enable the widespread adoption of this transformation will be the development of a significant number of appropriately qualified building managers to staff both the contracting and client sides of the industry. The challenge facing CIOBA is to encourage and train the people needed to create this change.

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The opinions expressed in this paper are those of the authors.

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Introduction

“Life is either a daring adventure or nothing. Security does not exist in nature, nor do the children of men as a whole experience it. Avoiding danger is no safer in the long run than exposure.”

Helen Keller, US blind & deaf educator (1880 - 1968)

Whilst most people consider risk and ‘danger’ to be closely aligned, risk has a significantly wider scope. The Project Management Institute in its PMBOK® Guide 3rd Edition¹ defines risk as “An uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives.” The building and construction industry is inherently risky; we suggest the key role of all professionals engaged in the industry, irrespective of their job title, is to mitigate the negative impacts of risk and exploit the positive aspects to deliver a quality product, profitably. This applies equally to people and organisations working in the government and private sectors, and includes financiers, clients, contractors, subcontractors and suppliers.

Risk factors range from weather and safety, through technology and industrial, to political and financial. Practitioners in the industry are compensated for the risks they accept two ways. Some risks are ‘priced’ into the cost of the works such as the cost of various insurance premiums, allowances for inclement weather and the costs associated with implementing planned risk mitigation activities.² Other, generally less tangible risks are compensated either by the ‘profit’ margins allowed on the portfolio of work undertaken by an organisation, or in the ‘whole of life’ value of the completed building or structure delivered at the end of the project.

Generally, the Australian construction industry is reasonably proficient at identifying and managing localised risks such as weather, safety, site conditions and technological innovation. The focus of this paper will be on identifying some of the macro risks faced by all levels of the industry from clients through to suppliers and to consider whether the attempt by certain sections of the industry to avoid all appearance of risk is either beneficial or practical.

Overview of the Australian Building Industry

Structure of the Industry

The Australian construction industry is divided rather neatly into three levels –

- The major contractors are dominant in the market and industry as a whole, but the number of entities is shrinking through failures (eg, Walter Construction Group) and acquisitions (eg, the Leighton Group now owns: Leighton Contractors, Thiess, John Holland, Broad Constructions, Lucon, Transfield Constructions and Fletcher Constructions Australia). The 12 largest contractors representing over 20% of the total industry (see Fig. 1).

Estimated Shares of Total Industry

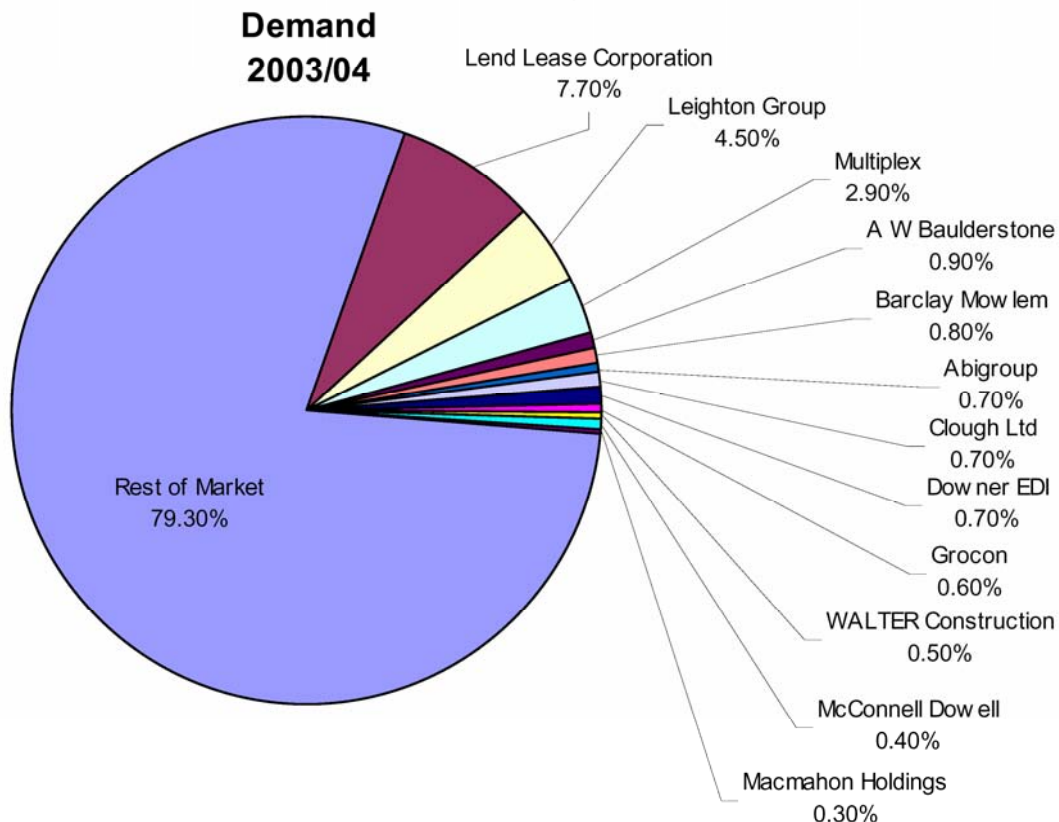


Figure 1³

- Medium sized businesses are squeezed between the low cost small contractors and the generally well financed majors; this sector represents some 3000 businesses. Whilst a number of businesses thrive either through excellent client relationships or through specific technical expertise; a large majority are perennially under pressure.
- The small end of the industry is the home of most subcontractors and niche/home builders. This sector is noticeable for its very large number of small businesses. Its very low entry threshold allows under resourced and novice businesses to start easily and contributes to the corresponding high rate of failure.

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The Australian construction industry can also be segmented into commercial builders (Engineering and Non-residential construction) and home builders (Residential building; primarily within the small and medium sectors) – see Fig. 2. Home builders tend to build to demand; even the speculative home builders only build to replace sales. This paper focuses on commercial industry where most of the work is delivered via some form of commercial contract (or subcontract).

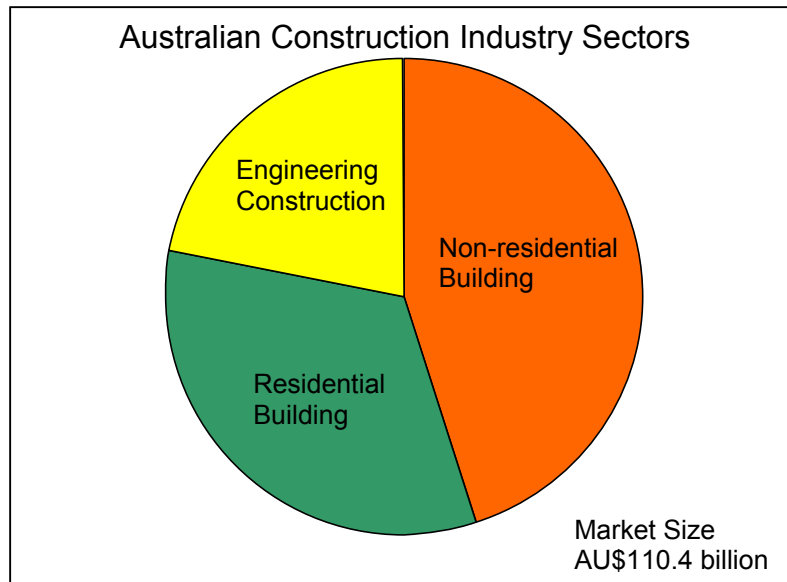


Figure 2 – Industry Sectors ⁶

Key Industry Trends

The current Australian building boom differs from earlier booms. The construction industry is experiencing a 'demand side' boom in which most clients are 'building to own' the completed project. The building boom of the 1980s was a speculative or 'supply side' boom in which clients were building to on-sell the projects (either as strata title or complete buildings). However, whilst the nature of the market has changed, most contemporary industry contracts and attitudes are still being shaped by experiences of the 1980s and 1990s.

Clients in the current market include:

- Property trusts of all types (shops, offices, units)
- Government agencies (schools, hospitals, roads)
- Industrial and resource companies (production facilities and infrastructure)
- PPP consortiums (infrastructure and facilities)

The types of client listed above expect to own and operate their buildings, factories and/or facilities for a significant period.

This change to a long term view of project ownership should be supported by shifting the procurement focus to optimising whole of life costs, excellence in design (and particularly design detailing), and delivering overall value to the client organisation. To date this change has been very slow to emerge. Whilst this change is noticeable in some parts of the industry and on a few projects, in most cases the construction

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procurement process is still heavily focused on risk avoidance and achieving the cheapest contract price, manifest by courting low bids in tendering processes, poorly structured D&C contracts and other tactics focused on short term financial savings at the expense of long term value.

Industry Risk Factors in Australia

The Australian construction industry has a number of characteristics that increase both development and construction risks. Some are endemic such as the industrial relations climate and multiple layers of government. Others, particularly the Building Industry Security of Payment legislation and the rapid escalation in material prices are new and the industry is still attempting to come to grips with the consequences of the change.

Industry Capacity

The Australian building industry is struggling to meet a rapidly escalating demand in many key areas (see Fig. 3); although a report by Master Builders Australia⁴ based on a survey of its members shows current industry conditions flattening out in the June 2005 quarter and suggests a downturn may be starting to appear.

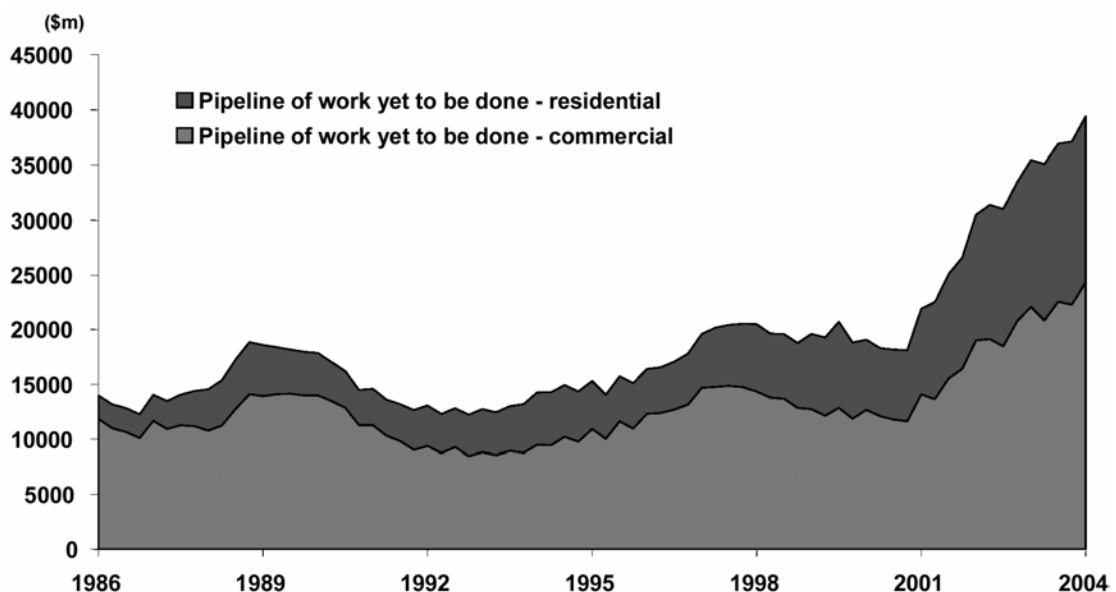


Figure 3 - Construction Workload AU\$⁵

The current building boom (with workloads close to the 2004 peak) has led to rapid price escalation and the de-skilling of the overall workforce as contractors employ almost anyone to fill vacancies and encounter extensive delays as suppliers and subcontractors experience the same over-demand as the main contractors.

This shortage of workers and lack of overall industry capacity has led to the average annual trade price inflation exceeding 6% pa over the last three years (to 2005) and trade price inflation is expected to continue to average 5% for the next two years. Whilst this figure is considerably higher than the rate of inflation in Australia, it shows an incomplete picture. Specific industry segments such as remote area work to support mining and resource developments, building fit-out in Queensland, and

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building generally in South Australia and West Australia have seen dramatically higher rates of cost escalation whilst some prices have eased in NSW and Victoria. Similarly, commodities that are influenced by the booming Chinese economy have experienced dramatic increases in price such as Concrete (+14%), and Steel (+30-50%)⁶.

Very few contractors on 'fixed price' bids would have allowed for these rates of inflation (and still had the lowest tender price). A direct consequence of this has been the steady erosion of profits across all reported sectors of the industry. Between 1996 and 2004, Deloitte Touche Tohmatsu⁷ report EBIT Margins for the eleven leading construction groups in Australia sliding from a sustainable average of some 6% to a worrying level below 2% (see Figs. 4 & 5).

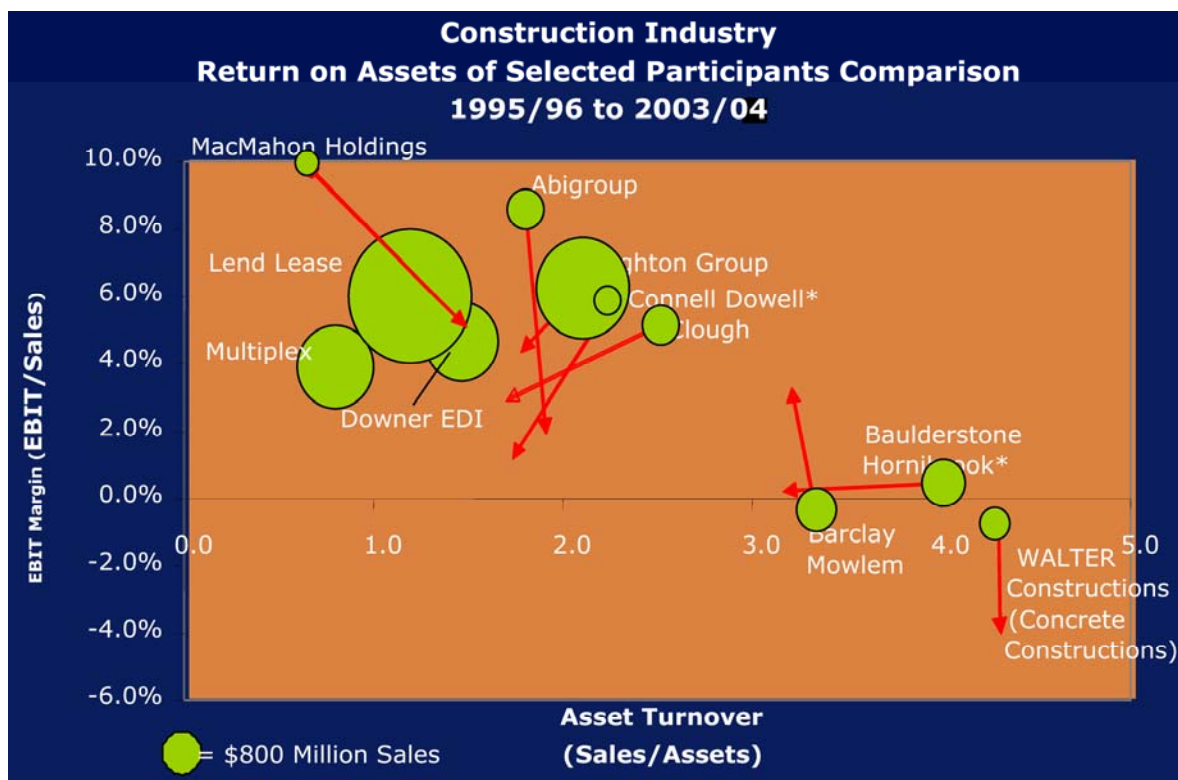


Figure 4 - Declining Industry Profits ⁶

Building Industry Security of Payment Legislation

The Building Industry Security of Payment (BIScOP) legislation in force in most States has been accurately described as enforcing a "pay now, argue later" regime onto the construction industry. The intention of the Acts was to ensure subcontractors and suppliers have a right to regular progress payments, in this regard the legislation has been reasonably successful but its impact has been far more widespread.

The various BIScOP Acts provide all levels of the industry with a tool to expedite payment and maintain cash flows. Claims made under the relevant Acts are typically resolved within 4 to 6 weeks and Adjudicated payments are generally enforceable within seven days. Whilst any Adjudicated amount is considered a 'payment on

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account' (similar to a normal progress payment) the impact on cash flows for the organisation that is required to pay can be significant.

Data from the NSW jurisdiction⁸ show for the 18 months prior to September 2004:-

- the largest claim to that date was \$39.4 million,
- claims totalling \$338 million had been made
- 44% of claims (by number) had been 100% successful
- Only 17% of claims (by number) had been awarded less than 20% of the amount claimed, the rest were resolved between these two extremes.

The introduction of the BScOP legislation dramatically changes the risk profile of construction projects. The Walter Construction Group was successful in a number of multi million dollar claims under the Acts (despite appeals to the NSW courts) before collapsing earlier this year, its former clients are now among the group's extensive list of unpaid creditors. In other cases, clients have initiated arbitrations and other dispute mechanisms to recover payments 'won' by contractors through BScOP Adjudications.

Unlike other contractual claims processes, BScOP favours the claimant. The claimant can take its time to prepare a claim and can pick the timing of the dispute to suit its strategy. Once the claim is initiated, the respondent has very limited (and strictly enforced) time periods to prepare its initial response (the payment schedule) and, if the schedule is not accepted by the claimant, to prepare a detailed reply to the Adjudication Application. If the claimant is successful, payment has to be made within days. If the claimant loses, apart from paying its share of the Adjudication process, there is no liability.

The impact of this legislation on building industry professionals has been described as akin to a 'contact sport' by Jim Doyle in his paper 'SoP; A new answer to an old question'⁹. Doyle argues that the Acts are "*causing a radical re-think of many traditional project management and contract management processes. All professional contract administrators must manage every aspect of a contract on the assumption that all outstanding issues will be included in a claim under the Act in the next month. It is no longer acceptable to let claims remain unanswered.*"

However, whilst the problem is manifest, very few organisations have been able (or willing) to invest in the core administrative skills needed to manage this issue effectively.

Industrial relations

Industrial disputes in the building and construction industries have always been high. The number of working days lost remains at between 4 and 7 times the all-industries average. The worst States are Victoria and West Australia where days lost are 3 to 4 times the level in NSW. The Australian federal government is seeking to force changes on the industry to reduce the level of disruption. The consequences of these actions remain to be determined.¹⁰

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Multiple Stakeholders

Every major development in Australia has to consider all three levels of government, local authorities, State governments and (at least) a number of federal laws. The issues range from normal zoning and town planning matters through to various environmental acts and, particularly for infrastructure projects, aspects of the national competition legislation.

Managing a project through the maze of legislation is time consuming, expensive and potentially risk prone given the involvement of the 'public' and their right to raise objections at various stages of the process, particularly if rezoning or environmental protection issues are raised.

Risk Management Strategies

As we suggested in the introduction, there is no such thing as a risk free construction project! The compensation for risk is reward. In the construction industry the clients reward is (or should be) the benefit it derives from the completed project.

The reward available to the various contractors and suppliers is the profit they make from the works they perform. As can be seen from Fig. 5, the ability of most contractors to absorb significant risk is very limited.

The art of managing risk in every construction project should have two key elements; the first is to assign each risk to the party best able to manage that particular aspect. The second is to balance the risk and reward so that each party to the project can expect to receive a fair return. In most projects, the allocation of risk is managed through the provisions of the contracts entered into by the various parties.

The reward available to the various contractors and suppliers is the profit they make from the works they perform. As can be seen from the graph below, the ability of most contractors to absorb significant risk is very limited.

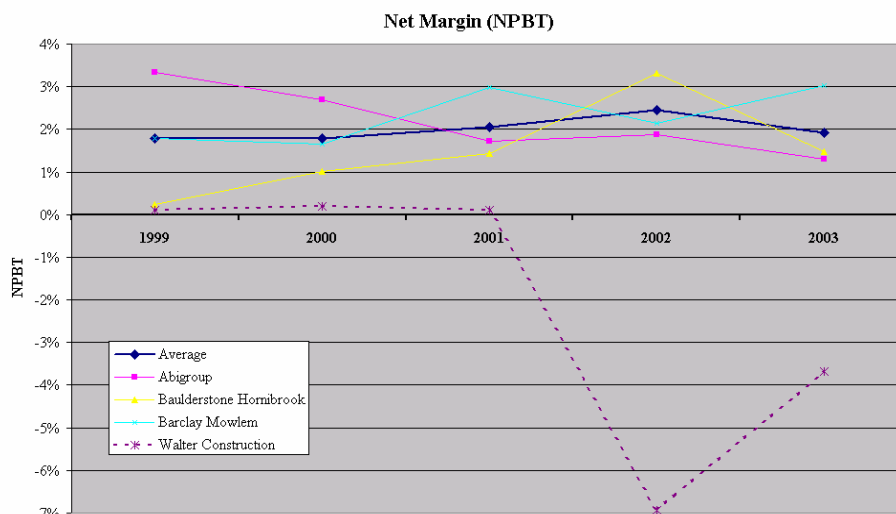


Figure 5 - Low Profit Margins - Selected Contractors & Average ⁵

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One of the more disturbing trends in the Australian construction industry has been the tendency for clients to attempt to transfer all of the project risk to the contractor (and many contractors' apparent willingness to accept these risks). This approach is most obvious in the almost universal application of Design and Construct (D&C) Contracts. D&C contracts place a significant portion of the development risk onto the contractor but in many cases, the contractor's margin remains the same as to a traditional tender. This may be a sensible strategy if the client intends to off-load the building as soon as it is finished but may not be as sensible if the client takes a long term view of the asset being created.

Contract Selection – 'Minimising Risk' with D&C

D&C Contracts – The Client's Perspective

The concept of Design and Construct contracts grew out of the 'supply side' building boom of the 1980s and is superficially attractive to clients (and in many cases, their financiers). Projects were built to on-sell and quality was focused on short term needs. The current 'demand side' boom is 'build to own' – the overall contracting process should now be focused on long term quality, whole of life costing, and a long term view of value.

The likely consequence of using a combination of a low 'fixed price' and 'D&C' in a construction contract include:-

1. Accepting low cost design in preference to a quality design: the contractor will have pushed the design costs as low as possible to minimise its overall cost and as a consequence, the designers will have neither the time nor the budget to undertake extensive design consultations and reviews with the client to produce an optimum design.
2. Loss of control over the design: as long as the final design meets the D&C brief, the contractor will have met its obligations. Writing a 'perfect' design brief is virtually impossible, therefore every interpretation will be heavily biased by the designer's and contractor's need to save costs rather than the best long term outcomes for the client.
3. D&C provides a so-called 'single point of responsibility': if the project is a failure the client can theoretically sue the contractor or the contractor's insurers. However, construction clients cannot mitigate ultimate risk (ie, the liquidation of head contractor) and increase their exposure to damage by attempting to avoid all risk. The client may end up with no rights to the design work done by the contractor and will inevitably face major cost escalation and time delays in attempting to complete a building after the contractor has gone into liquidation.
4. By accepting an unrealistic price, clients are inviting longer term expenses. Contractors forced into a loss will almost inevitably seek to recover monies by making claims; this is now much quicker and easier for the contractors with the advent of the BScOP Acts. The other natural reaction from a contractor losing money on a contract is to attempt to cut costs. Typically this involves reducing supervision with an inevitable impact on quality and may also involve overt reductions in the quality of materials and workmanship. The costs incurred by a client in closely supervising a contractor's work to enforce quality, defending

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claims and seeking to recover losses and disputed Adjudication payments can quickly erode any initial gains achieved by accepting an unrealistically low price.

The quality movement in manufacturing led by people such as Deeming and Crosby have long stated quality should be designed in, not inspected in. This philosophy is equally true for construction. Construction industry clients need to question the wisdom of abandoning control and influence over the design process for 'their project' to the lowest cost designer reporting to the lowest cost contractor.

D&C Contracts – The Contractor's Perspective

D&C contracts transfer substantial risk to the contractor as well as responsibility.

In the first instance, the D&C contractor has a massive conflict of interest to resolve. On one hand there are its obligations to its shareholders, employees and subcontractors to generate profits and remain viable so it can pay wages and debts. This set of obligations requires the D&C contractor to seek cheapest possible solution to its contractual obligations so as to maximise its profits (or minimise losses). This is diametrically opposite to the normal obligations of a designer which typically involve seeking to achieve the optimum design solution for the client by taking the time to balance multiple considerations including quality, whole of life costing, budgets, aesthetics and design costs.

The next major risk accepted by the D&C contractor is the interpretation of the design brief (and/or accepting the novation of the client's nominated designer). Any apparent ambiguity in the brief will tend to be read 'down' by the contractor and 'up' by the client. If the client wins the argument, the D&C contractor can end up building a much more expensive project than it allowed in its tender. This risk is compounded if the contract is a 'fixed price', awarded to the lowest bidder!

Beyond the issues surrounding the D&C process discussed above, the D&C contractor also accepts the full spectrum of design and development cost risks. The design solution may simply cost more to build than initially estimated! Traditional development margins were in the order of 30% to allow for the escalation of costs as the design evolved. In D&C contracts, many contractors are accepting these development risks at traditional contracting margins – we suggest this is a recipe for disaster. One only has to look at recent press announcements concerning Multiplex and the Wembley stadium project in London, Leighton and the Spencer Street redevelopment in Melbourne, and others, to see the impact of this type of risk.

The Fixed Price Fallacy

The fallacy of a firm fixed price contract remains despite centuries of experience to the contrary! Certainly a few decades ago when builders were operating on 10% margins, builder's could fund a degree of uncertainty and change (and times were far less litigious); but even then cost escalation was a normal part of building. With current margins below 2%, builders can be expected to claim for every change (real or imagined).

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This is particularly relevant when clients recognise that change is inevitable; no client can expect to specify every facet of its requirements in advance. Therefore, when client initiated change eventuates, claims will inevitably follow.

The concept of 'fixed price' contracts was based on insulating clients from trade price escalation, based on the premise contractors were better able to manage this risk. In the current boom market, the likelihood of contractors being able to price in more of this risk is open. Should this eventuate, the price charged by a contractor to cover the risk of trade price escalation based on the 6% plus per annum experienced over the last few years will be significant. If the building market cools, the allowance priced into the contract may be substantially more than is actually needed to cover the increase in costs, creating a windfall profit for the contractor.

The Ultimate Risk is Always with the Client!

No contract can protect a client from the failure of a contractor or protect it from the cost of defending claims made by a contractor! The ultimate risk is always the clients.

In the same way the builder remains responsible for the completion of the project if a subcontractor fails. The client has to either 'walk away' from a project if the builder fails (accepting a 100% loss on monies invested) or pay a premium to complete the work. This is the actual experience of clients of the Walter Construction Group, Henry Walker Eltin, and others.

Where the contractor remains viable but knows it is losing money, the client is potentially subject to a range of claims, either genuine or fabricated. In most Australian jurisdictions, the ability to claim has been enhanced by the power of the BIScOP Acts. Even if the client is 'successful' in defending a claim it is unlikely to recover the full extent of costs involved in managing the dispute.

Negotiated settlements frequently involve reduction in scope, quality or other facets of the project as well as financial settlements. The Victorian government and the Spencer Street station developers have recently agreed to settle their current round of disputes but with numerous reductions in scope and design changes including reducing the area covered by the 'wave roof', deleting a major new pedestrian link and using lower cost finishes on the platforms.



Figure 6 - © The Age Sat 9th July 2005 (Front Page)

Options to Manage Building Risk in the 21st Century

Attempts to artificially avoid risk will often generate sub-optimal outcomes. To improve project delivery rates and the health of the Australian construction industry, both clients and contractors need to take a longer term view. Whilst every contractor knows not winning work is a sure way to go out of business, accepting unfunded risks and unprofitable work has the same inevitable outcome, it simply takes longer and hurts more. Similarly, clients should be aware of the risks inherent in their project and seek to fund and manage the project realistically.

To improve project delivery, clients (and their financial institutions) have to be prepared to be more involved in their projects; abrogating control to a single point of responsibility (eg the D&C contractor) creates a single point of failure, opening the potential for catastrophic failure of the project if the D&C contractor collapses.

Enlightened clients, seeking better outcomes must take the lead in balancing risk, cost and control. Risk should be borne by the party most capable of managing it. Control, particularly over design and quality should be retained by the client to a large extent, particularly if the client plans to own the project for many years after the contract is finished. Costs and schedules need to be realistic and achievable.

Achieving an optimum outcome from a construction contract requires a robust and trusting relationship between the client and the contractor. Whilst developing and maintaining this type of relationship requires a significant investment of effort, there are already forms of contract in existence to facilitate the process such as Alliance Contracting and various forms of Partnering. The demonstrated success of these types of contract suggest they are both a viable and effective alternative to the simplistic 'fixed price, D&C' approach used on so many commercial contracts. Alliancing successes include projects as diverse as the National Museum in Canberra and the 'Tilt Train' project in Queensland.

It is important to recognise alliance/partnering contracts do not prevent problems arising; their true effectiveness is measured when things 'go wrong'. If the relationships are strong and proactive dispute management systems are in place, most issues are resolved fairly and equitably, the relationship is maintained and the contract continues to a successful conclusion.

Other innovative arrangements include:

- Buy what you need: a Queensland Shire Council buys mains water and sewage treatment based on the volume consumed (price per mega litre). The contractor is responsible for the construction and operation of the various water treatment facilities for 50 years.
- Focus on profits (or outputs): BP Retail makes its money from selling petrol and consumer items (building service stations is only a means to this end); therefore, maximising sales is the primary focus of the BP retail management team. The construction of its service stations is managed via long term partnering arrangements with skilled designers, planners and builders.

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Collaborative Working Agreements and Integrated Supply Teams

Sir John Egan's report 'Rethinking in Construction'¹¹ built on earlier reports (Latham¹²) and placed the concept of integrated supply chains firmly on the map. The main purpose of Collaborative Working Agreements and integrated supply teams is to engage the client, design consultants, contractors, sub-contractors, vendors into one team, with incentives to establish a structure to ensure that everyone works together to achieve agreed shared targets. The unified team creates an environment where outstanding results can be achieved and the incentives are developed into a Gain / Pain Share arrangement. If the project is successful there will be Gain Share, if it is not then there may well be Pain Share.

Some of the key principles involved include:

- There should be equitable benefit for all parties in the agreement.
- An attitude of openness and trust is required to make collaborative working successful.
- Encourage a team focus on "What is best for Project".
- Make sure adequate time is spent at the pre-planning stage.
- Include all organisations engaged on the project including sub contractors from as far down the supply chain as possible - they do most of the work!
- Long-term 'supply team' agreements eliminate the need to start from scratch on each project.
- Ensure processes exist to resolve technical differences (schedule / cost / scope) – independent experts can be helpful.
- Do not underestimate the cultural shift involved; some form of external facilitation is almost essential (as well as top level management support from all parties).

In the UK contracts such as the NEC Engineering and Construction Contract (ECC)¹³ have been designed to support these initiatives.

Risk Management Strategies

A professional team working together will implement effective risk management practices including:

- Understanding and documenting all risks and keeping this understanding up to date with regular reviews.
- Undertake early site investigations: both geotechnical and environmental, before starting on the design. In traditional D&C contracts any errors by the client give rise to potential claims; in an alliance, the parties have a problem to resolve.
- Approvals: plan and manage the processes proactively.
- Design: prepare an effective design brief, allow adequate design time, focus on design management and a high quality design team.
- Budgets and contingencies: ensure they are realistic, achievable and adequate.

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- Construction: ensure the on-site team are capable, experienced, etc, and that all contractors and subcontractors have adequate capacity. Accept the need for builders to make a fair profit.....
- Schedule: ensure it is realistic and achievable.
- Disposal / ownership: understand how the project closes down and hands over the building / facility to the users / operators.

This list is far from complete but should serve to identify areas where embracing the risk and proactively managing it will inevitably produce a better long term outcome for the client than ignoring the risks or trying to make the D&C contractor totally responsible.

The Need for Professional Managers

The construction industry proposed in this paper will need far greater numbers of skilled, professional managers than are currently available. Neither clients, nor their financiers will be able to engage effectively with contractors in an alliance or partnership unless they have skilled building managers working for them. The building and construction industry will also need to be better resourced with trained professionals that understand that delivering value is intrinsically linked to managing risks and relationships (as well as the more practical skills).

Developing and training managers at this level is a mid-career process and should be the natural role for institutions such as the CIOBA and AIB. The challenge is three fold:

- Developing training and qualifications that are relevant to mid-career construction managers (including managers with a trade background).
- Creating awareness and acceptance of the need for change in the client community and offering effective solutions to their problem.
- Creating a desire for true professionalism in the building and construction industries.

The project management industry has moved in this direction over the last decade with qualifications such as PMI's PMP¹⁴ and AIPM's RegPM. People seeking employment as a project manager in ICT, Defence and a range of other industries know they are disadvantaged if they do not hold such a qualification.

The challenge facing us in Australia is to make being a qualified construction professional (ie holding a qualification such as an MCIOB) as important for middle and senior managers in our industry as being a 'PMP' is to managers in the ICT industries, and then to encourage more clients and financiers to make use of their skills.

Conclusion

Any change that is intended to create a 'gain' has an element of risk; in this respect the construction industry is no different to any other endeavour. The change created by the construction project will inevitably have risks associated with it. Effective risk management seeks to optimise the balance between the consequences of risk and the capability to control the risk or absorb its consequences. Ideally, all risks should be borne by the party most capable of managing them. This includes ensuring that the appropriate time and cost budgets have realistic levels of flexibility and contingency to deal with risks as they arise; it is impossible to predict the future.

Forms of contract that seek to artificially hide the appearance of risk do not eliminate the risk. Inefficient risk allocation simply increases costs and increases the likelihood of a catastrophic failure when the risks eventuate. Ultimately, the client cannot escape the consequences of the risks inherent in its projects. No contract can protect a client from a catastrophic failure of some kind, or prevent a contractor making claims if it is experiencing unacceptable levels of loss.

The introduction of the BScOP Acts has substantially changed the rules of risk allocation in the Australian construction industry. Irrespective of the form of contract in place, contractors can easily generate claims using the provisions of the Act (not the contract). Most contractors will see little 'downside' in making a security of payment claim if they are losing substantial sums of money on a contract. Clients need to adapt to this new environment by becoming more closely involved with their projects.

Effective construction delivery processes when the client is 'building to own' require the client to maintain a level of control of key elements of the process such as design; the building owner will 'live' with design for the next 50 years. Clients can achieve effective management of risk and remain engaged with the critical elements of their projects by adopting forms of contract that focus on 'mutuality' and relationships. These include various forms of Alliance contracting and Partnering. However, the widespread adoption of this type of contracting will require a substantial increase in the number of professional building managers and a greater awareness of the contracting processes in client organisations and their financiers.

The challenge facing CIOBA is to build awareness amongst clients and the construction industry; and to develop training and qualifications that will encourage mid career managers to improve their skills in this critical area.

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- ⁷ Deloitte Touche Tohmatsu: Property & Construction presentation, March 2005.
- ⁸ See: www.construction.nsw.gov.au
- ⁹ Doyle J, Doyles Construction Lawyers, 'SoP; A new answer to an old question' (see www.doylesconstructionlawyers.com).
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- ¹¹ Egan J, Rethinking Construction, 1998
- ¹² Constructing the Team (The Latham Report), 1994
- ¹³ See: www.neccontract.com
- ¹⁴ See: www.mosaicprojects.com.au/training