Current Trends in Risk Allocation in Construction Projects and Their Implications for Industry Participants

By Patrick Mead*

LT Construction projects; Risk management

> "If human nature felt no temptation to take a chance . . . there might not be much investment as a result of cold calculation."
>
> John Maynard Keynes (1936)

Introduction

Risk identification and management has become increasingly important for nearly all commercial organisations operating in today's environment, but perhaps no more so than for companies involved in major mining, civil or construction projects, where failure to accurately identify and make appropriate allowance for risks being assumed under complex commercial and contractual arrangements can have dire consequences. We have seen in recent times many examples of such consequences and the fallout which may result in the event that risk is not carefully managed. This fallout can extend beyond the immediate parties to the construction project and can have political and social impacts extending from public hostility to future projects right through to the burden placed upon judicial resources, as a result of the inevitable disputation that can arise as a result of risks and projects spiralling out of control. This article will provide an overview of risk allocation in construction projects and the methods adopted by various participants to manage that risk in an always dynamic environment.

Ideology and practice

A logical starting point for an analysis of risk allocation in major construction projects is the set of principles of allocating obligations and/or risks for all

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projects expounded by the international construction lawyer Max Abrahamson, referred to as "the Abrahamson principles". Those principles suggest that a party to a contract should bear a risk where:

- the risk is within the party's control;
- the party can transfer the risk, e.g. through insurance, and it is most economically beneficial to deal with the risk in this fashion;
- the preponderant economic benefit of controlling the risk lies with the party in question;
- to place the risk upon the party in question is in the interests of efficiency, including planning, incentive and innovation efficiency;
- if the risk eventuates, the loss falls on that party in the first instance and it is not practicable, or there is no reason under the above principles, to cause expense and uncertainty by attempting to transfer the loss to another.[1]

These principles have not already translated into practice, however. A study of major construction contracts for example found that:

- risks were not allocated to the party best able to manage the risk;
- formal risk assessments were not being undertaken;
- risk clauses varied from those in standard contracts;
- risks were transferred to consultants and contractors which were impossible for them to manage;
- risks were not costed in tenders;
- cost savings would have occurred had risks been more effectively allocated;
- the implications of changing risk allocation were not known;
- disputes and claims increased as a consequence of changes to risk allocation.[2]

Perhaps more hopeful are the results of a more recent survey concerning the usage of risk management techniques, which indicated that:

- the use of risk management is moderate to high, with very little differences between the types, sizes and risk tolerance of the organisations, and experience and risk tolerance of the individual respondents;
- risk management usage in the execution and planning stages of the project life cycle is higher than in the conceptual or termination phases;

[1] See NPWC/NBCC report, "No Dispute—Strategies for improvement in the Australian Building and Construction Industry", May 1990.

[2] Engineers Australia and the Chamber of Commerce and Industry of Western Australia, "Effective Risk Allocation in Major Projects: Rhetoric or Reality", 2001, extracted from a paper by David Singleton, Chair National Engineering Registration Board, "Process for Resolving Technically Complex Disputes".

- risk identification and risk assessment are the most often used risk management elements ahead of risk response and risk documentation;
- brainstorming is the most common risk identification technique used;
- qualitative methods of risk assessment are used most frequently;
- risk reduction is the most frequently used risk response method, with the use of contingencies and contractual transfer preferred over insurance;
- project teams are the most frequent group used for risk analysis, ahead of in-house specialists and consultants.[3]

Multidisciplinary approach

The use of a project team to undertake risk analysis appears to be one of the key trends to have emerged in recent years and it is clearly necessary to take a holistic approach that focuses not only on legal risks but the myriad technical, commercial, regulatory and process risks likely to be encountered. Accordingly a legal "risk assessment" is likely to comprise only one aspect of assessments which should be made, involving a variety of professionals drawn from other disciplines, both in-house and sometimes externally. The diagram below illustrates the types of consultants which might be engaged for risk analysis (in the context of a PFI project process), highlighting the choices of the different industry stakeholders.

One of the things demonstrated by this diagram is that the risks which the various stakeholders consider as most significant to them will guide their focus on risk management, the allocation of those risks and their choice of disciplines called upon to inform their decision-making process.

The perception of risk—what constitutes a risk in the first place and the reaction of a particular party to it—will often be informed by past experiences and influenced by value systems, both personal and organisational. Hence a contractor in a competitive tendering situation may feel that it is being asked to assume risks over which it has no control, while at the same time the principal may consider that those risks have been allocated to the party best able to manage them.[4] The financier, on the other hand, its perception of risk being driven by the nature of the financing itself and the focus on completion risk, may seek to allocate maximum risk to the contractor for the good of cash flow—insisting on an allocation of risk even more narrow than that which might otherwise have been negotiated between industry participants.

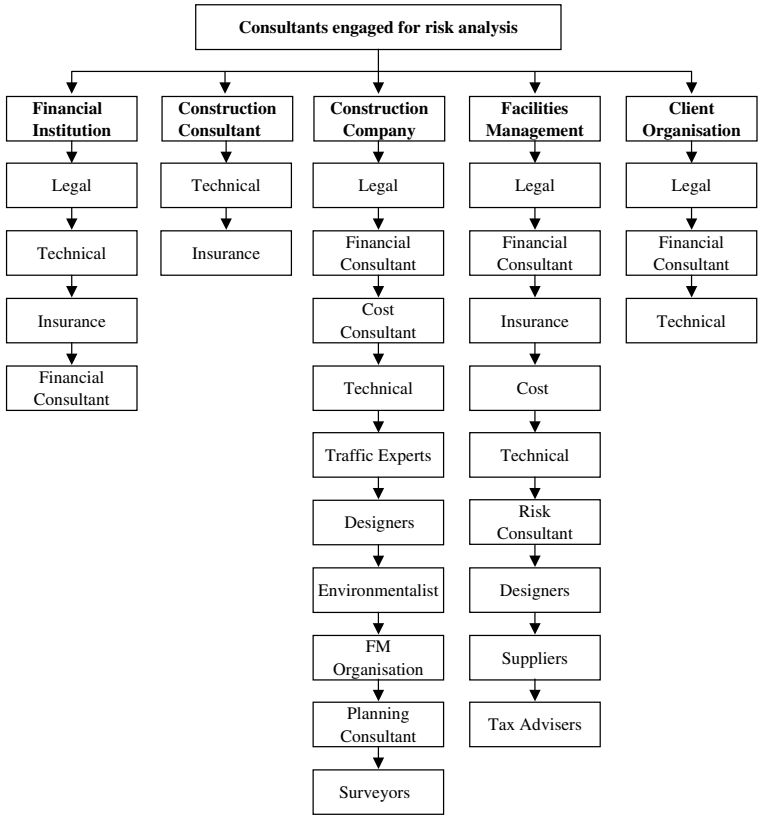
Risk management

Risk management involves the identification, mitigation and evaluation of risks.[5] Risk management has been defined as "the culture, processes and structures that

[3] Terry Lyons and Martin Skitmore, "Source Project Risk Management in the Queensland Engineering Construction Industry: A Survey", School of Construction Management and Property, Queensland University of Technology, November 5, 2002.

[4] As suggested by the result of the 2001 survey conducted by the Chamber of Commerce & Industry of Western Australia and the Institution of Engineers Australia: "Effective Risk Allocation in Major Projects: Rhetoric or Reality? 2001".

[5] Steele A., *Audit Risk & Audit Evidence: The Bayesian Approach to Statistical Auditing*, (Academic Press, London, 1992).



Source: Akintoye A., HardCastle C., Beck M., Chinyio E. and Asenova D., "Achieving Best Value in Private Finance Initiative Project Procurement" (2003) 21 (5) Construction Management and Economics 461.

Figure 1

are directed towards realising potential opportunities whilst managing adverse effects" and the risk management process as

> "the systematic application of management policies, procedures and practices to the tasks of communicating, establishing the context, identifying, analysing, evaluating, treating, monitoring and reviewing risk".[6]

While standards may specify the elements of the risk management process, they generally do not seek to enforce the uniformity of risk management systems and are independent of any specific industry or economic sector. Notwithstanding this, they have increasingly formed the basis for the more sophisticated forms of risk assessment undertaken by parties to major construction projects and set out the base parameters of the risk management process.

[6] 1.3.20/1.3.21:AS/NZ4360:2004, Risk Management, pp.4 and 5.

The figure below sets out the risk management process in detail.[7]

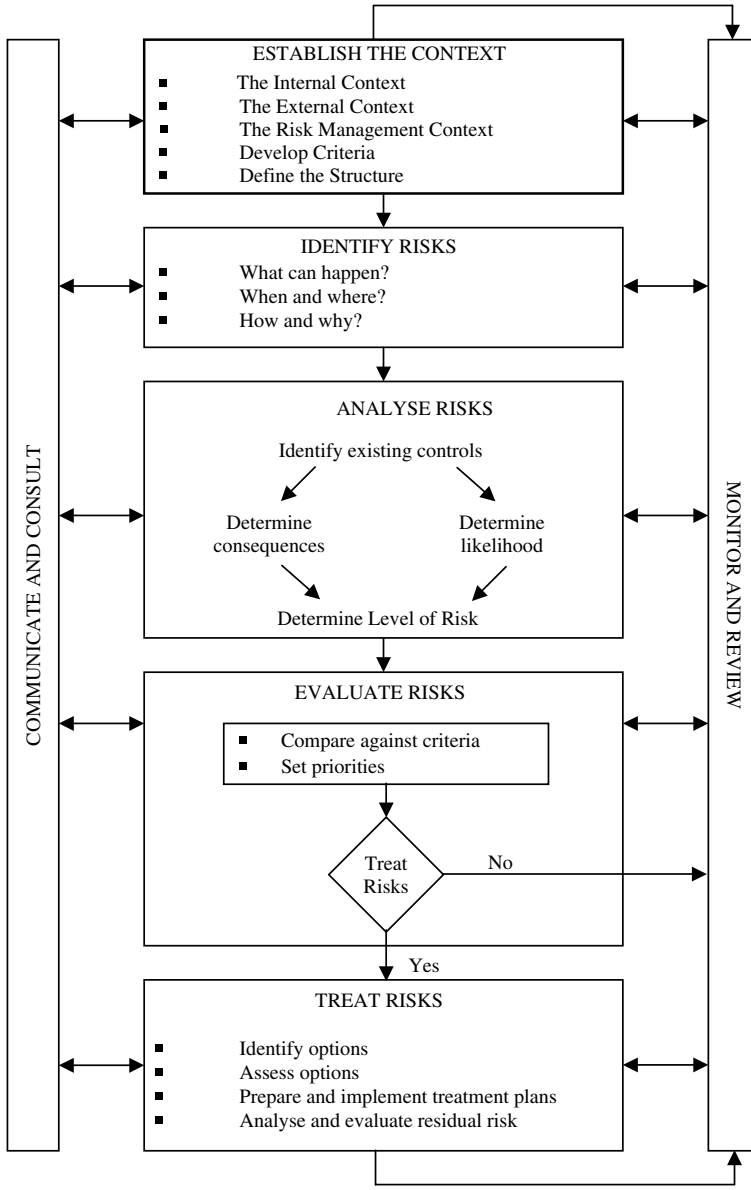


Figure 2

[7] Figure 2.1 Risk Management Process—Overview:, *ibid.*, p.9.

Establishing the context

Prior to the identification of the key significant categories of risk, it is first important to establish the context within which those risks must be managed and to set out the scope for the rest of the risk management process. The context will include the organisation's external and internal environment and the purpose of the risk management activity which will also include consideration of the interface between the external and internal environments. Clearly the context will vary depending on which party (i.e. principal, contractor, financier, insurer, end-user) is undertaking the risk management process.[8]

For example, a contractor being asked to submit a tender for a particular project can only do so in the context of its corporate goals and objectives, its particular tolerance for risk, and the external environment in which it is operating. Oftentimes the internal context will be established and documented in tendering and corporate risk guidelines against which any proposed project will then be gauged.

The external environmental may be more variable. In buoyant economic conditions, a contractor may take the view that it does not wish to procure contracts with a contract value of less than a certain figure and will only proceed to bid when it can achieve a particular margin. Given a scarcity of resources and the opportunities available in other areas of its business, it may also determine not to tender for projects that fall outside its direct area of expertise. Similarly, it may be in a position to insist upon strict compliance with its own internal guidelines in relation to the level of contractual and financial risk it is prepared to assume on the project before it is prepared to "walk away".

This context might be contrasted with that in which the contractor may find itself once boom conditions dissipate—work may be undertaken for a lower margin and at greater assumed risk in areas in which it has less expertise, in order to support an enlarged labour force and head office overheads.

Identifying the key significant categories of risk

Having established the context, the task of actual identification of risks needs to be undertaken. Risk identification itself is often undertaken through a variety of methods which may include checklists, brainstorming, visits to site, corporate experience (or drawing upon consultants or subcontractors who have experience in the particular industry segment), analysis of prior projects, the use of organisational charts to review internal structures and flowcharts to review process issues and through research, interviews and surveys of parties likely to be impacted by the proposal. Ultimately the aim is to generate a comprehensive list of sources of risks and events that might have an impact on the achievement of each of the objectives identified in the context. These events might prevent, degrade, delay or enhance the achievement of those objectives.

There are also a multitude of risks which could emerge at any stage of a project and while these will require constant monitoring, management and treatment, at some juncture the process of risk identification needs to be finalised in

[8] AS/NZS 4360:2004 Risk Management, above fn.6, paras 3.2.1–3.2.4.

order to progress through the balance of steps in the risk management process. Accordingly the main objective is to see that the major risks that could impact on the project most adversely are not left unidentified. Most commonly a relatively small percentage of key risks are likely to account for the majority of the time and cost implications of the entire risk.

Categories of risk

Owing to the various nature of risks which may be encountered in a major project and the differing weights which may attach to their consequences (and differing "treatments" which they may entail), it is not uncommon for parties to seek to identify these risks under major headings or categories, including attempts to break the risks down into commercial (business or project prerequisite and sustainability) risks, construction (and/or operational) risks and third party (act of God/government) risks—often each with their overlay of "legal risks". In the writer's view, one of the dangers of slavishly adopting such an approach is that it can tend to reinforce an assumed allocation of risk dependent on the project delivery method being proposed and the respective interests of the various parties.

By way of example, a contractor assessing the risks involved in bidding on a straightforward "construct only" commercial office tower project may assume that so called "project risks", such as the availability of requisite planning approvals or the principal's financing, are matters solely the concern of the principal and accordingly focus on so-called "construction risks" such as the impact of latent conditions, risks of delay, etc. This would be a mistake, however, for while contractors, principals and financiers will each attach varying levels of importance to various risks, a consideration of the totality of risks which may be encountered is essential in order to determine their impact and "knock-on" effect.

To use the above illustration, while the funding risk might be seen as a risk primarily relevant to the principal's ability to get the project off the ground and subsequently one borne by the principal and financier through to completion, the knock-on effects of the funding arrangements can be very significant from the contractor's point of view, for reasons we will consider in some detail shortly.

Accordingly, it is suggested that it is wise for each of the participants to consider each and every risk which they identify as being relevant to the project as a whole, and thereafter seek to categorise those risks by the manner in which they are proposed to be "treated", rather than seeking to "fit" risks into general categories or even more alarmingly seek to allocate them at the outset to the respective parties as matters of concern for the other project participants.

The timing and scope of the risk assessment undertaken will also necessarily be dependent on the involvement of the respective parties at the various stages of project and product life cycle—concept and feasibility, design, construction, commissioning and handover, operation and maintenance, decommissioning and disposal. Clearly the type and intensity of an assessment of the operational phase of a facility undertaken by a contractor will vary dramatically between a contractor involved under a standard "construct only" contract, and one in which the contractor has assumed ongoing contractual responsibility for operation and maintenance.

Key areas of risk

The key areas of risk for a principal are different to those applying to a contractor and different again from those applying to a financier. The principal is generally concerned that the project will be:

- feasible, in the sense that the project will "stack up" financially;
- able to proceed, in the sense of having obtained requisite site, planning and other approvals;
- able to be completed within budget (or allowed contingency) and on time having regard to the timing of end-user requirements;
- able to satisfy end-user requirements;
- fit for purpose, in the sense of it meeting design, construction and performance criteria.

On the other hand, the contractors' key concerns are generally:

- to be paid in accordance with the terms of the contract including any additional amounts owing because of variation, etc;
- to achieve its aimed for margin;
- to complete in accordance with its programme;
- to have had the contract fairly administered;
- to have avoided liability to third parties or the principal, e.g. liquidated damages, etc.

A financier of the project will have other key areas of risk which differ again, although there may be varying degrees of overlap. Completion risk, being the risk that the project will not be completed or not completed on time or at the anticipated cost translates into the risk for the financier that insufficient cash flow will be generated such that it may trigger default under the particular or a broader funding facility.

Other risks considered in project financing include:

- resource or reserves risk;
- security of tenure and political risk;
- raw materials and supplies risk;
- operating risk;
- market risk;
- financial risk;
- *force majeure* risk.[9]

[9] See McConnel, "Project Financing in the Energy Industry and its Impact on Completion Risk" (2001) 20 A.M.P.L.J. 153.

Other heads of risk in the construction industry which may be of concern (to varying degrees) for all stakeholders include:

- damage to persons, property or works;
- contractual;
- design/construction;
- operating;
- financial and funding;
- construction performance;
- design;
- compliance with legislative requirements;
- workplace health and safety;
- environmental;
- cultural heritage;
- taxation;
- currency;
- change in government;
- political;
- site conditions (e.g. latent conditions);
- site access;
- technology;
- supply;
- *force majeure*;
- interface;
- inclement weather;
- industrial relations;
- legal (change of legislation);
- insurance;
- disputation;
- insolvency;
- consumption;
- safety;
- escalation;
- interpretation.

Differentiating between risks that are and are not within the contractual parties' control

Having identified the key risks likely to be faced by the participants in a major project, it is important to differentiate between risks that are and are not within the respective parties' control. The reason for this are self-evident if one accepts the soundness and desirability of seeking to allocate risks in accordance with the Abrahamson principle, i.e. the decision as to whether or not a party should ideally bear a risk will be in part a consequence of the determination of whether that risk is one within the party's control.

If one is to assume that "bad" risk allocation (in the sense of a party being required to assume a risk over which it has no control or for which it is not adequately compensated or motivated to assume that risk) lies at the heart of much of the expensive and time-consuming litigation and disputes which arise out of construction projects, the necessity to accurately assess which risks do or do not fall within a party's control becomes clear. There are, however, other important consequences which may flow from the inability to correctly identify which risks do or do not fall within a party's control including:

- the bankability of the project (i.e. a project financier may be unhappy to proceed if it feels significant risks are being borne by a project participant who may not have the wherewithal nor ability to control that risk);
- the principal paying an inflated price for the project as a result of loading unnecessarily (from the principal's point of view) built into the tender prices as a result of the tenderers being asked to price a contingency over which they have no control;
- the ability of that party to procure the requisite and appropriate insurance or even to determine whether insurance is required with respect to a particular risk or whether that risk is better managed via that party's internal risk management processes.
- the inability to determine which risks should be shared: risks that are outside of the control of both contractual parties may be ones best shared—for example the risk of inclement weather may be one agreed to be borne by the principle in a time sense but in a cost sense will be the contractor's risk. Shared risks outside of the control of each party with financially significant consequences may also be ones transferred to a third party, such as an insurer, in order to provide balance sheet protection.

Conducting an effective and accurate assessment of risk (analysis and evaluation)

Risk analysis is about developing an understanding of the risk. It involves consideration of the sources of risk, their positive and negative consequences and the likelihood that those consequences may occur. The purpose of risk evaluation is to make decisions, based on the outcomes of risk analysis, about which risks need treatment and treatment priorities. Risk treatment involves identifying the range of options for treating risks, assessing those options and the preparation and implementation of treatment plans.

There are two features that characterise risks:

- the probability (chance) by which they can happen;
- their ultimate impact on the project, if they do materialise.[10]

An accurate assessment of these two aspects will enable an organisation or consortium to decide on a course of action.

The probability of a risk occurring and its impact on a project are used in tandem as decision aids. For example, if the chance of a risk happening is assessed to be high and its potential impact is equally high, than such risk is accorded high priority.

The following table demonstrates a prioritisation of risks where a risk designated "5" is accorded utmost priority, given that both its probability of occurring and its impact are both high.[11]

A delay in obtaining a mining lease, may for example be rated "5" particularly if the delay has "flow on" effects to the contract mining programme which may be significantly delayed by the wet season if operations are not able to be commenced before a certain date.

On the other hand a possible shortfall in reinforcing "trumpets" for a silo project might be rated "1" as the ability to quickly procure equivalent replacements would not unduly delay the project.

Table 1 Risk prioritisation matrix

	High			5
Probability	*Medium*	3		
	Low	1		
		Low	*Medium*	*High*
			Impact	

Once these priorities are determined an assessment needs to be made. Such assessments are usually qualitative, semi-quantitative or fully quantitative. In a qualitative assessment both probability and impact are assessed subjectively.

In practice, qualitative analysis is often used first to obtain a general indication of the level of risk and to reveal the major risk issues. Later it may be necessary to undertake more specific or quantitative analysis on the major risk issues. Qualitative analysis uses words to describe the magnitude of potential

[10] See Chinyio and Fergusson, "A Construction Perspective on Risk Management in Public-Private Partnership", in *Public-Private Partnerships—Managing Risks and Opportunities* (Blackwell Science, Oxford, 2003), p.105.

[11] *ibid*., p.106.

consequences and the likelihood that those consequences will occur. In semi-quantitative analysis, the objective is to produce a more expanded ranking scale than is usually achieved in qualitative analysis with probability being assessed subjectively but impact assessed objectively. In quantitative analysis numerical values for both consequences and likelihood using data from a variety of sources is undertaken. The quality of the analysis depends on the accuracy and the completeness of the numerical values and the validity of the models used. Consequences may be determined by modelling the outcomes of an event or set of events, or by extrapolation from experimental studies or past data.[12]

Risk evaluation involves comparing the level of risk found during the analysis process with risk criteria established when the context was considered. Whichever way the risks are evaluated, some form of sensitivity analysis is often conducted to identify the most volatile risks, i.e. those that have a knock-on effect on the achievement of the project's objectives. In sensitivity analysis, therefore, cumulative influence of the risks on the project's objectives is assessed.

Treatment of risks

Treatment options for risks having positive and negative outcomes can be similar although the interpretation and implications are clearly different. Often the consequences of both positive and negative outcomes can be dealt with by way of risk sharing and a "pain/gain" model commonly seen in forms of alliance and relationship contracting. Where dealing with negative outcomes from risks identified and having to treat those risks in the context of a more traditional contract structure, risk mitigation is called into play, this being the process of finding solutions to counter risks. Instead of simply pricing for risks there are other opportunities for mitigating risks including:

- risk elimination (e.g. not proceeding or proceeding on a different basis);
- risk reduction (e.g. by undertaking further investigations/due diligence);
- risk transference (e.g. by legal, contractual and insurance);
- risk retention (e.g. self-insurance, bearing a large deductible, internal management of risk).[13]

Often these mitigation strategies, particularly risk transference, are given effect contractually via the use of such means as contractual exclusions, limitations of liability, indemnity clauses, risk transference, guarantees, performance bonds and insertion of a risk premium.

Ensuring that risk factors are costed in appropriately and understanding which aspects of risk allocation are primarily market-driven

The reality is that as a result of inequality in bargaining power and the desire of contractors in a competitive market to secure the project, risks are not always

[12] Above fn.6, paras 3.4.4(a) and (b).
[13] Chinyio and Fergusson, above fn.10, p.114.

allocated to the party best able to manage them and there is not always the ability to insist upon an appropriate risk premium in exchange for having taken on that risk. Clearly one of the key factors in ensuring that risk factors are costed in appropriately (or at very least understanding the risk factor being assumed without requisite compensation) is first the accurate identification of risks and then an appropriate assessment of both their likelihood and consequences. The use by contractors of their own "base case" estimates, with their constituent parts being broken down and subject to percentage-based optimistic and pessimistic outcomes, can often be the basis to arrive at an overall risk premium in arriving at a final bid price.

While initially it may be the case that risks are assessed from several dimensions, these considerations are subsequently translated into financial terms. In terms of appropriately "costing in" risk factors, different organisations will use different approaches. After assessing every risk an organisation may identify those risks with a high probability and/or impact and then price its full impact into the bid. Another and arguably more realistic approach is to price all identifiable risks but to seek to control their cost consequences through probabilistic considerations.

For example, if the probability of encountering certain ground conditions is assessed at 20 per cent and the cost of contending with those conditions is estimated at $200,000, a contractor, rather than ignore the risk altogether and potentially leave itself exposed, or building in the full $200,000 into its bid price and thus potentially rendering its bid uncompetitive, may elect to price the risk in accordance with a simple formula to determine risk cover such as:

"$0.20 \times 200,000 = \$40,000$".[14]

The effect of each risk (where the probability of it occurring is uncertain) is treated accordingly and the cumulative effect will feed into the final bid price and act as the contractor's "risk buffer" or "risk premium".

As has been noted, the reality is that this "risk premium" is often eroded during the course of the "sharpening the pencil" discussions at the preferred tenderer stage of negotiations. Moreover the ability of contracting parties to adopt innovative risk management and transfer strategies can in a very real sense be impacted upon by the involvement of a project financier who will see completion risk as one of the key drivers.[15]

Notwithstanding a desire by contracting parties to achieve an appropriate allocation of risk in accordance with the Abrahamson principle or otherwise,

[14] *ibid*., p.109.

[15] As McConnel notes, above fn.9, p.154, there can be a wide variety of covenants and guarantees contained in completion agreements between the lender and parties providing completion covenants including:

- unconditional agreements to provide funds to ensure completion;
- financial guarantees to takeover project debt;
- cash or working capital deficiency agreements;
- best efforts and undertakings to use prudent commercial practice to secure completion (see J. McMurtrie, "Project Financing: A Lender's Perspective" (1983) 2(3) *Economic Society of Australia—Economic Papers* 56).

the necessity to make the project "bankable" will often see the contractor being asked to assume a greater amount of risk than might otherwise be the case. But while market-driven completion risk is a key driver for a project financier, the ability to secure guaranteed and timely payment is a key market-driven risk for a contractor looking to undertake a project.

For example, if acting on behalf of a contractor considering a building works proposal, the first question which needs to be considered is the ability of the principal to make payment for the finished works. While this may seem on its face to be an obvious consideration, it is one which is sometimes seemingly overlooked in the desire to secure the contract.

The first inquiry which one should make in those circumstances relates to the financial wherewithal of the principal. Is the principal a blue chip public company with all of the comfort its balance sheet affords, or is it a so-called "$2.00 company"? If it is a $2.00 company, is it a subsidiary of a substantial entity whereby the parent company is in a position to guarantee payment, or is it in fact proposed to have the entire project funded by an external financier?

It is in this latter scenario where substantial due diligence is required in relation to the principal's proposed funding arrangements, before a contractor would feel secure in proceeding to undertake the works. Such an exercise extends beyond the contractor merely satisfying itself in relation to the extent of finance available for the project. For example, the contractor would wish to ensure that the project financier's funding for the project was not capped at the contract value of the works, whether there was sufficient "buffer" available in the event of cost overruns which may arise as a result of variations or delays to the project.

A related reason why this is important is to guard against the consequences which may flow from a situation arising at or near the completion of a project, whereby the funding has been effectively exhausted, and the principal remains in possession of significant securities from the contractor "ordinarily a requirement of the project financier".

Assume for example that the total funding available for the project has been exhausted by the time of lodgement of the penultimate progress payment claim. By the time that the contractor is entitled to exercise its rights to suspend the works under the contract for non-payment it will have been obliged to proceed for a further month to complete the project and increase its unfunded exposure accordingly.

The principal may, in these circumstances, find itself under significant financial strain and may, as a last resort, seek to have recourse to the contractors' unconditional security. In those circumstances, the contractor faces a real risk of being contractually compelled to complete the project and not only face the prospects of conversion of its securities, but also of being "out of pocket" to the extent of its final two progress payment claims.

Additionally, the contractor would wish to satisfy itself that the facility funding available for construction was "earmarked" and "quarantined" to ensure that there was no shortfall in funding to pay the contractor at the end of the project.

Entry into a tripartite arrangement between the principal contractor and financier is a common means of seeking to ensure that payment to the contractor is adequately secured. In the absence, however, of appropriate due diligence

undertaken in relation to the facility deed between the financier and principal, a contractor may still face a potential fund shortfall at the completion of the project.

For example, it is necessary to ensure that in the event of default by the principal under the terms of its arrangements with the financier, the contractor has an ability to be paid for work undertaken to that point in time (and not just in respect of amounts currently certified for payment). In the absence of such arrangements, at the time of default, a contractor can find itself awaiting payment on a prior assessment or certificate and they have undertaken further significant work in the ensuing period, with no commensurate right to seek that payment from the financier. The financier on the other hand will have undoubtedly reserved to itself the right to "step into the shoes of" the principal and complete the project.

Further matters which require consideration to adequately ensure the contractor's security of payment are the ability to be paid for offsite materials and to be able to control any purported assignment of the contract, given the consequences which may flow from an attempt by the principal to on-sell the property on which the construction is to take place, prior to or during construction. Serious attention must also be given in circumstances where the owner of the property upon which construction is to take place is not the principal contracting with the contractor. It is necessary in those circumstances to fully understand the relationship between the two entities (who may be acting in a form of joint venture or alternatively simply an arrangement of vendor/purchaser) and guard against a circumstance where the property owner's lender may have an ability to exercise rights in respect of the property.

Contracting with joint venture parties (or commonly in mining projects, the joint venture manager) can create a myriad of payment risks which need to be clearly understood, particularly in circumstances where the joint venturer's liability for payment under the contract is several and not joint.

Hypothetical case studies

As a consideration of these principles can seem somewhat esoteric in the absence of their application to some concrete examples, we will now turn to briefly consider a hypothetical contractor's response to two hypothetical projects, the first being a joint mining and civil project and the second being a building project under a design and construction agreement.

In these hypothetical case studies, the context in which the contractor undertakes a risk assessment (at the Request for Proposal ("RFP") or tender phase) will be in accordance with corporate limits documented, for example in tendering guidelines which may also detail limits of liability for key commercial risks. The proposal or tender will then be considered against a number of criteria such as financial and funding risks, construction performance risks and designs risks.

A number of the issues for consideration under the financial and funding risks are those outlined above in relation to payment risk, but may also extent to issues such as maintaining positive cash flow through the life of the project, payment for on and off site materials and the possible impact of security of payment legislation.

Construction performance risks on the other hand relate to the willingness or otherwise of the contracting party to accept general damages and consequential damages, liquidated damages, the provision of parent company guarantees, the requirement for operating company performance guarantees, guarantees for long-term performance of materials or equipment and industrial relations risk.

In relation to design risks, a contractor may be asked to accept responsibility for process design and guaranteeing the outputs from a plant or facility, it may be asked to assume fit for purpose obligations under a design and construct regime or may be asked to accept the risk of achieving development approval for a project.

In each instance, the proposal or tender will be gauged against the criteria outlined, and if what the contractor is being asked to assume falls outside of those criteria, then that risk will need to be "treated", i.e. negotiated or transferred to another party. This highlights the importance of "context" in the risk management process.

Having conducted such a review and proposing optimal methods for "treating" the risk, ordinarily a number of key "threshold" risks emerge which require special consideration as the viability of the project (or at least the contractor's involvement in that project) may become very much dependent upon the willingness to assume, manage or transfer those risks.

Case study 1—hypothetical joint mining and civil project

In this study, after careful analysis and evaluation the following key risks have emerged:

(1) Risk—*mining lease*: the project is contingent upon the principal obtaining a new mining lease, and the date of the lease being granted is not certain. In the meantime, the contractor is expected to expend resources towards the project and pre-mobilise. The project cannot proceed if the lease is not granted.
Treatment: the risk can be adequately addressed in the contractor's response so that in the event of delay in issuing the mining lease, the contractor has the ability to review its ability to meet time and milestone achievements stated in the proposal, and review pricing if necessary. The contractor will also need to propose a basis for calculation and recovery of its costs in the event that mining lease approval is not forthcoming by a certain date.

(2) *Risk—25 per cent pain/gain model*: as an alternative model to that outlined in the RFP, the contractor proposes that a pain/gain model be adopted which makes 25 per cent of profits and overheads for both the civil and mining contracts for the first six months contingent upon meeting key performance indicators ("KPIs") under the civil works contract including early completion. If accepted by the principal, this 25 per cent of profits and overheads will be at substantial risk in the event of neutral or non-principal caused delays preventing the contractor from meeting the agreed KPIs.
Treatment: this is a risk created by the commercial arrangements proposed by the contractor to attract the client, and as such it is a

risk which it can commercially agree to bear for that purpose. It will not, however, be required to commit to any contract containing this pain/gain model unless other key aspects for the contract are agreed.

(3) *Risk—purchase of fleet*: in order to put itself in the best position to be awarded the contract/s and achieve or better the project milestones, the contractor will be required to commit to acquiring a fleet *prior* to entry into a firm contract with the client.
Treatment: this risk can be treated by preserving to the contractor (via a statement of clarification and departures in the RFP) a right to claim holding and delay costs, and to negotiate an agreement to compensation from the principal, where commitments are made by the contractor pre-contract with the agreement of the client.

(4) *Risk—interface risk*: the project will involve interface between both civil and mining components of the project, and between the project and the clients' other mining operations.
Treatment: this risk can be addressed by allocation of interface risk to the client if separate contracts are awarded for the civil and mining components; if the contractor is awarded both the civil and mining contract, the interface risk with the mine owner's existing operations can be addressed via contingencies and stated assumptions.

(5) *Risk—wall design* a significant design aspect has arisen in relation to a wall to protect against water inundation of the mine pit and whether or not a water impervious cut off wall needs to be constructed (at huge expense).
Treatment: after investigating the willingness or feasibility of the risk of water inundation of the mine pit being met by the contractor's insurer, the risk can be addressed by specific allocation of the risk to the client in the risk model proposed. As the construction of the water impervious cut-off wall would impact on the financial viability of the entire project, the risk of water inundation of the mine pit in the absence of the wall is one which the contractor should require to be borne by the principal.

(6) *Risk—scope of works/fit for purpose*: the RFP seeks to ensure that design, fit for purpose, whole of life and functionality risk is borne by the contractor.
Treatment: this risk can has be addressed on an interim basis by appropriate qualifications and statements contained in a statement of clarifications and departures within the response to the RFP which make it clear that this risk allocation will be reviewed based upon the final revised scope of works, and any additional information available at the time of negotiating the contracts.

(7) *Risk—cultural heritage*: cultural heritage management plans are included with the proposal documents which impose obligations on the contractor which must be complied with and procedures to be following when a cultural heritage discovery is made. Under the proposed contractual allocation of risk, the discovery of a cultural heritage item will entitle the contractor to an extension of time but will not entitle the contractor to additional costs.

Treatment: the cultural heritage management plan should be reviewed in detail to ensure that the contractor can comply with the obligations therein set out. As cultural heritage is clearly a concern at this site, the contractor should consider including an allowance in terms of time and money in its proposal and progress for the discovery of an item of cultural heritage.

Case study 2—hypothetical design and construct building contract

(1) *Risk—delay in award of tender/access to site*: the contractor is required to submit a tender which is to remain open for acceptance for a period of three months. Tender prices are to remain firm and are not to be subject to adjustment up to completion (i.e. no rise and fall), and no adjustment is to be made to the tender price should commencement on site be delayed beyond the period of three months from acceptance of the tender.
Treatment: the contractor can address this risk by requiring the ability to claim escalation if access to site is not available within a certain timeframe or alternatively can make its tender conditional upon a "sunset date" after which it has an ability to renegotiate its fixed lump sum price.

(2) *Risk—site conditions*: the contract requires the contractor to accept full risk of all site conditions. The principal takes no responsibility for the accuracy or completeness of any information which has been provided to the contractor by the principal and any reliance on such information is said to be at the contractor's own risk.
Treatment: the contractor needs to rely upon its experience and consider its tolerance for risk. Its alternatives are to either accept the risk and rely upon the site information provided by the principal (and ultimately rely upon legal rights or remedies potentially available to it under the Trade Practices Act 1974 (Cth) should the information prove to be inaccurate), or alternatively ensure that it has an opportunity to undertake its own investigations as to the site and satisfy itself in relation to all site conditions which may impact upon the works. Finally it has the option of seeking to qualify its tender in relation to this clause and negotiate provisions in relation to latent conditions which afford itself acceptable rights of recovery in the event that site conditions differ from those understood by the parties.

(3) *Risk—design responsibility*: the contractor is required to accept the risk of the design of the project and agrees to take a novation of consultancy agreements already in place between the principal/developer and the existing design consultants. The contractor is to accept responsibility for the designs prepared by the consultants prior to their novation to the contractor and under its contract it also provides a fitness for purpose warranty.
Treatment: the contractor can qualify its tender by only accepting responsibility for the designs prepared after its involvement in the project (as after the date of novation the contractor will be able to control the design through its consultancy agreements), or ensure it has reviewed the designs prepared by the consultants prior to the

date of novation and are satisfied with them. In relation to the fitness for purpose obligation the contractor should ensure that the statement of purpose contained within the project brief sufficiently limits the purpose by using clear objective and measurable terms.

(4) *Risk—ambiguities in documentation:* the contractor is asked to assume the risk of ambiguities in the project brief and for any error in or between the design documents arising *before* or *after* the date of the agreement. These may be errors between the design documents produced prior to novation and those produced subsequent to novation, by the same or different consultants.
Treatment: if this risk is to be accepted, a thorough review of all documents will be required and the contractor will need to ensure that the consultancy agreements allow the contractor to recover any loss it suffers arising out of defective design documents prepared by the consultants prior to their novation.

(5) *Risk—extensions of time*: the circumstances in which the contractor may be entitled to an extension of time are limited and the question of whether the superintendent may take into account any float built into the contractor's programme is unclear. The contractor is not entitled to a proportional extension of time for concurrent delays and its entitlement to an extension of time in respect of changes in legislative requirements is also unclear.
Treatment: if the contractor is to accept this risk it needs to consider any exposure it may have for either general or liquidated damages in the event of late completion and also its ability under its programme to accelerate the works to complete on time in the event that it is delayed. In either event it will wish to include an allowance in its tender in respect of this risk. More likely it will wish to clarify the circumstances in which it is entitled to an extension of time (with or without the right to claim additional costs), particularly in relation to neutral events of delay. It will also wish to address the issue of its on- and off-site overheads in the event of extended delay for which it is not contractually entitled to recover additional payment under the contract and seek to build in an appropriate contingency.

(6) *Risk—general and liquidated damages*: although the proposed contract contains a consequential loss exclusion, having regard to recent judicial interpretation of such clauses, the contractor is potentially at risk for the payment of uncapped direct general damages. The liquidated damages clause is calculated at a weekly rate and is uncapped, accordingly exposing the contractor to the potential for significant damages which may equate ultimately to a large percentage of the total contract value.
Treatment: given the presumed intent of the consequential loss exclusion, the contractor would wish to reserve to itself the right to have input into the final drafting of that clause to ensure its efficacy. The contractor would wish to ensure a cap calculated as a percentage of the contract sum is inserted and that this cap is in accordance with its corporate guidelines.

(7) *Risk—interface risk*: fit-out works—under the contract the contractor may be required to undertake fit-out works for tenants (by way of a

variation to the contract) or tenants may be entitled to engage their own fit-out contractor in which the contractor is responsible for coordinating the fit-out works with the contractor's own works. The contractor is not eligible for any extension of time or increase to the contract sum in respect of this.

Treatment: this "interface risk" between the tenants' contractors and the contractor is one in respect of which the contractor would either wish to make provision for extension of time or disruption to its own works or alternatively seek to build in a contingency—perhaps on a contractor-by-contractor basis given that it will not be known how many if any fit-out contractors would be involved during the project. The contractor would wish to ensure that it was not accepting the risk of co-ordinating other contractors or the risk of the failure of the tenants' design to comply with the principal's design and construction requirements.

The rôle of the adviser

These case studies illustrate the role that an adviser may have once risks have been identified, in suggesting "treatment" options for those risks which can include risk elimination, risk reduction, risk transfer and even risk retention (taking advantage of risk mitigation tools such as insurance, etc.). From a lawyer's perspective, having identified critical areas of concern in relation to risks that a client is being asked to assume and proposing options for treatment of those risks, it is of course imperative that the ultimate legal documentation accurately reflects the treatment of those risks as agreed between the parties and accurately reflects the agreed risk allocation.

Importantly and pleasingly there has also been a move away from the practice of simply putting the contractual documentation "in the bottom drawer" once the contract has been negotiated and leaving the superintendent and contractor's representative to administer the contract "in a vacuum". Rather parties are now commonly investing the time and effort in preparing working guides or manuals concerning the rights and obligations of the parties to the contracts, cross-referencing these to the relevant contractual provisions and noting time requirements. Provided such a guide is duly observed, this can form a critical feature of day-to-day risk management, particularly having regard to time bars often contained within contracts and the recent impost of security of payment legislation and adjudication with "drop dead dates" that are overlooked at a party's peril.

Evaluating the rôle of the insurance industry in determining risk allocation and negotiating risk allocation for uninsurable events

There are very real dangers in viewing insurance arrangements as something to be left for the broker once the contract terms governing the project have been finalised.

Problems which have arisen for project participants demonstrate that ideally the insurance strategy should be arrived at during the negotiation of the construction contract and not simply as an afterthought.

Types of insurances that would typically be found in a major project include contract works insurance (in an amount sufficient to cover full reinstatement of the works including costs of demolition and removal of debris and fees for all consultants), public liability insurance, workers compensation, vehicles and plant and professional liability. In addition, the contractor may seek to insure wider risks designed to protect the cash flow including insurance against latent defects, business interruption, strikes and industrial action and advanced loss of profits. Similarly owners seeking to have protection against defective or late design under an alliance style project will generally require some tailored form of insurance given that liability insurance is unlikely to be triggered under an alliance style arrangement in the absence of "wilful default" which most policies will exclude in any event.

Another key feature that has been observed in terms of insurance and risk allocation in recent years has been the cost and availability (or lack thereof) of professional liability insurance for design consultants, the level of that cover and the level of the deductible which the design professional is being asked to bear. As a result of this lack of cover for defective design, there has been an increased desire on behalf of principals to seek to novate their design consultant's obligations to their principal contractor and seek to impose a fit for purpose risk upon that party.

Similarly the large deductibles increasingly found in not just professional liability insurance but other forms of property and general liability cover have meant the need for a greater focus on both the financial wherewithal of project partners and the warranties and indemnities contained within project documentation.

One of the undesirable facets of leaving the negotiation of insurances for a project until the 11th hour, is that insurance is often seen as a way to "plug the gap" in respect of outstanding risks which have been identified, without the parties necessarily having formed a view as to which risks are best borne internally having regard to their own corporate risk profile and tolerance, and which risks are best borne by a third party such as an insurer. Given that the type and level of cover procured for a project will have differing financial costs, it may be more through good luck than good management if the most cost efficient and effective transfer of risk is achieved.

To illustrate: a principal undertaking a major CAPEX programme may see great benefit in insisting upon the head contractor effecting comprehensive insurance noting its interests (and the interests of all of its sub-contractors). It also insists upon the provision of blanket indemnities with respect to any claims arising out of the work under the contract. To plug the gaps it may take out its own "floater" policy which it regards as operating only on a DIC (difference in conditions) basis.

While this may at first instance appear to be a comprehensive exercise in risk transfer, it is arguably a very financially inefficient way for the principal to manage these risks on site. In effect it may find itself paying three (or more) times for the same effective cover for the reasons below.

The head contractor will no doubt have sought to have priced into its contingency the risk associated with the blanket indemnities negotiated. As it

will have been asked to assume responsibility for a number of risks outside of its control, the risk "buffer" contained within the contract price may be substantial.

Also built into the price which will be paid by the principal will be the actual cost of the project specific insurance which the contractor is required to procure—as this insurance is specified to cover not just the contractor but to also name the principal and the contractor's sub-contractors, it will be rated a high premium and that cost will be passed on.

The cost of the head contractor's sub-contractors will also form a part of its bid price and if they contain a "back to back" requirement to similarly provide indemnities and secure insurance in like terms, their costs will also feed into the contractor's bid price.

In these circumstances it can be seen that what at first might be regarded as a fail safe measure of risk transfer is economically inefficient in the extreme, and could in fact work against the principal's interests if multiple insurers take opposing views in relation to coverage as the project progresses. It might be suggested that the principal's interests may have been best served by procuring principal controlled coverage for the whole of the site.

Looking at where risk allocation is heading

There are a number of developments impacting, or likely to impact, upon approaches to risk allocation and risk management going forward.

There has been a rapid convergence between insurance and financial markets in recent years. In the same way that the reinsurance market has been developing the concept of catastrophe bonds, financial engineers should ensure new and innovative ways to lay off risk via accessing the pool of worldwide capital now looking for a home.

The emergence of the financial engineers themselves and their heavy involvement in major infrastructure consortia may increasingly see the risk/reward profile determined less by an assessment of traditional construction risk, and more so by the ability of the project to service the facility, meet the requisite financial return, and the management of completion risk.

There is also the somewhat disturbing emergence of potential uncertainty created by legislative intervention which may have the effect of cutting across carefully negotiated allocation of risk and accordingly may threaten the involvement of parties, once again principally financiers, in projects. While the risk of this should not be overstated, nor should it be dismissed.

The trend away from some of the more traditional modes of project delivery has challenged the approaches of some parties who have historically sought to transfer risk by the use of indemnities and insurance. Clearly these are inappropriate in project alliance agreements for example, where the principal will often accept design risk and the risk of associated cost overruns and may be met with reluctance on behalf of insurers to cover such risk in circumstances where it is ultimately within the control of others.

Similarly the move towards partnering and relationship contracting and the uncertain legal status of a partnering charter (and potential obligations arising

therefrom—good faith, etc.) while militating against some traditional risks, may see new ones emerge.

The so called "insurance crisis", coupled with the shrinking availability of insurances in the immediate aftermath of 9/11, have certainly led to astute commercial organisations assuming far greater responsibility internally for the management of risk, and this can be observed in the growing legal and risk teams of our major contractors and engineers. The use by some of our very large corporations of "captives" and the very significant deductibles being borne by most contracting organisations has seen a renewed focus on risk assessment and management at an early stage of projects, although empirical data as to the effectiveness of these processes is not yet readily available.

It is also worthy to note the emergence of PFI initiatives by governments. Given that the justification now given for such proposals is value for money by the achievement of optimal allocation of risk, an extensive risk assessment is called for, first to determine the public sector comparator ("PSC") and then to accurately assess the proposals being put forth by interested parties. These PPI participants will necessarily have to consider risk right through from conception to operation and termination.

While the overriding principle in PFI procurement is that risks should reside with the party best able to manage them, in reality it has tended to be only demand related risks which are retained by the public sector.

Suffice to say that with operating periods of between 25 and 45 years, a variety of risks can arise that may not do so in traditional contracts of lesser duration. No doubt the Ontario Government (in its well publicised dispute with the owners of the private tollway 407) may wish they had heeded John Quiggin's suggestion of the inclusion of appropriately designed put and call options, as a way to guard against unforseen risks emerging during the long period of the PPPs concession.[16]

As a final observation, it remains the case that no amount of risk assessment, management and treatment will guarantee that issues with serious financial and other consequences will not arise during the course of what is a dynamic and inherently risky enterprise. Accordingly, the attention increasingly being afforded to the careful drafting of dispute resolution clauses and innovative modes of dispute determination within the project documentation itself is to be welcomed.

[16] J. Quiggin, "Public–Private Partnerships: Options for Improved Risk Allocation" (1995) 28(4) *Australian Economic Review* 445–450.