Risky business: Risk management cruises into the 21st century

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This article provides a practical perspective on risk management, setting out how risk-management principles are applied in every day situations by both government and non-government bodies. Various examples accompany each part of the risk-management framework, illustrating realistic steps which might be taken to manage risk associated with all work in the construction, mining and engineering industries. Some particular emphasis is provided in relation to the various legal tools available to manage risk. Finally, two case studies involving large infrastructure projects are presented which provide an overview of the application of risk-management principles in real life situations.

INTRODUCTION

Risk management may be defined as the process of identifying and understanding a risk and determining an appropriate methodology regarding the treatment of that risk to minimise or eliminate that risk. The *Macquarie Dictionary* defines risk as "exposure to the chance of injury or loss".[1]

However, it should be borne in mind that, along with negative risks, positive risks with positive outcomes may occur. For example, a design review might cause a better and more inexpensive design to arise.[2]

The importance of risk management cannot be understated in that the amount of risk management undertaken on a project and the level of success of the project are related: "More successful projects use more risk management."[3] Further, the earlier risk management is introduced into a project, the more successful the project.[4]

The application of risk-management principles is extremely broad and not confined to strictly engineering tasks only. For example, in recent months, two partners of a national law firm have launched a book they have co-written entitled *Reputation Matters: A Legal Guide to Risk Management in Corporate Communications*[5] addressing the management of risks which arise in corporate life.

The purpose of this article is to set out and examine the basic principles of risk management, review the application of those principles as well as various risk management strategies and tools, and then examine, from a legal perspective, how various risks can be treated. The article concludes with two case studies regarding the application of risk management principles to a power station project in Pakistan and to the Channel Tunnel project in the United Kingdom.

SCOPE OF ARTICLE

This article focuses particularly upon projects in the construction, mining and engineering industries and the general risk-management issues associated with these industries from a construction perspective and a legal perspective.

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[1] *The Macquarie Dictionary* (Macquarie University, Sydney, 1997) p 1835.

[2] Young W and Bhuta C, "Effective Risk Apportioning in Contracts" (1996) 47 *Australian Construction Law Newsletter* 11 at 11.

[3] Elkington P and Smallman C, "Managing project risks: A case study from the utilities sector" (2002) 20(1) *International Journal of Project Management* 49 at 56.

[4] Elkington and Smallman, n 3 at 56.

[5] Keel P and Lucas N, *Reputation Matters: A Legal Guide to Risk Management in Corporate Communications* (1st ed, CCH, 2007).

It does not address in detail risk management from a financial perspective (which is of particular importance where the PPP model is being used as the project delivery method), nor will it examine all the various contracting methods available such as relationship contracting and alliance contracts (although some very brief reference will be made to these issues). These areas are more than capable of producing articles in themselves.

PRINCIPLES OF RISK MANAGEMENT

In 1990, a report entitled *No Dispute – Strategies for Improvement in the Australian Building and Construction Industry* was produced by the National Public Works Conference (NPWC) (now the Australian Procurement and Construction Council Inc) and the National Building and Construction Council (NBCC). This report sought to set out and establish the basic principles of allocating risk for all projects in Australia.

These risk management principles are those propounded by Professor Max Abrahamson, an international construction lawyer. The Abrahamson Principles hold that a party should bear a risk where:

- the risk is within the party's control;
- the party can transfer the risk, eg 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;
- 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.[6]

The *No Dispute* publication also noted that it was more appropriate to speak of contracts allocating "obligations and/or risks" rather than just "risks" on the basis that, even if an obligation was imposed upon a party thereby transferring the risk to that party, in the event that that party failed to comply with its obligation, the other party would be exposed to the risk arising from the failure to comply with the obligation.[7]

Since the production of the *No Dispute* publication in 1990, both Commonwealth and State governments have produced numerous publications on the topic of risk management.

In New South Wales, the Risk Profile Assessment Tool, as well as Attachments 4 and 5 to the *Policy and Guidelines Paper* (July 2004), provide guidelines for State government agencies in relation to the identification, assessment and management of procurement risk.

The New South Wales government has also produced *Risk Allocation and Commercial Principles for Privately Financed Projects* (May 2007) which sets out the risk management principles to be applied to all future privately financed social infrastructure projects. Some examples of those principles are:

- site conditions and suitability – the private party accepts overall responsibility for site conditions, including the adequacy of the site for delivering the project, regardless of whether the project site is selected by the government;
- environmental issues – the private party will be responsible for environmental compliance;
- native title and artefacts – government will assume responsibility for native title and provide relief and compensation in relation to the discovery of artefacts; and
- design – the private party is responsible (at its own cost) for designing the facility so as to achieve the output specifications for the contracted services.

[6] National Public Works Conference (NPWC)/ National Building and Construction Council (NBCC), *No Dispute – Strategies for Improvement in the Australian Building and Construction Industry* (1990) p 6.

[7] NPWC/NBCC, n 6, p 6.

The Commonwealth government has also produced a range of risk-management guidelines for a range of activities. Those relevant to the construction, engineering and mining industries include the following:

- The Australian National Audit Office has produced a guide to risk management, *Selecting Suppliers – Managing the Risk* (October 1998) which provides a framework for the Commonwealth to assess the financial and probity risks associated with contracting with non-government suppliers.
- The Department of Finance and Administration has produced guidelines entitled *Public Private Partnerships: Risk Management* (December 2006) which sets out a risk management framework for the duration of PPP projects adopting the risk-management principles outlined in this article.

WHY IS RISK MANAGEMENT IMPORTANT?

The importance of adopting and following good risk management can be critical to the success of a particular project. The outcome of poor risk management is that a party either pays too much for a project or will not be able to recover its losses (where a party is forced to bear a risk it is not able to manage and falls over when that risk materialises). For example, a situation might arise where a principal might:

(a) insist on a head contractor effecting comprehensive insurance;
(b) insist on complete indemnities from the head contractor in relation to any claims arising out of the work under the contract; and
(c) take out its own insurance cover to "plug the gaps".[8]

At first blush, the above would appear to be an effective way to ensure that the principal is insulated from the realisation of any risk. However, there is an additional cost associated with this approach because:

(a) the head contractor will pass on the cost of the required insurance to the principal;
(b) the head contractor will pass on to the principal the cost of the risk that the blanket indemnities might be called upon by the principal;
(c) in the event the above requirements are passed "back to back" by the head contractor to its subcontractors, then the additional cost of the subcontract work will also be passed on to the principal by the head contractor; and
(d) the cost of the principal-procured insurance coverage may be equivalent to the cost of primary cover due to the risk of dual insurance.[9]

Other outcomes of poor risk management may include the discouragement of responsible tenderers and attraction of tenderers prepared to take any chance, expecting to make up their losses via claims.[10]

Consequently, it is not necessarily in the principal's interest to pursue a completely fail-safe approach in the management of risk.

CURRENT ATTITUDES TO RISK MANAGEMENT

It appears from a number of surveys completed by various industry bodies that risk management principles are not being applied properly.

A survey completed by the Australian Constructors Association (ACA) in 1998 found:

> [T]he traditional risk management strategy adopted by clients has been to transfer as much of this risk as possible to others [and further] clients often try to transfer risks to designers and contractors that are more within the control of the client. This strategy is often pursued on the assumption that the extremely competitive nature of the Australian construction market will allow these risks to be transferred without paying any premium. However, this strategy often fails, creating an adversarial

[8] Mead P, "Current Trends in Risk Allocation in Construction Projects and their Implications for Industry Stakeholders" (2006) 22 BCL 407 at 421.

[9] Mead, n 8 at 6.

[10] Young and Bhuta, n 2 at 13.

> climate, a high level of commercial disputation, time and cost overruns and overall poor performance … [and] it may be in the contractor's interest to allow a problem to unfold rather than deal with it positively. At it's worst, the contractor's interests may be best served by pursuing strategies aimed at increasing the overall cost to the client.[11]

The results of the above survey were confirmed by a study conducted by the Institution of Engineers and the West Australian Chamber of Commerce and Industry in 2001, which found that:

- 36% of respondents did not undertake a formal risk assessment process before awarding a contract or tendering for a contract;
- 56% of respondents believed that at the contract delivery stage, risk were not allocated to the party best able to manage them;
- 60% of respondents said that the risk clauses in their contract varied from those in the standard form of contract;
- 35% of respondents said that risks were transferred to them that were impossible to manage;
- 49% of respondents stated that they did not determine the financial cost of the changes to risk allocation;
- 45% of respondents said that the cost of the project during contract delivery would have been lower had risks been more efficiently allocated; and
- 70% of respondents said that they expected claims as a result of changes made to risk allocation by the parties to their contract.[12]

Finally, a survey of the Queensland engineering construction industry conducted by the Queensland University of Technology in 2002 concluded, inter alia, that:

- "the use of risk management is moderate to high"; and
- "risk management usage in the execution and planning stages of the project life cycle is higher than in the conceptual or termination phases", notwithstanding most respondents feeling that risk management in the conceptual phase is the most important.[13]

From the above, there is some degree of inconsistency in the survey results regarding the level of use of risk management. However, it can at least be said that in some organisations risk management is not being used at all, while in organisations that do use risk management, it is not necessarily being applied properly.

It appears, therefore, that further education is required to ensure that all parts of the engineering, mining and construction sectors understand the importance of good risk-management principles and further, implement those principles properly when required.

BENEFITS OF RISK MANAGEMENT

Having looked at the general principles of risk management and particularly the current industry attitudes to risk management, it is important to be reminded its benefits. Why should time and money be spent on risk management? An excellent overview of the benefits of risk management is set out in *Introducing RISKMAN – The European Project Risk Management Methodology* and reproduced below:

> ***Strategic Benefits***
>
> - Corporate decision making is improved through the high visibility of risk exposure and also risk opportunity, both for individual major projects, and across the whole of the company's project portfolio.
> - A progressive management style and a culture of continuous improvement is enhanced by the encouragement of openness in relation to risk, enabling full use of the combined expertise of the staff.
> - The company's image in the eyes of clients, partners, suppliers and competitors is enhanced through the visible and highly professional approach to the crucial subject of risk.

[11] Australian Constructors Association (ACA), *Relationship Contracting: Optimising Projects Outcomes* (1999) p 8.

[12] Institution of Engineers Australia and the Chamber of Commerce and Industry of Western Australia, *Effective Risk Allocation in Major Projects: Rhetoric or Reality?* (2001) p 2.

[13] Lyons T and Skitmore M, "Project Risk Management in the Queensland Engineering Construction Industry: A Survey" (2004) 22(1) *International Journal of Project Management* 51 at 52, 55.

- Ensures that threats to cost, time and performance are managed with the clear aim of meeting the company's and customer's objectives.
- Creates an awareness of the risks in making business decisions at all levels in the company.

Financial Benefits

- Provides financial benefit to the organisation through improved profit potential.
- Improves management of project finance, thereby benefiting cash flow.
- Provides visibility and strict management of risk contingency.

Marketing Benefits

- Improves likelihood of winning additional business.
- Improves understanding of the project through the identification of risk and proper consideration of mitigation strategies.
- Creates an understanding of the relationship between risks, cost, programme timescales and price.
- Creates and environment for the conscious acceptance of business risks on an informed basis.
- Reduces the likelihood of over-pricing by giving confidence that all risk elements have been addressed.
- Assists in the establishment of criteria for the inclusion of risk contingency and the boundaries within which negotiators can negotiate the price.
- Reduces the need for subsidies to be hidden within individual elements of the cost estimate.

Tactical or management benefits

- Ensures "ownership" of both risks and their causes, so that they are effectively monitored, and pro-actively managed.
- Provides management with clear visibility of the risk and actions being taken to resolve them.
- Makes the relative importance of each risk immediately apparent.
- Improves contingency plans.
- Enables decision-making to be more systematic and less subjective.
- Reduces the need for time or cost escalation.
- Reduces product performance shortfalls.
- Brings realism into consideration of the trade-offs between performance, cost and time.
- Allows comparison of the robustness of projects to specific uncertainties.
- Assists in creating a "no surprises" environment.
- Enforces selection options only after consideration of the fall-back positions.
- Emphasises to project teams the importance of clear criteria for performance management.
- Provides a framework for encouraging lateral thinking in searching for better ways to mitigate risks.
- Creates an open and candid approach to risks, that encourages staff to assist in overcoming them.
- Encourages a considered and decisive style of management, resulting in proper handling of the risks themselves, rather than the management of crisis.
- Filters and prioritises risks so that management may have clear visibility of the important risks.
- Provides for acceptance and approval of risks at the correct management level.
- Creates an awareness in all personnel of the cost implications of their actions.[14]

Finally, as with many things, the attitude with which project management is approached is crucial to its success.

AS/NZS 4360: 2004

The Australian/New Zealand Standard 4360: 2004 revised the 1999 edition of the standard and "provides a generic framework for establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating risk".[15]

AS/NZS 4360: 2004 sets out the main elements of risk management as:

(a) Communicate and consult
Communicate and consult with internal and external stakeholders as appropriate at each stage of the risk management process and concerning the process as a whole.

(b) Establish the context

[14] Carter B, Hancock T, Morin J-M and Robins N, *Introducing RISKMAN – The European Project Risk Management Methodology* (NCC Blackwell, Oxford, 1994) p 152.

[15] Australian/New Zealand Standard (AS/NZS) 4360: 2004, *Risk Management*, p iii.

Establish the external, internal and risk management context in which the rest of the process with take place. Criteria against which risk will be evaluated should be established and the structure of the analysis defined.

(c) Identify risks

Identify where, when, why and how events could prevent, degrade, delay or enhance the achievement of objectives.

(d) Analyse risks

Identify and evaluate existing controls. Determine consequences and likelihood and hence the level of risk. This analysis should consider the range of potential consequences and how these could occur.

(e) Evaluate risks

Compare estimated levels of risk against the pre-established criteria and consider the balance between potential benefits and adverse outcomes. This enables decisions to be made about the extent and nature of treatments required and about priorities.

(f) Treat risks

Develop and implement specific cost-effective strategies and action plans for increasing potential benefits and reducing potential costs.

(g) Monitor and review

It is necessary to monitor the effectiveness of all steps of the risk management process. This is important for continuous improvement.

Risks and the effectiveness of treatment measures need to be monitored to ensure changing circumstances do not alter priorities.[16]

The following will address each of the above headings.

Communicate and consult

The manner in which information is transmitted within an organisation is an important consideration when managing risk in that the desired outcome of such communication is to improve people's understanding of risk, to ensure that the various views of stakeholders are considered, and to ensure that all participants are aware of their roles and responsibilities.[17]

To that end, the Guidelines to the Standard set out a process for communication and consultation.

Context of risk management

Before procuring goods or services and engaging in the process of managing the risk associated with that procurement, it is first important to examine the context in which the procurement and risk management is to take place because this will determine the level of risk management required.[18]

The level of risk of management required may extend from nominal (eg a short checklist) to extensive (eg the establishment of a working group etc).[19] The level selected will depend upon:

- for a principal, the principal's internal and external operating environment, the outcomes to be achieved via the procurement, as well as the nature, value and complexity of the procurement. For example, a complex procurement will require a more extensive approach to risk management;[20] and
- for a contractor, the submission of a tender is consistent with its corporate objectives and goals, its tolerance for risk and the external environment. For example, when the economy is buoyant, a contractor may only seek projects above a certain dollar value.[21]

[16] AS/NZS 4360: 2004, n 15, pp 7-8.

[17] AS/NZS 4360:2004, *Risk Management Guidelines Companion*, p 20.

[18] Australian National Audit Office, *Selecting Suppliers – Managing the Risk* (1998) p 11.

[19] Australian National Audit Office, n 18, p 11.

[20] Australian National Audit Office, n 18, p 11.

[21] Mead, n 8 at 411.

Identify areas of risk

Obviously, before risk can be allocated or managed, it must be identified by a proper review of all the potential areas of risk. From the survey results outlined above, while this might seem incontrovertible, it does not necessarily translate into action. It goes without saying that risk identification is "the most important stage of risk analysis, as no work can be done on risks that no one has discovered".[22]

The form of the review can take many shapes including:[23]

- Checklists – whilst checklists are valuable in that they are usually formulated following years of experience and can be elaborate, checklists are limited in that new risks will not be found on a checklist and other risks cannot be easily recorded on a checklist. The use of checklists can lead to a "blinkered" approach in that every project has its own set of risks and precedents and risk management tables should only be used as a starting point when developing a risk framework for the project. Indeed, there will be some projects for which there will not be a close precedent which can be drawn upon, eg the New South Wales RailCorp Rolling Stock project.[24]
- Personal and corporate experience.
- Safety reviews – the review of projects previously undertaken can give insight into mistakes which can be made.
- Intuitive insights and brainstorming – intuition assists in situations where the risk is unclear (eg a potential change of the law).
- Site visits – some risks are quickly identified through a site visit.
- Flow charts – these can set out the flow of materials or work over time and identify areas where issues can arise.
- Research, interviews and surveys – these fundamental information gathering techniques can be effective in identifying risk.
- Assumptions – projects will generally be based on a series of assumptions which should be listed and regularly referred to as the project progresses to ensure that they remain valid.
- Internal and external expertise.

Generally, the outcome of the review is a list of areas of risk. Each stakeholder in the construction, mining and engineering industries will have a different perspective on which risk is most within its control and of most concern. Sometimes these risks are interconnected.

Areas of risk for a principal

With respect to the contractor

Principals will be concerned about the following in respect of a contractor:

(a) the history and development of the contractor including:
  (i) the longevity and dependability of the business;
  (ii) the main business activity and relevant experience; and
  (iii) industry knowledge;
(b) the legal and financial structure of the contractor including:
  (i) whether the ownership of the business is transparent;
  (ii) who controls the business;
  (iii) financial history and stability; and
  (iv) the existence of legal agreements hindering or unduly influencing the business;
(c) the critical elements for the performance of a contract including:
  (i) access to the required technology, equipment, technology or intellectual property; and
  (ii) any reliance upon third parties for critical elements for the performance of the contract;

[22] Elkington and Smallman, n 3 at 50.

[23] Chinyio E and Fergusson A, "A Construction Perspective on Risk Management in Public-Private Partnership" in Akintoye A, Beck M and Hardcastle C (eds), *Public-Private Partnerships – Managing Risks and Opportunities* (Blackwell Science, Oxford, 2003) pp 100-105.

[24] Hayford O, "Successfully Allocating Risk and Negotiating a PPP Contract" (2007) 113 *Australian Construction Law Newsletter* 18 at 23.

(d) the management and employees of the contractor including:
  (i) experience of the management team;
  (ii) continuity of directors/management; and
  (iii) background of the directors/management;
(e) commitment, contingencies and litigation including:
  (i) whether the contractor has adequate financing in place to satisfy commitments for the duration of the contract;
  (ii) adequate insurance coverage; and
  (iii) any current litigation on foot likely to impact on the contractor as well as any history of litigious behaviour;
(f) financial viability including:
  (i) the financial position of the contractor;
  (ii) the level of debt and credit rating;
  (iii) the source of earnings and any over-reliance on any particular source;
  (iv) the accuracy and legitimacy of any audits and financial statements; and
  (v) compliance with Australian law including reporting and lodgement obligations.[25]

With respect to the project

A principal will be concerned about the following in respect of a project:
(a) all approvals have been obtained in order that the project can be commenced and completed in a predictable way including governmental approvals, site access and intellectual property;
(b) no judicial review of approvals provided occur;
(c) the project is completed within the required time constraints;
(d) that all financial targets of the project are met – eg that a profit will be made at the completion of the project or that the project is funded in an uninterrupted way; and
(e) the quality of the work completed is satisfactory and that the end product is fit for purpose and meets the demands of the ultimate consumer.[26]

Areas of risk for a contractor

A contractor will be concerned that:
(a) the site is available;
(b) it is regularly paid for the work completed by it as the work progresses so that a profit will be made at the completion of the project. For example, a contractor will be concerned to ensure that the principal has the financial resources to pay for the entire project;
(c) to this end, entry into a tripartite arrangement between the principal, financier and contractor will help to ensure payment to the contractor is secured;[27]
(d) it is able to complete the project within the required time without interruptions beyond its control;
(e) the contractor has no residual liability as a result of the project;
(f) political risk is eliminated or minimised; and
(g) all occupational health and safety (OH&S) and environmental requirements are met.[28]

Evaluation and assessment of risk

Once a risk has been identified, the nature of the risk needs to be evaluated and assessed to determine whether a project participant should continue to bid for the project or not.

The methods to evaluate and assess risk can be broadly categorised into qualitative and quantitative methods. The former has traditionally been more common outside of financial markets, where large statistical databases enable the determination of probabilities. However, project managers in the construction industry frequently face difficulties in determining the chances of an identified risk

[25] Australian National Audit Office, n 18, pp 16-32.

[26] Mead, n 8 at 412.

[27] Mead, n 8 at 416-417.

[28] Mead, n 8 at 412.

occurring. In this context, project managers may use historical project data or unwritten past experience, but often the likelihood of a risk occurring is derived by means of an educated guess.[29] Unfortunately, the meaning of an outcome of a qualitative method can be very widely interpreted and consequently their application is limited.

There are also a multitude of quantitative methods which may be used to evaluate and assess risk and a selection of these are detailed below.

Pilot studies are another useful means to assess risk and assist in the selection of an appropriate risk mitigation strategy or to implement a risk mitigation strategy once chosen.[30] Pilot studies are an element of work of a larger project or program undertaken to gather data to reduce risk or uncertainty in the project or program.[31]

Brief summaries of some qualitative and quantitative assessment techniques are set out below.[32]

Qualitative prioritisation

Risks are characterised by two aspects:[33]

(a) the probability of the risk materialising; and

(b) the consequence to the project of the risk materialising.

If the probability of the risk materialising is high and the consequence of that risk is serious, then that risk should be given a high priority.[34] This approach to prioritising risk is illustrated by the figure below. For example, if the probability is high but impact is low, then the risk is rated as 3. If the probability is medium and the impact is medium, then the risk is rated as 4. If the probability is high and the impact is high, then the risk is rated as 9.[35]

	High	3	3	6	9
Probability	**Medium**	2	2	4	6
	Low	1	1	2	3
		Indices	1	2	3
			Low	**Medium**	**High**
				Impact	

The above table is a simple guide for organisations regarding how to manage risk. Such tables can be expanded and more detail provided in order to more precisely determine risk levels (eg see Figure 4 in the guideline entitled *Public Private Partnerships: Risk Management* (December 2006) produced by the Department of Finance and Administration). Obviously, those risks at the higher end of the spectrum will require more management time and expense than those at the lower end of the spectrum.[36]

[29] Elkington and Smallman, n 3 at 51.

[30] Turner JR, "The Role of Pilot Studies in Reducing Risk on Projects and Programmes" (2005) 23(1) *International Journal of Project Management* 1 at 1.

[31] Turner, n 30 at 1.

[32] Carter et al, n 14, pp 187-197.

[33] Chinyio and Fergusson, n 23, p 105.

[34] Chinyio and Fergusson, n 23, p 105.

[35] Chinyio and Fergusson, n 23, pp 105-106.

[36] Chinyio and Fergusson, n 23, p 106.

Further, account must also be made of the fact that the profile of a risk may not remain static as in time a risk may move either way along the spectrum.[37]

Cause and effect analysis

While project risk is the manifestation of an effect, it is important to identify the causative influences which may conspire to produce an effect and thereby take steps to dispose of the cause and eliminate the risk.[38]

Quantitative assessment – simple probabilistic analysis

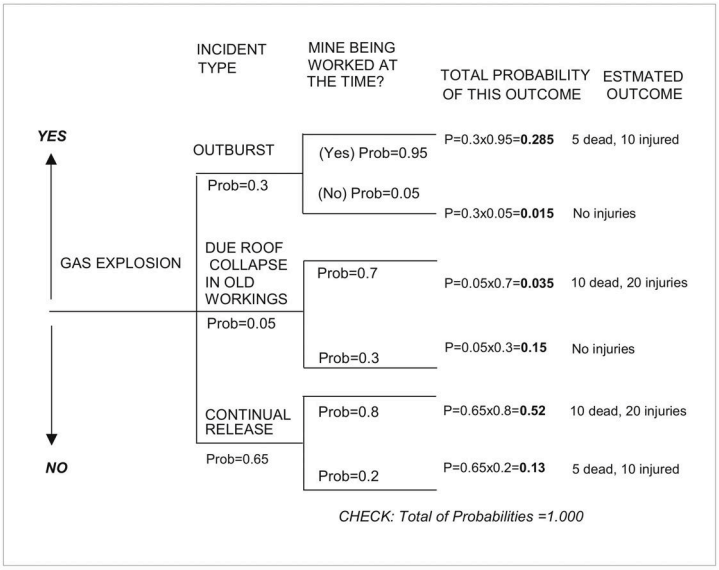
This quantitative assessment of risk is only possible when information is available (eg from past records), although it appears that such an objective approach is rarely possible.[39]

For example, if the probability of encountering a ground condition is 40% and the cost of encountering such a condition is $500,000, then the risk may be priced as 0.40 × $500,000 = $200,000 and the tender price should incorporate this figure.[40]

Quantitative assessment – probability and decision trees

A probability tree is a method of setting out all the potential events which might occur as branches in a tree diagram and following the assignment of probabilities to each branch, calculating the probability of each event occurring.[41] A decision tree is a particular application of probability trees.[42]

An interesting example of a probability tree addressing the likelihood of a gas explosion in a mine is set out below.[43] In the interests of conciseness, the various assumptions and statistical analysis upon which this risk evaluation is based have not been included.



[37] Chinyio and Fergusson, n 23, p 106.

[38] Carter et al, n 14, pp 189-191.

[39] Carter et al, n 14, p 191.

[40] Mead, n 8 at 415.

[41] Carter et al, n 14, p 192.

[42] Carter et al, n 14, p 192.

[43] NSW Department of Primary Industries, *Risk Management Handbook for the Mining Industry* (1997) p 52, Fig A2.2.

If the likelihood of a gas explosion in the mine were estimated to be 1% per year, then the frequency of accidents in which people would likely be killed would be:

0.01 per year × ***(0.285+0.035+0.52) = 0.0084 per year***

Quantitative assessment – schedule risk analysis techniques

There is a multitude of analysis techniques available which look to estimate, inter alia, the probability that the critical path for a project will remain unchanged and, if it does change, will calculate, eg:

- the minimum estimated duration;
- the maximum estimated duration; and
- the most likely duration.[44]

Finally, while the principles associated with risk management are clear, problems commonly arise with the application of those principles because:

- each party has its own subjective views regarding each party's ability to manage risks, the likelihood and consequence of those risks and the costs associated with managing those risks. Notwithstanding the fact that these views may be sincere and reasonably held by a party, the parties' views can differ substantially in this regard;[45] and
- one party may not be able to wholly control the risk in that the ability to control risk might depend upon how the other party behaves. In that situation, the conduct of the party that is not best able to manage the risk should be restricted in order to assist the party attempting to control the risk.[46]

Treatment and management of risk

Once a risk has been identified and evaluated, the question arises as to how that risk should be treated. Generally, the four risk mitigation strategies are:[47]

- risk elimination;
- risk reduction;
- risk transference; and
- risk retention.

Risk elimination

This approach could involve a range of possibilities from deciding not to undertake the project at all to completing the project in a way which eliminates the risk entirely.[48]

The decision regarding whether a project is undertaken or not can depend upon whether an organisation is risk averse, neutral or risk seeking. Generally, organisations can be risk averse when the drawbacks are significant and, vice versa, risk seeking when the downside is minimal.[49]

Naturally, whether an organisation regards particular drawbacks as significant or not depends upon how comfortable an organisation is with the associated risk. Organisations may be comfortable in relation to the construction of a large project which, at face value, has considerable associated risk because that organisation has significant experience in relation to such work. However, the same organisation may be uncomfortable in undertaking another project which in an objective sense has a lesser risk associated with it, but which the organisation has no experience in undertaking.[50]

[44] Carter et al, n 14, pp 194-195.

[45] Hayford, n 24 at 24.

[46] Hayford, n 24 at 24.

[47] Chinyio and Fergusson, n 23, p 114.

[48] Chinyio and Fergusson, n 23, p 114.

[49] Chinyio and Fergusson, n 23, pp 116-117.

[50] Chinyio and Fergusson, n 23, pp 116-117.

Ultimately, however, in a situation where an established relationship exists with the organisation requesting a tender, a decision not to tender can be a difficult one because reputations and future business relationships may be endangered.[51]

An alternative occasionally pursued is to submit a tender which is in some way unacceptable and minimise the time spent in preparing that tender. It should be noted that a danger exists with this approach in that, having had its tender accepted, the tenderer then can discover that, in minimising the time spent preparing the tender, a number of crucial items were overlooked.[52]

Other options might include placing conditions upon a tender or not tendering in relation to the high-risk portion of the contract.[53]

Risk reduction

By obtaining further information and determining more precisely the scope of such risk, steps may be taken to reduce the risk.[54]

For example, the education and training of staff in order that they are more aware of potential risks,[55] or the use of alternative methods of construction or project redesign.[56]

Risk transference

Risk may be transferred to another person. Such risk transfer should be governed by the Abrahamson principle that risk should be transferred to the person best able to manage and control the risk.

Risk transference may occur in many ways including transferring risk to parties lower down the contractual chain or entry into join venture agreements.[57]

Typically in PPP projects, consortia transfer most risks to other persons. For example, risks associated with construction tasks are transferred to the contractor and risks associated with facilities management tasks are transferred to the facilities manager. The contractor and facilities manager in turn transfer at least some of those risks to subcontractors and suppliers.[58] Consequently, as PPP consortia have few tasks, those consortia tend to be staffed minimally.[59]

Risk retention

Where risk cannot be eliminated, reduced or transferred, a party may seek to simply retain the risk and pass on the cost of such risk retention.

An industry survey has indicated that where an insurance premium is regarded as too high and the probability of the risk manifesting is low, the retention of that risk is regarded as more cost effective.[60]

Ideally, however, the risks retained are those with low probability and low impact. Careful consideration should also be given as to the possibility of a party to a project either being required to, or even seeking to, absorb risks beyond its capacity.

There are two basic ways in which risk may be retained but managed. They are:[61]

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[51] Carter et al, n 14, p 152.

[52] Carter et al, n 14, p 152.

[53] Baker S, Ponniah D and Smith S, "Risk Response Techniques Employed Currently for Major Projects" (1999) 17 *Construction Management and Economics* 205 at 207.

[54] Chinyio and Fergusson, n 23, p 114.

[55] Flanagan R and Norman G, *Risk Management and Construction* (Blackwell Scientific Publications, Oxford, 1993) p 63.

[56] Akintoye A and MacLeod M, "Risk Analysis and Management in Construction" (1997) 15 (1) *International Journal of Project Management* 31 at 34.

[57] Carter et al, n 14, p 115.

[58] Chinyio and Fergusson, n 23, p 115.

[59] Chinyio and Fergusson, n 23, p 115.

[60] Baker et al, n 53 at 211.

[61] Lyons T, *Project Risk Management in the Construction Industry: A Review* (Australian Institute of Quantity Surveyors, June 2003) p 25.

- contingency – incorporating a premium into the cost of doing work to cover a particular contingent event; and
- insurance – it should be noted that insurance only transfers the potential financial consequences of a risk, whereas contractual transfer also involves shifting the responsibility for the risk.[62]

Generally, risks which are retained require continuous management activity until they are managed out.[63]

Monitor and review

Finally, there should be some ongoing consideration given to whether the method of managing risk adopted at the outset continues to be appropriate as the project develops, since factors affecting the likelihood and consequences of an outcome may change.[64]

Section 9.3 of the Guidelines to the Standard sets out a number of different types of monitoring and review which might be employed including continuous monitoring, line management reviews and auditing.

RISK MANAGEMENT TOOLS

The following are tools available to contractors, principals and financiers to assist in applying risk mitigation strategies.

Financial tools

These include:[65]

- Insurance – see below for a further analysis of this significant area.
- Guarantees – a guarantee is issued by either a government, a bank or some other stakeholder in order that an innocent party has recourse to compensation in the event of default.
- Bid bonds – this is a bond provided by a tendering contractor to provide compensation to a principal in the event that a tendering contractor's tender is accepted and the contractor no longer wishes to complete the project.
- Performance bonds – this is a bond provided by a contractor to give recourse to compensation in the event of non-performance by the contractor. Performance bonds provide a guaranteed pay out of a stipulated maximum amount upon the occurrence of any risk event which prevents the completion of, or perhaps even the performance of, a project (eg the insolvency of the contractor).[66]
- Contingency.

Pre-contractual tools

- Undertakings regarding key personnel to be involved throughout the duration of the project (risk reduction).
- Appropriate due diligence measures prior to entry into contracts (risk reduction).

Contractual

- Regular performance reporting.
- Independent verification of quality and value of work completed.
- Inserting particular KPIs into the contract as conditions or milestones to be satisfied and, if not, various rights accrue (eg the exercise of a termination at will provision).

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[62] Lyons, n 61, p 26, quoting Henderson JA, (1995) *A Study of the Use of Formal Risk Management Processes* (unpublished dissertation, Queensland University of Technology) p 16.

[63] Carter et al, n 14, p 115.

[64] AS/NZS 4360: 2004, n 15, p 22.

[65] Chinyio and Fergusson, n 23, p 115-116.

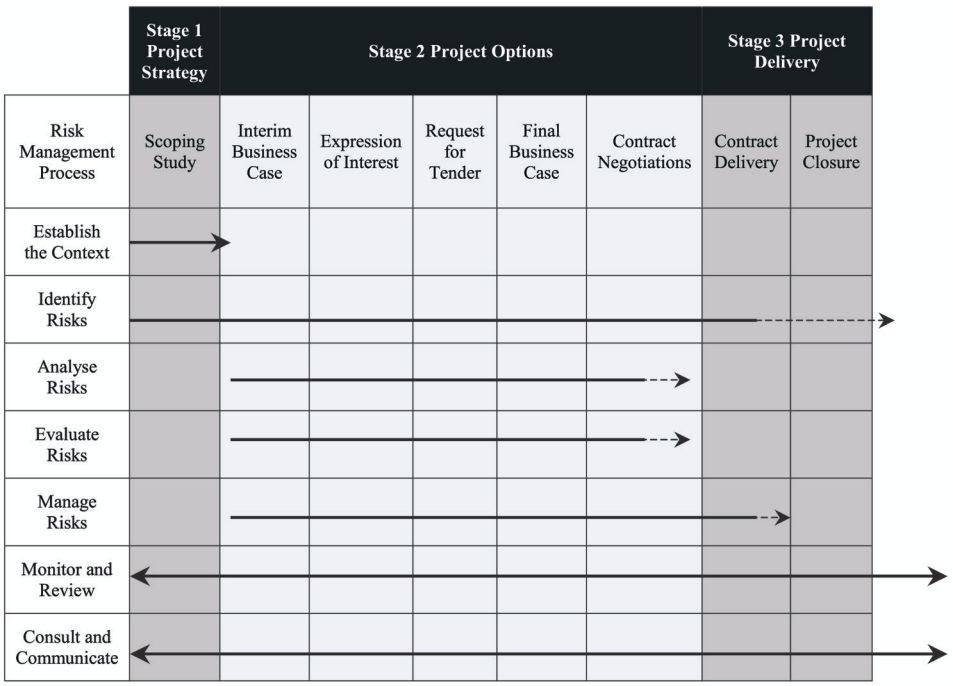
[66] Frawley St J, "Insurance Issues in Contracting" (2007) 115 *Australian Construction Law Newsletter* 36 at 39.

- Contractual provisions such as warranties, indemnity clauses, limitation of liability clauses, "step-in" rights, rights of lien, making rights of assignment conditional etc are risk-transference strategies. See below for an analysis of this area.

OVERVIEW OF RISK MANAGEMENT

General overview

A good broad overview of the application of the mechanics of risk management may be found as Figure 3 in the Department of Finance and Administration's guidelines entitled *Public Private Partnerships: Risk Management* (December 2006). This is reproduced below:



Overview of risk management literature

The general risk management principles set out above are uncontroversial. AS 4360: 2004 is generally regarded as an acceptable framework for the management of risk in a range of circumstances.

Naturally, difficulties arise when risk-management theory is applied in the real world, not only in determining the best methodology to analyse and evaluate each identified risk but, more particularly, in how each risk may be treated contractually.

The literature addressing risk-management issues is generally written from the point of view of engineers, with a heavy emphasis on statistical theories. That literature can be briefly categorised as follows.

- technical reviews on the most appropriate statistical methodology for the analysis of risk;
- texts setting risk management principles generally and emphasising:
  - general risk management methodologies such as Riskman (the European Project Risk Management Methodology);
  - the identification of areas of risk; and
  - the range of methodologies available for the analysis of risk;
- surveys regarding industry practices in relation to risk management across a range of industries and countries but in particular, the IT and construction industries; and
- risk management issues in the context of PPPs and project finance.

Legal commentary

Unfortunately, except for one or two notable exceptions, there is not a large amount of literature addressing directly the treatment of risks from a legal perspective.

To some extent, the reason for this is that while each legal tool which might be used to treat a particular risk probably has a large amount of literature written about it (eg parent company guarantees to treat the risk of insolvency of a subsidiary company), there is no particular emphasis in such literature on the specific application that legal tool has for risk-management purposes. For example, the literature regarding guarantees broadly addresses the formation and validity of guarantees, liability and discharge of the guarantor and the rights of parties to guarantees. It is up to the legal practitioner to review the law and literature as it specifically relates to guarantees and then apply it to treat a particular risk.

Naturally, if a lawyer knows the law, he or she can use that particular legal tool to treat a particular risk. However, it should be noted that literature addressing how guarantees might be used in particular circumstances to treat a particular risk is limited.

Further, it is impossible to examine and discuss every legal tool which conceivably might be used to manage risk because the circumstances of each project are different and the law relating to every legal tool would need to be addressed.

However, there has been some debate in relation to a number of particular areas of law relating to risk management (insurance law being a striking example). Consequently, the remainder of this article will address a number of these legal issues which commonly arise in the context of risk management.

ROLE OF INSURANCE

Introduction

As the arranging of insurance is a significant part of the risk-management process, it warrants some discussion. It should be noted that the topic of insurance and what coverage is necessary for a project is not one which is always carefully thought through.

Insurance has been described as "both a measure of risk transfer and risk retention" as well as "a measure taken to provide for a possible contingency".[67]

In the first instance, consideration needs to be given to the amount and type of insurance required. Different project delivery methods may require different types and levels of insurance. For example, "Construct Only" projects do not require professional indemnity insurance, whereas a BOOT (Build Own Operate Transfer) project may require business interruption coverage.[68]

The standard types of insurance used in the construction industry are works insurance (also known as "Construction Risk", "Contractor's All-Risk", "Construction Material Damage" or "Property Damage" insurance), professional indemnity insurance, public liability insurance and workers compensation insurance.[69]

Works insurance provides cover against loss or damage suffered by an insured as a result of any loss or damage caused to the works during the period of the relevant project. It does not cover the liability of an insured to third parties or liability for defective workmanship, consequential loss or faulty design.[70] Further, it does not cover any pre-existing work or structure on which the construction work is being carried out, nor does it cover the use of faulty materials.[71]

Professional indemnity insurance provides cover to an insured against liability to a third party arising from specified conduct by the insured.

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[67] Hartwell R, *Insurance in Building – Insurance Issues for Construction Lawyers* (Minter Ellison, August 2004) p 2, quoting Bennett C, *Dictionary of Insurance* (Pitman Publishing, 1992) and *The Australian Pocket Oxford Dictionary* (4th ed, 1996).

[68] Frawley, n 66 at 37.

[69] Frawley, n 66 at 37.

[70] Frawley, n 66 at 37.

[71] Ostermayer A, "Insurance Cover for Construction Projects" (2005) 17(5) *Australian Construction Law Bulletin* 49 at 49.

Although the lines are becoming increasingly blurred, traditionally, contractors are not required to take out professional indemnity insurance since they are not regarded as a class of "professionals" and negligent construction is not an area to which professional indemnity insurance will usually respond.[72]

Key risk-management issues in insurance

Some of the key risk-management issues arising in relation to insurance are:

- Subrogation is the substitution of one person for another in respect of a legal claim or demand. In some circumstances, an insurer may be able to make a subrogated claim against a co-insured. Consequently, construction contracts should require that a waiver of subrogation clause be inserted into the relevant insurance policy stating that proceedings will not be brought by an insurer against a co-insured. Obviously, it is therefore important to be an insured under such a policy to avoid any potential subrogated claim. To omit such a waiver would allow an insurer to exercise the rights of one insured against another insured and upset any regime of risk management which has been established.[73]
- Many policies provide for the reinstatement of the limit of indemnity on the occasion of each separate claim. Notwithstanding, it should be noted that while the insurance policy may provide that in any one-policy period the indemnity will reinstate fully, there is generally a prohibition that the aggregate of all claims must not exceed a particular amount.[74]
  This has the result that a principal should be concerned to ensure that the limit of indemnity is adequate and that cover has not been, or will not be, exhausted.
- Shifting uninsurable professional risks onto construction professionals such as design consultants by imposing onerous contractual provisions upon contractors and consultants. Some examples include:
  (a) requiring a standard of work under the contract higher than that for which coverage is provided by the professional indemnity policy held by consultant;[75]
  (b) a claim made pursuant to an indemnity under the contract requiring a principal to be indemnified for any loss, damage or claims will not trigger the operation of a professional indemnity policy;[76] and
  (c) commonly, construction contracts require the certification at practical completion that the works have been completed in accordance with the design documents. Arguably this certification is not covered under a normal professional indemnity insurance.[77]

Alliance contracts and insurance

Standard third-party liability policies will not respond to any claim arising from negligent work completed by a consultant where the contract is an alliance contract because of the "no blame, no disputes" philosophy which exists under pure alliance contracts.[78] Further, "wilful default" on the part of a party giving rise to liability under an alliance contract will not be covered by normal insurance.[79]

In addition to the above, under a standard works insurance policy, upon a claim being paid by an insurer, that insurer has a right of subrogation and can step into the shoes of the insured party and seek recovery of that part of the claim coming about as a result of the negligence of the other alliance participant (subject to the remarks made regarding subrogation above). However, in a pure alliance contract, a participant suffering loss has little or no legal recourse against the party causing the loss

[72] Pang A, "Building Protection into Professional Risk: The Operation of Professional Indemnity Insurance in Construction" (2007) 18 *Insurance Law Journal* 68 at 77.

[73] Frawley, n 66 at 41.

[74] Frawley, n 66 at 42.

[75] Pang, n 72 at 87.

[76] Pang, n 72 at 87.

[77] Pang, n 72 at 88.

[78] Pang, n 72 at 89.

[79] Pang, n 72 at 89.

due to the "no blame, no disputes" clause. Arguably, as a consequence, an insurer may be entitled to reduce the claim payment to the insured alliance participant to the extent that the insurer has lost its expected right of recourse against the negligent party. However, this result is readily overcome by requiring the insurer to confirm that the works policy will respond notwithstanding the no-blame regime.[80]

Finally, for an owner to have comfort in this area of alliance contracting, some tailored form of insurance is required. New insurance products designed to respond to the unique structure in alliance contracts and the nature of the relationship between alliance participants are emerging in the Australian market. Unfortunately, at present, these tailored policies tend to be (comparatively) expensive, the cost depending upon the size and complexity of the project as well as the insurer's assessment of risk.[81]

CONTRACTUAL ISSUES

Warranties

The wording of warranties needs to be carefully considered. Fitness-for-purpose warranties can create problems, particularly for engineers where they warrant matters outside the control of the engineer or warrant matters which the engineer cannot guarantee, eg that the project as a whole will be fit for its purpose. Most professional indemnity insurance contracts do not extend to cover such a warranty. An appropriate alternative provision might be that the engineer provides its services using reasonable skill, care and diligence.[82]

Indemnities

An indemnity is a promise given by one party in favour of another to hold the indemnified party harmless against specified losses which the indemnified party might incur.[83]

Benefits

The benefits of an indemnity are:

(a) the common law rules regarding causation and remoteness as well as the quantification of damages do not apply;[84]

(b) the scope of what might be recovered is enlarged beyond what is recoverable at common law;[85]

(c) the indemnified party is not required to mitigate its loss;[86] and

(d) limitations periods which would normally apply are extended.[87]

From the above, it can be seen that where loss is suffered as a result of the occurrence of an event in relation to which an indemnity has been given, the indemnifying party is liable for all loss suffered by the indemnified party.[88]

[80] Hayford O, *Understanding Alliance Contracting*, Seminar Paper presented at LexisNexis Building and Construction Law Masterclass (16-17 August 2007) p 6.

[81] Hayford, n 80, p 6.

[82] Williams J, "What Should Engineers Look For In Their Consultancy Agreements?" (2006) 18 *Australian Construction Law Bulletin* 61 at 66.

[83] Frawley, n 66 at 42.

[84] Feller SCD, *Insurance and Indemnity Clauses in Building Works Contracts*, Seminar Paper presented at Building and Construction Law Seminar organised by Legalwise Seminars (27 February 2007) p 6.

[85] Feller, n 84, p 6.

[86] Feller, n 84, p 6.

[87] Feller, n 84, p 6.

[88] Williams, n 82 at 67.

Therefore, if an indemnity is required, care should be taken to limit its extent. For example, an indemnity should only be provided in respect of the loss caused directly and solely as a result of the defective work of the engineer.[89]

The existence of an indemnity and its "mirroring" in an insurance policy required to be effected for a project is not cause to suggest that the indemnity be deleted as superfluous. The two provisions are completely separate risk coverage mechanisms and capable of enforcement independently of each other.[90] Indeed, the inclusion of both an indemnity clause and an insurance clause provides the beneficiary of these clauses with protection in the event of insolvency of either the party providing the indemnity or the insurer.[91]

Drafting indemnities

Careful attention to the drafting of indemnity clauses is important because where an indemnity is ambiguous, the courts will lean towards supporting the party giving the indemnity.[92] The High Court in *Andar Transport Pty Ltd v Brambles Ltd* (2004) 217 CLR 424 at [67]; (2004) 78 ALJR 907 held that indemnity clauses were to be "interpreted, especially in the case of any ambiguity or uncertainty, in favour of the party thereby rendered liable to afford a complete indemnity".

The New South Wales Court of Appeal in *F & D Normoyle Pty Ltd v Transfield Pty Ltd (t/as Transfield Bouygues Joint Venture)* (2005) 63 NSWLR 502 at [43], applied the principles in *Andar* as follows. The indemnity clause read as follows:

> The sub-contractor shall indemnify and keep indemnified [the Joint Venture] and their respective officers, employees and agents against all claims, demands, proceedings, liabilities, costs, charges and expenses arising as a result of any act, neglect or default of the sub-contractor, its employees or agents relating to its execution of the Works.

The above indemnity clause was interpreted on the basis that the word "act" did not include such omissions because the words "neglect" and "default" following the word "act" pointed toward an element of fault or breach of legal duty. This narrowed the broader concept inferred by the word "act".

Therefore, some of the considerations to be taken into account when a party seeking to rely upon an indemnity clause is drafting such a clause are:

(a) the purpose of the indemnity clause is important to understand to ensure that the indemnity clause responds to the claims envisaged;[93]

(b) whether the indemnified is entitled to be indemnified. For example, OS&H legislation may need to be reviewed and their application considered;[94]

(c) ensuring the indemnity clause survives termination of the contract in order that it applies to claims which have arisen but were not notified to the indemnified pre-termination;[95] and

(d) whether the party providing the indemnity can meet the obligations arising under the indemnity. If not, consideration should be given to other forms of security such as the provision of personal guarantees by directors.[96]

For those parties who are indemnifying the other party, consideration should be given to the following:

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[89] Williams, n 82 at 67.

[90] Frawley, n 66 at 42.

[91] Feller, n 84, p 2.

[92] Frawley, n 66, p 43.

[93] Tumiati N and Verdnik A, "Do Your Service Contracts Include An Effective Indemnity?" (2004) 7(8) *Inhouse Counsel* 87 at 88.

[94] Tumiati and Verdnik, n 93 at 88.

[95] Tumiati and Verdnik, n 93 at 88.

[96] Tumiati and Verdnik, n 93 at 88.

(a) notice provisions which should be provided prior to any party having recourse to an indemnity clause;[97]
(b) whether the indemnifying party is entitled to assume the conduct of, or participate in the defence of, any claims against the indemnified party (ie a right of subrogation);[98] and
(c) whether the provision of an indemnity will be covered by the insurance policies held by the indemnifying party.[99]

The Commonwealth Department of Finance and Administration has, within its *Guidelines for Issuing and Managing Indemnities, Guarantees, Warranties and Letters of Comfort*, described the matters to be considered prior to the Commonwealth providing an indemnity.[100] They include:

(a) time limits on the indemnity (eg to claims made during the term of the contract);
(b) use by the contractor of commercial insurance;
(c) reserving a termination right for the Commonwealth;
(d) the imposition of maximum financial limits on claims;
(e) the insertion of subrogation and notification clauses that give the Commonwealth the right to take over any litigation related to the indemnity.[101]

The Guidelines go on to recommend that the indemnity not cover damage from acts by the indemnified person which are "malicious, fraudulent, wilful, illegal, reckless, etc", mirroring ss 199A-199C of the *Corporations Act 2001* (Cth) and ss 27M-27P of the *Commonwealth Authorities and Companies Act 1997* (Cth).[102]

Limitation of liability

Limitation of liability clauses seek to cap, limit, reduce or exclude a liability that a party would otherwise have in contract, under statute (where possible) or otherwise at law.

There is an aversion by the courts to broadly apply limitation of liability clauses which are expressed generally and the courts have construed such clauses against the party seeking to rely upon them. The High Court in a joint judgement in *Darlington Futures Ltd v Delco Australia Pty Ltd* (1986) 161 CLR 500 at 519 stated:

> the interpretation of an exclusion clause is to be determined by construing the clause according to its natural and ordinary meaning, read in the light of the contract as a whole, thereby giving due weight to the context in which the clause appears including the nature and object of the contract, and where appropriate, construing the clause contra proferentum in the case of ambiguity. Notwithstanding the comments of Lord Fraser in *Ailsa Craig* (WLR at 970; All ER at 105), the same principle applies to the construction of limitation clauses. As King CJ noted in his judgment in the Supreme Court, a limitation clause may be so severe in its operation as to make its effect virtually indistinguishable from that of an exclusion clause. And the principle, in the form in which we have expressed it, does no more than express the general approach to the interpretation of contracts and it is of sufficient generality to accommodate the different considerations that may arise in the interpretation of a wide variety of exclusion and limitation clauses in formal commercial contracts between business people where no question of the reasonableness or fairness of the clause arises.

As set out above, it is not uncommon for parties to seek to exclude particular types of liability for which a party might be liable, eg loss of profits, loss of revenue, delay costs, loss of overheads etc. Parties should be particular when seeking to exclude losses and avoid using more general terms.[103]

[97] Tumiati and Verdnik, n 93 at 88.

[98] Tumiati and Verdnik, n 93 at 88.

[99] Tumiati and Verdnik, n 93 at 88.

[100] Richardson L, Miles A and Tipson S, *Indemnities in Commonwealth Contracting*, Australian Government Solicitor Legal Briefing No 79 (26 July 2006) p 6.

[101] Richardson et al, n 100, p 6.

[102] Richardson et al, n 100, p 6.

[103] McElveney D, *Excluding and Limiting Liability*, Seminar Paper presented at Kite Events & Conferences 2nd Annual Contract Management Masterclass (18 September 2007) p 2.

The liability to be excluded should be expressly stipulated, rather than simply assuming clauses expressed to limit or exclude "all liability" or liability for "any loss" will extend to cover negligence.[104] Finally, it is not uncommon for limitations on liability to be expressed by reference to the wording of or coverage expressed in an insurance policy and attention is required regarding the difference between what an insured is able to recover and the respective amount of the limit of any indemnity.[105]

PROPORTIONATE LIABILITY LEGISLATION

Under the proportionate liability regime in each State, each party's liability extends to its proportionate share of responsibility.

Consequently, when drafting contracts, attention should be given as to whether any contracting out of the proportionate liability regime will invalidate any insurance coverage which would otherwise exist.[106] In this regard, it should be noted that the various proportionate liability regimes in each State differ in relation to the issue of contracting out of the proportionate liability legislation.[107]

Further, consideration is required as to whether a client is likely to be the plaintiff in proceedings relating to the contract, and if so, ensuring itself can recover all of its loss by either expressing contracting out of the proportionate liability legislation or, alternatively, requiring a parent company of the other party, or an insurer, to indemnify the client in relation to all loss it may suffer as a result of the other party breaching its obligations under the contract.[108]

If a client is likely to be the defendant in proceedings in relation to the contract, is there a possibility of "concurrent wrongdoers" and, if so, are the client's interests are best served by the application of the proportionate liability regimes?[109]

An example of how the proportionate liability legislation might affect carefully drafted risk management provisions is where the contract indicates that a particular risk was the responsibility of the design and construct contractor (D & C contractor) and a court ultimately holds that the D & C contractor was only responsible for 10% of the crystallised risk. This results in the party suffering the loss being required to pursue the other 90% against a third party with whom it may not have any contractual relationship.[110]

CASE STUDIES ON RISK MANAGEMENT

13.1 Hub River power plant in Pakistan

The Hub River power plant project was developed in the 1990s and ultimately achieved commercial operation. While the project was very well structured from a contractual perspective, the project became the subject of a dispute when the government of the former Prime Minister Nawaz Sharif cancelled the project's power purchase agreement, alleging bribery had taken place when the contract had been awarded.[111]

During the contractual negotiations, the following key risks were recognised as follows.[112]

[104] Frawley, n 66 at 43.

[105] Frawley, n 66 at 43.

[106] Frawley, n 66 at 45.

[107] Rudge N, *Proportionate Liability*, Seminar Paper presented at Lexisnexis Building and Construction Law Masterclass (16-17 August 2007) p 14.

[108] Rudge, n 107, p 17.

[109] Rudge, n 107, p 17.

[110] Hayford, n 24 at 25.

[111] Tiong R and Anderson J, "Public-private Partnership Risk Assessment and Management Process: The Asian Dimension" in Akintoye A, Beck M and Hardcastle C (eds), *Public-Private Partnerships – Managing Risks and Opportunities* (Blackwell Science, Oxford, 2003) pp 230-242.

[112] Tiong and Anderson, n 111, pp 230-242.

Political risk

Pakistan has a history of instability since the death of its founder, Mohammed Ali Jinnah, and the assassination of his successor, Liaqat Ali Khan. Consequently, there is a risk that projects will be compromised by a change in government or a deterioration of the political climate. A government may change laws or regulations adversely affecting the project or may simply stop payments being made.

Risk Management Steps: First, a change in law as well as any other step designed to impair the project was classified contractually as a "government force majeure event" which would still require the continued payment of moneys or even provide an option to sell the project back to the utility at a price sufficient to cover all outstanding debt and provide compensation, to all relevant stakeholders.

Secondly, ensuring the involvement of well-connected lenders and investors: in this case, the World Bank. The World Bank's leverage with the Pakistani government was probably a key factor in the successful resolution of the dispute where private commercial bank lenders would not be able to bring the same pressure to bear.

Construction period risk

There was a requirement under the contract between the Pakistani government and the concession holders that the project achieve commercial operation by a particular date, otherwise the Pakistani government would terminate the contract, causing the lenders to lose most of the funds invested in the project up until that point.

Risk Management Steps: The concession holders required the contractors to enter into a lump-sum turnkey construction contract whereby the contractor assumed full responsibility for the performance of all subcontractors and equipment suppliers as well as providing performance and time guarantees that the project would be completed on time.

Construction risk

There was a risk that the construction work would not be completed to the standard required in the specifications.

Risk Management Steps: The contractor's work was supervised by a consultant under a consultancy service agreement, the obligations of which were guaranteed by the consultant's parent company. The consultancy agreement provided, inter alia, for the supervision of the contractor's work, overseeing the project design and advising the concession holder in relation to the construction works.

Foreign exchange risk

While a government might guarantee payment, that government's ability to provide a guarantee could be affected by any decline in the value of its currency. That is, most power purchase agreements in Asia require payment in the local currency, whereas the construction and equipment costs together with the various financing costs are payable in US dollars.

Risk Management Steps: In the first instance, ensuring that all power purchase agreements index local currency payments to the value of the US dollar.

Secondly, financing in local currency and other financial structuring (eg hedging) can mitigate the risk of local currency devaluation.

In the Hub power station project, the Pakistani government established an exchange risk insurance scheme covering currency risks such as the availability of foreign exchange, free transfer of funds, exchange rate risk and convertibility of local currency.

Demand risk

There was the risk that, once built, the power station would be under-utilised.

Risk Management Steps: The concession holders entered into a power purchase agreement to take or pay for net capacity. The purchaser's obligations were guaranteed by the Pakistani government.

Channel Tunnel Rail Link

The Channel Tunnel Rail Link (CTRL) is one of the United Kingdom's largest civil engineering projects. Section 2 of this project opened in November 2007.

This case study outlines the risk assessments and analyses performed during the preparation of the tender to design, construct and operate the CTRL by one of the tendering consortia.[113]

The object of the exercise was to determine a realistic probable capital cost and program for the design, construction and commissioning of the infrastructure work including the stations, tunnels, track, signalling and control systems.[114]

Risk identification

The risk management process ultimately identified seven categories of risk:

- Project-wide uncertainties – the proposed track corridor involved problems with geography (affecting requirements for track gradients, speed and locomotive power), geotechnical information (being incomplete), and disagreements with landowners (potentially causing delay).
- Advanced and enabling works – constraints regarding utility and road diversions required before work could commence.
- St Pancras Terminal – seven significant risks were identified with this terminal. The main uncertainty was the role and influence of third parties during the planning and consultancy stages of the design process and during construction (eg the need to maintain existing rail services).
- Tunnels – six significant risks were identified comprising the urgency of planning consents required, difficulties with the tunnel design and ground conditions and various construction related issues.
- Route sections (excluding tunnels) – seven significant risks were identified including planning consents, weather and various construction related issues.
- Intermediate stations – no detailed designs existed for these stations.
- Mechanical and electrical equipment, including signalling – these risks evolved from undefined systems, installation of equipment in the tunnels, track installation and commissioning.[115]

Risk assessment and response

Risks were first allocated on the basis of which party should carry or share each risk leading to proposals regarding contractual arrangements.[116]

Secondly, risks allocated to the consortium were reviewed and categorised according to whether or not they would be included in the estimates and programs or whether it was assumed that management action would be taken to avoid the risks.[117]

Finally, risks retained by the consortium were reviewed and categorised under four headings, being:

- the influence of market forces on the costs of resources and materials;
- the probability of cost increases due to increased scope, changes and variations, changing technology etc;
- specific uncertainty for the signalling and controls and communication systems which are likely to be subject to the greatest technology changes and which were the least defined elements of the system; and
- program delays resulting in cost increases due to either extensions of time, acceleration payments or a combination of the two.[118]

The above four categories were the subject of risk modelling and analysis to determine their likely impact on the project.[119]

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[113] Smith N, *Managing Risk in Construction Projects* (Blackwell Science, Oxford, 1999) p 192.

[114] Smith, n 113, p 193.

[115] Smith, n 113, pp 198-203.

[116] Smith, n 113, p 203.

[117] Smith, n 113, p 203.

[118] Smith, n 113, p 204.

[119] Smith, n 113, p 204.

Two risk models were developed, one for program risk and the other for cost risk. This occurred over three successive phases:

- development of a costs model for a "not to exceed" estimate in December 1994. This enabled preliminary discussions with potential funding institutions;
- development of the program risk models and review of the results. The range of programs assessed were minimum duration (completion three months earlier than the contract completion date), most likely duration (completion six months late) and maximum duration (15 months delay to opening). The cost associated with each duration was determined by calculating the time-related costs for each part of the project; and
- finalisation of the cost model based upon a much refined base estimate. The analysis indicated that approximately 573 million pounds needed to be added to the base estimate.[120]

CONCLUSION

Good risk-management principles and practice are now clear and recognised. However, it appears that their implementation across the construction, engineering and mining industries in all projects and by all industry participants is yet to occur.

Further, where risk-management principles are applied, they should be applied intelligently, and involve at least some consideration of their consequences. The arbitrary and unsophisticated approach of seeking to shift all possible risk to contractors is detrimental to both contractors and principals.

Finally, careful consideration must be given as to which risk-management tools should be employed, as well as ensuring contracts are drafted to reflect the risk-management regime agreed by the parties.

[120] Smith, n 113, p 205.