1. Introduction

When the representative of the Highways Department announced that no extensions of time or additional cost would be granted for weather events, you could hear a pin drop. The surprise of the legal team representing the Government of Hong Kong in the construction of the Tsing Ma Bridge – to be the longest suspension bridge in the World at that time (early 1990’s) – was tangible, as we considered the consequences of such a significant transfer of risk.

The Tsing Ma Bridge was to have a span (between towers) of 1.3 km. It was employer designed, and was to be the iconic element of the new Lantau Fixed Crossing, linking the city of Hong Kong to its new airport at Chek Lap Kok. The bridge was an ambitious project, costing in excess of HKD 4 billion, and taking over 4 years to build.

Many of the allocations of risk for the Hong Kong airport associated projects were aggressive, but transferring the risk of delay and additional cost for weather events in typhoon-prone Hong Kong was (initially) breathtaking.

The discussion which followed was instructive. While no one could say with any certainty when a typhoon would strike the Territory, how long it would last, and how bad it would be, there were some certainties.

Statistically, we knew when typhoons were most likely to strike, and when the bad ones were most prevalent. Furthermore, the programme for the work, and the construction method statement were under the control of the contractor making the contractor the party better able to manage the risk. In that context, it would be a bold contractor who programmed the lifting of the 40 metre deck sections...
(complete with a 6 lane top deck, and rail and all weather lanes underneath) onto the hangers during the typhoon season.

From a risk allocation perspective, what looked aggressive developed a certain logic. The proposed position relating to weather events was ultimately modified to allow for an extension of time for the periods during which Signals 8 and 10 were hoisted, but in practical terms the obligation to manage the project in such a way as to minimise the effects of weather events remained with the contractor.

The lesson to be learned from this approach is not that we should be more aggressive with transferring risk, but that risk is specific to the project, its location and the availability of information, and should be analysed and allocated on a case by case basis.

This paper addresses the avoidance, transfer, acceptance or sharing of risk (all methods of management requiring an assessment of the risks specific to each project); the consequent uncertainty that may occur; and the provision of a basis for pricing and assessment of delay and cost, if such risks should occur. For this reason, the paper focuses on management of risk (including the risk of disputes) but recognising that the perception of a risk may differ:

- From project to project.
- Between different types of owner.
- Between owner and contractor.

Major international projects are commonly carried out by substantial experienced international contractors either alone or in joint venture. However, the owner may on the one hand be a sophisticated entity used to commissioning and managing very substantial projects, and on the other, may be an inexperienced owner in a developing country who does not have access to the experience and project management teams of the sophisticated owner. It should also be acknowledged that it is not uncommon in a developing country for a government owner to want to transfer as much risk as possible to the contractor even though that may drive up the price of the work.

The type of owner has an impact on the extent to which they are prepared to adopt sophisticated contract mechanisms and risk allocations, including the dispute resolution mechanisms referred to in paragraph 9.2.

Each can be a valid approach, provided there is a proper assessment of the risks and requirements of each project.
2. What is risk?

We hesitate to sound like Donald Rumsfeld, with his “known-knowns, unknown-knowns, known-unknowns and unknown-unknowns”, however there is an element of truth in his torturing of the English language, when it comes to analysing risk.

A distinction needs to be drawn at the outset over the use of the word risk in this context and more general causes of project failure. There is always the risk of one or other of the parties simply failing to do what they said they would do. We do not single out any particular participant in construction projects – there is no monopoly in mistakes. It is a simple human failing.

The risk we are focused on here is not only simple failure or breach of contract by a party. What we are looking at is the occurrence of any event (which includes failure by a party to respond adequately to it) which has the potential to put time, cost or quality at risk. Whether such an event has been identified and legislated for in the contract, identified but considered so unlikely to occur that it is covered only in general force majeure type provisions, or is completely unexpected, we are effectively dealing with uncertainty in the timing and duration of the event and its impact on the project.

In terms of the categories of events creating uncertainty (all of which are addressed in most standard form contracts) we are looking at, in broad terms the following events and the risk of disputes occurring in relation to them:

- unforeseen physical conditions – classically, ground conditions, weather conditions and the like.
- intervening events (independent of the parties) – e.g. delays by government authorities and failures by other contracting parties.
- act of prevention or delay by the employer or its agents – notably design error or delay, constraints on access, delays to approvals and instructions.
- delays caused by the contractor – resulting in the application of liquidated damages.
- force majeure – or other unforeseen change in circumstance beyond the control of the parties.

In English law (unlike civil law) force majeure must be provided for in the contract. Commonly force majeure clauses in standard form contracts do not provide for the costs of economic hardship or changes in the economic equilibrium of the contract. This concept is not recognised as such under English law but many civil law codes provide for it. The concept of changes in the economic equilibrium of a contract (particularly if long term) is one that requires greater consideration in times of economic uncertainty.

Of these, the most common category of uncertainty is unforeseen ground conditions; and it is a topic
worthy of closer inspection.\textsuperscript{4}

At common law, dealing with ground conditions as found, like any other physical condition or buildability issue, rests with the contractor.\textsuperscript{5} This approach has been modified in standard forms to one of foreseeability, which creates further problems; not least of which is that such a claim is assessed after the event. Also, the Engineer/Architect’s assessment of what the experienced contractor might foresee is inevitably subjective.

The standard approach appears to chart a middle ground between the approach of the Hong Kong Government in the airport projects (placing ground condition risk on the contractor), and the other extreme of simply paying the contractor for what is encountered, without regard to what was bid for. The problem with this middle ground approach is that, while appearing reasonable, it plays to neither parties’ strengths. Under this standard approach, no one has an incentive to carry out a thorough investigation, no one properly considers how to avoid the risk, or at least minimise it and there is no vested interest in proper risk management. Claims management, yes; risk management on a best for project basis, no.

It is our view that for any project, there must first be an assessment of what information is available, and how best to come to an informed view of the ground condition most likely to be encountered. That should then be recorded in a geotechnical baseline report, which both parties review and agree as being the most likely condition to be encountered. The contractor then prices for dealing with those conditions.

Construction projects are complex, expensive and typically take time to complete; even completion can be a variable outcome. Typically, contractors are therefore asked to price making certain assumptions; the contracts we draft must then legislate for uncertainty.

Those uncertainties are then dealt with by either the contractor or the employer, with agreed bases for compensation for time or cost, or not.

It is not that these risks are unlikely, improbable, unforeseeable\textsuperscript{6} or that they have such a small chance of occurring that it would have been unreasonable to have allowed for it.\textsuperscript{7} Nor is it a case where a general determination by the Engineer as to what is fair is appropriate.\textsuperscript{8} These vague and rather general concepts, while perhaps uncontroversial, are not especially helpful, and give rise to considerable disagreement when it comes to applying them as they ultimately rely on an objective assessment of a mythical experienced contractor.
It is our view that a more productive approach would be to assess the extent of uncertainty, to then determine a baseline of likely conditions the contractor is to encounter, against which the contractor prices its bid. If the contractor encounters nothing outside the original baseline, then it is fair to say that the preliminary investigations were probably worthwhile and no claim is likely to be sustained. If an event is encountered which is outside that agreed baseline, and if the contractor had relied on that baseline (or had actually taken a more conservative approach), and cost or delay had actually been incurred, any entitlements should be relatively uncontroversial.

Much like the issue of weather in the Hong Kong project referred to above, risk has a considerable element of subjectivity to it; varying from project to project, and circumstance to circumstance. But it does have the common element of uncertainty; uncertainty of severity and outcome, if not of occurrence. Returning to the words of the former US Secretary for Defence, it is not that the occurrence of the event (known or unknown) was unforeseen, but that the consequences for the project of the event occurring are typically not included in the pricing or the programme.

3. How should risk be allocated?

In every negotiation in the construction industry, someone will voice the truism – risk should be allocated to the party best able to manage it – or some variant of it. While undoubtedly true, it does rather beg the question of how risk can be managed, particularly those risks where neither party has a greater ability to control it.

Similarly, we hear from time to time that risk is owned by one party or the other. Such shorthand can also obscure certain fundamental realities in the discussion of risk. In any construction project, the employer or owner pays for the project, one way or the other. The most uncertain issues are what the price will be and when the owner gets the benefit of the completed project.

For the formation of the Hong Kong airport platform, involving the levelling of two islands and the reclamation of 9.38 km² of the seabed, the decision of the Government to pass all ground condition risk to the contractor was on its face aggressive. What can be said, however, is that the Government of Hong Kong is experienced in major capital projects, and knows and understands the environment in which it carries out those projects. In Hong Kong there is also significant knowledge, information and experience in relation to ground conditions which is known to contractors. Although the ground condition risk may be said to be owned by the Government, in the context of this project and the information available, it was more easily managed or controlled by the contractor.

Consequently, to talk in that context of ownership is misleading. The issue is really whether or not the contractor priced, or should have priced, for the risk; and whether or not the employer is to be
required to pay more, and if the imposition of liquidated damages is to be deferred to give the contractor more time to complete the works. No one owns the risk, although one party may have more ability to manage or control it.

Where a risk can be identified and the cost of avoiding that risk, or managing its effects, can be reasonably assessed at the time of tender, then it is sensible to allocate that risk in the contract. As with the Hong Kong Airport project, where considerable data was available and tenderers given the opportunity to carry out further investigations, international experience has shown that time spent understanding the levels of uncertainty prior to tender and adopting an informed approach to risk is critical to overall project success.\textsuperscript{12} The alternative approach of simply pricing the work based on the design, and the protection offered by the allocations of risk and claims procedures in the standard forms of contract can be less rewarding, not least because almost all standard form contracts represent a compromise approach to risk negotiated between construction industry groups with different interests.

Some employers and contractors fail to understand that a standard form contains an existing allocation of risk that may not be appropriate to any particular project or they assume that the standard allocation is appropriate for their project without proper analysis.

Any allocation of risk must start with a careful assessment of uncertainty, followed by understanding the extent of that uncertainty and a consideration of how it might be reduced. Once those uncertainties have been understood, and recorded in a baseline condition for pricing, managing any such risk and the consequences of the risk eventuating are then matters to be covered in the contract procedures.

4. History of contract approaches to risk

Historically, any event, unanticipated or otherwise, was simply priced into the project. Much of the infrastructure developed during the 19\textsuperscript{th} century was designed and constructed will little regard for price certainty or timely delivery.

It was only in the 20\textsuperscript{th} century that the standard forms, developed by the Royal Institution of British Architects (RIBA), Institution of Civil Engineers (ICE) & the International Federation of Consulting Engineers (FIDIC), really tried to bring certainty to cost and completion.

Under this traditional model, the design was prepared by the employer’s consultant to a stage where a fixed price could be tendered, and events giving rise to additional time and payment were dealt with in the contract. Any concern which contractors may have had about contract administration
were balanced (in theory at least) by the Engineer/Architect undertaking a dual role as employer’s agent, and independent certifier and disputes resolver.\(^{13}\)

The traditional role of the Engineer/Architect can be summarised as follows:

- carry out site investigation and project feasibility,
- prepare concept design and costing,
- draft tender documentation, including plans, specifications and contract documentations, and call tenders,
- make recommendation over contract award,
- prepare detailed designs,
- administer the construction contract as employer’s agent, including fulfilling the dual role of Engineer/Architect under the construction contract and determining disputes on an interim basis under the disputes resolution clause, and
- arguably, ensuring delivery of the project to the quality required, on time and within budget.\(^{14}\)

While this approach enjoyed considerable success for some time, it was not without its problems:

1. The contested tender process encouraged contractors to be aggressive in their pricing, often cutting margins in the hope they would be able to recover bid costs and lost margin through claims after award.
2. Over time, bid costs increased, imposing a considerable financial burden across the construction industry.
3. The tender process set in place an adversarial relationship between employers and contractors, which often carried over after award.
4. Tender designs were frequently incomplete, resulting in costly variations.
5. The independent Engineer/Architect, as designer and administrator, was frequently far from independent when it came to determining issues like variation claims, which have the potential to impact on their own liability.\(^{15}\)

That has led to a reasonably widespread reconsideration of the traditional procurement models.\(^{16}\)

When considering risk management more generally, it is also important to recognise that the parties themselves often have a different perspective to risk. For experienced and competent employers (like the Hong Kong Government in the examples above or utility providers like energy and water companies in developed economies), assessing, recording, allocating and managing risk is something they are relatively comfortable with.
Conversely, in developing economies, and where there are other challenges to project delivery, there can be considerable (often political) appeal to paying a premium for transferring all risk to the contractor, and procuring a greater level of price certainty. This approach is not without its risks, as there is no certainty about how the contractor has priced for the risk, or will manage it if it eventuates, but it has an undeniable appeal.

4.1 Alternative contract approaches

As mentioned above, over the last 25 years or so, there has been a move away from the hard letter and perhaps confrontational style of traditional contracting to a more collaborative or cooperative approach. This is reflected in the growth of partnering charters, alliance contracts, Early Contractor Involvement (ECI), long term PPPs, joint ventures and, more modestly, in the use of forms of contract like NEC3 – each responding to these changes in their own ways.

Partnering

Partnering charters are a useful adjunct to any contract, provided they are properly tailored to the project. They are no substitute for a properly considered and detailed contract. At their most basic, an agreement to act in good faith, in accordance with the contract, and on a best for project basis, can be very powerful.

Alliance contracts

Without wanting to be overly critical of alliancing contracts, it can be argued that these represent an abandonment of any sensible allocation of risk. Alliances, when they are successful, rely on high performing teams and the integration of the owner’s and the contractor’s teams without recourse to the disputes process. The difficulty with this approach is that the owner generally has nothing to contribute to the process, other than funding. They tend to be drawn into decisions and into processes where they add no value, except of course, sharing in risks which would otherwise be the contractor’s responsibility to manage.

More generally, alliances can be little more than cost-plus contracting, with a more relaxed approach to controlling the Final Outturn Cost, and preserving the contractor’s margin. That is not to say that there are no concepts in alliances which have a useful role to play, and proponents would argue that alliancing, rather than abandoning allocation of risk, adopts a sophisticated approach to risk via the collaborative approach.

We should add that there is an interesting test case to be had on the no dispute provisions common to alliancing contracts. While a no fault / no blame culture is admirable, there is a risk that a court somewhere, given sufficient encouragement, will find such a clause to be nothing short of an ouster.
of jurisdiction and unenforceable on public policy grounds. Without the support of provisions like those found in arbitration acts in common law countries, any reference to court would be hard to resist on contractual grounds alone.

**Early Contractor Involvement (ECI)**

The UK Highways Agency pioneered the use of ECI in 2001 but in late 2009 decided that ECI would no longer be its preferred project procurement method as it failed to deliver cost savings consistently.\(^{(17)}\) ECI was introduced as an alternative to apparently less efficient procurement processes, by bringing the employer and contractor together, in the project planning stage, on an open book cost basis to develop a target price.\(^{(18)}\)

The primary concern of the Highways Agency with ECI was that they did not receive enough commercial information and there was too great a risk of losing control of costs, particularly during the planning stage, despite the key benefit being a reduction in preparation time of 30% to 40%.\(^{(19)}\) The Crossrail Project in the UK utilises Optimised Contractor Involvement (OCI) (a variant of ECI) so that the contractors are incorporated in the design process as early as possible, enabling Crossrail to identify potential design problems and reduce tender costs, but keeping control of costs through a two stage tendering process. The key to making ECI or OCI work is that the employer has strong commercial and cost estimation skills to at least match those of the contractor.

In New Zealand, with its complex consent environment, a two stage ECI process was used in 1996 to develop the facilities for the America’s Cup defence in 2000. For that project, time was strictly limited, and the contractor’s expertise was essential for enabling legislation and the procuring of consents. The strength of its balance sheet was also a factor.

For that project, the second stage appointment was on a single point of responsibility, design and construct basis, with most of the risk transferred to the contractor. The ground was highly contaminated, but reasonably well understood through extensive investigation. The work was completed on time and within budget (though the scope of work did expand somewhat).

**Public Private Partnerships (PPPs)**

Long term PPPs are, perhaps, at the other end of the scale, with the concession holder recouping the cost of the construction and operation of the entire project through the collection of revenue streams over a 30 year or so period. For the grantor of the concession, typically a government body, there is usually an irresistible desire to transfer all risk to the concession holder, whether sensible or not.\(^{(20)}\)

This approach then simply gets passed down the line by the concession holder and its financiers to
its constituent members; to the construction contractor, operator and the maintenance contractor. One often hears representatives of the concession holder say during negotiation that they have “slim shoulders and Teflon suits”.

There are generally a number of complex difficulties with long term PPP contracts. They have been very popular with governments of developed economies like Australia, Hong Kong and the United Kingdom, with a strong *laissez faire* approach to the provision of infrastructure.

In the developing world, there is sometimes a misconception that the asset is effectively provided free, and all funding is carried by the concession holder. In order to attract potential bidders for PPP contracts, such bidders must have a clear expectation of recovering their costs and margins from a guaranteed income stream. Bid expenses for PPP projects are also high, and bidders need to be assured of some level of exclusivity. In that context, PPPs are anything but free.

Where infrastructure is funded through traditional debt, the government has the benefit of *sovereign risk*, which ensures a very beneficial interest rate. However, any such borrowing must be recognised by governments in its annual accounts; particularly if the government is conforming to generally accepted accounting principals, as in the UK, New Zealand and Australia, or if such economic rigour is imposed by international funding agencies like the IMF or World Bank.

Until recently, the outgoings for PPPs were *off balance sheet* for governments, particularly if no guarantees were given. This has meant that massive infrastructure investment has been possible, for example in the UK, with no adverse impact on the government accounts. That investment has not, however, come free. The cost is still imposed on the communities which get the benefit of the new infrastructure and may not, in the current climate in the UK, be as suitable for financing projects as it has in the past.²¹

The experience in the UK has also been that pricing and assessment of risk for the entire concession period, at the start of a long term PPP, brings problems of its own. In most cases, the sharp peak in risk during the construction phase distorts the risk assessment for the balance of the concession period. In others, significant shifts in the cost of funding can have a disastrous impact on the operation of the asset.

This has had two effects – first, the UK Government introduced a periodic renegotiation and profit share to ensure that excessive or windfall profits (difficult to justify politically) were shared between government and the concession holder; and second, in a number of cases the UK Government has had to take the operation back into public ownership (for example in the case of the London
Joint Ventures

The formation of joint ventures, primarily by contractors, has increased in response to the size and complexity of projects and the risks involved. A joint venture can bring together the skills, assets and financial resources of separate companies for the benefit of the project. The advantages and disadvantages of joint ventures are beyond the scope of this paper, but although the joint venture spreads the risk from its participants’ point of view, this only holds good for so long as each partner remains in business, because each partner is usually jointly and severally liable to the employer. There are also project management issues that can occur with ad hoc joint ventures that lead to inefficiency.

NEC3

The most recent and it has to be said most widespread alternative approach has been the use of the Engineering and Construction Contract (NEC3), issued by the Institution of Civil Engineers in response to the Latham report.

The NEC3 introduces an entirely new language and approach to contracting. The contract adopts an approach near to the civil law concept of “good faith” together with procedures for the maintenance of a project risk register, risk meetings and early warning, all independent of the claims process (styled compensation events).

This form of contract provides a happy medium, by allowing for some hard letter contracting, with a more co-operative overlay. Like all standard form contracts, it does tend to assume that all risks in the project can be handled in the same way. For more complex projects, this is usually far from the case. For example, in a current infrastructure project in New Zealand, the owner has adopted an NEC3 approach, but with a combination of different pricing approaches for different activities which would be best described as a mix of fixed price, target price and measure and value. That approach has been greeted positively by the contractor, as it is seen as showing an understanding of the complex risks in the project. The contractor is also being treated fairly for uncertainty. Time will tell if this approach is successful; the project is not due for completion until 2015.

No standard contract is going to work for every major project; at least, not without some adjustment.

4.2 Role of insurance

No discussion of risk is complete without some consideration of the role of insurance.
Where failure of design, damage to the contract works, and general liability are all insured under policies for the benefit of the employer, the contractor and subcontractors, in depth discussions of risk are often cut short with the comment – surely this is covered by your insurance. It is never entirely clear whether the sudden silence which follows such statements is because the parties genuinely feel that insurance does cover everyone’s losses, or because no one really understands insurance and they’re happy if the whole topic just goes away!

Along with the dispute resolution provisions, insurance is the subject which gets the least attention during pre-contract negotiations, partly because at that stage the parties do not want to envisage things going wrong and partly because they are topics which tend to be left to the “professionals”. These clauses also tend to be read at a stage in the review and negotiation where everyone’s attention has started to wander.

The answer, of course, is that loss is not always covered by insurance, and the cover does not treat all the parties necessarily equally. It is beyond the scope of this paper to go into an in depth discussion of insurance, but there are a number of points that need to be made.

The first is that all risks are not covered. The most obvious are what were traditionally referred to as excepted risks, which are not capable of insurance. These are the lengthy and often baffling lists of unlikely events that only lawyers get excited about, using words like civil commotion, heave, nuclear fallout and pressure waves caused by aircraft travelling at super sonic speeds. Also, there are limits to the sums covered by such insurance. For example, the deductible or excess, which represents the first tranche of any loss suffered by the insured. For most insurance policies, these lower sums represent the highest risk of payment, and therefore significant savings in premium can be obtained by accepting a higher level of deductible.

Next there is the limit of cover, whether for a single event, or in aggregate. Increasingly, particularly for professional indemnity policies, insurers are insisting on an overall cap on the amount of cover, rather than simply on a per event basis.

And finally, there are losses which are excluded from cover, either by the specific exclusion clauses, or as a result of vitiation of the cover through some act or omission by one of the insured parties, for example a failure to pay the premium or a failure to disclose a material risk.

In each of these situations there will be losses suffered by one or all parties which are not covered by the insurance. It should be noted that with a significant number of insured events over the last
few years, like the Christchurch, New Zealand earthquake, the number of add-ons previously offered
by insurance companies at little or no additional premium has reduced significantly, and in some
cases insurance is simply not available.

The second point in relation to insurance is that all parties are not necessarily treated equally by the
insurers. If the insurance is in *joint names* then the parties are equally insured. However, if the
parties simply have their respective interests *noted*, that may mean nothing more than the inclusion
of a waiver of subrogation.

More worryingly, where only one party (for example the employer) is insured, while the insurer may
pay out the insured party’s losses, it will almost certainly exercise its rights of subrogation and will
sue the other parties (in the name of the insured) to recover those losses.

So, while insurance may provide some comfort for some events, it should not be used as an
opportunity to avoid engaging in a forthright discussion about risk, or to abandon the procedures in
the contract for dealing with claims and allocation of responsibility, simply because the risk is
covered.

**5. Risk avoidance**

To the extent that risk avoidance means the employer and/or the contractor (via for example
procedures such as ECI) investigating the risks pre-contract or as part of a two stage contract and
this results in avoiding a risk through, for example, changing the design, then avoidance is
important. If, however, it simply means that a potential risk is avoided by the employer transferring
it to the contractor with no analysis or consideration of appropriate allocation then this is
inappropriate and likely to be costly.

In short, investigation, and acceptance that both parties have a vested interest in avoiding, or at
least reducing risk, is the right approach. To avoid risk by ignoring it or transferring it without
analysis is generally not sensible.

But, if a party has a vested interest in the outcome, they will be more careful about the result.

In a recent tunnelling project in Auckland, the employer’s design consultant originally proposed a 40
m$^{RL}$ vertical alignment in order to avoid passing immediately under a tidal estuary containing
alluvium, basalt and other uncertain ground conditions (including ground water). The design also
assumed construction using a road header. While conservative, this approach had questionable
benefit for the owner; particularly in relation to operating costs.
On further consideration, it was decided that an earth pressure balance tunnel boring machine could cope with the variable ground conditions at a vertical elevation of 20 m\textsuperscript{RL}, at a considerable overall saving to the project. Granted, this brought some uncertainty about the ground conditions, including water ingress, but rates for operating in open mode (faster, but exposed to water ingress), closed mode (pressurising the cutting head, but slowing progress) and changing the cutting head (from picks to cutters) were agreed during tender negotiations. Pricing for dealing with potential conditions which could be foreseen, although not with any accuracy, was therefore managed from the outset.

6. Risk Transfer

As indicated above, risk transfer, normally by an employer to a contractor, without analysis of what is an appropriate allocation of risk for the particular project is not a sensible approach.

As an example of the consequences of inappropriate risk transfer, the experience of another project in New Zealand some years ago, is instructive.

The project involved the installation of a cogeneration plant within an existing industrial plant. Under an energy supply agreement, the cogeneration operator was to construct the plant, own it and operate it, and to supply high pressure steam and electricity of a high quality (in terms of consistent voltage and frequency not guaranteed from the national grid) to the adjoining plant for the agreed term.

The energy company, which was experienced in construction contracting, had a supply of gas, and access to the national grid as a fall back position.

The owner of the factory in which the cogeneration plant was to be installed had one overwhelming risk issue it wished to transfer to the energy company – the date for commencement of operation of the plant (particularly the provision of steam and electricity) could not be deferred. Regardless of any force majeure or other qualifying unforeseen event, the plant had to start operation on a fixed date, otherwise the plant owner would have to dump agricultural product, with enormous adverse environmental impact, from a specified calendar date.

The energy supply agreement was negotiated in the true style of all big contracts of the day – into the small hours, with lawyers struggling with the drafting long after they were capable of stringing a sensible sentence together.

Similarly, the construction contract for the plant was negotiated on a single point of responsibility,
design & construct basis; a hard letter contract, with the contractor taking considerable management risk. It is probably fair to say both the factory owner and the cogeneration operator took a heavily contractual approach.

When the contractor spectacularly failed to complete the heat recovery steam generator supplying the high pressure steam system, and then proceeded to get prosecuted for breaching construction consents (particularly noise), the agricultural product hit the fan. In the ensuing legal and contractual mess of called bonds, terminated contracts and damages claims, it became apparent to all that a right to sue for damages is no substitute for proper management and an allocation of risk which sensibly deals with issues on a best for project basis.

In that case, everyone lost.

7. Risk acceptance

As mentioned above, risk can simply be accepted, whether under pressure during a tender process, as a gamble, or as a considered commercial position, particularly where there is a long term appointment (like a franchise under a PPP or similar project) over which the risk, and any losses arising from it, can be managed.

Pressuring contractors to accept inappropriate risks, or to gamble, is really nothing more than engaging in a game of chance. If the risk has been properly assessed, it is usually capable of sensible allocation and management. If it isn't properly assessed, then any allowance by the contractor is unlikely to be based on anything more than guesswork.

If the risk doesn't eventuate, there will have been an unnecessary cost to the project.

If the risk does eventuate, there is no guarantee that the contractor's allowance would cover the cost. If that allowance doesn't cover the consequences of the risk eventuating, the cost to the project would be considerable; in deteriorating relationships, inflated and manufactured claims and an inevitable reduction in the quality of the work.

And yet, this approach is relatively common in PPP projects. For governments, franchising the construction and operation of the significant infrastructure asset is seen, sometimes, as a perfect opportunity to pass all risk, manageable or not to the concession holder.

Granted, the time available to spread losses and recover costs over the full term of a PPP is greater than in a traditional construction contract, but this clouds the issue. The contractor in a PPP
consortium will shoulder the risk, as it will still be appointed under a traditional construction contract. The only compensation it will receive for accepting the risk is the natural hedge it will have as an equity participant; if it is an equity participant.28

8. Risk management

Contracting is all about risk management first as a matter of appropriate and sensible allocation of risk and then as a matter of how the risk is managed by the party to whom it is allocated.

In the ideal scenario, the employer undertakes an investigation of risk, typically though a risk workshop, prior to inviting tenders. This forms the basis for the baseline condition. The tenderers are then invited to comment on the risk register, and the reasonableness of the baseline condition. Provided tenderers are satisfied that they will be fairly compensated, they will comment productively on these documents.

Following award, the risk register is kept up to date, and risks are notified through the early warning system. This does not assure compensation. That is a separate process. Sophisticated risk management approaches do require experienced project management teams for both parties.

8.1 Sharing the cost of risk

There is little point in simply sharing the liability for risk as this blurs the lines of responsibility. However, if a risk which is allocated to a contractor, (e.g., the risk of adverse ground conditions) does not occur it is possible, assuming the contract pricing is on an open book basis, for the employer and contractor to share the saving made by the contractor against the amount in his price for this risk. Equally, if the risk does occur the contractor can bear the cost up to an agreed figure and if the cost is greater then employer and contractor can share the overrun. This concept was utilised by one bidder for a light rail project in Trinidad, although the project did not proceed beyond the first phase.

This is also common in alliance and other contracts using a painshare/gainshare approach. Generally, these approaches only work where there is proper and rigorous control over changes to the Final Outturn Cost, and where uncertainty is reduced as the Actual Final Outturn Cost becomes more certain.

For the parties to share the financial consequences of risk can be very productive. But it is no panacea for an appropriate allocation of risk in the first place.
8.2 Management of risks by Dispute Resolution Mechanisms

Over the last two decades, at least, the issue of how to resolve disputes under international construction contracts in a relatively quick, fair and inexpensive timeframe has become a very significant issue. The risk of long running disputes, both during and after the completion of the work, is a matter of concern both for employers and contractors.

Many of the international forms of contract, such as the FIDIC suite of contracts, are based on English drafts primarily underpinned by common law concepts. One of the principles utilised in these forms of contract was the role of the Engineer/Architect in taking the initial decisions on disputes.

Originally, the engineer under the FIDIC form of contract (initially the Red Book) was commonly a powerful entity who was able to take decisions frequently without fear or favour between the employer and contractor. An international contractor was able, in these situations, to rely (mostly) on the fact that the engineer although appointed by the employer, would act fairly and independently and that he would get an initial decision in relation to a claim or dispute which, even if he did not like the decision, he would normally be able to recognise as being fair and reasonable.

Over the years, the role of the third party powerful engineer has been diluted and the ability of even an independent engineer to act without interference by an employer has been reduced. In many cases the engineer is now an employee of the owner or another government entity who cannot be relied on to take an independent position. This is now reflected in the FIDIC contracts, and in the ICE Conditions of Contract 7th Edition, which requires the owner to set out in the contract any restrictions which are placed upon the ability of the engineer to take independent decisions without the approval of the employer. These restrictions frequently require that the engineer cannot grant an extension of time or extra payment to a contractor without the approval of the employer. This is so, notwithstanding that under, for example, extension of time provisions the provision still relies upon the common law concept of a fair and independent decision by the engineer when deciding upon an extension of time.

A second reason why the resolution of disputes has become a significant risk issue relates to the cost and time of international arbitration. International arbitration has always been and continues to be the ultimate method of dispute resolution under an international cross border construction contract. However, what started in the UK as the cheaper, quicker alternative to court litigation has now become, in any many cases, more expensive and more time consuming than obtaining a decision in, for example, the UK Commercial Court or the Technology and Construction Court. However, arbitration remains the only sensible ultimate dispute resolution mechanism in a cross border project contract.
A third factor driving the need for improved dispute resolution mechanisms has been the risks inherent in mega projects such as the Channel Tunnel (1980s) and the Hong Kong Airport and associated projects (1990s). Such complex and costly projects needed and developed multi-tier dispute resolution mechanisms to manage the risks inherent in disputes.

As a consequence of these and other developments, there has been an increasing pressure to develop cheaper, quicker forms of interim dispute resolution in international construction contracts and this has also been reflected in the UK and Australian schemes of statutory adjudication in domestic contracts and the increasing use of contract dispute boards, mediation and adjudication. There are a number of forms of interim dispute resolution that are commonly utilised and these include: dispute boards, expert determination, adjudication and mediation. Pre-arbitral dispute resolution steps fall into two categories. The first are effectively settlement provisions – amicable settlement; mediation; and dispute review boards (DRB) (although it can be argued that a DRB is a separate category of its own).

The second category is third party decision provisions - adjudication; expert determination and dispute adjudication boards (DAB).

In all cases, in the absence of a final settlement or final third party decision, the ultimate dispute resolution provision is arbitration or in some cases court proceedings.

In this paper we intend to focus on dispute boards and their growing use in major projects as a method of managing disputes as they occur.

Dispute boards (DBs), fall into three types: DRBs, DABs and the combined dispute board (CDB) promoted by the International Chamber of Commerce (ICC). The key difference is that a DRB makes a recommendation to the parties in relation to a particular dispute whereas under the DAB, the dispute board will make a decision which is binding on the parties unless and until overturned in arbitration. That decision is enforceable under the contract and failure to comply with the decision would constitute a breach of contract. The CDB is, as its name implies, a halfway house where the parties can decide whether the dispute board decision is to be a recommendation or a decision.

DRBs are prevalent in the USA whereas DABs occur more frequently outside the USA for example under the FIDIC forms of contract.

Although dispute boards can be established on an ad hoc basis, they are commonly set up at the beginning of the contract and on major projects there are usually three members. Throughout the
life of the project they will pay regular visits to the site and be updated by the parties on progress and any issues that are arising. They will have informal discussions with the parties and in many cases are able, through those discussions, to help the parties informally resolve issues. The following discussion will assume that the employer is an experienced employer who understands international contracting and a number of the mechanisms that are available, in relation to dispute management.

From a contractor’s point of view, the increasing use of dispute boards is an attractive feature in the context of the decline in the independence of the engineer and the expense and delay involved in arbitration. In addition, a contractor is usually reluctant to embark upon an arbitration during the course of the works (unless there is a very significant issue that needs to be resolved) because that will disrupt his concentration on carrying out the works and may also sour relations with the employer irrevocably.

On the other hand, a DB where the members become known to both employer and contractor and with whom they have regular discussions and who can help them resolve a dispute either in informal discussion or by way of recommendation or decision is valuable from a contractor’s point of view. He will achieve a result reasonably quickly during the course of the contract and even if he does not obtain a wholly favourable result he may be willing to accept the outcome and move on without resort to arbitration. 

The fact is that most disputes under international construction contracts relate to claims by contractors for more time and/or money arising from third party events (e.g., bad weather; adverse ground conditions) or the actions of the employer. Consequently it is not surprising if contractors consider that dispute boards are a method by which a contractor can manage the risk of such claims arising. But, in our opinion, DBs are also a useful mechanism for the employer in managing disputes at an early stage at a lower cost than utilising arbitration. This view is increasingly being accepted in the developed economies, but in emerging markets there remain doubts, for example in Romania where DBs are seen by some employers as a cost centre.

Dispute boards in both forms have been in use for enough time now for various studies to have been carried out as to their effectiveness.

8.3 The Impact of Dispute Boards
The key test of the efficacy of any dispute resolution and management mechanism is whether it benefits the stakeholders, that is the parties to the contract. Dispute resolution may be the business of the dispute resolution community (arbitrators, dispute board members, lawyers, claims advisers

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and experts) but it is never the business of the parties. The issue for the parties is how to minimise and manage risks and to prevent disputes arising. If they do arise, the parties need a fair, quick and relatively inexpensive method of resolving their disputes; albeit an interim one.

The question then is what has been the impact of dispute boards and some of the other pre-arbitral dispute management mechanisms?

The two obvious benchmarks against which to measure the impact of dispute boards are:

1. Have dispute boards successfully reduced the number of disputes which proceed to arbitration or court?
2. Does the inclusion of a dispute board in a contract mean that tender prices are less than when there is no dispute board included in a contract?

In a paper published in 2009 (but first prepared in 2008) Kathleen Harman studied the impact of the dispute review board process in the Boston Central Artery Tunnel (CAT) Project (the Big Dig). 35

The Big Dig commenced in 1991 and reached substantial completion in December 2005. It was $12 billion over the original budget and seven years late.

Not all the Big Dig contracts made provision for a DRB but in those that did, the DRB made a recommendation which was then referred to the owner’s project director who would accept or reject all or part of the recommendation. If the contractor disagreed with the project director’s decision it was entitled to appeal such a decision to the Massachusetts Highway Division Board of Contract Appeals or file an action in the Superior Court.

There were 86 separate construction contracts of which 46 had DRBs and 40 did not. Because of this, it is possible to measure on the same project the impact of DRBs on contracts against contracts which did not have DRBs.

In relation to the questions above:

Were DRBs successful in reducing disputes that went to court (in this case)?

Harman found:

Essentially, although the majority of issues were resolved on the entire project, $57 million (1375) claims/disputes were left unresolved at the entire project’s substantial completion. Moreover, a greater percentage of DRB contracts as opposed to non-DRB contracts had unresolved claims/disputes.
There was a low level of presentation of claims/disputes to the DRBs which may have been due to the fact that there were significant partnering efforts between the employer and contractors during the project and the majority of disputes, change orders and claims were resolved by other means. Harman says several factors appear to have influenced the owner as well as the contractors to ignore the benefits of the DRB process. These were:

- Elongated dispute resolution process;
- DRB process viewed as adversarial;
- Preparation for the hearing was time consuming;
- Issues with the DRB recommendations being unconvincing; and
- Recommended settlement amounts below the historical average.

In short, the DRB process as used on the Big Dig seems to have been procedurally too complex (nearer to arbitration processes than it should have been) and did not enjoy the confidence of the parties to the process.

As a result of the lack of take-up of the formal DRB process, the parties instituted an advisory DRB process to which we refer below.

In Florida the use of DRBs by the Florida Department of Transportation (FDOT) has been positive. The FDOT has used 460 DRBs between 1994 and 2009.36

- DRB cost per project – 0.39% of project cost.
- DRB recommendations accepted by both parties – 84%.37
- Compared with non DRB contracts DRBs save more than 5% in cost overrun and 17% in time overrun.
- Significant reduction in subsequent litigation/arbitration.

**Did the use of a DRB in a contract create bid savings?**

Harman finds that the average bid saving for DRB contracts was 13.4% against the engineer’s original estimates but that the average bid saving on the non-DRB contracts was 12.25%. Consequently, having a DRB provision did not appear to significantly influence contractors to submit a lower bid price than they would have submitted had the provision not been included in the contract documents.

Harman suggests that the experience with the DRBs on the Big Dig and the timing of when issues can be brought to hearing was in sharp contrast to the Corps of Engineers’ (COE) use of DRBs. The COE process allowed factual disputes to be resolved at the contracting officer level and a DRB hearing was held earlier. This use of DRBs was shown to reduce delays, claims and cost overruns.
The experience in Australia of DBs also appears to be positive. In a paper prepared for the 2011 IBA Annual Conference, Professor Doug Jones looks at the experience in Australia.³⁸

Professor Jones indicates that DRBs have been used in 21 projects between 1987 and mid-2010³⁹. Professor Jones states:

In summary, the Australian construction industry has been comparatively slow to embrace the use of DRBs as a dispute resolution method. However, they are starting to be used more commonly. Importantly, the international success of DRBs has been mirrored in Australia. Empirical evidence has been shown that in each instance of their Australian use, no dispute progressed to arbitration or litigation.⁴⁰

The experience in New Zealand is similar. DRBs were put in place for the Manapouri Tail Race project, and for the upgrade of Pole 2 for the Cook Strait HVDC Cable project. The DRB in the first project resolved considerable disagreement about ground condition variations; the second project is ongoing.

It is fair to say that in New Zealand, adjudication has supplanted both the interim determination of the Engineer/Architect and arbitration. DRBs have been proposed for a number of projects, but they tend to be viewed as an added expense in an industry where project managers generally back themselves as being good negotiators.

Informal Resolution of Disputes by Dispute Boards
As indicated above, on the Big Dig the parties instituted an advisory DRB process under which the documentation was not as elaborate, oral testimony was abbreviated and the DRB rendered an oral opinion after an informal presentation. There were 30 advisory hearings which were held on issues ranging from $100,000 to $10 million. All the issues brought forward for advisory opinions were settled and contract modifications were issued.

The institution of this advisory process is described by Bryson S Shipley in a paper entitled “Expanding the DRB’s Role”.⁴¹

Shipley indicates that on the one hand the low number of disputes submitted to the DRBs as at 1999 (the project was not substantially complete until 2005) was due to the success of partnering in resolving the bulk of the issues that have arisen but there was concern that there was a growing backlog of unresolved disputes. Accordingly, the parties began to develop an “Advisory DRB Initiative” reflecting a positive experience of the University of Washington in using DRBs to render early, informal, advisory opinions. This initiative, according to Shipley, offered an opportunity to take
greater advantage of the experience and expertise of the DRB panel. The contractors supported the initiative. Given that this initiative took place in the context of DRBs where the DRB is only issuing a formal recommendation rather than a decision, it is interesting that it was felt that an earlier stage of advisory opinion would be helpful. The statistics quoted in Harman’s study suggest that it was.

In our view, the most significant advantage of a dispute board (whether DRB or DAB) derives from the knowledge that the DB panel have of the project from the outset and the DB members’ ability to utilise that knowledge and their own experience to assist the parties in managing and resolving disputes informally and as soon as the potential for dispute arises, without the need for a formal recommendation, decision or opinion. This informal process is not without some difficulties. Firstly it depends very much on the experience of and respect for the members of the DB and the understanding which the parties have of how to utilise the process.

Secondly, there are concerns, particularly in relation to a DAB, as to whether the expression of an informal view or opinion by the DAB before a dispute is referred to it prejudices in any way its ability to deliver a decision. 42

The 2008 edition of the FIDIC Gold Book contains an option for the parties to request the DAB to provide assistance or informally discuss a dispute and attempt to resolve it.

In the case of Glencot Development & Design Ltd v Ben Barrett & Son (Contractors) Ltd [2001] EWHC, TCC, Judge Humphrey Lloyd QC stated:

Discussions or a mediation of the kind which apparently took place...are or may be at variance with adjudication... There are clearly risks to all when an adjudicator steps from that role and enters a different arena and is to perform a different function.

If a binding settlement of the whole or part of the dispute results, then the risk will prove to be worth taking.

In our view, this difficulty between the informal process and the formal process may be exacerbated when the contract attempts to legislate for the informal process. 43 It may be better for the informal process to be permitted but to rely on the experience of the DB members as to how to conduct it. In any event, the effort is normally directed at informal discussions with the parties from which the parties will reach their own conclusions without the dispute board having to render any informal opinion. This approach seems to have been borne out in Hong Kong where the Hong Kong Government Architectural Services Department has used a Dispute Resolution Adviser on at least 60 projects since 1995. A department study 44 found the following:

- Average cost savings with DRA – 2.2%;
• Average cost savings with other provisions – 1.75%;
• Increase in duration of the project through extension of time with DRA – 7.2%;
• Increase in duration of the project through extension of time with other provisions – 15.7%.

In summary, the available evidence – although mixed – and certainly the anecdotal evidence, suggests that where there is a willing acceptance by both parties of the DB process, it is effective in reducing the number of disputes that go to arbitration provided the DB process itself is not cumbersome or time consuming; there is respect for the DB members; and a reasoned decision or recommendation is issued by the DB, if they have not been able to resolve the issues by more informal means.45

Whatever dispute resolution processes are adopted, due to the complexities and uncertainties of construction projects, their long gestation and delivery periods and high cost, an interim determination process, trusted by the parties, is critical as a last stop in risk management. In the past, that was to have been the Engineer/Architect’s determination, followed by arbitration. Now, depending on your jurisdiction, it is adjudication or disputes boards, or a combination of them, followed by arbitration.

9. Conclusion

A proper allocation of risk is generally not achieved by simply accepting a standard or doctrinaire approach.

Risks are usually project specific, and therefore need to be identified on a project by project basis. This is most effectively done by developing a risk register, first within the project team, then refining it during the tender process, and maintaining it after award on a collaborative basis with the contractor as work progresses. Skilled, experienced project teams for the employer and contractor working together from the outset of a project are important to this process.

When allocating that risk, careful consideration must be given to the levels of uncertainty over each risk, and the extent to which the risk can be avoided; and if it can’t be avoided, its effects mitigated or managed. While most traditional forms of contract do deal with project uncertainty, they do so loosely with formulae like the experienced contractor.

A better approach is to adopt the concept of an agreed baseline, where the parties formulate the most likely condition, upon which the contractor then prices. Any departures from that baseline condition, provided the contractor has actually relied on it and has actually incurred cost and delay,
are then either compensated for on a previously agreed basis or valued at contract rates.

The final stage of appropriate management of risk is a prompt, cost effective dispute resolution process. Such a process not only improves the resolution of disputes themselves but may have a beneficial impact on tender costs. This is probably no longer a role the engineer can fill. There is now considerable choice between statutory adjudication in many parts of the world, contracted disputes boards, mediation, negotiated settlement, and if all else fails, arbitration.

End Notes:

1. The Hong Kong typhoon warning signals that indicate a serious typhoon is imminent; signal 8 advises that a typhoon is approaching the Territory, and that people should go home; and signal 10 indicates a direct hit on the Territory, with all businesses, including transport, closed.
2. The former US Defence Secretary.
3. English law does have the concept of frustration whereby if a contract becomes impossible to perform, a right of termination arises, but there is no right to damages.
5. See Thorn v London Corp (1876) 1 App Cas 120.
6. See cl 1.1.6.8 of the FIDIC Red Book – "not reasonably foreseeable by an experienced contractor by the date for submission of the Tender".
7. See cl 60.1(19) of the NEC3 Engineering and Construction Contract.
9. It can be argued that there are two types of uncertainty – specifically that where the uncertainty is measurable, it is not in effect an uncertainty at all – which have a bearing on how the risk of one or the other should be managed. If the uncertainty can be measured, it can then be allocated more easily and priced accordingly. See John Powell, 'Professional Liability and Construction: Risk Retained and Risk Transformed' (Paper presented to the Society of Construction Law, London, 1 December 2009) <http://www.scl.org.uk./professional-liability-and-construction-risk-retained-and-risk-transferred>.
10. This is the approach favoured by the International Tunnelling Insurance Group, Code of Practice for Risk Management of Tunnel Works (30 January 2006).
11. Subject to any overriding obligation on the contractor to mitigate delay and/or cost, and at whose expense.
12. For an Australian perspective, see Bill Smith, 'Scope for Improvement – A Survey of Pressure Points in Australian Construction and Infrastructure Projects' [2007] International Construction Law Review 24, 36.
13. See paragraph 9.2 below for a discussion of the reduced independence of the Engineer.


18. In the USA there is a similar approach called Construction Management at Risk (CMR).

19. Nichols Review of the Highways Agency Major Roads Programme for the UK Secretary of State for Transport 2006, which found that the Highways Agency needed to improve its approach to estimating costs when using ECI.

20. It is interesting to note that the New Zealand Government has gone down this route with its draft PPP Standard Contract <http://www.infrastructure.govt.nz/publications/draftpppstandardcontract>.


22. Notably, NEC3 has been accepted as a form of contract for all PPP projects in the UK, and for the development of facilities for this year’s Olympics in London.


25. See cl 16 of the Engineering and Construction Contract.

26. An interesting aside to that project is that the employer is controlling the supply chain by contracting directly for all critical supplies using the NEC3 Supply Contract.

27. See cl 17.3 of the FIDIC Red Book.

28. As an aside, for good reason the Government of Hong Kong preferred that the contractor should not be part of the bidding consortia for both the Western Harbour Crossing and the Route 3 – Country Park Section build-own-operate-transfer projects.

29. See cl 3.1 of the FIDIC Red Book.

30. See cl 2(1)(b).

31. The authors were members of the legal team advising the Hong Kong Government on the airport associated projects. John Bellhouse was also a member of the legal team that advised the employer in relation to the Channel Tunnel construction contract.

32. In this connection, see Christopher Seppala, ‘Enforcement by an arbitral award of a binding but not final engineer’s or DAB’s decision under the FIDIC conditions’ The International Construction Law Review (2009) 26(4).

33. See, eg, cls 20.2 to 20.4 of FIDIC Red Book.

34. Project mediation, as offered in the UK by CEDR Solve addresses some of these issues. A NZ version of the Project Mediation Protocol is available for download from <http://www.johnwalton.co.nz/projectmediation.html>.

36. Ralph Ellis, ‘Success of DRBs in Florida’ (Paper presented at the Dispute Resolution Board Foundation 14th Annual Conference, Charleston USA, October 1-3 2010) <www.drb.org>.

37. In the article by Kurt Dettman and Christopher Miers 'Dispute Review Boards and Dispute Adjudication Boards: Comparison and Commentary' (2012) 16(1) Dispute Resolution Board Foundation Forum, it is stated at footnote 8 “…for example, owners who are major users of DRBs on road contracts have stated they follow approximately 75% of recommendations.”


42. See Lanes Group PLC v Galliford Try Infrastructure Ltd [2011] EWCA 1617.

43. For a discussion of the requirements for arbitrators to act as mediators, see the judgment of Fisher J in Acorn Farms Ltd v Schnuriger [2003] 3 NZLR 121.

44. See an article by Andrzej Cierpicki ‘The Dispute Resolution Adviser System’ (2008) Asian Dispute Review.

45. In the article by Paula Gerber and Brendan J Ong ‘DRBs Down Under: Ready for Takeoff!’ (2012) 16(1) Dispute Resolution Board Foundation Forum 1, 1 it is stated: “DRBs have proven to be 98% effective in over 2000 DRB projects around the world...”. The source for this statement and the definition of “effective” do not appear to be given.
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