CRC Construction Innovation
BUILDING OUR FUTURE

Guide to Leading Practice for Dispute Avoidance and Resolution

ACEA
ASSOCIATION OF CONSULTING ENGINEERS AUSTRALIA

AUSTRALIAN CONSTRUCTORS ASSOCIATION

AUSTRALIAN PROCUREMENT AND CONSTRUCTION COUNCIL

CIVIL CONTRACTORS FEDERATION

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Preface

The Australian construction industry is a significant sector of the economy in its own right, employing close to one million people, and undertaking more than $120 billion worth of work annually. It is a critical part of the economy, providing shelter and facilities for all other parts of the economy. The people who work in the industry, whether clients, designers or constructors, are proud of their achievements.

However, the industry is bedevilled with a reputation for tough commercial behaviour, and a propensity to solve problems using formal dispute resolution. This is the case in Australia, and it is reflected in other developed economies with adversarial-based legal frameworks. Academic and industry journals are replete with studies of the behaviour of the industry, and its predisposition to adversarial problem solving.

The aim of the CRC for *Construction Innovation's* dispute avoidance and resolution research and implementation project was to identify and communicate to key industry stakeholders recommended change management strategies – strategies to avoid contractual disputes between clients, contractors and other industry stakeholders, and where disputes cannot be avoided, to manage disputes more effectively.

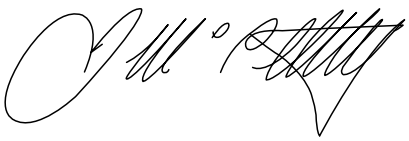
The project involved original research and an extensive review of local and overseas literature on dispute causation and avoidance, with the aim of identifying alternative issue resolution methods. It has resulted in this *Guide to Leading Practice for Dispute Avoidance and Resolution* which incorporates suggested change strategies and implementation tools, to help people in the construction industry avoid the causes of disputes.

This publication is the culmination of significant input from the broader construction industry represented by clients, designers and contractors across the Australian infrastructure and building industry. The industry research leadership and primary funding for the project was provided by *Construction Innovation*. Congratulations and thanks must go to *Construction Innovation's* project team, led by Rick Collins, Manager, Contractual Services, Leighton Contractors, and including representatives of Brisbane City Council, Curtin University of Technology, John Holland Group, Queensland Department of Public Works, Queensland Transport and Main Roads, RMIT University and Thiess.

Construction Innovation also convened a senior industry Dispute Avoidance and Resolution Taskforce, chaired by Tony Barry, Chief Executive – Asia Pacific, Aurecon and representing the Association of Consulting Engineers Australia. We thank the members of the Taskforce and participating member organisations – Australian Constructors Association, Australian Procurement and Construction Council, Civil Contractors Federation, Queensland Transport and Main Roads and Main Roads Western Australia – who have contributed significantly to the success of this important initiative.

Construction Innovation's unique ability to bring together industry stakeholders has produced a significant innovation dividend that will help combat the unacceptably high community costs from disputes on construction projects in Australia. We encourage industry to implement the suggested strategies and turn presently wasted resources into additional wealth and productive investment to enhance the quality of life for the Australian community.

We look forward to industry adopting the Guide and working together to improve the future of Australia's construction industry – developing a new era of enhanced business practices and innovation.



Mr John V McCarthy AO
Chair
CRC for *Construction Innovation*

Dr Keith Hampson
Chief Executive Officer
CRC for *Construction Innovation*

Preamble

I am delighted to present this *Guide to Leading Practice for Dispute Avoidance and Resolution*.

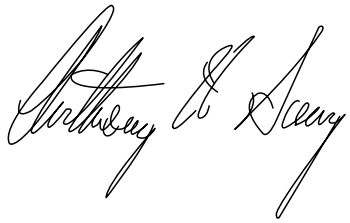
The global financial crisis and its repercussions have reinforced for us the urgency to deliver every benefit we can from the Australian Government's infrastructure stimulus package and the catch-up funding to secure much-needed community facilities. Wasting resources on non-productive tasks cannot continue.

It has become increasingly clear that sustained improvements will not be achieved without significant cultural and behavioural change to create a lasting culture that supports alternative methods to avoid disputes between clients, designers, contractors and other industry stakeholders and where these cannot be avoided, to manage disputes more effectively, quickly and at a lower cost.

Such change requires the active cooperation of all sectors of the industry. It is no coincidence that the best performances of the industry have been achieved where there is a high degree of leadership and commitment shown by each of the main participants: the clients, designers and the contractors.

I offer my congratulations and thanks to everyone involved in the development of the Guide. In particular I would like to thank the CRC for *Construction Innovation* for its research leadership and for its role in funding and managing the development of the Guide. I also thank those other participating member organisations and those who provided additional financial support.

I hope and trust that the Guide will be embraced by the whole industry as a useful and practical tool that will help drive the much needed improvement to the avoidance of contractual disputes.



Tony Barry
Chief Executive – Asia Pacific, Aurecon
Chair, Dispute Avoidance and Resolution Taskforce
Representing the Association of Consulting Engineers Australia

Contents

The challenge

1. To avoid and resolve disputes a cultural change is required within the construction industry.

2. Research undertaken for this project showed that there are six factors critical to minimisation and avoidance of disputes:

    i. Recognition that each construction project involves the creation of a new group of people with diverse interests. There is thus the need to create a culture within the group which is project oriented, but which recognises the financial and social requirements of each participant, and facilitates the building of trust between them.

    ii. In selecting project participants, significant weight should be given to the attitude of a participant, as well as its capacity and pricing.

    iii. The early involvement of head contractors, specialist subcontractors and designers with the client and other project sponsors.

    iv. Sensible risk allocation.

    v. Appropriate delegation of authority, including financial authority, to problem solve rapidly.

    vi. Selecting a project delivery mechanism and contractual framework that reflects the matters above.

3. Without the cultural change inherent in adopting the concepts above, the Australian economy will continue to suffer wastage from disputes in the construction industry estimated at approximately $7 billion per annum.

4. Achieving cultural change will not be easy, but it is achievable and obviously worthwhile. It will require leadership and direction from the most senior executives of all industry participants.

Dispute avoidance checklist

This CRC for *Construction Innovation's* Dispute Avoidance and Resolution (DAR) research and implementation project found that there are readily available opportunities to improve the performance of construction projects that could annually deliver an additional $7 billion of value to the Australian economy.

Those opportunities require the elimination or minimisation of causes of disputes within different phases of the project delivery process, and are reflected in the following checklist.

The power to influence the elimination or minimisation of causes of disputes changes as projects unfold — clients and other project sponsors (financiers, end-users, operators) have the greatest ability to take advantage of opportunities at the beginning of projects. Designers and contractors assume control through the design and construction of projects.

Early in a project's life the project sponsors' visionary and strategic activities include deciding whether a need is best met by construction of an asset, settling on an approach to risk management and deciding on a procurement strategy. It is here that clients and project sponsors have the greatest ability to minimise disputes and maximise value.

Informed leadership decisions, supported by in-house or consultant construction project skills, have the ability to minimise the risk of disputes. They are similar to the decisions taken in the establishment of any ongoing enterprise.

The research undertaken for this DAR project identified a number of causes of disputes that occur again and again on construction projects, in Australia and other countries. Some are in the control of the client or its advisers, whilst others are in the control of designers or contractors. Those causes, whether they lead to the need for formal dispute resolution or not, are wasteful and contribute to the inclusion of unnecessary "business as usual" contingencies in the cost structure of the industry.

Informed clients and project sponsors (or "wise buyers") understand that each construction project is essentially a prototype, and will be designed and constructed by a team of people brought together in a virtual organisation specifically for that purpose. Unless key people in that team have previously worked together, and for the client, it is all but certain that there will be little if any trust between them, or between the client and the team.

Research shows clearly that the level of trust present has a direct impact on team relationships and on the project environment or culture. If the project environment is characterised by poor team relationships, there is likely to be considerable wasted effort on the project, and the likelihood of disputes over technical or commercial matters is greatly increased.

There are strategic decisions that clients and project sponsors can take during the earliest stages of project initiation to signal both a level of trust, and trustworthiness. This is done to reduce the risk of disputes, and minimise wasted effort.

In the right circumstances, designers and contractors will willingly respond to the client signalling trusting behaviour, by bringing their skills to bear to reduce cost, shorten construction time, and optimise functionality. They will avoid opportunistic decisions that could otherwise be taken to force additional costs on the client.

There is nothing particularly complicated or difficult in the decisions that clients and other project sponsors, designers and contractors can take to create trusting relationships and a positive project environment.

Client and project sponsor decisions

1. Identify need

The need being addressed by funding a construction project should be clearly identified and articulated. The project may deliver an asset that satisfies a business need (creating wealth measured in dollars) or a social need (improving services to a community from a new school, hospital, road or other facility). Designers and other advisers should have a clear understanding of the need to be able to suggest design options and develop concept designs.

2. Project team selection

Designers and other advisers are selected based on their ability to work well together as a team, as well as their technical skills and track record. Particularly with more complex projects, greater certainty of cost and constructability is achieved when the client engages a head contractor and key subcontractors to work with engineers, architects and other advisers on option development and early design and planning work.

3. Scope of work

The scope of the work and the functionality or performance characteristics to be delivered by the asset should be clearly documented. This should include the time within which the asset is required, and take into account the characteristics of the site on which it is to be constructed, including adequate geotechnical analysis.

4. Adequate finance

Sufficient finance must be available to undertake the project. Given that construction projects demonstrate most of the characteristics of prototypes, and therefore changes in their technical or commercial parameters is common, the budget should include prudent contingencies for possible changes in time or cost required, or changes in functionality.

5. Risk management

A thorough risk register, identifying possible risks to achieving required time, cost and functionality, and strategies to mitigate those risks, is shared with designers and contractors. Responsibility for managing each risk is clearly allocated to the organisation or person best able to manage it, and that organisation or person is paid to assume the risk.

6. Procurement strategy

The procurement strategy for construction is adopted after a considered analysis of available options, and the client's key strategic drivers. Those drivers generally include:

- how well the scope of the project has been defined
- the time within which the asset is required, the likely time to construct it, and the purpose for which it is required
- the complexity of the design
- the level of certainty about market costs, and availability of necessary design and construction capability
- the funding available, including contingencies
- the risk appetite of the client and project sponsors
- the client's experience of construction projects.

7. Design

The level of design made available for the market to price is appropriate to the procurement strategy and the level of risk the client expects contractors to take. As a general rule, the more design detail and information about the site of the project made available to potential head contractors and subcontractors, the lower the risk to them.

8. Risk allocation

The head contract documentation for the project prepared by the client reflects the clear and unambiguous risk allocations that were part of the package of information made available for the market to price. Any changes made necessary as a result of firming up prices or the scope of the project are clearly identified. The introduction of integrated digital modelling or virtual prototypes early in the design process has significantly reduced the need for contingencies, improved clash detection and reduced waste and wasted effort, and improved construction optimisation at design stage.

9. Client project management

The client's most senior representative charged with making decisions under the head contract is given a clear brief to act in the best interests of the project, including monitoring the quality of project team relationships. That representative may be an employee of the client, or a consultant.

10. Communication protocols

The head contract will require communication protocols that encourage open communication and the solving of problems or issues as quickly as possible. It will include a framework for formal, alternative, issue resolution, focused on rapid identification of issues, and escalation of issues that cannot be resolved by agreement at site level, to the lowest possible level of off-site negotiation and resolution.

11. Dispute resolution

Formal dispute resolution may be aided by the use of processes involving independent monitoring of project issues, and "coaching" to assist in their resolution.

Project team decisions

12. Project team planning

Once the head contractor has been appointed, its task of building team relationships with designers and subcontractors, and the client's representatives, begins in earnest. There are a series of planning, design, and other tasks that provide opportunities to the head contractor to build team relationships. Most importantly, as with any business or sporting team, objectives should be aligned and agreed if effort is not to be wasted and disputes avoided.

13. Subcontract risk allocation

The first step is to make sure that subcontract documentation mirrors the technical and commercial elements of the head contract, and is consistent with information made available for the market to price. Subcontract risk allocations for individual trade packages should be consistent with those in the head contract.

14. Project team relationships

The head contract documentation should require the head contractor to take responsibility for, and to monitor and report on, project team relationships. One approach to this is for the head contractor to develop a formal project business plan, with the involvement of the designers and subcontractors.

The process of doing so does two things: first, it documents the way the team will work together to undertake particular tasks including design coordination, programming, safety management, material handling, and so on; second, by agreeing on those practical tasks in a collaborative way, business relationships are developed, trust has the opportunity to be shown, and a set of agreed project objectives is established.

15. Integrated design

Some head contractors are only engaging subcontractors that are prepared to produce digital models of their components (including formwork, mechanical ductwork and pipework) at the same time as the design team, so enabling the integration of all information into a single model. This provides clash detection and integrated data early in the design and construction process.

16. Alternative issue resolution

The project business plan will include communication protocols that encourage open communication, and the solving of problems or issues as quickly as possible. The plan will include a framework for formal issue resolution, focused on rapid identification of issues and escalation of issues that cannot be resolved by agreement at site level, to the lowest possible level of off-site negotiation and resolution.

Formal resolution may be aided by the use of processes involving independent monitoring of project issues, and "coaching" to assist in their resolution.

A. The issues and costs

A1. Characteristics of the construction industry

The construction industry delivers vital infrastructure and buildings that are a foundation to the Australian economy. The DAR project was primarily concerned with issues arising in the course of non-residential building (including offices, hospitals, schools, shopping centres, factories, sports venues, and hotels), and infrastructure (including roads, railways, mines, power stations). It was not concerned with residential cottage building, although some of the characteristics of, and issues arising on, non-residential building projects also apply to high density/high rise accommodation projects.

The Construction Forecasting Council reported in June 2009 that $120 billion worth of such work (non-residential building, engineering construction, and apartment building) would be carried out in the 2008-09 year. Approximately one million people were employed in the industry in that year.

The construction of every capital asset involves unique design, procurement and construction challenges. Different location and site conditions, construction methods, equipment and materials, and the assembly and management of a team of people to design, procure and construct each asset invariably mean the construction process is one of creating a prototype.

By its very nature, the delivery of a prototype is a dynamic process, requiring members of the project team to work together to continually fine-tune and adjust the detailed project requirements, project designs and construction methods, sequence, resources and logistics. Project teams are created anew for each project. People from different disciplines, and organisations, are engaged to design and construct different elements of each project. Problem solving is an integral part of managing construction projects to foster innovation, reduce rework, avoid waste, and reduce risks including those of issues escalating to become disputes requiring arbitration or litigation to resolve.

The same challenges also lead to wasted effort evidenced by, amongst other things, unnecessary or inadequate design documentation, poor quality, mis-communication, sub-optimal materials handling on site, and poor allocation and management of human and material resources.

A2. Disputes and their costs

The costs of contractual disputes, direct and indirect, are substantial. They are borne not only by clients, designers and contractors, but also by the community through, for example, additional taxation revenue needed to provide essential services, and the management of the taxpayer-funded Federal, State and Territory court systems to deal with disputes.

There are direct costs in disputes such as legal services, arbitration, consultants, courts, and the diversion of in-house resources (both legal and non-legal) to manage dispute resolution processes – for clients, designers and contractors. When disputes proceed to arbitration or litigation, the direct costs can be significantly high and are often comparable to the amount of the claim itself.

There are also indirect costs incurred by the parties such as delays to the project, adverse performance of the project, distraction and over-burdening of staff on the project, reduced morale, erosion of confidence and trust in working relationships, adverse impact on the reputation of the parties, emotional impact on people involved, lost opportunities for future work, destruction of business relationships, and the loss of people to the industry because of wasted effort, disillusionment and frustration.

A 2006 Blake Dawson Waldron (BDW) report[1], based on an analysis of 183 responses received to an industry-wide survey, indicates an estimated industry-wide weighted average value of matters in dispute of about 8.4% of contract prices.

Construction Innovation's project team estimated an industry-wide weighted average value of avoidable costs that end up in dispute of about 5.9% of contract price (i.e. 70% of the 8.4% of contract price identified by the BDW report).

[1] Blake Dawson Waldron (2006) "Scope for improvement – A survey of pressure points in Australian construction and infrastructure projects".

The DAR project team's analysis of available industry data regarding the direct cost of resolving disputes, and feedback from clients, contractors and legal practitioners, indicated that an industry-wide general magnitude estimate of the direct cost of resolving disputes of between about $560 million and $840 million per year.

When the direct cost of resolving disputes is added to the avoidable costs, the total waste exceeds $7 billion per year, given construction industry turnover of $120 billion in 2008-09. This turnover figure includes the value of engineering projects, non-residential building and apartment building projects, but excludes the value of residential cottage building.

Disputes and a disruptive industry environment also contribute to inflation of future project cost through higher tendered prices based on previous experience in similar work incorporated into a "business as usual" approach. This represents a tragic loss to the Australian community and the Australian economy in terms of the lost opportunity to deliver real value through improved transport, health, education, infrastructure, facilities and services. If the unnecessary cost can be avoided by appropriate attitudes and practices, the same capital and human resource pool would be released to produce significantly more public and private infrastructure and services for the benefit of the community as a whole.

The challenge for the industry, through this project, was to produce a set of guidelines that can be applied on every project, regardless of size, delivery strategy, or location, to avoid contractual disputes. The evidence from Australia and overseas is that dispute avoidance relies primarily on the technical and commercial skills of project managers and their ability to personally interact with others in an impartial and non-adversarial manner.

A3. Construction and problematic issues

Research in the United States[2] has shown that a combination of environmental and behavioural issues can lead to disputes on construction and engineering projects. The inherent degree of uncertainty that prevails within construction projects, given their character as prototypes, can result in planning being a problematic issue, especially when adequate information is not available. When uncertainty is high, initial drawings and specifications will invariably change, and the project team will have to solve problems as they occur during construction. If functional requirements or design documentation are unclear or inadequate, or the resolution of a design problem does not satisfy the needs of all who are affected by it, disagreements between parties can materialise. This is particularly the case when design documentation is completed progressively during construction, leading to potential contingencies not being able to be identified and assessed until they materialise.

Many of the problems that arise because of rework, scope changes and documentation quality are interrelated, and are typically a product of a project's procurement strategy and the management practices implemented by organisations involved with the project. There is also the potential for one party to behave in an opportunistic way, when the contract does not offer a straightforward answer to an issue. If there is no specific provision to deal unequivocally with an unforeseen event, or a provision is interpreted to suit the particular circumstances that have arisen, then there is a potential for opportunism.

When procurement strategies include risk allocation provisions intended to avoid or minimise the client's exposure to uncertain cost or time outcomes, they discourage integration, cooperation and collaboration between project participants. Further, they reflect an incompatibility of interest arising from differing norms and values, as well as the competing objectives and goals of project participants. The end result is the anticipation of adversarial relations between the parties before any work has been done. This does nothing to create an environment in which collaborative problem solving can readily occur.

Worse, inappropriate risk allocation through disclaimer clauses in contracts has been shown to be a significant driver of increased construction costs[3].

In the United Kingdom much of the construction industry's efforts to increase productivity and reduce disputes since the mid-1990s have focused on the fragmented structure of the industry, a characteristic shared with Australia and the United States. The fragmented structure has significant impacts on risk allocation, working relationships, and the likelihood of disputes. A United Kingdom House of Commons Committee Report in 2008 assessed the performance of the industry in the United Kingdom[4]:

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[2] Mitropoulos, P and Howell G (2001) "Model for understanding, preventing, and resolving project disputes" *Journal of Construction Engineering and Management, ASCE 127(3): 223-231.*

[3] Hartman, F (1998) "The real cost of weasel clauses in your contract", 29th Annual Project Management Institute Seminars and Symposium.

[4] *Construction matters* United Kingdom House of Commons Business and Enterprise Committee, July 2008, p. 44.

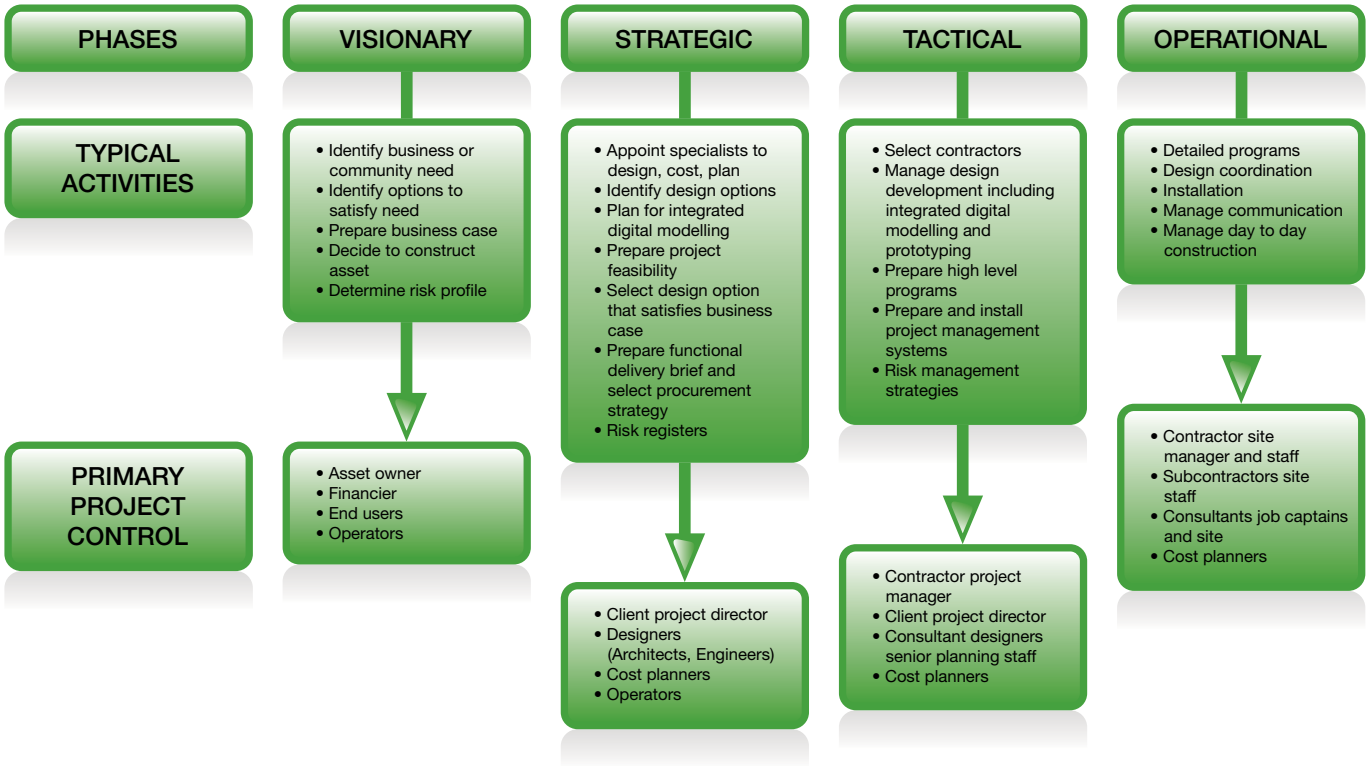
112. The construction industry's poor performance is largely a consequence of its highly fragmented structure. The main contractor will then subcontract the work to specialist contractors who are largely responsible for making the original design a reality. This hierarchical structure often leads to adversarial relationships, with most parties operating in silos, and the transferral of risk along the supply chain. Frequently delays occur because sub-contractors have not had the chance to influence the early design. Disputes and reworking impact on out-turn costs and the quality of the end-product. This puts at risk the improved services or business performance that the project is meant to deliver.

The power or influence to eliminate or minimise causes of disputes changes as projects unfold. Clients and other project sponsors (for example, financiers, end-users, operators) have greatest ability to take advantage of opportunities at the beginning of projects. Designers and contractors assume control through the design and construction of projects. Figure 1 summarises the phases typical to most projects.

Early in a project's life the project sponsors' visionary and strategic activities include deciding whether a need is best met by construction of an asset, settling on an approach to risk management and deciding on a procurement strategy. It is here that clients and project sponsors have the greatest ability to minimise disputes and maximise value.

Informed leadership decisions, supported by in house or consultant construction project skills, have the ability to minimise the risk of disputes. They are similar to the decisions taken in the establishment of any ongoing enterprise.

Figure 1: Project delivery phases and responsibilities



B. Identifying the causes of disputes

B1. Previous initiatives

The Australian construction industry has undergone a series of introspective reviews over the last 20 years. They began in the late 1980s when the then National Public Works Committee and the National Building and Construction Council spent more than 12 months identifying the causes of disputes, and suggesting strategies to minimise disputes. The work culminated in a report published in 1990 called *No Dispute*.

No Dispute was widely acclaimed within the industry and by clients of the industry. However in much the same way that the then Australian colonies agreed on something quite important in 1901 but have been squabbling ever since, so the causes of poor performance and disputes identified in 1990 continue to bedevil the industry.

Clients and end-users complain that projects are delivered late, over budget, and with inadequate functionality or quality, and that contractors have a "take no prisoners" mentality. Contractors and designers complain that clients don't define their needs clearly, do not adequately scope their needs, expect contractors to take risks they cannot manage, and are reluctant to pay a fair price. The principal concerns addressed in *No Dispute* included:

- unreasonable risk allocations imposed by clients in head contracts, and cascading down to sub-contracts
- systems for the selection of contractors and subcontractors placing too much emphasis on price and not enough on capability or the ability of disparate organisations to work well together
- inadequate scoping of work by clients through design documents.

Those concerns continue to be pointed as the apparent causes of disputes. Specific problems identified in the BDW report[5] were inadequate scoping, unrealistic time and cost objectives, poor risk allocation and inappropriate procurement methods. It is no comfort that in the intervening 20 years the list of problems has been added to, and is shared with counterparts in the United Kingdom and the United States. The United Kingdom in particular has spent considerable time, intellectual horsepower, and money on a series of inquiries, reports and programs, all focused on reducing disputes and enhancing performance. The literature is replete with data and analysis and recommendations.[6]

Construction Innovation's project team commissioned a review of the literature from the University of Newcastle, and had the benefit of further reviews of past work in the reports it commissioned from Curtin University of Technology[7] and the RMIT University.[8] It found that some of the more recent work was seeking to go behind the more orthodox descriptions of the causes of disputes, to identify the underlying causes of disputes – the underlying reasons that create problems which, if eliminated, would prevent recurrence. The common sense thesis is that the best way to avoid disputes is to avoid the underlying causes of disputes.

Construction Innovation's report commissioned from Curtin included a review of previous studies into the cause of disputes, and concluded that the key causal factors contributing to disputes are:

- poor contract documentation that arise from the organisational system (e.g. inadequate/incomplete design information, ambiguities in contract documents)
- scope changes that arise from the innate uncertainty that exists within the project management system (e.g. variations due to client, design errors, site conditions)
- educational and behavioural adaptations of individuals within the people system (e.g. poor communication, poor management, skill and experience, and personality traits).

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[5] Blake Dawson Waldron (2006) "Scope for improvement – A survey of pressure points in Australian construction and infrastructure projects".

[6] *Relationship Contracting* (1998) Australian Constructors Association.

Constructing the Team (1994) United Kingdom Department of the Environment.

Rethinking Construction (1998) United Kingdom Construction Task Force.

Accelerating Change (2002) United Kingdom Strategic Forum for Construction.

Construction Matters (2008) United Kingdom House of Commons Business and Enterprise Committee, Ninth Report of Session 2007-2008.

[7] Love, P, Davis, P et al (2008) "Causal ascription of disputes in construction projects".

[8] Blismas N, Jellie D, Wakefield R and Harley J (2008) "Strategies for Dispute Avoidance".

Project sponsors (end-users, the client, financiers, operators) make key strategic decisions at the outset of projects – the project initiation process – involving the determination of their needs, the selection of a suitable procurement strategy to satisfy the needs, and the appointment of designers and contractors to do the work. These strategic decisions largely determine the quality of contract documentation, selection of the project management system, and appointment of the project team.

The business as usual strategies adopted by many construction industry participants who prepare or influence the terms of contracts for building and construction projects (referred to as the contract makers) do not avoid the underlying causes of disputes. This situation is exacerbated by some contract makers who erroneously believe that preventing disputes is best achieved by adopting risk averse terms backed up by complex and convoluted contract administration requirements reinforced by adversarial behaviour.

In this regard contract makers include, for example:

- client organisations that prepare and administer the terms of head contracts
- public sector treasury departments and private sector financiers that may influence the manner in which contracts are administered through the creation of polices that are not congruent with a contract's commercial terms
- head contractors that prepare the terms of subcontracts
- legal advisers that advise on, and thus influence, the terms of contracts.

This business as usual approach has historically been part of the culture for a large part of the industry. Typically this results in polarised positions being taken by the participants, often causing distrust, disengagement, poor communication, antagonism, adversarial attitudes, competitive pressures and other counter-productive behaviours.

The research shows that (perhaps counter-intuitively) risk averse strategies do not avoid the underlying causes of disputes, and that these strategies are in themselves risky, uncertain and counterproductive for all project participants. For example, a tender document for a project may, at the tender box, produce what appears to be good price for the client, but it may fail to minimise future claims, variations or disputes that may occur.

This adversarial and harmful culture is self perpetuating and, in turn, is passed on to incoming participants. The culture influences the development of organisational policies and practices. It provides the organisational framework within which organisations and their people work. It binds them through both explicit and implicit rules that perpetuate the adversarial culture.

The choice of procurement strategy, and its implementation, rarely involves consideration of aligning the goals and objectives of the project sponsors and the various organisations in the project team before settling on the final bundle of contractual rights and obligations. Conventionally, once the head contractor has been appointed and a contract agreed, project sponsors expect that the head contractor takes primary responsibility for all later required tactical and operational decisions. That being so, there is the likelihood that differing goals and objectives may trigger adversarial relations that lead to unhappy projects and disputes.

Furthermore, risk averse strategies greatly increase the cost of "up-front" legal and risk management services incurred by the client, head contractors, design consultants, and subcontractors when preparing, tendering, negotiating, performing and administering risk averse contracts for a project as a result of the additional complexity and unreasonable nature of the proposed project risk allocation and contract processes.

The DAR project team's analysis of the costs of "up-front" legal and risk management services for construction projects indicates that an industry wide general magnitude estimate of these costs would be in the range from about $500 million to $750 million per year, a significant share of which would be attributable to the "up-front" legal and risk management services associated with risk averse contracts.

These "up-front" legal and risk management costs are in addition to the $560 million to $840 million per year direct costs of resolving disputes described in section A2.

B2. Causes of disputes embedded in project initiation processes

The *Construction Innovation* research identified and categorised many of the underlying causes of disputes, and the relationship between them and the underlying drivers of a successful project.

The categorisation of the causes of disputes facilitates understanding and helps in targeting strategies for addressing industry, organisation and project team development.

Common symptoms of the causes of disputes on construction projects include the failure to:

- adequately specify project scope
- thoroughly investigate and/or understand the factors relevant to the site
- select an appropriate procurement strategy for the project
- provide an adequate budget and time frame for the project
- select suitable organisations and provide sufficient suitable people for the project team
- develop a "can-do" project team attitude based on proactive, cooperative behaviour and trust
- structure the project team rewards to encourage win-win, best-for-project outcomes
- use project strategies that effectively manage the issues, risks and opportunities created by the dynamics of project performance
- use project management skills to overview and fine-tune the behavioural interaction of the project team
- ensure contracts include appropriate roles, relationships, risk allocation, contract processes and procedures for effective project performance
- manage risk effectively and/or allocate risk appropriately
- adopt strategies that maximise operating flexibility
- ensure open effective communication
- encourage initiative and innovation
- adopt effective strategies for digital modelling that allows early integration of discipline input for prototype testing of design performance, construction planning and buildability, clash detection, commissioning and operation
- use resource based planning techniques
- avoid "urgent" variations that do not add value to the project
- adopt proactive issue resolution strategies.

Events and circumstances involving one or more of the above failures will cause the project works to be carried out less efficiently and cause some or all of the project team to incur additional cost, delay, disruption, and/or cause mistakes and/or perform poor quality work that requires rectification.

The *Construction Innovation* research[9] makes the observation that a "root" cause of a potential dispute may lie hidden or dormant within systems and processes for a considerable period of time, and may become an integral part of everyday work practice, but still causing a significant adverse impact on a project. The adverse effects of these hidden factors are typically absorbed into historical productivity data and higher industry tender unit prices. These hidden factors are often the result of one or more of three categories of issues:

1. circumstance – arising from the project's operating environment, and can include external environment, project location, client type, client expectations, procurement strategy and integration with other works

2. practice – arising from practices such as poor planning, poor resourcing, poor tender/award process, failure to check designs, opportunistic behaviour, interpersonal relationships, failure to hand over the site

3. task – arising from the nature of the task being performed, for example poor documentation standards, defective work, misinterpretation of contract requirements, persistent late payment and poor document control.

[9] Love, P, Davis, P et al (2008) "Causal ascription of disputes in construction projects

These categories of issues are in turn often the product of strategic decisions made by project sponsors at the outset of projects and embedded in the commercial documentation of projects by contract makers. They condition the industry to behave in particular ways, and lead to the environment or culture of each construction project having unique characteristics. As in any enterprise, the environment or culture of a project will have a fundamental impact on the way people work, and the way issues are addressed.[10]

A study of 28 very successful projects commissioned by the Property Council of Australia in 2001[11] identified decisions made about five matters that largely determine the culture or environment of projects, and their commercial success. These decisions are made by the client and, if made sub-optimally, contain the root causes of disputes. The client's decision may be the product of its own experience or policy, or be the result of advice from another project sponsor or contract maker. The five matters relate to:

i. the level of trust shown in the skills and behaviour of the project team (particularly the head contractor) borne of previous experience or the advice of lawyers or other advisers

ii. the risk appetite/tolerance of the asset owner and financiers

iii. the financial management of the project, and the limit of construction risk each of the project sponsors is able or prepared to take

iv. the project delivery strategy selected and its appropriateness to the asset, market conditions, and site conditions

v. the brief given to the client project director and the limitations it places on that person to deal equitably with other parties to the contract when solving problems.

Those strategic decisions substantially determine the project environment or culture, and the manner in which the project team is conditioned to behave. They determine the bounds within which later decisions regarding the nature and quality of documentation, and the project management system, are made. They are at the heart of whether a collaborative approach to the project is possible.

In many cases the project sponsors do not make a deliberate decision regarding these matters. The common business as usual or default position is borne of previous experience or professional advice, often intended to win certainty of outcomes.

The choice made (or default position adopted) in relation to each matter can be plotted in a maturity model, using descriptors typically encountered on project sites. The descriptors for each of the five decisions are shown below. Project sponsors operating in the business as usual or "red" zone will elicit responses from designers and contractors that are different to those produced by behaviour in the "green" zone.[12] The Property Council study showed that the top 10% of projects (with clients making "green" decisions) produce on average 30% more wealth/value than the average wealth/value created by the other 90% of projects. The study adopted a broad definition of "wealth":[13]

> *".. wealth is measured not only by the creation of new physical assets but by such factors as return on investment, extra value from capital, supplier margins, quality of life factors (including health), extra services provided to end-users, improved operator morale, and lower maintenance and operating costs."*

[10] Diekmann, J and Girard, M (1995) "Are contract disputes predictable?" *Journal of Construction Engineering and Management ASCE 121(4): 355-363*.

[11] Crow TW (2004) "Strategies for achieving excellence in project outcomes" Doctoral thesis, Deakin University.

[12] Crow, TW and Barda, P (2004) *Project strategic planning – A prerequisite to lean construction*, International Group for Lean Construction 12, Copenhagen.

[13] Crow, TW and Barda, P (2001) *Projects as Wealth Creators* Property Council of Australia p. 7.

Project sponsor strategic decision 1: Level of trust

BUSINESS AS USUAL	TOWARDS EXCELLENCE	EXCELLENCE	BEYOND EXCELLENCE
Most team members are assumed to be untrustworthy by the client and each other.	Client and team members would like to trust each other.	Trustworthiness is earned through demonstration and by creating relationships.	Mutual trust and good relationships are cornerstones to a project environment conducive to wealth creation.

A “red” decision by project sponsors, showing a lack of trust, will be demonstrated in contract conditions that are risk averse and seek to place all construction risk on the designers and contractors. The typical response from contractors is to seek to protect their commercial positions by following the letter of the contract, without any “give or take”.

Project sponsor strategic decision 2: Client risk tolerance

BUSINESS AS USUAL	TOWARDS EXCELLENCE	EXCELLENCE	BEYOND EXCELLENCE
All risks are contracted out (risk averse).	Price negotiations consider risk allocation responsibility.	Risk allocated to supplier only if able to control it.	Risk management shared by all project team members regardless of contracted responsibility.

“Red” risk tolerance on the part of project sponsors exposes head contractors to some risks over which they have little or no control. Contractors typically understand that some risks have been inappropriately allocated, but continue to participate, albeit reluctantly. Examples of the consequences of a “red” approach are inadequate scoping of the project, and incomplete documentation available at the time the project is tendered.

When faced with imposed or inappropriately allocated risks, head contractors back these risks down onto their subcontractors, some of whom may have no idea of the consequences.

Conversely, a “green” or “blue” decision will involve informed project sponsors who do not have unrealistic expectations and who do not try and offload all the construction risk to the builder. Thorough risk assessment involving the project sponsors, the head contractor, and key subcontractors, leads to a collaborative approach, and incentives for all parties to manage the project to mitigate the consequences of a risk event.

Project sponsor strategic decision 3: Financial management

BUSINESS AS USUAL	TOWARDS EXCELLENCE	EXCELLENCE	BEYOND EXCELLENCE
Client saves on interest by paying team as late as possible and project brief under-funded.	Client understands that team members provide better service if paid regularly and on time.	Functional brief is fully funded with adequate contingencies for risk management.	Client understands that advancing payments saves more than it costs. Contingencies determined with team.

Project sponsor strategic decision 4: Selection of delivery strategy

BUSINESS AS USUAL	TOWARDS EXCELLENCE	EXCELLENCE	BEYOND EXCELLENCE
Legal advice and selected contract determine strategy.	Delivery strategy considered as one criterion for contract selection.	Delivery strategy determined with stakeholder involvement.	Delivery strategy designed with stakeholders to optimally achieve end-user needs.

"Red" decisions involve selecting a delivery strategy and accompanying risk profile that seeks to avoid as much construction risk as possible. These strategies invite contractors to take the risk of a range of matters including less than perfect knowledge of site conditions, delays from causes beyond the control of the contractor, and delays in receiving approvals from third parties (including government agencies).

Project sponsor strategic decision 5: Client project director's brief

BUSINESS AS USUAL	TOWARDS EXCELLENCE	EXCELLENCE	BEYOND EXCELLENCE
Provide inequitable leadership and ruthlessly administer contract.	Contract limits relationship development.	Provide equitable leadership to achieve project business case.	Inspire visionary achievements by project team to achieve an enhanced project business case.

The manner in which the role and responsibilities of the client's most senior representative on a project are implemented will determine in large measure the quality of working relationships on the project. At the "red" end of the spectrum the project director is concerned only with protecting the client's contractual rights, whereas if empowered to behave in the "green" zone the entire project team can be motivated to improve the project feasibility or business case.

The three principal categories of causes of dispute identified in the *Construction Innovation* research are often the "downstream" consequences of decisions made by a project sponsor during project initiation. For example:

1. a financiers' or other project sponsors' refusal to allow adequate contingency for time or cost over-runs is reflected in attempts to shift construction risk to head contractors, and then subcontractors

2. failure to consider how well head contractors' personnel will work as a team with designers' personnel, and the project sponsors team, militates against collaborative problem solving

3. inadequate time and fees for design lead to inadequate design documentation, in turn leading to wasted effort and disputes.

Other factors contributing to disputes and sub-optimal project outcomes are the products of the experience, skills and attitude of different members of the project team – clients, designers, and contractors alike.

In other words, everyone engaged on a construction project has a role to play in minimising potential causes of disputes. The ability of designers and contractors to do so however, is largely determined by the commercial framework of risk allocation and contract conditions imposed by project sponsors.

C. Avoiding disputes – the role of project sponsors

Clear and strong client leadership is essential if the risk of disputes occurring is to be minimised. That leadership, and the trust that results from it, are key drivers of successful projects. Strategic decisions made early in the life of a project by the client and other project sponsors can either limit or promote the likelihood that the project will avoid significant disputes. Setting a constructive delivery environment for the project at the outset is vital. Understanding the degree and nature of changing circumstances likely to be experienced during the delivery of a project is critical to the project's success. The surest way to avoid disputes is to seek to develop and implement strategies that are in the "green" zone.

The client has the opportunity, before contract documents are finalised, to determine how it will create that environment, and reflect it in the terms of tender documents, the brief it gives to its senior project personnel, and in its approach to risk identification and management. There are opportunities during tender negotiations for the project participants to jointly identify and report on risks and mitigation strategies, and incorporate them in contract documents.

The objective at this stage is to optimise prospects of a successful project (obviously one without significant disputes) by putting in place unequivocal risk allocation, quality documentation, and a fully defined project scope.

These elements are substantially captured in three key processes initially controlled by project sponsors that have a significant impact on the efficiency of the project and, by definition, on the likelihood of avoiding disputes and minimising wasted effort:

1. project definition and briefing
2. ensuring contractor and specialist contractor input to design
3. selecting the head contractor and specialist contractors.

C1. Project definition and briefing

The Australian Procurement and Construction Council and the Australian Construction Industry Forum describe a thorough series of actions to be undertaken on all projects in the *Guide to Project Initiation*. The steps involved in Leading Practice Project Initiation described in the Guide are summarised in Figure 2.[14] If reflected in thorough preparation of briefing documents for designers and contractors, they greatly limit the scope for disputes, and for wasted effort in design documentation.

The final deliverable from the project initiation phase is the delivery brief, which consolidates and documents all of the project analysis, description and planning, which has been approved by the client, into a brief for the implementation of the project. The delivery brief should contain:

- project sponsors' strategic objectives for the project
- the functional objectives for the project – what it must do
- a first draft of any required sustainability rating tool outcome for the project
- the financial constraints and objectives
- a summary of the conclusions from feasibility and risk analysis
- details of planning approvals
- the project implementation plan, actions and schedules
- a procurement plan
- a cost plan
- the project concept design, description and illustrative definition.

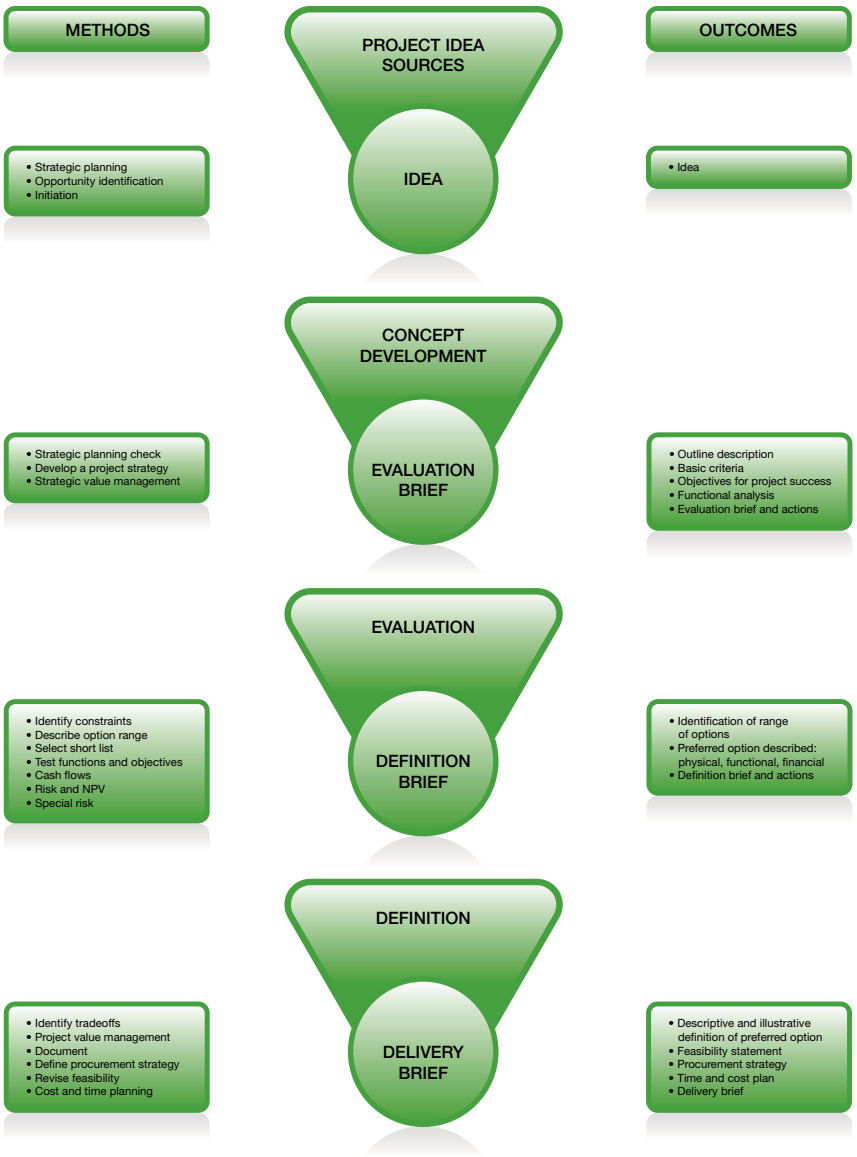
These outcomes provide a clear project scope, and a solid platform for quality design documentation.

[14] Construction Industry Development Agency (1994) *Construction Industry Project Initiation Guide* p. 11.

Some parts of the construction industry in the United Kingdom and Australia have developed early contractor involvement (ECI) strategies as strategies to gain the benefits of contractor input to design, optimise constructability/buildability, and minimise the likelihood of disputes. Those strategies emerged from a 1998 report of the United Kingdom Construction Task Force[15], chaired by Sir John Egan, which identified integrated processes and teams as a key driver of enhanced productivity and teamwork, in turn minimising the causes of disputes. These strategies allow the advice of contractors, engaged and paid for as consultants, to be reflected in early design, without compromising clients and other project sponsors ability to later use hard dollar contracting strategies if they wish to.

The use of ECI strategies is also growing in the United States, driven by the growing adoption of integrated digital modelling and the need to formalise the earlier involvement of head contractors and subcontractors in the design process.[16] Australian government agencies (notably the Queensland Government and the Australian Government Department of Defence) have successfully used two stage contract approaches to gain the same benefits as those delivered by ECI strategies[17].

Figure 2: The project initiation process



[15] United Kingdom Construction Task Force (1998) *Rethinking Construction*.

[16] Young, N, Jones, S and Bernstein, H (2008) *Building Information Modelling, Transforming Design and Construction to Achieve Greater Industry Productivity*, McGraw Hill Construction.

[17] Quick R (2007) *Queensland's ECI Contract*, International Construction Law Review.

C2. Contractor input to design

The hierarchical structure of the industry almost always excludes specialist subcontractors and manufacturers from contributing to the optimal way of satisfying a project's functional objectives, and is a substantial cause of wasted effort. Deficiencies or errors in design documentation contribute to disputes and are a source of considerable wasted effort.

Few design consultants have manufacturing or direct construction experience – to optimise design, manufacturing and construction experience is essential, particularly when structural and mechanical elements are concerned. The specialist subcontractors involved in manufacture typically represent between 20% and 40% of capital cost of major buildings and process plants, and have the capacity to contribute significantly to reduce whole-of-life cost.

Similarly, construction efficiency or constructability of any design is of major significance in optimising construction costs. The solution lies in increasing integration of the key specialist subcontractors, the head contractor and design consultants. Ideally this should happen before the design is frozen.

The higher the level of integration of team members at the early design stages, the greater the opportunities to get maximum benefit from the use of computer aided drafting and in particular its most recent exemplar, integrated digital modelling. Integrated digital modelling promotes clearer, more accurate, up-to-date communication by consolidating currently disparate project information allowing all team members to contribute to the establishment and population of the databases underpinning the planning, design, construction and operation of the asset.[18]

Ideally, an integrated project team including design consultants and cost planners, head contractor and key specialist subcontractors, will be involved in developing the design, cost plan and move on to design development. As a result, project sponsors can expect much more clarity about cost, schedule and quality far earlier in the process. The ability of key people from different organisations to work well together to solve problems, avoid wasted effort and eliminate disputes is tested before construction commences.

The project team members are able to work collaboratively together, and with project sponsors, and establish ideal project management and people management protocols. This goes a long way towards ensuring problems are solved and do not become issues requiring formal dispute resolution.

The United Kingdom House of Commons *Construction matters* report points to the benefits of greater integration in design.[19]

> *"Traditionally, construction projects have followed a sequential process of design, specification, and procurement. However, this approach tends to preclude manufacturers and specialist contractors from offering expert advice at an early stage. Integrated working, which involves the supply chain early on in projects, generates efficiencies in both the design and construction stages. The whole team is able to influence the planning of the project, its design, and the management of risks and costs. Issues which might have arisen further down the line, leading to costly re-working of the initial design, can be addressed at the outset. In so doing, early engagement promotes a more realistic costing and bidding process."*

[18] Fischer, M and Drogemuller, R (2009) "Virtual design and construction", in Newton P, Hampson K and Drogemuller R, *Technology, Design and Process Innovation in the Built Environment*, Spon Press, London.

[19] United Kingdom House of Commons Business and Enterprise Committee (2008) *Construction matters* p. 46.

C3. Selecting the head contractor and specialist subcontractors

Head and specialist sub contractors are generally selected on the basis of capacity and price. However experienced clients understand that low prices may mask a lack of understanding of what is required to realise a design and deliver required functionality, and will test the capability of low bidders and their understanding of the project before accepting a low price.

What is not so well understood is the nature of the project process itself, creating a temporary enterprise made up of sometimes a multitude of organisations which are relative strangers to each other, for a single project. Little attention is paid to matching the attitudes of key team members. Less is paid to whether they will work well as a team. Careful attention should be paid to putting in place appropriate and efficient communication protocols as the potential for disputes to arise from poor communication protocols is considerable.

Whilst the industry seems to be able to make superb technical construction and engineering skills available to its clients in this way, it has not spent enough time or effort in making sure the necessary level of management and human resource skills are available to manage each new "temporary" enterprise as it is created.

Collaborative delivery strategies such as alliances embody processes that demand that project team leaders work well together and draw on each other's strengths towards achieving common project objectives, as well as cost and capability considerations. There is no reason why similar approaches cannot be used in other delivery strategies, using focused task-driven "events" to test how people work together e.g. developing shared objectives, preparing risk/reward equations, preparing programs, and so on.

Research identified in the course of the *Construction Innovation* project points to the benefits of collaborative forms of procurement, and the need for such forms of procurement to be based on the development of relationships between the various parties. The research makes the point that this requires an iterative and evolutionary learning process with three important characteristics – commitment, trust and cooperation.[20]

Collaborative procurement can take many forms. Partnering and alliances are examples, with alignment of objectives towards a common business objects as a common thread. Collaborative procurement, virtually by definition, requires an approach that includes clear articulation of project scope, shared values and objectives, and open and transparent risk sharing.[21]

As discussed earlier, the growing use of ECI strategies is another example of new thinking that focuses on collaboration to improve results and decrease the risk of disputes.

[20] Davis, PR (2004) "Relationship development in construction partner selection" COBRA 2004 International Construction Research Conference of the Royal Institution of Chartered Surveyors, 7-8 September, Leeds Metropolitan University, Leeds, United Kingdom.

[21] Walker, DHT and Hampson, KD (2003) "Developing cross team relationships" in *Procurement strategies: a relationship based approach* by DHT Walker and KD Hampson, Blackwell Science, Oxford, United Kingdom, p. 297.

D. Avoiding disputes – the role of contractors and designers

D1. Contractors response strategies

The way in which problems are addressed by contractors and designers is substantially dependent on the way head contract conditions are drafted and interpreted, the way in which they are reflected in sub-contracts, and the skills and experience of key project team leaders and their problem solving capability. In other words, both process and people issues are at play.

Project sponsors may seek to limit exposure to construction risk, and avoid disputes, by using risk averse procurement strategies and matching contract conditions. These strategies are known to experienced contractors and trade contractors, who have developed strategies of their own in response:

- where market conditions permit, head contractors and subcontractors attempt to include time and cost contingencies in their contract conditions, to protect their commercial positions
- the extent to which they are successful in doing so influences their approach to problem solving. If they have sufficient time and cost protection, they are more likely to accept a solution to a problem that involves giving up cost or time, than would be the case if they are under time and/or cost pressure
- where they are unable to gain the comfort of contingencies, the project leaders appointed to manage the interests of either the head contractor or subcontractors, may be selected on the basis of their capacity to exploit technical and commercial loopholes as well as their ability to deliver the project.

The consequence for the client is likely to be that either that too much may be paid, or that the cost and aggravation associated with "loophole engineering" and possibly disputes are endured.

D2. Management of change

Within the "envelope" of project environment decisions made by project sponsors, the project team and its decision makers must manage the triggers which cause disputes. These can be described generically as change events. The response to a change event may be centred around three influences:

- behavioural and situational leadership
- causal and factual drivers
- contractual and process drivers.

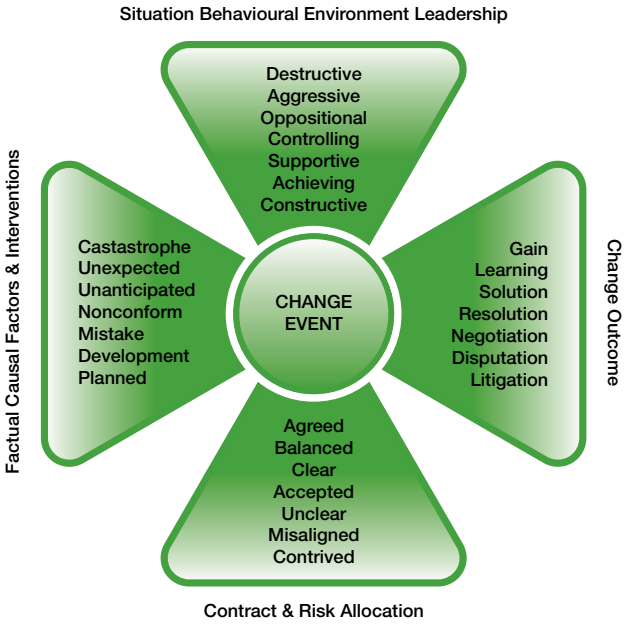
The change outcome depends on the influences these three aspects bring to the change event.

Figure 3: Change model[22]

[22] Barry, A (2008) "Change Events and Meta Processes", Dispute Avoidance and Resolution discussion paper.

Each of these aspects in simple terms, imposed on a change event, can bring about different change outcomes. In building on the model described above in Figure 3, we can look at these influences and outcomes and provide descriptors which look at the range of inputs, impacts and outputs involved. A typical set of descriptors are set out in Figure 4.

Figure 4: Descriptors[23]



A dispute can arise when one or more of these influences on a change event is not managed or led effectively. As observed earlier in this report, managing changing circumstances is an essential element of any project delivery process. It is hard to conceive of a project where changing circumstances do not arise.

Particularly in large projects, clients, designers and contractors are simply unable to achieve a successful project outcome without effectively managing the changing circumstances inevitably encountered as the project progresses.

However, being task focused and outcome driven, the practices used in the industry to manage this change process are typically less than sophisticated when it comes to motivating people to succeed together. That is, the processes used by the industry to deliver the projects and by the organisations involved in the projects do not always achieve the agility required to deliver change effectively.

In considering the influences on change events described earlier, there are three elements of change management which are vital to success. In conceptual terms these are:

- the “what” – change
- the “how” – change process and communication
- the “who” – the people and the organisations involved.

The industry is very competent at managing the “what”. It is that very strength in quickly identifying a solution outcome, and driving to achieve that outcome, that often creates a circumstance where:

- there is absence of or inadequate process
- the change is not well communicated to the organisations and people involved
- the impact on the organisations and people involved is not adequately considered.

[23] Barry, A (2008) “Change Events and Meta Processes”, Dispute Avoidance and Resolution discussion paper.

This may range from a simple failure to communicate, through to assumptions about the impacts on people and organisation outcomes, and the adoption of a solution which in fact is damaging to one of the participants. In other cases, people are constrained in their ability to change or manage change by external circumstances, or lack of authority from within their own organisations. Regrettably there are still occasions when people on site are not given authority to act rationally.

Ideally the project team will implement communication protocols, starting with induction of every person starting work on the project, that ensure everyone is fully aware of:

- the context in which they are working
- project objectives
- participants objectives
- key success factors
- the interactions between the roles and responsibilities of different team members.

D3. Project management processes

There is a set of project management processes that sit above other project processes and are designed to manage the influences on project activities. For example, project control, design and various other types of project meetings follow an agenda and involve participants adopting protocols which are usually agreed and relatively straight forward. These are often termed “meta” processes. The meetings meta-process looks at the behaviours of the participants and what remains unsaid between the parties, and considers the behavioural responses and the project team culture to the extent it is influenced by the way meetings are conducted.

The meta-process management concept is concerned with the “how” rather than the “what”, of team relationships and decision making. With apologies to the author of an old proverb, it encourages people to be as comfortable with each other as if they had been the best of friends for a very long time, but as courteous as if they had just met.

Here is an example. A participant in a project meeting makes commitment which on a regular basis is reviewed by his senior manager back in the office. Then however, an alternative position is put, but outside the meeting framework, requiring rework and continual change. The causes why such behaviours are adopted may range from unhelpful manipulation to micromanagement, or genuinely trying to be helpful. Nonetheless, this conduct is disruptive to the project team, damaging to confidence and can cause participants to be continually revisiting decisions and redoing work undertaken as a result of the agreed outcomes of the meeting. This kind of conduct can lead to frustration and discontent, and sometimes more serious dysfunctional behaviours among project team participants.

The meta-process would be used here for early identification and management of poor behaviours and poor process implementation. Examples of meta-process being used in our industry include alliance contracting methods, and the use of dispute resolution boards (DRBs). Partnering was another attempt to create a meta-process concept.

One of the key features of the alliance model is the creation of an alliance leadership team, which is focused on best-for-project outcomes and with providing the alliance management team with appropriate oversight and shared governance. By doing so, many of the influences on change are effectively managed and aligned with the performance outcomes.

It is open to project teams formed under other delivery strategies, to borrow from the alliance model, and provide for a leadership team, made up of people not directly involved in the day-to-day management of the project, to focus on the quality of relationships and the playing out of roles and responsibilities with a “best-for-project” focus. An alternative approach is to appoint a project “coach”, whose role is to monitor the behaviour of the project team, and that of the client, at regular intervals, to flag possible problems and encourage open communication to address them.

Another approach is to appoint, at the outset, a DRB to deal with issues that cannot quickly be solved at project site level. The DRB may be one or more people, charged with informally advising parties on issues as they arise. The experience of the industry in Australia with DRBs is that if appointed early in the life of the project, the parties are often motivated, as a matter of professional pride, to resolve issues promptly rather than be seen to require the services of the DRB.

D4. Project start up

In their 2001 study for the Property Council of Australia, Crow and Barda[24] found that about 10% of projects are "excellent" projects in terms of wealth/value created. Wealth/value reflects matters such as project outturn cost, timely completion, quality and functionality, ongoing operating and maintenance costs, return on investment, and ongoing business and personal relationships.

The "excellent" projects analysed by Crow and Barda used a mix of procurement strategies. The common feature of the "excellent" projects is that they avoided the underlying causes of disputes, with a strong focus on informed client leadership creating project environments within which all parties were able to focus on common project objectives i.e. achieving time, cost and quality targets, whilst enjoying working together.

The 10% of projects that are "excellent" projects created an average of about 30% more wealth/value than the average wealth/value created by the other 90% of "business as usual" and "risk averse" projects. One conclusion from that work is that the causes of wasted effort embedded in "business as usual" processes, are also possible causes of disputes.

All projects require the development and implementation of particular project management elements including communications protocols, programs, risk management registers, design coordination protocols, quality management processes, and value management studies. If these are undertaken collaboratively and involve key designers and specialist subcontractors, the very fact of involvement is likely to create "ownership" of the outcomes, and an environment that encourages proactive issue resolution.

Each of these project management tasks generates an output and, if undertaken collaboratively, the outcome is a positive project culture, based on open and transparent working relationships.

This kind of collaborative work is able to take place regardless of the project delivery strategy put in place by project sponsors, provided the head contractors' site management team is sufficiently experienced and prepared to undertake it. One of the contractors interviewed for the *Construction Innovation* research makes the point pithily and well:[25]

> *"…but actually you can have, as long as you are careful in your selection of the contractor and you're vigorous about how you deal with risk within the contract price … a great relationship on a fixed price contract. But at the end of the day it comes down to personalities, not the procurement strategy."*

[24] Crow, TW and Barda, P (2001) Projects as Wealth Creators Property Council of Australia.

[25] Love, P, Davis, P et al (2008) "Causal Ascription of Disputes in Construction Projects".

E. Managing disputes

Whilst the primary focus of the *Construction Innovation* project has been on strategies for the avoidance of disputes, it is recognised that if an issue cannot be readily resolved at site level, there should be a framework for resolution of issues.

The objective is to deliver a commercial framework within which project staff are able to behave positively, and which encourages collaborative issue resolution. As mentioned in the previous section, a number of project management tasks may be used to give the leaders of head and trade contractors project teams the opportunity to work together and build positive working relationships, based on open and efficient relationships and communication protocols.

These will include a framework for formal issue resolution, focused on rapid identification of issues, and escalation of issues that cannot be resolved by agreement at site level, to the lowest possible level of off-site negotiation and resolution. Formal resolution may be aided by the use of processes involving independent monitoring of project issues, and "coaching" to assist in their resolution.

All proactive issue resolution processes have a common philosophical basis, namely: optimising the management and resolution of issues that may arise during performance of construction contracts and minimising the likelihood of resolution extending beyond the project team.

A primary difference between situations that avoid disputes on a project and those that do not is that disputes are avoidedwhen the participating organisations and the project team working together have the ability to develop an open communication strategy regarding issues of concern to a participant to and are committed to resolving issues in a proactive, cooperative, and timely manner as they arise.

Effective issue resolution should be understood or viewed in the context these two elements: ability and commitment.

Ability includes enabling elements such as:

- a contract and organisational policy framework which supports and promotes proactive issue resolution
- communicating with all parties effectively
- identifying a solution
- financial capacity to bear the outcome
- authority to resolve an issue
- being personally able to accept the consequences and move forward
- relationships that will support resolution
- interpersonal skills to negotiate an outcome.

Commitment includes enabling elements such as:

- wanting resolution and an ongoing healthy relationship
- time and opportunity to communicate with the right people
- persevering to find a solution which is acceptable to all parties
- the preparedness to accept the financial outcome
- taking responsibility for the outcome
- accepting the consequences for the outcome
- commitment to an ongoing healthy relationship beyond resolution.

For the most part, these enablers are put in place by the participants and their advisers through their organisations' policies and practices. The ability and commitment of the project team to resolve issues that arise on their project will enhance their effectiveness in delivering a successful project outcome.

However, without these enablers the project team is constrained in delivering a successful project outcome. The effectiveness of the project team is constrained by the extent to which the enablers are out of alignment with or where incompatibilities exist between:

- success and the project objectives and scope
- participant organisations and their policies and practices
- members of the project organisation
- the roles of the participants and the contracts including the terms and the scope
- the behaviours adopted by the project team.

Effective issue resolution will seek to resolve issues as they arise and before an issue results in a dispute over, say additional time, additional cost and poor quality. That is, it seeks to avoid claims as well as disputes.

There is a general dissatisfaction across the construction industry with respect to reactive dispute resolution processes because of, for example:

- the excessive time and cost of the dispute resolution processes
- the slow, cumbersome and negative nature of many dispute resolution processes
- the adversarial behaviour and blame game
- the breakdown of cooperative and trusting relationships
- the protracted and uncertain outcome of the reactive dispute resolution processes.

Several processes have been developed to assist project participants in working together to gain the benefits of alternative issue resolution, including:

- issue resolution managed directly by the project participants
- dispute resolution boards
- project mediation (not to be confused with alternative dispute resolution).

The issue resolution strategy adopted for any particular project should reflect the nature of the project and the preferences of the client and the other project participants.

In this regard, for example, for larger projects (say greater than $30 million in contract value) and increasingly on smaller contracts, the use of DRBs on contracts is seen as an effective strategy to avoid disputes. The approach is proven internationally, is readily adapted to most contract types, typical contract clauses are readily available and there is an increasingly experienced pool of DRB practitioners available in Australia.

F. Project definition and briefing

F1. The project initiation process

Apart from being complex and unique in nature, as a system, construction projects are dynamic, passing through several discrete phases of initiation, documentation and delivery. In addition, most projects are sufficiently unique to have many of the characteristics of a prototype.

This “one-off” nature of the construction industry increases the importance of careful initiation.

Although each construction project may be unique, thorough project initiation is generic in nature and can be applied to any project, through key steps:

1. project definition and briefing
2. ensuring contractor and specialist contractor input to design
3. selecting the head contractor and specialist contractors.

The relationship between these is shown in the project initiation process in Figure 2.

Selecting the project initiation team

At the outset, clients should employ (or appoint) a person with the skills and authority necessary to exercise the client’s obligations. These include overseeing careful and thorough project initiation, making decisions and taking responsibility on behalf of the client during design, construction, and issue and dispute resolution.

Many of the organisations appointed at this early stage will be likely to be involved in the project as it progresses past initiation, to detail design, documentation and procurement. The ability of designers in particular to work collaboratively with a head contractor and its subcontractors is an important factor in determining the initial selection of designers.

There are considerable benefits in having the early involvement of contractors in design. They bring experience of construction processes, in many cases also have significant knowledge and skill to offer in design, and are able to suggest options during strategic value management.

It is hard to overstate the importance of the client selecting a team that includes contractors and that will work well together at this early stage, in reducing the scope for later misunderstandings and disputes. Those who have played a meaningful role in determining strategic design options, and considered buildability/constructability issues, are far more likely to have their objectives for the project aligned with those of the client. The benefits of early involvement of contractors are explored in greater detail in Section C.

Key outcomes from a careful project initiation process will include achievement of the following elements of the dispute avoidance checklist.

1. Identify need

The need being addressed by fundung a construction project should be clearly identified and articulated. The project may deliver an asset that satisfies a business need (creating wealth measured in dollars) or a social need (improving services to a community from a new school, hospital road or other facility). Designers and other advisers should have a clear understanding of the need to be able to suggest design options and develop concept designs.

2. Project team selection

Designers and other advisers are selected based on their ability to work well together as a team, as well as their technical skills and track record. Particularly with more complex projects, greater certainty of cost and constructability is achieved when the client engages a head contractor and key subcontractors to work with engineers, architects and other advisers on option development and early design and planning work.

3. Scope of work

The scope of the work and the functionality or performance characteristics to be delivered by the asset should be clearly documented. This should include the time within which the asset is required, and take into account the characteristicsa of the site on which it is to be constructed, including adequate geotechnical analysis.

4. Adequate finance

Sufficient finance must be available to undertake the project. Given that construction projects demonstrate most of the characteristics of prototypes, and therefore changes in their technical or commercial parameters is common, the budget should include prudent contingencies for possible changes in time or cost required, or changes in functionality.

5. Risk management

A thorough risk register, identifying possible risks to achieving required time, cost and functionality, and strategies to mitigate those risks, is shared with designers and contractors. Responsibility for managing each risk is clearly allocated to the organisation or person best able to manage it, and that organisation or person is paid to assume the risk.

6. Procurement strategy

The procurement strategy for construction is adopted after a considered analysis of available options, and the client's key strategic drivers. Thise drivers generally include:

- how well the scope of the project has been defined
- the time within which the asset is required, the likely time to construct it, and the purpose for which it is required
- the complexity of the design
- the level of certainty about market costs, and availability of necessary design and construction capability
- the funding available, including contingencies
- the risk appetite of the client and project sponsors
- the client's experience of construction projects.

F2. Concept development

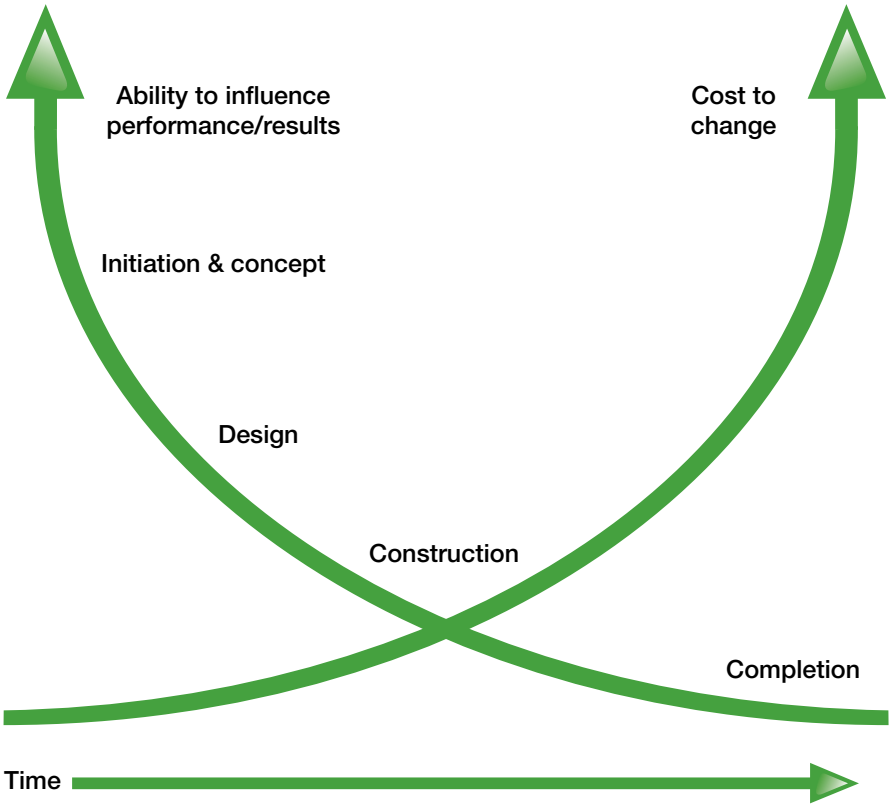
Issues

Project sponsors and clients having seen an opportunity or "need" will develop a project concept to a stage that will allow for evaluation against a strategic, service or business plan. This concept development will include a range of reasonable alternative options, including a no-build option.

Rushing the concept and evaluation phase misses the best and lowest cost opportunity to get the project right. Changes made at the concept phase cost little but can have a major impact. In contrast, late changes are expensive or cannot be done, and then disrupt and dislocate project delivery leading to cost and time overruns.

Figure 5 outlines the benefits of good concept development, planning and brief preparation, and the decreasing ability to influence final cost as construction proceeds. The target is to improve the quality of solutions at the earliest stage and have the greatest impact on outcomes.

Figure 5: Ability to influence performance/results over project



Methods and outcomes

The concept development phase of project initiation has three stages:

1. concept identification
2. needs analysis
3. development of the evaluation brief.

Concept identification ensures that a project concept is consistent with the client's strategic, business or service planning. It should develop the concept detail to a level that enables the project to be compared with the organisation's strategic direction. Construction solutions should support these quantified objectives. This process will include the preparation of a cost plan, within the broad strategic direction of the organisation's business plan.

The outcomes from this stage include a summary of the need and possible solution, a cost plan framework and a recommendation whether to proceed or not to proceed to the next phases of a construction project.

Strategic value management is one technique which can be used as a key to presenting a clear set of client objectives for the project and to answer the key functional questions up front. By establishing this at the earliest stage of the project and tying it to the business plan for the organisation, a coherent framework is established which enables the project to proceed to the next stage.

The task in this stage is to achieve a ranked set of objectives that broadly describe "what the job must do". Analysis to achieve this consists of:

- market service needs analysis
- functional needs and outcomes (what must it do)
- prioritisation of objectives and functions
- explicit evaluation of project objectives against strategic business or service plans
- an action plan for next stages, which identifies both actions and "gaps".

The concept phase is commonly completed by the owner or sponsor of the project with limited specialist assistance. The next phase (evaluation) requires specialist analysis of the project concept to test for viability and robustness of assumptions. It requires an increased involvement by technical and business specialists.

F3. Evaluation

Issues

The key issues which emerge from review of the preparation of feasibility analysis in the evaluation phase include:

- the need for proper adequate risk assessment
- the criticality of testing of needs, functions and objectives to determine best value for money.

Methods and outcomes

The evaluation phase of project initiation has three stages:

1. options generation
2. testing and feedback
3. development of the definition brief.

Provided the function or uses are clear and the project objectives are well defined, there is a firm basis for generating a range of meaningful options for analysis and consideration. This will include early design studies by design consultants.

The adequate examination of options also provides a review of risk for the project and may help to add flexibility for evolving choices or changed circumstances.

The methods used in the options generation phase are mainly descriptive. Group processes, expert input and the project consultant team are used to identify a range of options. This step in the process is very important and requires the full input of the owner or sponsor of the project. It is also assisted by the input of a head contractor and selected subcontractors.

The outcomes from this stage include:

- a range of identified possible alternatives
- each of the alternatives described quantitatively and qualitatively and priced
- initiation of early planning approval process steps.

It is at this point that a preferred option is selected, based on the criteria established for the project. It involves taking the various options and a range of tests and techniques to fully determine the range of likely outcomes and risks for the project. It forms the essential groundwork for the decision in the definition phase to proceed with the project.

The outcomes from this stage are packaged into a brief for the definition phase, including:

- a written description of the preferred option
- cost targets
- time requirements
- quality considerations
- redefinition of the objectives for project success.

F4. Definition

Issues

The definition phase involves the design of the preferred option being developed to bring the project plan, cost plan and time schedule to a point where the owner or sponsor can make a final decision to proceed.

This is a key phase in confirming project objectives, to confirm the functions and objectives of the project and their connection to the service and business planning for the project, and minimise the risk of disputes. If not carefully undertaken, the design process often absorbs the need to make decisions which should have been made prior to commencing this stage. Consequently some of the following may occur, which may give rise to disputes between the client and the designers:

- no criteria or objectives for testing the success of the project
- lack of process for client or end-user involvement in decision making
- delays in design while options studies are completed
- the expensive process of finding out on the drawing board that a particular approach does not work
- the design process does not have the fees to support a thorough project initiation process and the project does not deliver value for money
- projects which are poorly conceived or not viable “slip through” the process
- more extensive rework occurs.

Methods and outcomes

The project definition phase has three stages:

- schematic design
- testing and feedback
- development of the delivery brief.

The description of the design is, for the first time now moved fully into the realm of the design professionals to prepare the schematic design. This developed schematic design for the project is then used for a value management study which confirms the strategic value management but also tackles the specifics of value for money with the chosen design. This process is used to ensure the money is being spent to deliver the function required and to eliminate high cost/low function elements of the design.

The developed cost plan and the value management study will result in ranked trade-offs in the design process and make the choices on these visible to the client or project sponsor.

The outcomes from this stage will include a descriptive and illustrative definition of the preferred option including a time schedule, cost plan and schematic drawings.

Projects do not exist in isolation. Therefore, where the site conditions for the project are likely to have an influence on design or construction, it should also deal with known issues in sufficient detail for designers and contractors to accommodate those issues in their work. Relevant factors to consider include:

- environmental issues
- ground conditions
- climatic conditions
- existing infrastructure e.g. buildings, services and other existing infrastructure at the site
- access constraints
- adjoining property and neighbourhood issues: e.g. use of air space above adjoining property
- neighbours' right of way and or services easements through the site.

Also included in this stage are evaluation of competing demands for resources and logistics, and evaluation of the costs of ownership and operation which flow from the chosen design. Techniques including Life Cycle Cost Analysis would be used at this point.

The outcomes from this stage can include:

- revised feasibility analysis
- time schedules in place
- financial constraints set
- planning approval achieved
- cost of ownership and operation defined
- a GO/NO GO decision in principle from the owner or sponsor.

The delivery brief

The delivery brief consolidates and documents all of the project analysis, description and planning, which has resulted in the approval of the client, into a brief for the implementation of the project. The delivery brief should include:

- the client and project sponsors' strategic objectives for the project
- the functional objectives for the project – what it must do
- the financial constraints and objectives
- a summary of the conclusions from the feasibility and risk analysis
- details of planning approvals
- the project implementation plan, actions and schedules
- a procurement plan
- a cost plan
- the project schematic design, description and illustrative definition.

G. Selecting the project team

G1. Project culture and relationships

Each construction project develops its own culture, or “the way we do things here”. That culture is driven to a great extent by the leadership of the head contractor’s senior project staff, and their interaction with their counterparts amongst subcontractors and designers. Strong leadership is critical if organisations are to avoid the cause of disputes. Ideally, project leaders will share the same values, lead positively by example, and be consistent in the way they behave.

The successful performance of a construction project relies on the cooperative interaction between the client team, the design team and the construction team. The successful delivery of a project relies on the members of the project team working cooperatively together to respond to the ever changing circumstances that are part and parcel of construction projects.

Leaders who instigate a project culture based on alternative issue resolution methods generally will avoid the negative effects of adversarial reactive dispute resolution as they create a culture in which the parties actively seek to avoid disputes by resolving issues on a best-for-project basis as they arise.

What needs to be done to create such a supportive project culture?

Project business planning, discussed in Section H2, offers an early opportunity to develop strong relationships and a positive project culture, by respecting the contribution key project team leaders can make by involving them in development of a project business plan. Planning includes identifying the key factors critical to the success of the project. While these factors will depend on the particular circumstances of the project and its key priorities, they are most likely to be achieved if:

- the required outcomes are clearly and consistently communicated to, and shared with, each member of the project team
- each member of the project team communicates these required outcomes to its people, and explains why they are required
- the recognition and reward structure for the people in the project team is consistent with, and linked to, the achievement of the required outcomes.

Experience indicates that, in such circumstances, a project team will typically identify the achievement of the required key performance outcomes as a project challenge, and will often take great pride in regularly surpassing the required outcomes.

Alternative issue resolution is an integral part of an effective risk management strategy required to identify, assess and develop management strategies to deal with project risks and maximise project opportunities. This initial analysis of project risks and opportunities should be carried out jointly by the head contractor and the key members of the project team as part of the initial collaborative project planning process.

The benefits of a positive project culture are well known to those who have enjoyed working on such projects and include:

- fewer disputes
- better profit performance
- increased performance of project teams
- increased morale
- confidence and trust in working relationships
- positive reputations of the parties
- more opportunities for future work
- improved business relationships
- an attraction of skilled people into the industry.

The challenge is to ensure that the culture is spread to, and adopted by, all those involved in the project. This can be achieved by a number of actions, including:

- explaining project objectives by preparing concise printed statements of key messages from project business plans
- using simple charts to show progress of the project
- expanding the role of conventional tool box talks beyond safety issues to embrace project objectives
- encouraging all personnel to put forward ideas and opportunities for improvement, without fear of criticism
- encouraging regular social interaction between all workers on site.

Well informed leadership of the project team selection process should result in achievement of the following elements from the dispute avoidance checklist.

7. Design

The level of design made available for the market to price appropriate to the procurement strategy and the level of risk the client expects contractors to take. As a general rule the more design detail and information about the site of the project made available to potential head contractors and subcontractors, the lower the risk to them.

8. Risk allocation

The head contract documentation for the project prepared by the client reflects the clear and unambiguous risk allocations that were part of the package of information made available for the market to price. Any changes made necessary as a result of firming up prices or the scope of the project are clearly identified. The introduction of integrated digital modelling or virtual prototypes early in the design process has significantly reduced the need for contingencies, improved clash detection and reduced waste and wasted effort, and improved construction optimisation at design stage.

9. Client project management

The client's most senior representative charged with making decisions under the head contract is given a clear brief to act in the best interests of the project, including monitoring the quality of the project team relationships. That representative may be an employee of the client or a consultant.

10. Communication protocols

The head contract will require communication protocols that encourage open communication, and the solving of problems or issues as quickly as possible. It will include a framework for formal, alternative, issue resolution, focused on rapid identification of issues, and escalation of issues that cannot be resolved by agreement at site level, to the lowest possible level of off-site negotiation and resolution.

11. Dispute resolution

Formal dispute resolution may be aided by the use of processes involving independent monitoring of project issues, and "coaching" to assist in their resolution.

G2. Choosing a procurement strategy

Many techniques are available to assist decision-makers select the most appropriate procurement strategy for a given project. The selection decision has become challenging as the number of methods available within the marketplace has proliferated in recent years.

The procurement strategy or plan included in the project initiation phase delivery brief will be the product of decisions that in aggregate define the client's strategic objectives. These include:

- the time within which the asset is required and likely time to construct
- the complexity of the design
- the level of certainty about market costs, and availability of necessary design and construction capability
- the funding available, including contingencies
- the risk appetite of the client and project sponsors
- the client's experience of construction projects.

The advice of external advisers regarding risks and contract conditions will influence the selection of procurement strategy, and head contract risk allocation and conditions.

Table 1 provides a generalised comparison of four broad categories of procurement strategy.

There are numerous detailed procurement strategies that generally fit within the four broad categories outlined in the table. Furthermore, there are some hybrid procurement strategies (e.g. early contractor involvement procurement strategies) that use:

- open book procurement strategies in the planning phase
- either open book or hard dollar procurement strategies in the detailed design and documentation phase
- hard dollar procurement strategies in the construction phase of the project.

It is important to check that there are no conflicting and/or inconsistent requirements between the various contracts proposed for a project, as such conflicting and inconsistent requirements are a frequent cause of problems and disputes. These may occur where, for example, the client wishes to novate to the main contractor:

- certain subcontracts the client has already let for long lead supply items and/or
- certain consultant agreements the client has already let for design of the project.

Table 1: Procurement strategy options

Issue	Construct only hard dollar	Design and construct hard dollar	Target price gain share/painshare open book	Fee for service, open book
Relationship between the parties Client team Design team Construction team	Arms length contractual relationships between all parties.	Arms length contractual relationship between the client team and the design and construction team. Interactive working relationship between the design team and the construction team.	Interactive working relationship between all parties.	Interactive working relationship between all parties.
Factors to consider when selecting a procurement strategy for a project	A construct-only hard dollar strategy may be suitable for a project where there is only one construction method to achieve client's requirements, where there is little uncertainty as to the factors relevant to the site, and where the detailed design has been completed before letting the construction contract.	A design and construct hard dollar strategy may be suitable for a project where the client can specify its requirements in clear, objective and measurable terms, where there is little uncertainty as to the factors relevant to the site, and where a day-to-day interactive relationship between the client and the design and construction team is not required or necessary.	An open book, target price, gainshare/ painshare strategy (such as an alliance) may be suitable for a complex project, and/ or a project where there may be significant uncertainty as to the factors relevant to the site and/or stakeholder requirements, and/ or a project that would otherwise benefit from a day-to-day interactive relationship between the client team and the design team and the construction team.	An open book, fee for service project management strategy may be suitable for a project with generally similar characteristics to those indicated for open book, target price, gainshare/ painshare strategy, but where the scope of the project is uncertain and/or there are other significant risks that cannot be priced.

G3. Roles and responsibilities

Project contracts and organisational policies and procedures should adequately describe roles and relationships between members of the client's team, and the design and construction team. These should accurately reflect risk allocation, as well as processes and procedures for effective project performance. They will cover:

- the roles to be carried out on a project by each member of the project team
- the relationship between the parties
- the allocation of risks
- the administrative and communication processes and procedures.

The principle objective is to ensure that all members of the project team understand who is to do what, and when. However, it is equally important to appreciate that the effective management of change is an essential element in the successful performance of a construction project and the avoidance of disputes.

For example, some problems and mistakes can be expected to occur on any complex project and reflect the reality that the people who make up the project team are "mere mortals" and that mistakes will sometimes be made. Things may be missed, things will not always happen as planned, and it will be necessary to deal with issues caused by the imperfections of human nature. The client may issue an instruction, the weather may impede timely performance, or an external authority may demand a change.

The documents used to describe roles and responsibilities should enable the project team sufficient flexibility to use their experience and skills to manage this dynamic process and avoid disputes. This flexibility is achieved through:

- adopting planning strategies that maximise operating flexibility within the constraints necessarily required in the circumstances of the project
- using planning and performance control strategies that are based on and model the performance of the critical resources and logistics that drive the delivery of the project
- emphasising the importance of effective behavioural and situational leadership, and adopting ffective behavioural management strategies
- adopting project strategies that encourage and reward
- open, effective communication between the members of the project team
- cooperative project attitudes and behaviour
- initiative, innovation and flexible thinking
- effective issue resolution.

Each member of the project team needs to allocate sufficient suitable people to the project team to ensure that the project processes relevant to their role on the project are carried out in an appropriate and timely manner to facilitate the efficient performance of the project.

The detailed planning needed to reflect clear statements of roles and responsibilities, and to describe how change is to be managed, should be undertaken by the project team as part of the project business planning process described in Section H2.

G4. Time and cost contingencies

A thorough project initiation process will ensure that the project budget and timeframe are carefully prepared with due regard to all relevant factors. Ideally the budget and the timeframe for a proposed project will have due regard for the degree of difficulty, location and climatic influences of the project.

In the event that the client has a limited budget allocation and/or a tight timeframe for the project, it is important that the scope of the project works be adjusted during the planning phase as appropriate to reflect that limited budget and/or tight timeframe.

Similar problems and disputes can occur on subcontracts where the head contractor acts in an inappropriate and/or adversarial manner to protect an inadequate cost plan or time allowance for the subcontract works.

Problems and disputes can also occur in a reverse situation where a contractor, a subcontractor or a design consultant has only allowed a certain resource, budget and/or time period to perform its role on the project. In such circumstances there is a tendency for certain contractors, subcontractors and design consultants to act in an inappropriate and adversarial manner or in a state of denial in the event that they find that they need more than anticipated resources to properly complete their role on the project.

Such a course of action is invariably counter-productive and usually ends up causing greater time, cost and/or quality problems and disputes for the contractor, subcontractor or design consultant than if they had committed the necessary additional resource as may be necessary to complete their role on the project in a proper and timely manner.

The project team should be alert to the potential for such problems and disputes when selecting organisations and appointing key people to the project team.

G5. Risk allocation and contract conditions

Effective risk management and clear and unambiguous allocation of risk are key factors in driving successful projects and avoiding disputes. They:

- are important to engender a spirit of cooperation and trust between the members of the project team
- provide an incentive for each member of the project team to perform their role in a proper and timely manner
- encourage alternative and effective issue resolution whereby the members of the project team work together to find innovative solutions to overcome unforeseen issues
- focus on managing risk to achieve a successful project for all parties
- recognise that disputation is itself a project risk that needs to be managed accordingly.

Conversely a failure to manage risks effectively and/or a failure to allocate risk appropriately is a major cause of disputes on construction projects.

Effective risk management involves, in general terms, the identification, assessment and management of risks to facilitate the effective and efficient performance of a project. If the potential risks to project performance are carefully and comprehensively identified and objectively assessed prior to the performance of a project, effective strategies can be developed and implemented to avoid the risks and/or minimise the impact of the risks should they eventuate.

Effective risk management can reduce risk exposure by:

- reducing the probability of occurrence
- reducing the severity of impact
- tackling common causes of risk
- focussing management attention on priority issues.

The strategies used for the identification, assessment and management of project risks are also suitable for the identification, assessment and management of project opportunities.

The tendency for risk averse contracts to attempt to transfer to another party the risk of matters within the control or influence of the party is entirely counterproductive and leads directly and indirectly to project inefficiency, delays, costs, quality issues and disputes. Such contracts may mislead the client into believing that its risk exposure has been minimised. It is preferable that the client remain engaged with risk management.

It is important to understand that the transfer of risk may create other risks which are more onerous upon the client than the original risk transferred. For example, driving a contractor into liquidation creates a huge problem for the client.

Effective risk management is best carried out with the client and key members of the design team, the construction team and, where relevant, other project stakeholders working together to identify and assess the potential risks for a project and to develop effective management strategies to avoid or minimise the impact of those risks should they eventuate. That is, all parties should openly share their understanding of project risks and potential adverse outcomes.

The allocation of risk should reflect each party's role, willingness and capacity to manage the risk and to bear adverse outcomes. For example, the party best able to control or influence a risk should have the primary responsibility for that risk, and that party's role should include the development and implementation of strategies to avoid that risk and/or to minimise the impact of that risk.

A characteristic of open book procurement strategies is that the key members of the project team are appointed at an early stage in the planning phase for the project. This provides the ideal circumstance to enable the parties to work together to develop and implement an effective risk management strategy for the project.

However many hard dollar procurement strategies do not provide this opportunity for the project team to work together during the planning phase. For example, many hard dollar procurement strategies require the contract maker to allocate risks in the tender documents for a project before the parties have had an opportunity to work together to properly understand the nature and the extent of the risks for that project. Similarly, a tenderer for a hard dollar contract typically does not have the opportunity to work together with the contract initiator to understand the project risks. Tenderers are often required to make their own assessment of the risks in what is often a short tender period and without a proper understanding of many of the issues that may be relevant to the risks known only to the contract initiator.

There are risk management strategies that can be used to overcome these disadvantages.

- On larger and/or complex projects an early contractor involvement strategy enables the key members of the (proposed) project team to work together in the planning phase of the project to identify and properly assess the project risks and jointly develop strategies to effectively manage those risks. The resultant risk management strategy can then be built into a hard dollar contract for the construction of the project (or the design and the construction of the project as the case may be).

- For clients with an ongoing program of smaller and relatively straightforward projects (such as the smaller projects carried out by road authorities and public works authorities), the client could conduct risk management workshops with groups of prequalified design consultants and contractors. Such workshops should be based on a typical generic project, rather than a specific project out to tender, as experience indicates design consultants and contractors are reluctant to disclose their ideas regarding a specific project during the tender period for that project for fear of losing a competitive advantage.

These workshops would enable the client, design consultants and contractors to better understand project risk on a typical generic project from the perspective of the other members of a project team and jointly develop risk management strategies to address the potential risks.

The client's request for tenders should:

- reflect the risk management strategies indicated by the workshops to the extent that they may be relevant to that project
- encourage a tenderer to include in its tender proposal any risk management initiatives relevant to that project that would provide better value and/or otherwise facilitate the successful performance of the project.

In the event that an unanticipated factor is encountered during the performance of the project, the contracts between the client and/or the various members of the project team should include risk allocation strategies that create an incentive for the client, the design team and the construction team to work together to find an innovative best-for-project solution to minimise the adverse impact of the unanticipated factor.

G6. Dispute resolution framework

Regardless of the issue resolution process adopted for a particular project contract, the underlying principles of effective issue resolution should be included in all project contracts. They may be reduced to five key points:

i. ensure that contracts embody processes to resolve issues at the lowest appropriate level
ii. if necessary, issues are escalated for resolution to more senior and if need be, the most senior, executives in each organisation
iii. employ every endeavour to resolve issues by negotiation before the involvement of lawyers
iv. consider utilising skilled engineers, contractors or negotiators to assist in resolving issues
v. if formal dispute resolution is inevitable, select the most appropriate method to achieve an early, cheap and non project disruptive solution.

Except as the parties may agree otherwise:

- the inclusion of an issue resolution clause in a project contract that calls for alternative dispute resolution processes should not affect the parties' rights at law with respect to the resolution of an issue
- in the (hopefully rare) event that the parties are unable to resolve an issue using alternative issue resolution techniques, the absence of a reactive dispute resolution clause in a project contract would not prevent the parties reaching an agreement as to the reactive process they will adopt to resolve a the resulting dispute and/or otherwise affect their rights at law.

Contracting parties may wish to include a short clause in a project contract clarifying this fall-back position for the parties. For greater certainty the parties may wish to include a structured reactive dispute resolution clause to apply as a fall-back position in the event the parties are unable to resolve an issue.

There are two main categories of alternative issue resolution strategies that can be implemented:

- issue resolution managed directly by the project team
- issue resolution using independent third party facilitators.

Issue resolution managed directly by the project team

Alternative issue resolution processes commonly adopted by the project team on such contracts include:

- One or more all-party workshops at project commencement to define and agree:
  - project risk areas
  - methods best suited to mitigating and managing those risks
  - key performance indicators for success across the major project outcomes, including personnel job satisfaction.
- Each member of the project team is charged with identifying issues as soon as they become apparent for solution by the relevant members of the project team in a cooperative, best-for-project and timely manner without disruption to the orderly performance of the project.
- An escalation process is established to ensure the senior members of the project team become aware of issues in time to take the necessary steps or decisions to minimise unnecessary cost and/or schedule damage and/or to provide advice regarding a sensible resolution of the issue that does not impact adversely on the relationship with the other members of the project team. The escalation process may include, for example:
  - a joint (on-site) management team comprised of senior on-site party representatives with responsibility for day-to-day operations
  - a joint (off-site) leadership team comprised of senior party representatives with ultimate responsibility for the successful project delivery.

It is emphasised that success depends principally on cooperative, constructive attitudes of all members of the project team. The role of the alternative issue resolution processes for a project, such as outlined above, is to clarify and reinforce the intent of the parties in this regard and to create a process framework to facilitate alternative resolution of issues.

The *Construction Innovation* research report prepared by RMIT University[26] identified that about 90% of construction contracts are in the less than $20 million range and that most of those contracts would be based on a construct-only hard dollar procurement strategy. The close working relationships between client, the contractor and the design consultants on these smaller projects, and the more informal overhead structure of the organisations typically engaged on these smaller projects, mean that alternative issue resolution managed directly by the project team is ideally suited to smaller construct-only hard dollar projects. However, as described below, facilitated issue resolution processes are being used increasingly on smaller projects as well as on larger projects.

[26] Blismas N, Jellie D, Wakefield R and Harley J (2008) "Strategies for Dispute Avoidance" RMIT University.

Issue resolution using independent third party facilitators, such as dispute resolution boards and project mediation

The issues that may potentially arise on larger, more complex projects, and the project participants' decision making processes on such projects, may be harder to manage than the issues and processes typically encountered on smaller projects. The use of alternative issue resolution processes using independent third party facilitators to achieve similar outcomes to those discussed above has come into quite wide-spread use in such contracts.

Dispute Resolution Boards (DRBs)

DRBs are the best known and most widely used alternative issue resolution process used in conjunction with 'hard money' contracts. DRBs are based on the principles originally devised in the United States in the mid 1970's, subsequently developed through the 1980's and 1990's, and now adopted internationally[27] under various names such as Dispute Review Boards or Dispute Resolution Boards, Dispute Adjudication Boards, or just Dispute Boards.

DRBs have an established track record internationally (and more recently in Australia) for providing a cost effective method of resolving issues as they arise on projects, and thereby avoid disputes. The international record of DRBs indicate that about 97% of decisions made by DRBs have been directly accepted by the parties or led to a party to party negotiated settlement. DRBs are now adopted by the International Federation of Consulting Engineers (FIDIC), International Chamber of Commerce (ICC) and the United Kingdom's Institution of Civil Engineers (ICE) as forms of contract and are required by funding agencies such as the World Bank and multi-lateral banks as well as many government and project execution agencies.

The objectives of the DRB concept reflect basic commercial common sense, and include:

- encouraging the parties to articulate issues as they arise
- promoting discussion and resolution of issues by the parties on the basis of best-for-project and least cost whoever pays while the work is in progress
- establishing a pre-agreed panel of experts with continuous knowledge of the project and exposure to any issues while the work is in progress to provide a quick and simple method of resolving ongoing issues.

The DRB concepts are flexible, readily adaptable to most project procurement strategies and can be readily used by small, medium and large projects.

Project mediation

The project mediation concept (not to be confused with ADR mediation) was launched by the United Kingdom based Centre for Effective Dispute Resolution[28] (CEDR) in December 2006 with the stated objective *"to help support the successful delivery of a project by identifying and addressing problems before they turn into disputes about payment and delay"*. CEDR claims that its concept of project mediation *"is more flexible and cost effective than other conflict management mechanisms adopted at the outset of a project (such as a dispute resolution boards)"*.

Project mediation has many facets in common with DRBs, some of which may be considered more flexible, some of which appear less positive, and all of which appear to be on a par with the likely cost outcome of DRBs.

[27] Since 1996, FIDIC the World Bank and all multilateral development banks, the ICE, ICC and the European Union have progressively embraced the concept. The non-profit making international Dispute Resolution Board Foundation headquartered in Seattle is presently represented in 28 countries around the world, and DRBs are in common use on numerous contracts in the less than $US30 million range.

[28] Non-profit organisation launched in 1990 with the support of 'The Confederation of British Industry'

A paper titled “Project Mediation” by John Walton outlines the purpose and methodology of project mediation:

“Project mediation is designed to promote successful project delivery by identifying potential problems early, and addressing them before they impact on payment, delay the work or otherwise have an adverse effect on the relationships of the parties.

Under the CEDR model protocol, typically two project mediators are appointed for the project – one technical and one legal. The project mediators are not facilitative or transformative mediators, but genuine experts bringing their experience and professional judgment with them to the project. There are then three distinct elements to project mediation.

The first is a risk workshop, convened by the project mediators, and attended by all interested parties. This will usually be the owners and their representatives, contractors, key subcontractors and may extend to financiers and insurers. The risk workshop is ostensibly for the parties to establish lines of communication and levels of authority, and to discuss risks for the project, and potential areas of conflict going forward. For high risk projects, like major tunnelling, it is also an opportunity to establish and work through the risk register for the project.

The second element focuses on dispute avoidance, by allowing access to the project mediators during the project. This will involve attendance on site from time to time to discuss progress and to identify potential problems,

and direct discussion between mediators and the parties to prevent disputes arising, or to clarify information requirements which need to be addressed before settlement discussions take place. In this role, the project mediators are more alternative and more involved than traditional disputes boards, however this reduced level of formality and more flexible approach to dispute avoidance allows the mediators to bring their respective skills to bear.

The final element of project mediation is to formally mediate any disputes which then arise, before they are referred for final determination, whether in court or in arbitration. Again, the mediators will assist the parties in the context of a voluntary and confidential mediation. The mediators will inevitably provide more guidance to the parties on the relative strengths of their positions than many facilitative or transformative mediators would feel comfortable with. However, it is the mediators’ experience and judgment which they bring to the process, rather than a theoretically neutral forum for airing grievances.

The attraction of project mediation is that its focus is on identifying areas for disagreement early and the avoiding disputes developing, while preserving party autonomy and confidentiality. That it can do so in parallel with most dispute resolution provisions and with statutory adjudication only adds to its appeal.

The critical elements for the success of project mediation here will be that project mediators take on board their revised roles as dispute avoiders and conflict managers, and that owners and contractors perceive project mediation as a further tool to reduce conflict, rather than as a further layer of cost for their projects. Project mediation moves the focus of ADR away from establishing processes for dealing with disputes to addressing the differences in expectation and difficulties with communication which give rise to the conflict in the first place.”

H. Managing the project team

H1. Establishing the project team

Working on a project team should be creative, satisfying and fun. Project processes and behavioural cultures should be structured to achieve these objectives. To accomplish this, key project team leaders need to commit to cooperative and collaborative work practices based on trust, honesty, valued relationships and effective communication.

Key members of the design and construction teams should be selected not only for their technical skill and experience but also for their behavioural flexibility and their cooperative, alternative, innovative "can-do" attitude, people skills, and an overriding commitment to communicate effectively with each other.

Process issues that build-up and/or facilitate cooperation and trust:

- providing the team with a clear scope of works described in contract documentation
- include contract processes that model the open, effective, interactive communication and alternative issue resolution strategies that are used instinctively or spontaneously by alternative, innovative, cooperative "can-do" project teams on successful projects
- avoid convoluted and/or unrealistic notice and administrative processes often requiring excessive detail and/or with punitive time barriers that engender negative attitudes, add no value to the project, divert resources from their intended productive role on the project, create unnecessary arguments and disputes and destroy project team morale
- ensure the allocation of risk is fair and reasonable. A fair and reasonable allocation of risk provides an incentive for each party to perform its role in a proper and timely manner, and encourages the parties to work together to find innovative solutions to overcome unforeseen issues
- encourage, recognise and reward initiative, innovation and all the other aspects of good performance that facilitate the successful performance of the project and avoid disputes
- implement an alternative process for the identification and resolution of issues as they arise, so the issues may be resolved in an amicable, appropriate and timely manner, that does not disrupt the orderly performance of the project or impact on the parties' relationships.

One of the challenges is to convince relevant organisations and people of the need for, and the benefits of, a cultural environment that embraces an alternative, cooperative approach to project performance for hard dollar contracts as well as open book contracts.

H2. Subcontracting

Subcontracts typically need to reflect the requirements of the corresponding head contracts to allow the requirements of the head contract to be complied with in a proper and timely manner.

A properly formulated subcontract for a construction project is a particularly complex contractual arrangement (i.e. more complex than the corresponding head contract arrangement) on account of the need to address issues such as:

- the management of the interface between the concurrent performance of numerous subcontracts
- the establishment and operation of site logistics (e.g. vertical transport) and temporary site accommodation and other site facilities to be shared by the various subcontractors
- the management of things such as occupational health and safety, industrial relations, environmental issues and traffic management that must be implemented and managed on a project-wide basis to a uniform high standard
- the management of, and the compliance with, the process and procedural requirements in the head contract relevant to the subcontract.

Subcontract documents prepared by industry committees typically do not address the issues set out in the first three dot points above.

The subcontracts prepared by certain head contractors on the other hand may be found to have many risk averse and unhelpful characteristics.

To some extent, the risk averse subcontracts used by some head contractors may seek to do no more than to mirror and to pass down the contractual chain the unreasonable and adversarial requirements in a risk averse head contract. Risk averse subcontracts have the effect of further exacerbating the counterproductive fall-out from a client's risk averse contract. In such circumstances and in order to minimise the adverse impact of what may be a necessarily risk averse subcontract, a head contractor should seek to work closely with the subcontractor with special emphasis on the people issues, rather than seek to rely on than the inappropriate process issues for the management of the subcontract work.

The optimum head contract strategy for a complex project may be an open book procurement strategy, but a hard dollar construct-only subcontract strategy may be more appropriate for the construction of certain of the relatively straightforward components of the project works. However, in such circumstances, there is no justification for the head contractor to use a risk averse subcontract where the client has adopted a cooperative strategy for a project. In such circumstances the hard dollar construct-only subcontract should reflect the best practice cooperative strategies included in the head contract adjusted as may be necessary to reflect the administrative requirements of a hard dollar construct-only subcontract. That is, the subcontract should reflect similar cooperative behavioural standards to those included in the head contract.

H3. Project business planning

The client will help to establish a positive relationship with the head contractor by making available to it the key elements of the client's delivery brief, including the elements setting out its strategic objectives, and time and cost contingencies. In return, the client will expect the head contractor to develop a concise project business plan that is used to introduce all key project team members to the project. This plan is ideally developed soon after the head contractor is appointed, with the involvement of key designers and subcontractors.

The project business plan is a concise document that is used as a tool to introduce all designers and subcontractors to the client's objectives, the head contractor's objectives, and the key tasks that each organisation is expected to carry out if those objectives are to be achieved.

Just as importantly, engaging representatives of the client, end-users, key designers and subcontractors in the preparation of the plan allows each organisation both to state its objectives, and hear and understand what other members of the project team hope to achieve from the project. This is an important part of creating a properly functioning project team with aligned objectives, and a commitment to avoiding disputes and minimising wasted effort.

A suggested framework for project business plans is in Table 2.

Table 2: Project business plan contents

Section	Purpose	Content	Benefit
1. Mission and objectives			
1.1 Overview project business plan	Projects success criteria	Criteria by which the success of the project will be judged. Incorporates all results of the project initiation phase.	All project team members are fully aware of their responsibilities and are committed to achieving the shared project development strategy.
1.2 Corporate and project missions	Corporate goals aligned with project outcomes	Client corporate mission/objectives to establish customer service needs which justify capital expenditure and provides project mission.	Project team is focused on satisfying the end-user/ customer of the development and not just providing an asset. Capital/recurrent cost optimisation becomes a key measure of project team performance.
1.3 Project scope, objectives and functional brief	Project team owned objectives	Key performance indicators and critical success factors for the project team.	Removes the major cause of underperformance of projects of project team members not agreeing objectives before project commencement.
1.4 Business case	Justification for proceeding with project	Client's feasibility study, marketing plan, customer requirements and stakeholder approval process justifying development to proceed.	Establishes performance measures to monitor during development, ensuring financial returns.
2. Strategies			
2.1 Project delivery strategy	Optimum project delivery and risk allocation	Project delivery strategy covering consultants, contractors, information management, design, organisation, staging, contractual approach, risk allocation, authority approvals and project processes.	Project team owns implementation strategy. Risks are fairly allocated to party best able to manage risks. Equity and fairness establishes reward basis.
2.2 Roles, responsibilities, organisation	Harmonious project team	Roles, responsibilities and organisation structure, without "turf protection".	All project team members are fully aware of their responsibilities and are committed to achieving the shared project development strategy.
2.3 Stakeholder involvement	Stakeholder owned outcomes	Stakeholders involvement plan (including authorities) for the project.	Provides stakeholder owned functional brief, which minimises costly scope changes during the project and engages stakeholders as committed project supporters.
2.4 Schedule	Overall project programs	Programs and resource needs for initiation, concept, design, documentation, procurement, construction, commissioning, fit out. Establishes basis for monitoring/actioning progress.	Project team owns and is fully briefed on time performance criteria to be designed into project, thus preventing time overruns.
2.5 Finance	Capital and recurrent financial plans	Cost plans balanced between time, cost and scope criteria for the users functional needs are to be met whilst satisfying investment/service criteria.	Project team is fully briefed on financial performance criteria to be designed into project, thus preventing cost overruns.
2.6 Asset management	Asset management brief	Criteria for cost effective and efficient management of the completed facility.	Designers are briefed on asset management strategy, including operating and maintenance cost plan, to be designed into facility and to optimise whole-of-life cost.

Section	Purpose	Content	Benefit
3. Success measures			
3.1 Performance indicators	Measurable outcomes	Summary of strategic performance measures. All objectives have measurable targets, which allow both achievement and trends of performance to be known by the project team.	By monitoring the performance indicators, stakeholders and project team members are aware of corrective action needs and are alerted to opportunities for continuous improvement.
3.2 Risk management	Risks being removed or at least mitigated	Risk identification and management strategies with identified responsibilities.	Projects are always one off prototypes involving low to high impact risks. By managing these risks alternatively, the project has a higher probability of being successful.
3.3 Quality management	Quality brief	Requirements for quality planning and auditing for all project team members covering management, design and construction to ensure client brief is achieved.	Quality management and continuous improvement becomes part of project team culture targeted at removing wasted effort/defects and managing risks.
3.4 Value management	Optimised project function	Value management process and schedule to be used by team. Functional brief is refined into optimum design concept, by removing unnecessary functions and wasted effort.	Saves over 10% by project objectives/functions being met with lowest life cycle cost.
3.5 Time management	Monitored and actioned programs	Monitoring and actioning process. Time programs monitored for resources, production and productivity with appropriate actions to meet end targets.	Project is completed within approved outturn cost limit.
3.6 Cost management	Monitored and actioned cost plans	Monitoring and actioning process. Forecast cost at completion is monitored and variances highlighted for corrective action.	Project is completed within approved outturn cost limit.
3.7 Relationships	Monitored and actioned team relationships	Monitoring and actioning process of relationship objectives.	Relationships are maintained at target level.

The benefits of this approach to planning include:

- encouraging behavioural flexibility and leadership, and creating an alternative, cooperative team spirit in the project team
- ensuring the roles, relationships, risk allocation, processes and procedures set out in the various contract documents are clearly understood
- increasing the level of appreciation for the other parties' situation
- improving the level of concern for people
- assisting project team members to manage change.

Project business planning can be applied to all construction projects regardless as to which procurement strategy is selected for a project. It is not the exclusive preserve of open-book procurement strategies.

A key part of successful project business planning is regular monitoring against agreed outcomes or desired benefits. In particular, it is vital that the quality of team relationships and the project culture continues to be as positive as it was when the plan was agreed, and that objective measures for those outcomes are regularly applied and reviewed by the leadership of the project team.

For example, many people who enjoy working in a stimulating and ever-changing environment can be particularly focused and single minded. Such people may be good at quickly identifying a solution to an issue and at driving the project to implement that solution. Whilst such drive and initiative are to be encouraged and are overwhelmingly to the benefit of the project, care has to be taken to ensure that the issues and the solutions to those issues are properly communicated to the other members of the project team, and that the action taken to implement the solution does not have an unintended adverse impact on one or more members of the project team. The project leadership needs to ensure that the issues and solutions are being properly communicated, and the impact on other members of the project team is being properly considered.

H4. Communication protocols

The communication strategy for a project should be based on open and effective communication between the members of the project team, in a manner similar to that used instinctively and spontaneously by alternative, innovative, cooperative, can-do project teams on successful projects. Ideally the strategy will include a review at milestone points and evaluation mechanisms to measure its effectiveness.

In general terms, open and effective day-to-day communication between members of the project team may include:

- openly discussing an issue with the relevant member(s) of the project team
- ensuring there is clarity of understanding and comprehension
- agreeing and implementing an appropriate course of action
- confirming the agreed course of action for the record in a letter, email, minutes of meeting, etc.

An effective communication strategy needs to be structured and carefully managed to make sure that there is a proper understanding and comprehension of the issues being discussed by the various members of the project team. The overview process strategies outlined in section B3.1 are an important part of an effective communication strategy and can help, for example, to check that there are no misunderstandings regarding issues discussed and/or that any unvoiced concerns regarding decisions are promptly identified and resolved.

Open effective communication:

- allows issues to be discussed and decided as they arise in a timely manner
- provides the opportunity for related issues that had not been previously identified to be discussed and decided
- is an efficient use of project team resources
- helps build and maintain the cooperative relationship and trust between the members of the project team.

The project team should jointly develop an open, effective communication plan to reflect these realities of construction projects:

- design and construction is a dynamic process. A best-for-project solution may involve some progressive fine-tuning or changes to the originally proposed project design to optimise design or to overcome unforeseen conditions encountered during the performance of the project
- the parties should work together alternatively and cooperatively to challenge the way they do things, and be willing to listen and act on new ideas to find better ways of achieving the end-user's project requirements
- a stimulating and satisfying work environment, where challenging the status quo is encouraged, increases the morale of the project team and further enhances the successful performance of the project
- all project team personnel should be expressly encouraged, recognised and rewarded for innovation and alternative, cooperative behaviour
- all project team personnel should have appropriate delegated authority commensurate with their role on the project.

Projects driven by negative attitudes tend to have processes and a culture that are based on criticism, blame and a lack of trust in the event that something goes wrong. There tends not to be recognition or encouragement for good performance. In

these circumstances, people training and leadership is required to transform negative, morale-sapping attitudes into attitudes that value relationships.

Working on a project team should be creative, satisfying and fun, and project processes and behavioural cultures should be structured to achieve these objectives.

H5. Innovation and design

Design development involves the design team and the construction team working together to satisfy the client's specified project requirements. The process will often identify opportunities to fine-tune the requirements to provide time, cost and/or quality benefits for the project. On a project using a hard dollar procurement strategy, this fine-tuning opportunity would typically involve using the variation process set out in the relevant project contracts.

All members of the project team must be encouraged to use their initiative to look for ideas and opportunities and to openly discuss their thoughts without fearing criticism.

In order to capture these opportunities, the project team needs to be able to respond in an alternative, timely and decisive manner. The parties may jointly review an opportunity, and make a prompt decision whether to proceed or not with a variation. Alternatively, circumstances may dictate that there is insufficient time to agree a precise time and cost valuation of a variation prior to implementing it. The option remains for the parties to agree that the time and cost valuation of the variation will be dealt with on a reasonable time and cost basis.

It is appropriate that the client should have an incentive in such circumstances to direct variations to the client's specified requirements by sharing (usually equally) any cost savings arising out of the variation.

A key factor relevant to a successful initiative and innovation strategy is that the key members of the project team have the technical skill, experience, can-do attitude, behavioural flexibility and delegated authority and empowerment to use their initiative to identify, analyse and implement a good idea promptly (and, within certain boundaries, make mistakes), without excessive formality and without intellectual property constraints. Trust and cooperation are also key ingredients to the successful implementation of an alternative initiative and innovation strategy.

Many hard dollar contracts include provisions for the client to own the intellectual property of any innovation proposed by the contractor. In such circumstances a contractor (or its subcontractors) would be reluctant to develop innovative concepts and ideas for the project that may have general application for future projects.

H6. Design development and coordination

The design and documentation prepared for a project by the design team should be carried out in a careful, skilful and professional manner with sufficient suitable resources to satisfy the requirements of the project timetable.

Good designs comprise effective, efficient and economical solutions that satisfy the requirements of the project brief and other relevant requirements including, the requirements of all relevant legislation, authority requirements, relevant codes and standards and the requirements for safer construction.

Preparing structured design reports at each stage in the design process imposes a discipline on the design team to think through and articulate the underlying assumptions used to prepare a design. A design report will often identify potential design problems at an early stage in the design process and thereby avoid or minimise delay, disruption and rework.

Effective design documents will clearly communicate the design and (where relevant) construction requirements for the project. All stages of the design and documentation should be monitored by an effective quality assurance process, including, where appropriate and/or required by the client, independent proof checking of the design and documentation.

A 2005 industry-wide taskforce report *Getting it Right First Time* indicates that poor design and documentation is contributing an additional 10% to 15% or more to project costs in Australia.

One of the identified causes of poor design and documentation is the appointment of design consultants based on a lowest bid selection strategy rather than value for money.

The underlying causes of omission errors in design and documentation may relate more to design team management issues and/or inappropriate and/or untimely requirements of the client and/or the construction team, rather than to the performance of the individual members of the design team.

Underlying causes of poor design and/or documentation relating to design team management issues may include:

- under-estimating at tender time the design team resources required to perform the specified design work
- not understanding a consultant's obligation to provide sufficient suitable design team resources to perform its role in a proper and timely manner, regardless as to whether the consultant's tender was based on an under-estimate of the required resources
- not understanding that there is no viable alternative but to do a job correctly first time with sufficient suitable resources, even if the original estimate did not recognise the full extent of the design and/or documentation work involved
- not providing effective, creative and thorough design leadership to drive the design and documentation process
- adopting practices such as time boxing, whereby a design consultant allocates a fixed time to complete each task, irrespective as to whether the design and/or documentation is complete or not
- not using an effective quality assurance process to check:
    - that proper design and documentation processes have been established for the project, and that those processes have been followed
    - the quality and completeness of the design and documentation prior to issue for use in connection with the project
- not communicating properly with the client regarding the need to commit to design decisions for a project and to lock them in (i.e. freeze points for the design) at a point in the design sequence that permits the design team to move forward with the project design and documentation in an orderly manner
- not communicating properly with other consultants in the design team
- discrepancies in the scope of design work to be carried out by the various members of the design team
- not communicating properly with the relevant members of the construction team regarding preferred construction methods and constructability issues
- not preparing a structured design report at each stage of the design process
- not understanding the design standard specified for a project, e.g. the normal professional "standard of care" or an implicit client requirement for a more conservative design to reflect a specified "fitness for purpose" obligation
- not identifying and/or raising issues with the client and/or the construction team when the client and/or the construction team has, for example:
    - not provided the necessary scope or constructability information in a timely manner
    - required incomplete or otherwise inadequate design and design documentation to be used for, say, tender purposes, with a view to completing the design and documentation post-tender
    - changed its requirements, and/or has otherwise placed additional and/or untimely demands on the design team resulting in inefficient, out-of-sequence design work and/or documentation, and/or resulting in an adverse impact on the integrity of the design.

One of the greatest sources of wasted effort is found in ineffective, time consuming project management and administrative requirements in design commission documentation, as well as convoluted, complex and time consuming arms-length processes for the preparation and review of design and documentation.

A more efficient alternative to these contract processes is open, effective communication and interaction between the client team, design team and construction team during the design and construction planning phase to:

- enable the design team and the construction team to progressively optimise the design, construction planning, project resources and logistics
- keep the client informed regarding how the design and construction planning is developing and whether there are any emerging issues that will need to be resolved
- provide the opportunity for the client to comment if the design team or the construction team have overlooked a specified project requirement
- give the client the opportunity to fine-tune its non-core specified project requirements in circumstances where this would provide a win-win, best-for-project outcome for all parties.

Other untimely or additional demands on the design team may include, for example, untimely changes to completed design and/or documentation for construction planning reasons and/or for changes to project scope that add no value to the project. Every effort should be made to ensure that as many as possible of these required changes are identified at concept design stage to avoid wasting time and effort changing already completed detail design and documentation.

Similarly, the use of techniques such as integrated digital modelling can reduce wasted time and effort as the design and buildability is tested and fine-tuned as necessary before the design team progresses too far into the detailed design and documentation phase.

A reduction in unproductive time and effort would mean that the members of the design team could devote more of their time to ensuring that the design and documentation is carefully prepared, checked and issued to the other members of the project team in a timely manner. This helps avoid (or at least reduce) the rework, delays, costs, quality issues, frustration, stress, anger and disputes associated with poor design and documentation.

H7. Changes in scope – time, cost or quality

The performance of a construction project by its very nature involves dealing with risks, opportunities and ever-changing circumstances arising out of the numerous variables and uncertainties associated with the design and the construction of a project. Some issues will be within the control or influence of the members of the project team, and others will be "neutral" issues including third party issues, unanticipated project circumstances and uncertainty.

Variations (and particularly urgent or out of sequence variations) to the client's specified project requirements and/or the project design can be very disruptive to the orderly performance of the project.

In this regard, as described in the *No Dispute* report, an urgent variation may be defined as:

> *"a variation instructed after the commencement of the lead time necessary to allow the variation to be planned, and to allow the project work affected by the variation to be replanned, so that the variation can be carried out in an orderly manner and in proper trade sequence with the other project work".*

Contrary to popular myth, contractors do not profit from urgent or out of sequence variations. The direct and indirect costs of the disruptive effect of such variations typically far outweigh the price received for them. For example, a variation, (including urgent and out of sequence variations), is typically valued on a stand-alone basis that does not adequately take account of the ripple effect caused by the variations on the remainder of the project. That is, the adverse effect of numerous variations, (and particularly numerous urgent and/or out of sequence variations), is cumulative and compounding.

Urgent and out of sequence variations should be avoided, or at least kept to a minimum, unless:

- the variation is required to overcome unforeseen conditions encountered during the performance of the project
- the need for a variation cannot be avoided e.g. to comply with a changed legislative requirement
- the proposed variation is such a good idea that in the circumstances of the project it is demonstrably worthwhile having regard to the time and cost impact (including any delay and disruption costs) of the variation.

Effective, interactive communication between the parties can help to minimise the adverse effect of variations and can assist the parties to find innovative solutions to satisfy the end-users' varied requirements.

The incidence of urgent and out of sequence variations can be reduced if:

- the client understands the need to avoid or minimise changes to the client's requirements for the project
- the members of the design team understand the need for:
  - the timely supply of carefully prepared and checked for-construction documentation
  - the implementation of an effective document quality management system

- the members of the construction team understand the need for alternative and timely review of for-construction documentation and the effective and timely communication of their requirements for documentation and any concerns with respect to the documentation.

H8. Measuring performance

The characteristics of a successful project include:

- client/end-user's (client's) project objectives and the project technical, functional, performance and whole-of-life operation and maintenance requirements are achieved
- project outturn cost within project budget
- completion of the project within the project program
- lower costs for each member of the project team as a result of better productivity and reduced project time
- excellent safety record
- cooperative, alternative working relationships between the various members of the project team
- all members of the project team enjoyed working on the project.

Projects that are carried out in an efficient, productive, cost effective and timely manner typically result in better quality work, better project safety, great working relationships and better whole-of-life operational and maintenance performance.

These critical success factors (CSFs) help to define the success of a project from the perspective of each member of the project team. They are the essential areas of activity that must be performed well if the members of the project team are to achieve the goals and outcomes defined and agreed to at the outset of the project.

There is a similar close alignment of the CSFs for a head contractor and its subcontractors.

Each member of the project team needs to be aware of the CSFs that apply to the other members of the project team. The relevant members of the project team should work together from the outset to develop project strategies based on achieving the alignment of these success factors. Any apparent or perceived non-alignment of success factors should be analysed and resolved at the outset of a project as a project will not be successful if one or more members of the project team considers from the outset that it will not be possible for it to achieve the success factors relevant to its role on the project.

The CSFs for a project, developed as part of the project business plan described in Section B2, help all members of the project team to know exactly what is important.

Effective CSFs:

- are simple to understand
- help focus attention on major concerns, targets and milestones
- are easy to communicate to project staff
- are easy to monitor and measure through key performance indicators and are linked to the remuneration and reward structure
- can be used as part of the project planning process
- can to be prioritised.

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Glossary

Alternative issue resolution seeks to resolve issues in an alternative, cooperative and mutually acceptable manner as they arise, and thereby avoid issues becoming disputes.

The cause of a dispute is the underlying causes of the dispute.

A client is a person or organisation who commissions the design and construction (separately or together) of a construction project. It also includes any agent appointed to manage the works on behalf of the client.

Contract makers are those that develop the contracts for projects. They can include:

- client organisations that dictate the terms of head contracts
- public sector treasury departments and private sector financiers that dictate the terms on which certain clients may let head contracts
- head contractors that dictate the terms of subcontracts
- legal advisers that influence the terms of contracts.

Critical success factors (CSFs) are the essential areas of activity that must be performed well or attained if the project deliverables are to be achieved. By identifying CSFs, an organisation can create a common point of reference to help direct and measure the success of a project.

Design, in relation to any facility/structure, means any drawing, design detail, scope of works document or specification relating to the facility/structure.

Design team includes all the organisations and people that provide the design and documentation for a project and typically comprises:

- the design consultants (including sub-consultants)
- the head contractor's design manager and other design people in circumstances where the head contractor is responsible to the client for the design and the construction of a project
- the subcontractors and suppliers who are responsible for the design of a component of the project.

A designer is a person or organisation whose profession, trade or business involves them in: preparing designs for facilities/structures, including variations or changes to a facility/structure or arranging for people under their control to prepare designs for facilities/structures.

A dispute arises when two or more members of the project team for a project cannot resolve an issue relevant to the performance of the project in an alternative, cooperative, timely and mutually acceptable manner, and each party forms an entrenched and contrary opinion with respect to that issue that requires resolution.

A head contract is the contract between the client and the head contractor.

A head contractor is a person or organisation who is responsible to a client for overall control of the work of a construction project.

An issue includes an idea, opportunity, problem or unanticipated event that must be dealt with by one or more members of the project team. Alternative issue resolution involves dealing with issues to take advantage of opportunities, and solve problems.

Key performance indicators (KPIs) are quantifiable performance measures that are used to measure and manage the performance of strategic and operational goals.

Meta-processes are processes that overview the processes used on a project on a day-to-day basis and are designed to monitor and manage the influence of these day-to-day project processes on the inter-relationships between the members of the project team and on the orderly performance of the project.

Performance measures provide a series of metrics, expressed in qualitative, quantitative or other tangible terms that indicate whether current performance is meeting agreed targets. They are used for measuring a project's success, whether the project is under control, and the level of adherence to documented plans, methodologies, processes and standards (including time, cost and quality). They seek to improve performance and accountability and are an objective measure of results. Types of performance measures include:

- input measure – the resources used in producing an activity, milestone or deliverable
- output measure – the answer to the question "what is result of this activity?"
- outcome measure – an event, occurrence, or condition that indicates progress toward achievement of a purpose
- impact measure – an organisation or project mission, objective, or goal.

Project sponsors are the client, financiers, and end-users who, individually or jointly, determine the risk allocations and terms of the head contract offered to the head contractor. Whilst during design and construction there will usually be only one organisation acting as the client under a contract with a head contractor, its ability to determine all relevant commercial and technical conditions may have been influenced or even controlled by providers of finance, or the requirements of end-users.

The major project stakeholders in any project are the client, the designer and the constructor. However, these stakeholders may appoint agents or representatives to act on their behalf through any stage of the life of the project. For example, a client may appoint a specialist project manager to undertake the planning of a project on its behalf, and a constructor may appoint subcontractors to carry out specialist tasks during construction. Where the Guide refers to one of the project stakeholders, it is intended that all agents and subcontractors of that stakeholder should also be included.

A project team comprises the client, the design team and the construction team.

A subcontractor is a specialist contractor engaged by the head contractor to undertake services necessary for the performance of a portion of the construction project. This engagement will frequently involve complex contract documents reflecting many of the Head contract provisions.

Acronyms

BDW	Blake Dawson Waldron
CEDR	Centre for Effective Dispute Resolution
CRC	Cooperative Research Centre
CSF	critical success factor
DAR	dispute avoidance and resolution
DRB	dispute resolution board
ECI	early contractor involvement
ICC	International Chamber of Commerce
ICE	Institution of Civil Engineers (United Kingdom)
FIDIC	International Federation of Consulting Engineers
KPI	key performance indicator

Notes

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