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Research Report: Causal Ascription of Disputes in Construction Projects





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Research Report

Causal Ascription of Disputes in Construction Projects

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1. EXECUTIVE SUMMARY

Disputes have become an endemic feature of the Australian construction industry. If they are not resolved promptly they escalate causing project delays, lead to claims that require litigation proceedings for resolution and destroy business relationships. The competitive nature and contractual complexity inherent within construction can aggravate the incidence of disputes. Research over the last two decades has revealed that factors such as scope changes, poor contract documentation, restricted access, unforeseen ground conditions and contractual ambiguities are contributors of disputes. While this is widely known, disputes still prevail over such issues. Before disputes can be avoided an understanding of what the underlying conditions that contributes to their occurrence needs to be determined so that mechanisms can be put in place to prevent them from arising.

Recognizing this need a three-phase research strategy was adopted to determine the causes of disputes. Initially case law was reviewed and it was revealed that the underlying issues that were brought to litigation were to do with points of law, namely 'civil procedure'. Two focus groups were undertaken with a public sector client and a contracting organization. The focus groups enabled participants to present their experiences with the causes and costs of disputes. There was a significant difference in opinion as to causes of disputes. For clients it was perceived the underlying latent conditions that resulted in a dispute were predominately due to the nature of the task being performed (e.g., failure to detect and correct errors), and those arising from people's deliberate practices (e.g., failure to comply with contractual requirements). The causes identified by the public sector client included poor workmanship and defects, opportunistic behaviour of contractors, incomplete/erroneous documentation, and poor planning and resources of consultants and contractors. For the contractor focus group the circumstance arising from the situation or environment the project was operating in was identified as the main underlying latent condition for disputes (e.g., unforeseen scope changes). There was however found to be a degree of convergence for estimates of dispute costs. The direct costs of disputes were estimated to range from 0.5% to 5% of contract value depending on the resolution method adopted.

In the final phase, 41 semi-structured interviews were undertaken with a variety of construction industry practitioners to gain an in-depth understanding about the specific causes of disputes. Interviewees identified 58 specific dispute events that occurred in construction and engineering projects they had been involved with. Analysis revealed that 72% of the projects identified by interviewees were procured using traditional lump sum with an AS2124 contract. The most popular method to resolve disputes was negotiation, which occurred in 64% of projects. Litigation was the most expensive resolution method costing as much as 30% of the original contract value. Conversely, adjudication was found to be the most cost effective resolution method with costs being less than or equal to 0.15% of contract value.

Analysis of interviewee perceptions revealed the latent conditions of *task*, *practice* and *circumstance* contributed to 87% of dispute. The findings indicate that the interaction of the organization and project environment influence behavioural adaptations of individuals toward how a dispute occurs and is ultimately resolved. A number of reasons contributed to the disputes that occurred, which included the competitive relationship between consultant and contractor, contractual complexity and risk allocation, and the ambiguity inherent within the interpretation of contract documents. Such reasons should not be seen as causes of dispute but rather the latent conditions that act as stimulus for tension and conflict as well as contributors to the likelihood of problems. It was revealed that people engage in disputes on behalf of their employing organization rather than on behalf of themselves. People however have to resolve conflict, and few people were able to entirely eliminate personal feelings toward each other in a conflict situation, even when they were acting as representatives of an organization.

2. INTRODUCTION

During the last two decades the Australian construction industry has been in an intense period of introspection, specifically examining how it can improve its performance and productivity (NWPC and NBCC, 1990; Gyles, 1992; CIDA, 1995 DIST, 1998; Cole 2002; Blake Waldron Dawson, 2006). Time and cost overruns in construction projects has become an ubiquitous feature of the industry (Love *et al.*, 2005; Blake Waldron Dawson, 2006). Significant factors that have been identified as contributing to time and cost overruns in Australian construction projects are *rework* (Love, 2002a), *variations* (Chan and Yeong, 1995; Blake Waldron Dawson, 2006), *incorrect design and incomplete documentation* (Tilley *et al.* 2000; Love *et al.* 2006), and *late authority approvals* (Blake Waldron Dawson, 2006). As a result of such issues arising in projects, conflict and disputes may occur, which can lead to the disruption of construction schedules, increased project costs, and even adversely influence relationships between project participants (Yiu and Cheung, 2004). If a dispute is not resolved promptly, it may escalate, and ultimately require litigation proceedings, which is usually extremely costly for the parties concerned (Cheung *et al.*, 2004). Bristow and Vassilopoulos (1995) revealed that litigation fees are often more costly than the claim being sought. In the United States, for example, it has been estimated that in excess of US\$5 billion a year is spent on construction litigation and such expenditure is expected to increase annually by 10% (DeSai, 1997; Michel, 1998). This figure excludes the 95% of disputes that are settled before trial (Stipanowich, 2004).

Many of the problems that arise because of rework, scope changes and documentation are interrelated, and are typically a product of a project's procurement strategy and the management practices implemented by organizations involved with the project (Love *et al.*, 2003). Within the procurement strategy adopted there is typically an imbalance of risk allocation in contract provisions, a pre-conditioning of adversarial relations between project participants and a traditional client-contractor mentality. As a result these issue arising they can work in tandem to produce an environment where joint problem solving is stymied (Jannadia *et al.*, 2000; Cheung *et al.*, 2003; Love *et al.*, 2005).

Negotiation is deemed to be a more suitable method of selecting consultants and contractors than competitive tendering. This is because competitive tendering invokes clients to choose the lowest bid. This may lead to substandard services being provided by consultants (Tilley *et al.*, 2000; Love *et al.*, 2003) and contractors adopting a 'claims conscious' strategy to improve their margin or recover costs for items missed when preparing their competitive tender (Kumaraswamy, 1997). Being claims conscious, can however, be a prerequisite to successful project management if a contractor aims to recognize and identify a claim situation when it first develops, and not after it has become a problem. Effective claims administration is as important as good design and engineering and is an integral part of the construction process (Levin, 1998). Notwithstanding widespread availability of lessons learned from project failures and successes and resulting technological advancements, disputes still continue to plague construction projects (Harmon, 2003). A contributing factor is that contractors often focus on 'preparing the next bid and project' and as such, do not allocate adequate time for reflection, which is a critical part of any learning process. Understanding how organizations approach problems and conflicts is critical to learning, dispute avoidance and resolution and project success (Diekmann *et al.*, 1994).

Research into determining the causes of disputes has reached saturation point; consistently the same causal variables are identified and continue to manifest in projects (e.g., Semple *et al.*, 1994; Kumaraswamy, 1997; Yiu and Cheung, 2007). As most of the studies undertaken have been based upon questionnaires (e.g., Kumaraswamy, 1997) or derived from case law (e.g., Watts and Scrivener, 1995), the factors identified lack contextual meaning. For example, poor communication has been identified as a cause of disputes (Rhys Jones, 1994; Bristow and Vassilopoulos, 1995; Kumaraswamy, 1997). Yet problems do not arise because X does not communicate Z to Y, but the way Y interprets Z in light of some prior experience (or lack of), which X does not know about. Thus, X fails to make allowances for Z, and Y does not realise X does this because Y thinks their experiences are representative. Simply

improving communication practices by improving information flow with technology or using Computer-Aided-Design will not reduce *per se* the incidence of disputes in construction (Love *et al.*, 2008). (It may not, but it is important to note the benefits that others have gained through the use of digital modelling). Fundamentally, work processes, policies, and procedures as well behaviours need to change in concert if disputes are to be reduced in construction.

Considering the increasing complexity of construction projects and the economic environments within which they are being procured, there is a need to obtain an ameliorated understanding of the underlying conditions that contribute to disputes. With this in mind, a conceptual 'systemic causal' model is developed from a review of the literature and case law, as well as a series of focus groups and of semi-structured interviews with industry practitioners about their *perceived* causes of disputes.

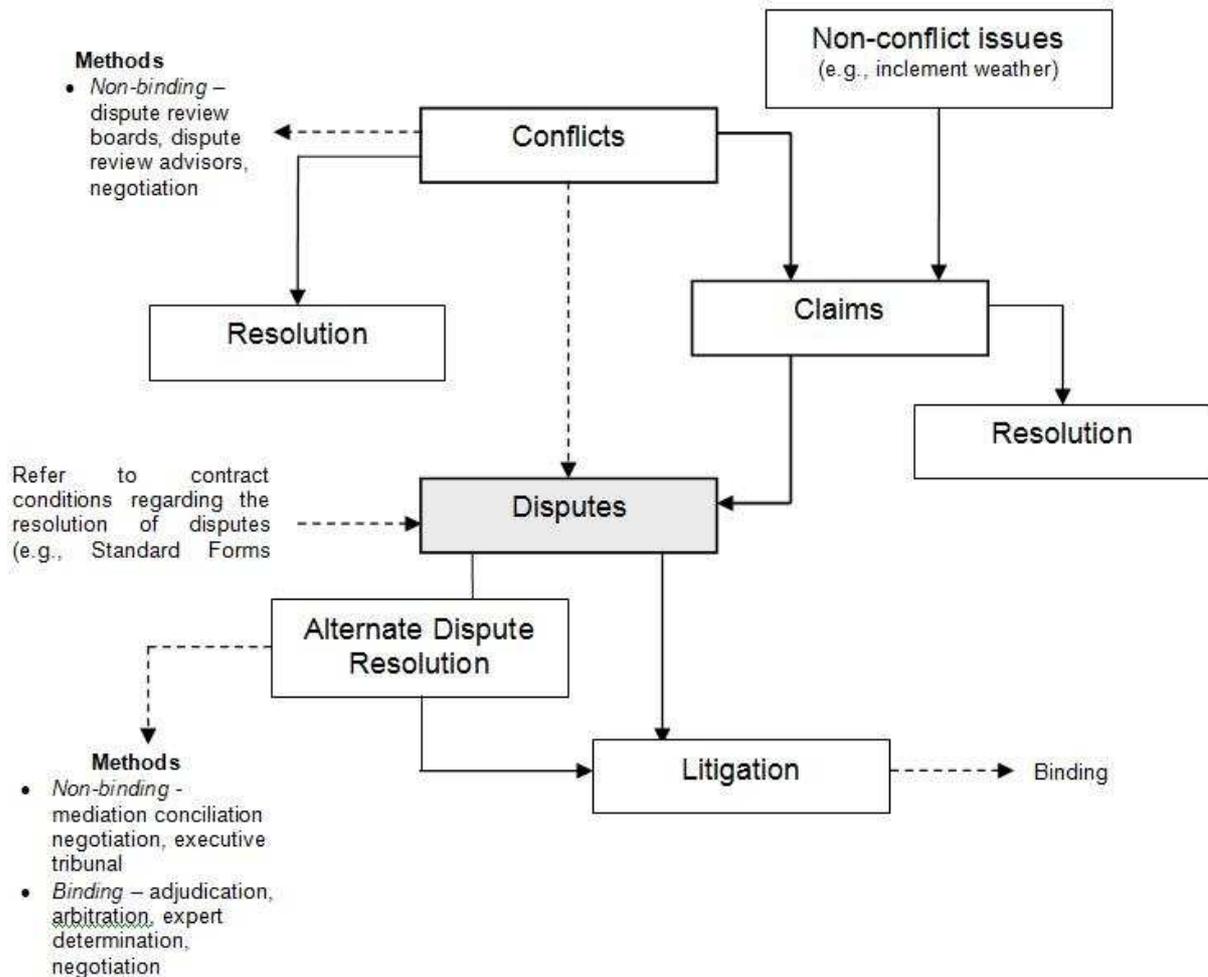
3. CONFLICT, CLAIM AND DISPUTE

A plethora of definitions as to what constitutes a dispute can be found in the normative literature. The terms conflict, claim and dispute are often used interchangeably, but their meanings are very different. Figure 3.1 identifies the relationship between these terms. Examples of how each of these terms has been defined include:

- *Conflict* – “serious disagreement and agreement about something important” (Collins, 1995). Similarly, Leung *et al.* (2005) define conflict as a “functional or dysfunctional element in the management process”. Willmot and Hocker (1998), on the other hand, provide a detailed definition of conflict as “an expressed struggle between at least two independent parties who perceive incompatible goals, scarce resources, and interference from other achieving those goals”. According to Brown and Marriot (1998) a dispute is regarded as a form of conflict that is made public and requires resolution.
- *Claim* – “for the assertion of a right to money, property or remedy” (Powell-Smith and Stephenson, 1993). Likewise, Semple *et al.* (1994) define a claim as “a request for compensation for damages incurred by any party to a contract”. Levin (1998) defines a claim as “a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in certain sum, the adjustment or interpretation of contract terms, or other relief arising under or related to a given contract”
- *Dispute* – “any contract question or controversy that must be settled beyond the job site management” (Diekmann and Girard, 1995).

Reid and Ellis (2007) argue that there is no definitive meaning of a dispute and the existence of which is a subjective issue requiring a common-sense approach that relies on the facts, the law and policy considerations. Ndekugri and Russell (2006) and Reid and Ellis (2007) refer to the *Halki Principle* (*Halki Shipping Corporation v Sopex Oils Ltd*, [1998], 1 WLR CA) where a dispute does not exist until a claim has been submitted and rejected; a claim being a request for compensation for damages incurred by any party to the contract. When disputes occur they invariably require resolution and therefore are associated with distinct legal remedies (Fenn *et al.*, 1997). Conflict is endemic within construction projects; it exists where there is incompatibility of interest (Fenn *et al.*, 1997). This incompatibility generally arises because of differing norms and values as well as competing objectives and goals of project participants. Conflict is further exasperated by the use of procurement strategies (e.g., traditional lump sum contracts) that discourage integration, cooperation and collaboration between project participants, particularly clients and contractors (Love *et al.*, 1999, Zaghoul and Hartman, 2003).

Figure 3.1 Conflict, claims and disputes (Adapted from Kumaraswamy, 1997 and Fenn et al., 1997)



In an attempt to reduce the incidence of conflicts and disputes a plethora of strategies to build 'trust between parties' and improve 'teamwork', 'communication', 'joint problem solving' and 'inter-organizational relationships' in projects have been utilised; for example alliancing, and partnering arrangements (Brown, 1994; Larson, 1995; Kumaraswamy, 1997; Holt *et al.*, 2003; Harmon, 2003; Cheung *et al.*, 2003; Wong *et al.*, 2008). The use of alliancing and partnering arrangements can enable conflict between parties to be managed to the point of preventing a dispute from emerging (Fenn *et al.*, 1997).

Bearing in mind the *Halki Principle*, a claim is deemed to be an integral part of the dispute process. Yet claims are unavoidable and necessary to contractually accommodate unforeseen changes in project conditions (Kumaraswamy, 1997). Essentially, claims are the administrative processes required to handle construction events that take place where the contract "leaves off", for example changed conditions, design changes, defective specifications, quantity variations, delays, disruptions and accelerations (Levin, 1998). While many claims can be resolved harmoniously, prior presence of conflict between parties may initiate an unnecessary dispute (Kumaraswamy, 1997).

There may be instances where there are stark differences between parties whereby they have diametrically opposed opinions and the resultant dispute simply cannot be resolved without third party intervention. There will also be occasions where one of the parties takes a stance to improve its commercial bargaining position. In this situation, mediation, adjudication, arbitration and litigation in their various forms can be used to resolve the dispute at hand. The availability of adjudication clauses such as those contained in standard forms of contract makes this a less destructive action for the parties concerned.

According to Carnell (2000) disputes should not be demonized, as resolution mechanisms have their place in the construction process. This is especially the case with onerous and

one-sided amendments to standard forms. Such amendments are often drafted by lawyers with the objective of improving their clients' position at the exception of fairness, or when the only way in which a party can actually protect their position because the contract conditions promote conflict (Clegg, 1992). Inappropriate risk allocation through disclaimer clauses in contracts is a significant reason for increasing total construction costs (Hartman, 1998). The most common *exculpatory* clauses used in construction are (Zaghoul and Hartman, 2003):

- uncertainty of work conditions;
- delaying events;
- indemnification;
- liquidated damages; and
- sufficiency in contract documents.

The use of disclaimer clauses to shift project risks to other contracting parties is still the general practice in the construction industry (Cole, 2002). To obtain an improved risk allocation process, a trust relationship between contracting parties needs to be established (Zaghoul and Hartman, 2003). This process should happen at the onset of the project so that risks can be managed or mitigated through a process of *negotiation* (Kozek and Hebbard, 1998). In particular, there is a need for a greater understanding of risk allocation between contracted parties so as to determine who owns or can manage the risk (Cole, 2002).

4. PATHOGENS

Research undertaken by Love *et al.* (2008) has revealed that errors and scope changes in projects arise because of inherent pathogens that exist in projects. These are latent conditions that lay dormant within the project system until a problem comes to light. Before the problem becomes apparent, project participants often remain unaware of the impact upon project performance that particular decisions, practices or procedures can have (Love *et al.*, 2008). Pathogens can arise because of strategic decisions taken by top management or key decision-makers within a project. Such strategic decisions may be mistaken but they need not be. Latent conditions (i.e. pathogens) can lay dormant within a system for a considerable period of time and thus become an integral part of everyday work practices. However, once they combine with active failures (which are similar to Deming's common causes) then the problem that arises and the subsequent consequences may be significant. Active failures are essentially inappropriate acts committed by people who are in direct contact with a system. Such acts include: slips, lapses, mistakes and procedural violations (Reason, 2000). Active failures are often difficult to foresee and therefore cannot be eliminated by simply reacting to the event that has occurred. Latent conditions, however, can be identified and remedied before an adverse event such as a dispute occurs. Pathogens have been defined by a number of qualities (Busby and Hughes, 2004):

- they are a relatively stable phenomena that have been in existence for a substantial time before the dispute occurs;
- before the dispute occurs, they would not have been seen as obvious stages in an identifiable sequence failure; and
- they are strongly connected to the dispute, and are identifiable as principal causes of the disputes once it occurred

According to Busby and Hughes (2004) pathogens can be categorised as:

- *Practice* – arising from people's deliberate practices;
- *Task* – arising from the nature of the task being performed;
- *Circumstance* – arising from the situation or environment the project was operating in;
- *Organisation* – arising from organisational structure or operation;
- *System* – arising from an organisational system;
- *Industry* – arising from the structural property of the industry; and
- *Tool* – arising from the technical characteristic of the tool.

Love *et al.* (2008) have suggested that before causal inferences can be made it is necessary to initially determine the pathogens that contribute to the problem that is being experienced.

5. DISPUTE CAUSATIONS

The literature offers much theorizing about what causes disputes (Table 5.1). Fenn *et al.* (1997) previously suggested that there had been limited empirical evidence that has been structured to justify the theories that had been presented. It would appear that Fenn *et al.*'s (1997) observation is still pertinent some ten years on. Much of the research that has been undertaken simply seeks to identify a list of factors or triggers that show some association with disputes. In fact, many of the factors identified are not dissimilar in nature (Table 5.1). The identification of such factors, while useful, does not explain the underlying causal nature of disputes.

In an attempt to examine the causality of disputes Kumaraswamy (1997) sought to determine the *root* (the underlying reason of the problem which if eliminated, would prevent recurrence) and *proximate* (immediately precedes and produces the effect) causes. Root causes identified by Kumaraswamy (1997) include: unfair risk allocation, unrealistic time/cost/quality targets by the client, adversarial industry culture, inappropriate contract type, and unrealistic information expectations. Proximate causes identified include: an inadequate brief, slow client responses, inaccurate design information, inaccurate design documentation, inappropriate contract form, inadequate contract administration, and inappropriate contractor selection.

A close examination of root and proximate causes of disputes proposed by authors such as Kumaraswamy (1997) makes it difficult to determine what originally gave rise to the other in many instances. Here parallels can be drawn with the 'chicken or the egg causality dilemma' and the circular cause of consequence (Garner, 2003). There are many real world examples of circular cause-and-effect, in which the chicken-or-egg dilemma helps identify the analytical problem. For example, fear of economic downturn causes people to spend less, therefore reducing demand, resulting in an economic downturn. A lack of professionalism by design professionals (e.g., architects and engineers) because of reduced design fees can result in inadequate contract documentation being produced, and therefore lead to rework that manifests as a lack of professionalism that may eventually emerge in a dispute.

Table 5.1 Claims and disputes in construction (Adapted from Kumaraswamy, 1997)

Author(s)	Factors contributing to claims/disputes
Blake Dawson Waldron (2006)	<p><i>Nine</i> key causes in disputes:</p> <ol style="list-style-type: none"> 1. Variations to scope 2. Contract interpretation 3. EOT claims 4. Site conditions 5. Late, incomplete or substandard information 6. Obtaining approvals 7. Site access 8. Quality of design 9. Availability of resources
Cheung and Yui (2006)	<p><i>Three</i> root causes of disputes:</p> <ol style="list-style-type: none"> 1. <i>Conflict</i> - Task interdependency, differentiations, communication obstacles, tensions, personality traits 2. <i>Triggering events</i> - Non performance, payment, time 3. <i>Contract Provision</i>
Yiu and Cheung (2004)	<p><i>Significant</i> sources:</p> <ul style="list-style-type: none"> • Construction related: variation and delay in work progress • Human behaviour parties: expectations and inter parties' problems
Killian (2003)	<ul style="list-style-type: none"> • <i>Project management procedure</i>: Change order, pre-award design review, pre-construction conference proceedings, and quality assurance. • <i>Design errors</i>: errors in drawings and defective specifications. • <i>Contracting officer</i>: Knowledge of local statutes, faulty negotiation procedure, scheduling, bid review • <i>Contracting practices</i>: Contract familiarity/client contracting procedures. • <i>Site management</i>: scheduling, project management procedures, quality control, and financial packages • <i>Bid development errors</i>: estimating error
Mitropoulos and Howell (2001)	<p>Factors that drive the development of a dispute:</p> <ol style="list-style-type: none"> 1. Project uncertainty 2. Contractual problems 3. Opportunistic behaviour
Kumaraswamy (1997)	<p><i>Five</i> common category of claims:</p> <ol style="list-style-type: none"> 1. Variations due to site conditions 2. Variations due to client changes 3. Variations due to design errors 4. Unforeseen ground conditions 5. Ambiguities in contract documents <p><i>Five</i> common causes of claims:</p> <ol style="list-style-type: none"> 1. Inaccurate design information

Author(s)	Factors contributing to claims/disputes
	<ol style="list-style-type: none"> 2. Inadequate design information 3. Slow client response to decision 4. Poor communication 5. Unrealistic time targets
Conlin <i>et al.</i> (1996)	<p>Six key dispute areas:</p> <ol style="list-style-type: none"> 1. Payment and budget 2. Performance 3. Delay and time 4. Negligence 5. Quality 6. Administration
Sykes (1996)	<p>Two major groupings of claims and disputes:</p> <ol style="list-style-type: none"> 1. Misunderstandings 2. Unpredictability
Bristow and Vasilopoulos (1995)	<p>Five primary causes of claims:</p> <ol style="list-style-type: none"> 1. Unrealistic expectations by parties 2. Ambiguous contract documents 3. Poor communications between project participants; 4. Lack of team spirit 5. Failure of participants to deal promptly with changes and unexpected outcomes
Diekman <i>et al.</i> (1994)	<p>Three main dispute areas:</p> <ol style="list-style-type: none"> 1. Project uncertainty 2. Process problems 3. People issues
Heath <i>et al.</i> (1994)	<p>Five main categories of claims:</p> <ol style="list-style-type: none"> 1. Extension of time 2. Variations in quantities 3. Variations in specifications 4. Drawing changes 5. Others <p>Seven main types of disputes:</p> <ol style="list-style-type: none"> 1. Contract terms 2. Payments 3. Variations 4. Extensions of time 5. Nomination 6. Re-nomination 7. Availability of information
Rhys Jones (1994)	<p>Ten factors in the development of disputes:</p> <ol style="list-style-type: none"> 1. Poor management 2. Adversarial culture 3. Poor communications 4. Inadequate design 5. Economic environment 6. Unrealistic tendering 7. Influence of lawyers 8. Unrealistic client expectations 9. Inadequate contract drafting 10. Poor workmanship

Author(s)	Factors contributing to claims/disputes
Semple <i>et al.</i> (1994)	<p>Six commons categories of dispute claims:</p> <ol style="list-style-type: none"> 1. Premium time 2. Equipment costs 3. Financing costs 4. Loss of revenue 5. Loss of productivity 6. Site overhead <p>Four common causes of claims:</p> <ol style="list-style-type: none"> 1. Acceleration 2. Restricted access 3. Weather/cold 4. Increase in scope
Watts and Scrivener (1992)	<p>Most frequent sources of claims:</p> <ol style="list-style-type: none"> 1. Variations 2. Negligence in tort 3. Delays
Hewitt (1991)	<p>Six areas:</p> <ol style="list-style-type: none"> 1. Change of scope 2. Change conditions 3. Delay 4. Disruption 5. Acceleration 6. Termination

Many of the root causes of disputes identified in the literature can be managed and controlled using various project management strategies, tools and techniques. For example, errors in documentation can be reduced or even prevented through the use of design audits and reviews, (what about digital clash detection and design reviews) with the exception being uncontrollable external events such as weather and unforeseen ground conditions and the behavior of parties (Kumaraswamy, 1997).

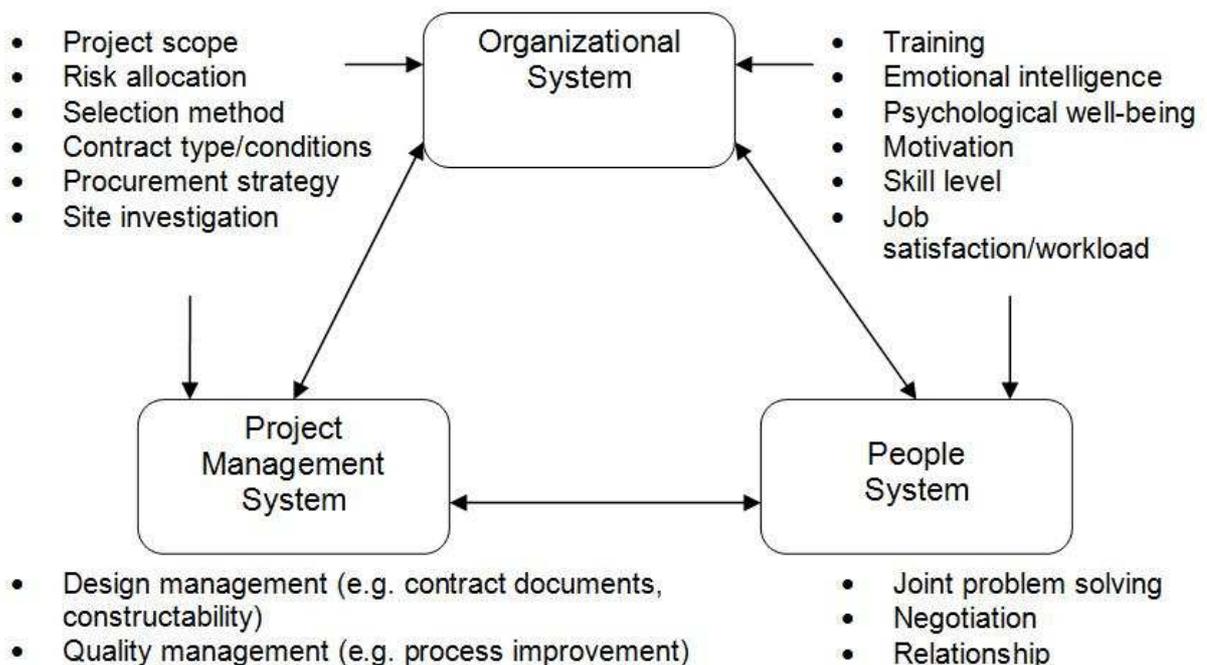
Mitropoulos and Howell (2001) suggest that a combination of environmental and behavioral problems can lead to disputes. The inherent degree of uncertainty that prevails within construction projects can result in planning being a problematic issue, especially when information is not available. When uncertainty is high, initial drawings and specifications will invariably change, and the project team will have to solve problems as they occur during construction. Once changes arise they may be deemed to be ambiguous and as a result disagreements between parties can materialize. This is because under the concept of *bounded rationality* not all potential contingencies are identifiable and be assessed until they materialize (Williamson, 1979). When parties enter into a contract and a specific clause fails to account for an unforeseen event, or it is interpreted to suit the particular circumstances that have arisen, then there is a potential for *opportunism*. In this instance there is likelihood for a party to opportunistically exploit or delay another to maximize their gain (Mitropoulos and Howell, 2001). The dispute causation factors of uncertainty, contractual problems and opportunistic behavior identified by Mitropoulos and Howell (2001) are similar to those recognized by Diekman *et al.* (1994): (1) project uncertainty, which cause change beyond the expectation of the party, (2) process problems, which includes imperfect contracts and unrealistic performance expectations, and (3) people issues, problems due to poor communication, poor interpersonal skills, opportunistic behavior and cognitive dissonance.

6. SYSTEMIC VIEW OF DISPUTES

To understand the mechanisms that contribute to the underlying problems that arise in projects, such as delays, rework, and scope change, a systems perspective can be used (Rodrigues and Bowers, 1996; Williams *et al.*, 1996; Rodrigues and Williams, 1998). Such a perspective provides a fundamental shift in thinking and encourages the 'dispute problem' to be visualized in a holistic manner. By adopting a systems perspective the interdependence and links amongst different components of a system can be explored. The environment within which construction projects are procured can be categorized as being comprised of the following systems, as illustrated in Figure 6.1:

- *People*, which includes the underlying values, attitudes, personality, education, training, experience and motivation of individuals that can influence organizational and project outcomes;
- *Organizational*, which includes the practices, policies, procedures, culture, and social responsibility of the firm; and
- *Project management*, which includes the procurement strategy (design and production management), contract arrangement, selection processes, and technology implemented to deliver a project.

Figure 6.1 Interaction of systems within a project (author)



The major elements that need to be considered within the people system are the experience of the individual, the training they may require, their psychological well-being, workload, and job satisfaction. Individuals need to be experienced with the work they have been allocated to undertake so as to reduce the likelihood of errors being made. In construction there is a proclivity for people to be subjected to high job demands, which can result in workplace stress being endured. According to Beehr and Newman (1978) stress can cause job dissatisfaction and result in psychological (e.g. tension, anxiety, irritability, boredom and procrastination) and behavioral symptoms (e.g. changes in productivity, absence and turnover, changes in eating habits, increased alcohol consumption and sleep disorders).

Changes in an individual's attitudes and disposition and behavior can adversely influence their decision-making capacity, relationships, and their ability to solve problems and negotiate, especially over contractual claims. The organizational system is the interface

between the individual and the project and is the cultural setting of the individual's workplace. Here practices, policies and procedures are put into place and tasks are performed in accordance to the organization's role in the project. Project scope, contractual conditions (particularly the allocation of risk and responsibility), and procurement strategy are key elements to be considered by the organization, as this will influence their planning and resourcing and their ability to achieve project outcomes. The organization needs to examine how it can best deliver a client's requirements with the resources available and within the parameters specified. In the project system, the procurement strategy adopted will influence how design, quality and production process will be managed and how issues of 'uncertainty' are addressed within the project.

7. DISPUTE DYNAMICS

Determining how various factors are related to one another is central to understanding a project system's performance. In order to establish the underlying causes of a dispute it is necessary to examine the relationship between project variables. For example, what variables are related to one another? What are the internal mechanisms by which a particular factor causes a change in another factor? For example, poor communication can lead to disputes, but how? How does an affected factor cause change in such a way that the former input is ultimately affected? Poor communication can lead to a dispute, but the dispute may eventually force improvements in communication. In addressing these issues, the technique of causal loop diagramming is used to provide a platform for linking causal variables.

A causal loop diagram can show explicitly the direction and type of causality among major variables. It can be used to model the influences of inputs on outputs and vice-versa. For example, if variable *A* is causing a change in variable *B*, the direction of causality is from *A* to *B*. If an increase (decrease) in variable *A* leads to increase (decrease) in variable *B* then the type of causality is positive. Otherwise it is negative. There are two types of feedback loops: (1) negative feedback loops, (2) positive feedback loops. A negative feedback loop is in equilibrium or stability-seeking loop. The loop perceives discrepancies between desired and actual states and takes action to keep the real world close to the desired state (Sterman, 1992). A positive feedback loop generates growth not equilibrium as in a negative feedback loop.

Causal modelling of this nature has been used to examine claims (Cooper, 1980), rework (Cooper, 1993; Love *et al.*, 2008), delays and disruption (Ackerman *et al.*, 1997), the impact of client behaviour on project performance (Rodrigues and Williams, 1998), and the effects of scope on project performance (Chritamara *et al.*, 2001; Chritamara *et al.*, 2002). Causal models can provide managers with the necessary insights about the inter-dependencies and the behaviour between key variables that can contribute to disputes so that learning and process improvements can be made to future projects (Ackermann *et al.*, 1997; Eden *et al.* 2000).

An examination of Table 5.1 reveals that the key causal factors contributing to disputes are poor contract documentation that arise from the *organizational 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) and educational and behavioural adaptations of individuals within the *people system* (e.g. poor communication, poor management, skill and experience, and personality traits).

7.1 Contract Documentation

Design consultants (such as architects and engineers) are expected to use reasonable and ordinary care in the practice of their profession and their responsibilities are in part defined by *social ascription* (Grunwald, 2001). From a legal perspective this is well known among the professions but clients are not always aware or made of aware of this (Guckert and King, 2002). Architects and engineers cannot guarantee the results of their service. Their liability for errors and omissions, however, can be "determined by whether they have performed their services with the standard of care consistent with other professional designers within their community" (Guckert and King, 2002). Once clients become aware of their designer's obligation they often find it difficult to comprehend what is meant by *standard of care* (Chapman, 1998).

Usually this is left up to a court of law or a panel of experts once a breach of the standard of care is identified, but this can be a long and tedious process for clients with no guarantee of a successful outcome (e.g., Chapman, 1998). Even when a standard of care is agreed upon pre-contract, any financial recovery may hinge on whether the mistake was an error

(mistakes made by the designer) or omission (omitted from the contract). A particularly difficult issue to determine relates to what management practice should have been implemented to prevent the error or omission from occurring in the first place. Rounce (1998) has suggested that architects specifically lack procedures to control the design process and generally do not implement activities that assure conformance. As a result, design related documentation produced often contains errors and omissions and often leads to contractual claims and disputes (Diekmann and Nelson, 1985).

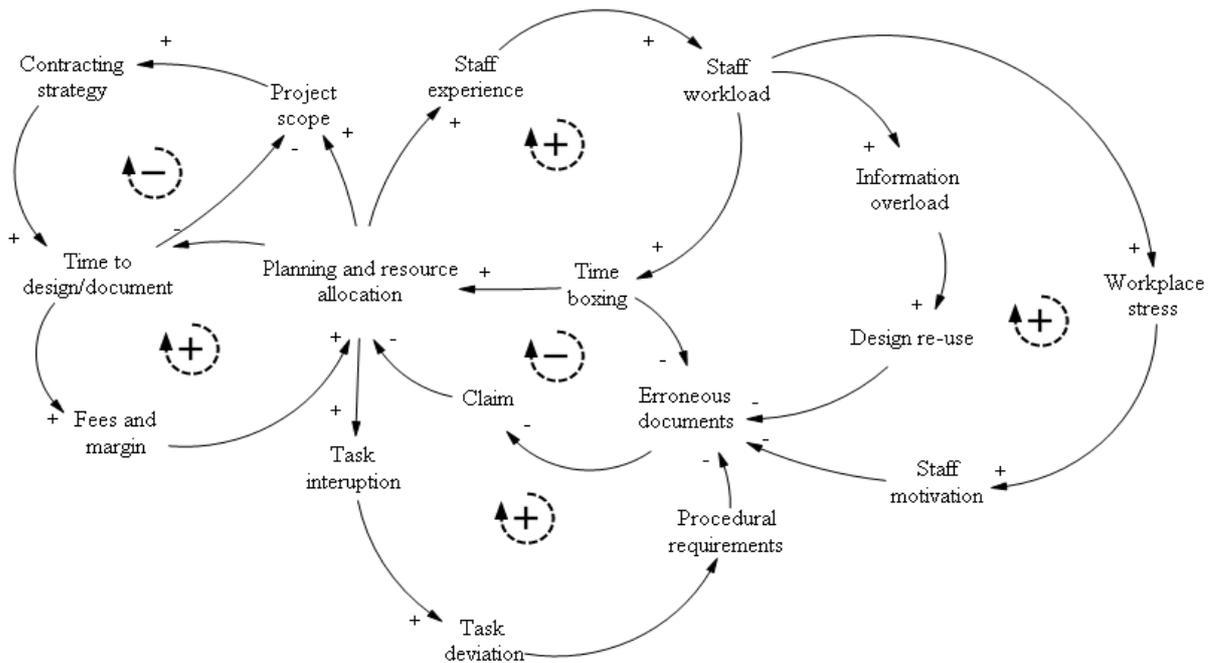
Figure 7.1 provides an overview of the factors that contribute to erroneous contract documentation being produced by design consultants. An array of variables contributes to errors being made in contract documents. There is need to obtain a thorough understanding of client requirements so as to develop the project's scope (including objectives and constraints), which will influence the contracting strategy that is necessary to adopt for a project. Often clients do not give enough time to designers to design and document (Tilley and McFallen, 2000), which can influence the fees charged, as well as the planning and resource requirements for the project. Staff with the appropriate experience will be allocated to the project or a series of projects, and this will influence individual workloads. The practice of 'time boxing' may be initiated, especially when design fees are considered to be low, or when staff have considerable workloads and are unable to cope with their job demands. In this instance, a fixed time is allocated to complete each task, irrespective of whether documentation is complete or not (Love *et al.* 1999).

Issues associated with uncertainty will not have been identified during the planning process and as result tasks that are being undertaken by an individual may be interrupted, which can lead to them deviating from what was being done and forgetting to complete the respective task. Thus, omission errors arise within contract documentation, which may not be identified until construction is well underway. The time to rectify the error may affect the progress of the work or even require a design change and thus lead to a claim being made for additional payment or an extension of time.

Errors can arise because of poor knowledge, carelessness and negligence, and intent (Kaminetzky, 1991). Poor knowledge is often a result of insufficient education and training, and experience. Carelessness and negligence include errors in calculations and detailing, and incorrect reading of drawings and specifications. These are errors of execution and are a result of a lack of due diligence. Regardless of the skill level, experience or training that individual's possess, errors may be made at any time during a project's life cycle. The later design errors are identified in the project cycle the more costly they are to rectify, especially once construction has commenced. Many design firms, however, fail to undertake design audits, verifications and reviews of the documents that they produce prior to tendering (Love *et al.* 2003).

There is an explicit moral belief within society that professionals should not make errors (Busby and Coekelbergh, 2003). According to Reason (2002) there are two corollaries to such a view. First, the errors of professionals are deemed to be invariably rare, but when they do occur they are significant in the causation of adverse events. Second, an error of adverse consequences must be negligent or even reckless and deserve deterrent sanctions. Amalberti (1997) states that responsible and highly trained professionals regularly make errors, many of which are detected and recovered or inconsequential in nature. The identification of errors, particularly during design, can be useful in 'trial and error' learning or serendipitous discovery. Error identification within a system may often help design professionals understand the underlying nature of a task that may have come become routine, automated, or simply taken for granted (Busby, 2001).

Figure 7.1 Factors influencing the occurrence of erroneous contract documents



7.2 Change of Scope

Additions, deletions, omissions, or changes in the nature of the work to be undertaken lead to changes in scope being made. Most change orders that occur are at the request of the client and are generally in the form of design changes. Zeitoun and Oberlander (1993) found that the median cost of change orders for 71 fixed price projects were 5.3% of contract value and 6.8% for 35 cost reimbursable projects. Zeitoun and Oberlander (1993) suggest that the procurement method adopted for a project can influence cost and schedule growth in projects. For example, they reported that traditional lump sum methods are subject to greater cost and schedule growth than construction management and design and build projects. Similarly, Cox *et al.* (1999) have revealed that the cost of design change orders initiated by clients to range from 5% to 8% of contract value even when projects were managed effectively. Love (2002a) has revealed that design change orders initiated by clients account for 79% of rework costs that arise in projects, with the remainder of costs being attributable to omissions errors and construction changes.

Most clients who procure construction projects tend to be inexperienced and may only ever build once or twice (Sharif and Morledge, 1997). Clients are often bemused by unrealistic expectations and do not understand the design process and the part they have to play in it (Blackmore, 1990). Even organizations that regularly procure projects such as the public sector are not necessarily experienced, as they may only be familiar with one procurement method such as traditional lump sum. This method has tended to prevail within the marketplace even though it is associated with design and cost problems. When an inexperienced client recognises a need for a building they will seek the advice of an architect. From this point forward, the client will rely heavily on the advice given by the architect. When a traditional method is employed, an architect is likely to gain a higher fee due to the greater design work required. It is therefore in the interest of the architect to persuade the client to use a traditional method of procurement. In Figure 7.2 the factors that contribute to scope changes are identified. Scope uncertainty arises because of client experience, their requirements, stakeholder needs, physical location and the prevailing economic environment. A client who understands their scope should be able to select a procurement option that best meets their needs. Contractor involvement during the design process can

improve constructability and reduce the probability of design changes. When there is scope uncertainty and no contractor involvement during design then the likelihood of scope changes increases, which may escalate project costs and time and lead to claims and disputes.

Figure 7.2 Factors influencing the occurrence of scope changes (author)

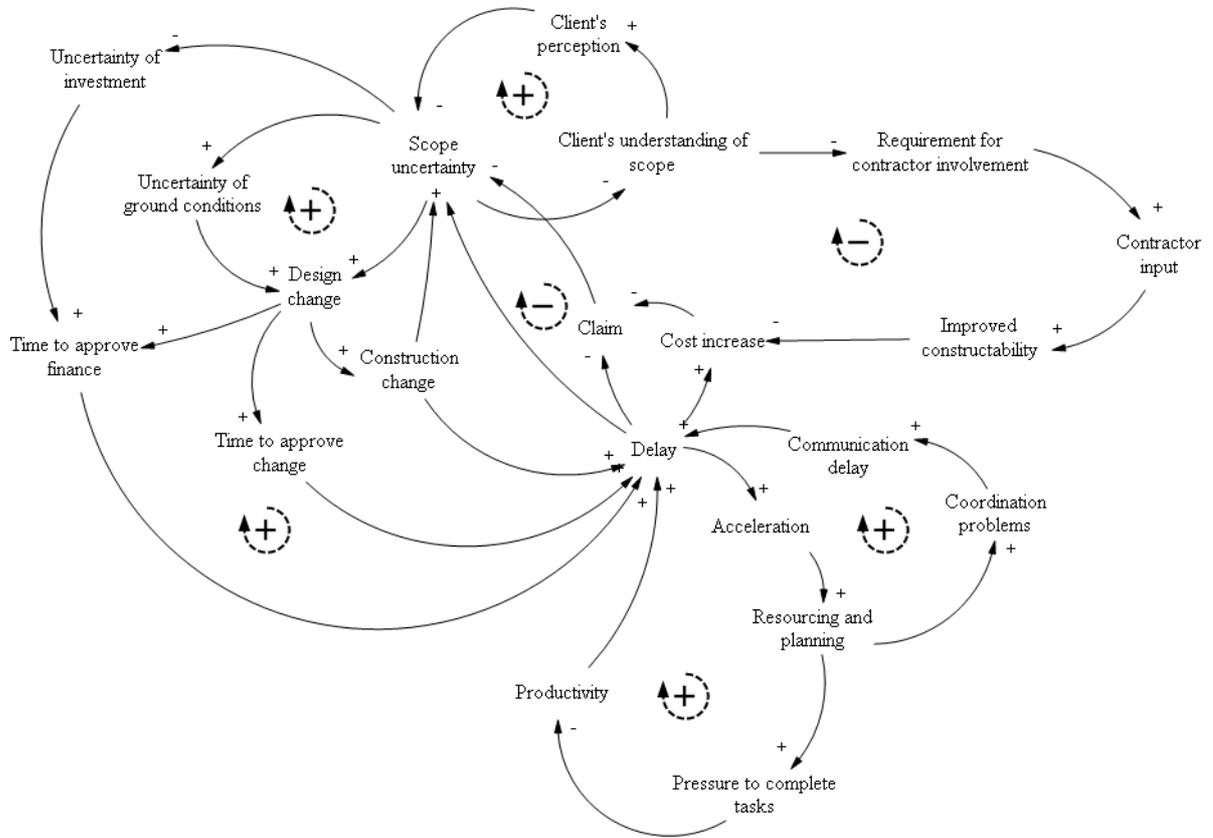
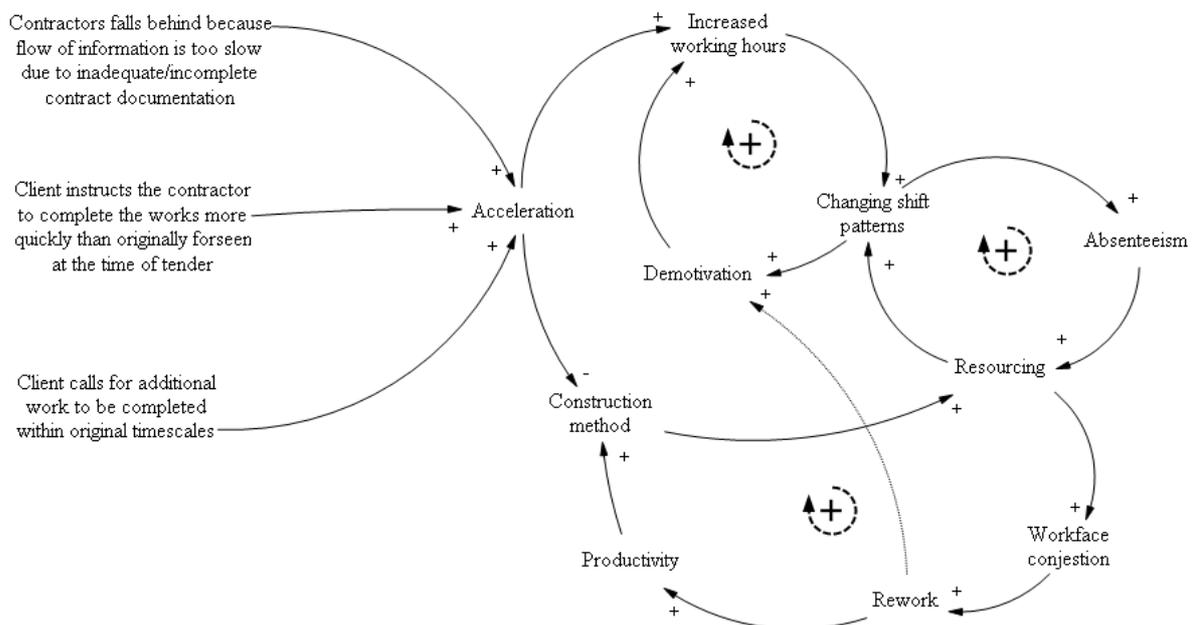


Figure 7.3 Scope changes and acceleration of works (author)



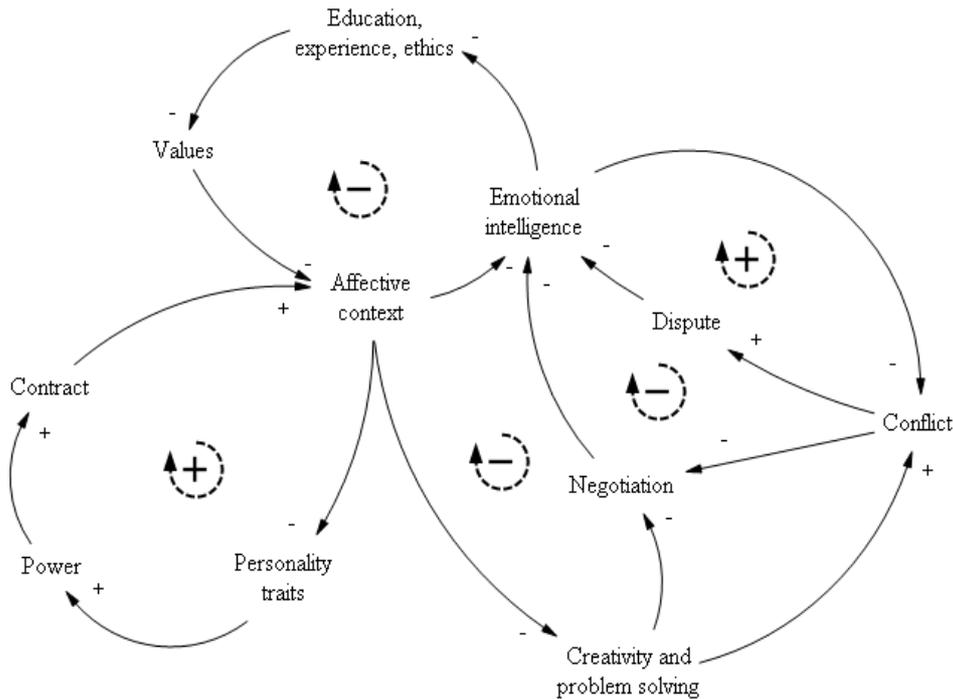
7.3 Behavioural Adaptations of Individuals

Cherns and Bryant (1984) and Smith (2005) have suggested problems concerning design changes, delays, and difficulties during the construction phase have their origins in unresolved conflicts within the client organization. Such conflict often remains unresolved when the decision to build is taken, and is exacerbated by an early insistence on an oversimplified client representative function. Architects have typically adopted this function, and as a result are prone to recommending a traditionally based procurement option where they can provide complete control throughout the construction process. It has been suggested that the personality differences between architects and construction managers can lead to conflict as they may have diametrically opposed goals, objectives and values (Gardiner and Simmons, 1992; Leung *et al.*, 2002). According to Loosemore (1999) when an issue arises power struggles can emerge between different groups who seek to offload responsibility for its occurrence. Such power struggles are often exasperated in times of recession when margins are particularly tight. When a power struggle does emerge there is a reluctance to accept responsibility, contractual clauses may be interpreted differently or the contract may fail to cover an unexpected event (Loosemore and Hughes, 1998).

The underlying values that an individual possesses will largely depend on their education, training, experience, judgement and ethics (Figure 7.4). When an issue arises that requires resolution it is necessary for individuals to recognize the professional knowledge of each other to ensure an appropriate resolution is attained. The way that individuals interact with one another is fundamental to resolving issues. Aggressive and passive forms of communication between individuals can trigger conflict and thus discourage open, frank or democratic discussion which is needed when addressing issues that have arisen (Fodor, 1976).

An individual's emotional intelligence is also integral to the problem solving process. Being emotionally intelligent involves being actively able to identify, understand, process and influence one's own emotions and those of others to guide feeling, thinking and action (Mayer and Salovey, 1997). Individuals who possess a high degree of emotional intelligence are able to make informed decisions, better cope with environmental demands and pressures, handle conflict in an effective manner, communicate in interesting and assertive ways, and make others feel better in their work environment (Mayer and Salovey, 1997). For the project participants who are constantly confronted with solving issues during pre and post construction activities, an ability to formulate satisfactory solutions is essential.

Figure 7.4 Behavioural factors influencing disputes (author)



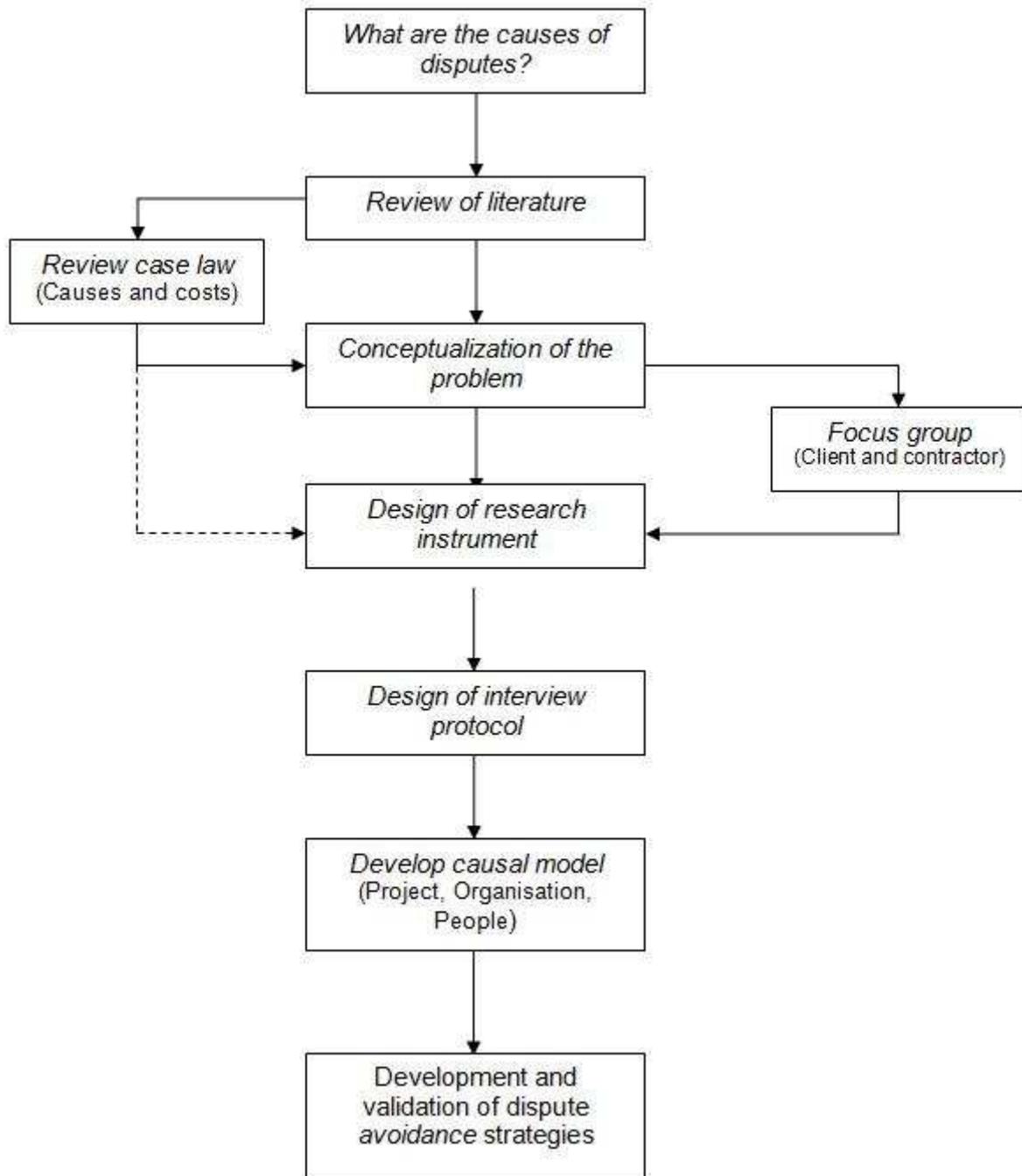
Individual moods and emotions, emotion sharing processes, and team affective composition may all be modified by the affective context (i.e. emotion norms that govern emotional expression) in which a project team is situated (Hackman, 1992). Isen and Daubman (1984) have demonstrated that positive affect predicts better creativity, greater cognitive flexibility and problem solving (Figure 7.4). Individuals who have a positive mood toward problem solving will invariably evaluate things more positively than those who have a negative mood (Mayer *et al.*, 1992). Negotiations, for example, between a contractor and a client's representative (with respect to a claim) can be a highly emotionally charged situation for both parties, especially when substantial financial investments are at stake. The negotiation process is fraught with emotion, and emotional relationships and contingent interactions can all impact the outcome (Baron, 1993). Thus, when entering negotiations or solving problems with team members or subcontractors it is important that individuals are cognisant that their emotional standing can influence their mood, those around them and the outcome.

8. RESEARCH APPROACH

To determine the underlying conditions that contribute to the occurrence of disputes in construction projects an exploratory research approach was adopted. This was because limited research pertaining to the underlying dynamics of the causal ascription of construction disputes has been undertaken. The research design adopted is presented in Figure 8.1. The review of the normative and case law literature enabled the research problem to be conceptualized. Two methods of data collection were used for the main study (Figure 8.1). Focus groups were initially undertaken with a client body and a contracting organization to obtain an overview of key dispute related issues. Data derived from the focus groups and literature was then used to construct a semi-structured interview protocol (Appendix A). Considering the lack of a consensus in the literature on the meaning of a dispute the following *operational definition* was used for the purposes of this research:

“When parties cannot resolve an issue relevant to the performance of the project in a proactive, timely and mutually acceptable manner, and each party forms an entrenched and contrary opinion with respect to that issue that requires resolution”.

Figure 8.1 Research design (author)



8.1 Case Law

Prior to commencing the focus groups Australian case law was reviewed to determine the causes of disputes. The LexisNexis® database (reference?) was used to search for cases from 1998 until 2007. The descriptors “building” and “construction” disputes were used to identify cases and each one was then examined in detail to determine dispute causation. Only disputes that pertained to commercial, industrial and engineering construction projects were used in the research. Domestic building disputes were excluded from the search. Cases were also examined to obtain an estimate of the costs that had been incurred by parties. The costs of disputes are not published in the public domain and so where possible reference to the costs associated with adjudications were made. For example, adjudications from ‘The Building and Construction Payments Agency Payments Agency’ that were made available within the public domain were used to ascertain why payment was not forthcoming

to a party. A detailed review of the literature and Australian case law provided underlying issues that were explored in greater depth in during the focus group and interviews.

8.2 Focus Groups

The focus groups were used to elicit viewpoints and examine the perceived causes and costs of disputes. Unlike conducting multiple individual interviews, participants in the focus group can listen to and comment on each other's original responses, discussing their perceptions and ideas with each other in an often enjoyable and comfortable shared environment (Patton 2002). The feedback obtained from the focus group is also deemed to be more specific, animated and meaningful than the feedback from individually completed interviews and questionnaires (Patton 2002).

The focus group was used to obtain initial information relating to the views and opinions of participants about the causes of disputes in a non-threatening environment. As a common method of selecting participants for focus groups, convenience sampling was used. Participants from a public sector client and contracting organization who had been involved with several disputes were invited to participate in the research. Ideally focus groups should contain between 6 and 12 participants (Stewart and Shamdasani, 1990); for both groups 6 people were present. While the focus group progressed, participants were given freedom to discuss issues, listen to fellow participants, provide reflective comment and arrive at a shared understanding of collective experiences regarding the causes of disputes. Whilst working with the group the facilitator appeared to be 'genuinely naïve' and avoided leading questions so as to allow corroboration to naturally occur.

8.3 Interviews

Forty-one in-depth interviews were conducted over a two month period with a variety of personnel such as project directors, quantity surveyors, architects, arbitrators, project managers, contract administrators (Appendix C). Interviews were used as the mechanism to determine the latent causal nature of disputes. Interviews were chosen as the primary data collection mechanism because they are deemed to be an effective tool for learning about matters that cannot be observed. According to Taylor and Bogdan (1984:p.79), no other method "can provide the detailed understanding that comes from directly observing people and listening to what they have to say at the scene". Firms from the metropolitan area of Perth, Western Australia (WA) were randomly sampled from the Yellow Pages® and invited to participate in the research. The interviews were conducted at the offices of interviewees. Interviews were digitally recorded and transcribed verbatim to allow for the nuances in the interview to be apparent in the text. The interviewees' details were coded to allow for anonymity, although all interviewees were aware that it might be possible to identify them from the content of the text. The format of the interviews was kept as consistent as possible following the themes associated with disputes identified from the literature. The nature of the questions allowed for avenues of interest to be pursued as they arose without introducing bias in the response. Notes were taken during the interview to support the digital recording to maintain validity. Each of the interviews varied in length from 30 minutes to two hours. Interviews were open to stimulate conversation and breakdown any barriers that may have existed between the interviewer and interviewee.

8.4 Data Analysis

Content analysis was used as the primary analysis technique of the data that was obtained. In its simplest form this technique is the extraction and categorisation of information from documents. Inferences from the data can only be drawn of the relationship with what the data means from the context it drawn from (Krippendorff, 1980). For the case law this was undertaken manually because the researchers were not able to store the data in an electronic format. The text derived from the focus groups and interviews was analysed using QSR Nvivo (which is a version of QSR N6 and combines the efficient management of Non-numerical Unstructured Data with powerful processes of Indexing and Theorising) and

enabled the development of themes to be identified. One advantage of such software is that it enables additional data sources and journal notes to be incorporated into the analysis. The development and re-assessment of themes as the analysis progressed accorded with the calls to avoid confining data to pre-determined sets of categories (Silverman, 2001). Kvale (1996) suggests that *ad hoc* methods for generating meaning enable the researcher access to 'a variety of common-sense approaches to interview text using an interplay of techniques such as noting patterns, seeing plausibility, making comparisons etc' (p.204). Using Nvivo enabled the researchers to develop an organic approach to coding as it identified triggers or categories of interest in the text to be coded at 'nodes' and used to keep track of emerging and developing ideas (Kvale, 1996). These nodes can be modified, integrated or migrated as the analysis progresses, and the generation of reports using Boolean search, facilitates the recognition of conflicts and contradictions. This process enabled the development of a generic causal model of disputes to be constructed.

9. RESEARCH FINDINGS

An examination of Australian case law provided limited insights into the nature and extent of disputes. Most cases were employment case disputes involving construction companies and employees' superannuation, long service leave, and workers compensation. Tables 9.1 and 9.2 provide examples of construction dispute cases from WA. It was found that almost all cases from WA that proceeded to litigation involved 'Civil Procedure' matters or focused on the meaning and interpretation of contractual terms.

The cases identified did not provide an indication to the cause of the initial dispute as they dealt with matters of law that arose during disputation process. It would appear that most construction disputes are actually settled before litigation proceedings become advanced or an outcome is reported in the public domain. It is suggested most parties eschew litigation because of the resources required and emotional effort needed to reach a resolution. The examination of the case law clearly indicates that a majority of disputes that arise in construction are actually resolved using alternative dispute resolution processes such as those identified in Figure 3.1. Disputes that arise due to non-payment are dealt with under the 'Security of Payment Legislation' and the use of adjudication. A request for adjudication may arise because a payment claim is rejected, is disputed, not paid in full, or security of retention monies not returned by the due date under the contract.

Only data on the 'Security of Payments' and adjudication statistics were readily available from the 'Building and Construction Industry Payments Agency (Queensland)'. The typical causes of non-payment were found to be quality issues (e.g., poor workmanship, and defective work), change of scope, ambiguity of contract terms, and incomplete contract documentation (Appendix B). In Queensland, 75% of claims for non-payment arose from subcontractors, 13% from contractors, 7% from consultants, and 7% from suppliers. Interestingly, it was observed that litigation occurs mainly between contractors, their client and unions. No litigation cases were identified that involved consultants and subcontractors.

Table 9.1 Civil procedural matters: Examples of litigation cases

Point of Law	Case
Discovery of Documents	<ul style="list-style-type: none"> • Leighton Contractors Pty Ltd v Public Transport Authority of Western Australia (No 5) — Supreme Court, WA — Le Miere J — 8 Oct 2007 [2007] WASC 233, BC200708582, • Leighton Contractors Pty Ltd v Public Transport Authority of Western Australia — Supreme Court, WA — Le Miere J — 28 Jun 2007 [2007] WASC 143, BC200704989 • Leighton Contractors Pty Ltd v Public Transport Authority of Western Australia — Supreme Court, WA — Le Miere J — 22 Mar 2007 [2007] WASC 65, BC200701962 • Leighton Contractors Pty Ltd v Public Transport Authority of Western Australia — Supreme Court, WA — Le Miere J — 13 Feb 2007 [2007] WASC 32, BC200700565
Privilege	<ul style="list-style-type: none"> • Public Transport Authority of Western Australia v Leighton Contractors Pty Ltd — Supreme Court, WA, Court of Appeal — Steytler P, McLure and Miller JJA — 18 Jul 2007 [2007] WASCA 151, BC200705603
Application for Interlocutory Injunction	<ul style="list-style-type: none"> • Leighton Contractors Pty Ltd v Construction, Forestry, Mining and Energy Union — Supreme Court, WA — Le Miere J — 24 Feb 2006 [2006] WASC 39, BC200601158
Unlawful Industrial Action <i>Interlocutory Injunction</i>	<ul style="list-style-type: none"> • Leighton Contractors Pty Ltd v Construction, Forestry, Mining and Energy Union — Supreme Court, WA — Le Miere J — 20 Jul 2006 [2006] WASC 144, BC200605662
Injunctions	<ul style="list-style-type: none"> • Leighton Contractors Pty Ltd v Construction, Forestry, Mining and Energy Union — Supreme Court, WA — Le Miere J — 3 Mar 2006 [2006] WASC 47, BC200601349 • Construction, Forestry, Mining and Energy Union; Ex parte Leighton Contractors Pty Ltd — Supreme Court, WA — Roberts-Smith J — 16 Nov 2004 [2004] WASC 250, BC200407846
Court Application	<ul style="list-style-type: none"> • Leighton Holdings Ltd v HIH Casual & General Insurance Ltd — Supreme Court, WA — Master Sanderson — 13 Feb 2001 [2001] WASC 34, BC200100241
Arbitration Clauses	<ul style="list-style-type: none"> • WMC Resources Ltd v Leighton Contractors Pty Ltd — Supreme Court, WA, Full Court — Kennedy, Ipp and White JJ — 7 May 1999 [1999] WASCA 10, BC9902536,

Table 9.2 Dispute examples: Interpretation and health and safety

Point of Law	Case
Contractual <i>Interpretation of Contractual Terms</i>	<ul style="list-style-type: none"> • WMC Resources Ltd v Leighton Contractors Pty Ltd — Supreme Court, WA, Full Court — Kennedy, Ipp and White JJ — 7 May 1999 [1999] WASCA 10, BC9902536, • WMC Resources Ltd v Leighton Contractors Pty Ltd — Supreme Court, WA — Anderson J — 10 Sep 1998 ARB15/98, BC9804601, • WMC Resources Ltd v Leighton Contractors Pty Ltd - BC9902536 • WMC Resources Ltd v Leighton Contractors Pty Ltd - BC9804601
Occupational Health and Safety	<ul style="list-style-type: none"> • Leighton Contractors Pty Ltd v Ridge — Supreme Court, WA — Miller J — 23 Nov 1998 980650, BC9806256, • Leighton Contractors Pty Ltd v Simon Luigi John Ridge - BC9806256

9.1 Divergence: Client and Contractor Perceptions of Dispute Causation

The client and contractor focus groups revealed valuable insights about their experiences with disputes. The client focus group comprised of a project director, and five project managers. For the contractor, a state manager, two operations managers, a construction manager, and a project manager were in attendance. The focus groups provided an open forum to discuss what the causes of disputes were and how they could be avoided. Initially, participants within the client and contractor groups were reluctant to express their views and experiences with respect to specific dispute examples. It was perceived that the presence of senior managers hindered interviewees from ‘speaking openly’ because of the commercial sensitivity that may have been associated with a dispute that the organization had or was currently involved with. With this in mind, the dialogue switched from the specific to the generic causes, consequences, costs and avoidance strategies of disputes.

Table 9.3 identifies the perceived causes of disputes noted by the client and contractor groups. The pathogens contributing to the cause of the dispute are also identified. In many instances several pathogens are also identified. For example, in the case of poor planning and resource availability by contractors and consultants *practice* and *circumstance* are identified as being contributing pathogens. The client group suggested that the prevailing skills shortage was a problematic issue for consultants and contractors, and this was affecting their ability to deliver services within specified time frames. Furthermore, it was suggested that the design documentation process evolved in an ad hoc manner and as a result it was often incomplete for the purposes of tendering. Similarly, it was perceived that contractors frequently were not able to respond to changing conditions as their planning efforts were deemed to be reactive rather than being proactive. It was stated by a client project manager that:

“Contractors don’t seem to plan for changes; I mean even the smallest change. There is no contingency and a slightest change means that they claim for an extension of time or for delay and disruption because they are reactive. We don’t take this nonsense from them”.

In this instance, a genuine claim could be made but the client perceives it to be a small change when in fact such a change could delay a project’s completion date. The stern stance taken by the client could be viewed as being provocative and thus lead to conflict emerging.

Incomplete documentation and opportunistic behaviour on the contractor's behalf were deemed to be in congruence with one another. The contributing latent conditions were identified as the *task*, *practice*, and *system*. Here errors can occur because design audits reviews, and verifications are not undertaken, or employees do not have the skill and experience to document. Errors contained within the contract documentation can lay the foundation for opportunistic behaviour from the contractor to make a claim for something that they may have already taken into account during the tendering process. For example, it was stated:

“At the moment contractors are doing very well. Margins are high, I believe in the region of 15%. When the market changes you watch, they'll look for any error or mistake within the contract documents so they can increase their margin through claims. There are several contractors who have a reputation for being claim merchants. I know one firm who flooded the client with claims in the hope to get a few extra dollars”.

Table 9.3 Focus group summary: client and contractor perceived dispute causes and avoidance

Client (N=6)	Pathogen	Dispute avoidance	Contractor (N=6)	Pathogen	Dispute avoidance
<ul style="list-style-type: none"> Poor planning and resourcing by the contractor/consultants Misinterpreting the contract terms and conditions Financial capacity of contractor Poor workmanship and defective work Pricing of scope changes Opportunistic behaviour by a contractor Incomplete/erroneous contract documentation Non-payment of work 	<p>(P),(C)</p> <p>(T),(C)</p> <p>(C),(O)</p> <p>(T) (S)</p> <p>(S), (C)</p> <p>(O), (P)</p> <p>(T) (P) (S) (T)</p>	<ul style="list-style-type: none"> Prequalification Traditional lump sum contracts Behavioural assessment of project team members Greater emphasis on planning and documenting project of scope Improved intelligence of market conditions Design reviews and audits Partnering Improved planning of consultants and contractors Security of Payment Legislation 	<ul style="list-style-type: none"> Restricted access to site Uncertainty of project scope Scope changes Letting a contract too early Bespoke contracts Site conditions Poor contract documentation Interpretation of contract clauses Unreasonable expectations of clients e.g., time pressures Transfer of conditions (risk) from the client to contractor/ to the subcontractor Lack of understanding about cost escalation in contracts Competitive tendering Inappropriate procurement method Nominated subcontractors/suppliers 	<p>(C)</p> <p>(C)</p> <p>(T), (C)</p> <p>(C), (S)</p> <p>(C)</p> <p>(T),(P), (S),</p> <p>(P), (C)</p> <p>(I), (C)</p> <p>(I), (CO),(C)</p> <p>(C)</p> <p>(I), (C),(CO) (S),(C),</p> <p>(C), (T), (S)</p>	<ul style="list-style-type: none"> Fully defined scope Proactive claims management Detailed evaluation of site conditions Standard forms of contract Negotiated contracts Greater consideration to procurement method selection Constructability: involvement of contractor earlier in the design process to resolve planning issues that occur on-site

Key: Practice (P), Task(T), Circumstance(C), Convention (CO) Organization(O), System(S), Industry(I), Tool(TO)

In contrast to the perceptions of the client group, the contractors' views as to dispute causes are extremely dissimilar. More emphasis is placed on the *circumstance* arising from the situation or environment the project operates in than on the *task, practice* and *organisation* suggested by the client group. Competitive tendering was identified as a dispute cause because price was deemed to be the primary selection factor for contractors. This resulted in a member of the contractor focus group stating:

"You're reputation is an issue, its sensitive particularly when you're in the business of trying to establish and maintain relationships. We try so hard to develop relationships with our clients, though we feel we are constantly screwed on price, especially when we tender for projects".

As a result of the contractor's tender price for works being typically reduced their reaction to such a scenario appeared to be premeditated as it was stated:

"We have entitlements under a contract and when they are taken away from us then we stand up for ourselves. We just want what is fair and reasonable – we're not opportunistic. There are two types of claim: opportunistic and needs based. Opportunistic claims are when you fight like a dog because essentially you're in a loss position and you want the most you can out of it. Most of our disputes are on a needs basis and not opportunistic".

The *circumstances* that arise in a project are predominately driven by clients who have limited knowledge of market conditions and innovation, and who place too much emphasis on cost rather than 'value for money'. The client and contractor group unanimously agreed that disputes were non-value adding and could cause considerable emotional and financial heartache for organizations involved. A plethora of activities that could be implemented in projects to reduce the incidence of disputes were propagated and presented in Table 9.3. Those activities identified should form an integral part of work practices and project procurement. For example, design audits, verifications and reviews would reduce the incidence of errors in documents, a fully developed scope would reduce the likelihood of scope changes, and standard forms of contract would eliminate misinterpretation. Interestingly, a dichotomy appears between the client and contractor in terms of their view on what procurement method to use to reduce disputes: traditional compared to non-traditional procurement (constructability is integral to these methods). There is a greater propensity for projects being procured using traditional forms to experience disputes than those procured using non-traditional methods (Cheung and Yiu, 2006).

9.2 Congruence: Client and Contractor Perceptions of Dispute Costs

The client and contractor agreed that the costs of resolving disputes were significant, particularly when litigation proceedings had commenced. The General Manager for the contractor stated:

"Both parties feel the pain of a dispute when it ends up in the court room. It's a very emotional experience and the costs can be unbelievable. There is only one winner, the lawyers. We try to avoid them at all costs".

The determination of dispute costs was an area that was considered problematic for participants in the focus groups. No systematic method for determining the cost of disputes was in place within their respective organizations. The total dispute cost, excluding the actual claim cost, can be expressed as:

$$\text{Total Dispute Cost} = \sum_1^i C_i \text{ direct} + \sum_1^j C_j \text{ indirect}$$

Direct costs include fees and expenses paid to lawyers, paralegals, accountants, claims consultants, and other experts. Indirect costs are salaries and the associated overhead of in-

house lawyers, company managers, and other employees involved in processing the dispute. Hidden costs are inefficiencies, delays, loss of quality to the project, and the cost of strained business relationships among the various parties. It was suggested by a member of the contractor's organization that the direct cost of a dispute incurred accounted for approximately 5% of the project's original contract value. Estimates provided from participants from both groups ranged from 0.5% to 5% of project's contract value. The estimate of 5% provided by the contractor was considered to be a major dispute and could only be resolved through the litigation process.

Other indirect costs identified by participants included lost productivity, stress and fatigue, loss of future work, reduced profit, and tarnished reputation. Love (2002b) revealed that the indirect cost of rework, for example, to be as much as six times the rectification cost. It is widely accepted that defective work and scope changes are primary causes of rework and disputes. Assuming the associated costs of litigation could be as high as 5% of contract value and the indirect costs have a multiplier of six, then disputes could account for 30% of a contract's value.

9.3 Project Characteristics

Following the focus groups, semi-structured interviews were undertaken with 41 individuals who had considerable construction industry experience and been involved with an array of disputes. The sample of 41 interviewed comprised of: 3(7%) public sector client, 6(15%) private sector client, 3(7%) consulting project managers, 11(27%) contractors, 4(10%) consulting engineers, 4(10%) architects, 3(7%) quantity surveyors, 4(10%) arbitrators/mediators 3(7%) and subcontractor 1(2%). Each individual was initially asked to describe a recently completed project where they had been involved with a dispute. 11 respondents were not able to identify any particular project but were able to provide examples and their perceived causes of disputes. 30 respondents identified and described a specific dispute that they had recently been involved in, and in some cases were able to identify more than one example. Table C provides a detailed summary of projects identified by the 30 interviews (Appendix C).

In total 58 projects were identified and these were: commercial – offices 6(10%), commercial – retail 6(10%), administration – authorities 9(16%), hospital/health 5(9%), administrative – civic 5(9%), and railway 4(7%). The procurement methods used to deliver the projects were traditional lump sum 42(72%), design and construct 10(17%), construction management 2(3%), alliance 2(3%) and traditional cost-plus 1(2%). The type of contracts used in the projects varied but the most popular form used was AS2124 for 42(72%) projects. Other types of contract forms used were AS4902 2(3%), AS4000 4(7%), owner bespoke forms 3(5%), AS4300 (Amended) 2(3%), AS4916 (Amended) 1(2%), engineering and construction contract 1(2%), and NPWC3 1(2%). The total value of the projects sampled was approximately \$4.47 billion. The contract value for the projects ranged from \$250,000 to \$1.8 billion with a mean of \$77.23 million. The duration of the projects ranged from 3 to 60 months with a mean of 15.5 months.

The most popular method to resolve disputes was negotiation, which occurred in 37(64%) of projects. Other dispute resolution methods were litigation 9(15%), mediation 8(14%), adjudication 3(5%), arbitration 2(3%) and determination 1(2%). Like the focus group participants, interviewees found it difficult to determine the cost of the dispute that had occurred. The costs that were proposed by interviewees varied between extremes (\$500 to \$50 million). In some cases the costs of the dispute could be represented as a proportion of contract value. In this instance a direct dispute cost for a project that experienced litigation was found to be 30% of the original contract value (Table C).

Several of the projects identified were experiencing on-going litigation proceedings and so the dispute cost *per se* could not be ascertained. Interviewees, however, did estimate the direct costs incurred up to the point in time of the interview to be in the vicinity of 15% to 20% of the project's original contract value. One project in particular, a pumping station/water

treatment plant and pipeline, had a contract value of \$90 million and a dispute occurred because of scope changes, delays and disruptions to the project. Unfortunately, lawyers became involved and there was an extensive analysis of programme, the pricing of scope changes, and contract documents. Approximately \$7 million had been expended and mediation was in process. Both parties agreed that the costs being incurred were far too much financially and emotionally. The contractor stated:

“We had spent too much trying to state our position. The client had spent too much as well. We were going nowhere and it was getting ridiculous, it was really unnecessary. Our emotions were running high and it felt like a battlefield every time we met. We both eventually saw the writing on the wall and came to a settlement once we’d agreed on things. Nobody was winning except the lawyers. We were losing money. We settled in a day and both came away relieved it was all over, I think”.

Here the estimated direct costs of the dispute accounted for 13% of contract value. The costs could have been significantly higher if litigation proceedings had been initiated. From the estimates provided by interviewees it would appear that adjudication is the most effective dispute resolution procedure with costs being less than or equal to 0.15% of contract value.

9.4 Pathogens: Determination of Causal Paths

A number of pathogens emerged from the analysis of the interview data. The most common issues were client influences and expectations, scope and design changes, contract documentation, inadequate planning and management, risk allocation and non-adherence to practices and procedures. Each of the examples provided by interviewees was examined in detail and the latent conditions contributing to the dispute determined. Table 9.4 identifies the pathogens that were deemed to have occurred. Examples are used to illustrate how the classification process was used. In almost all cases there appeared to be several pathogens working together and so related pathogens were also identified. It can be seen that the pathogens of *task*, *practice* and *circumstance* contributed to 87% of disputes. Examples of these disputes and the underlying conditions that contributed to their occurrence are presented herein after.

9.4.1 Task pathogen: Procedural violation

In the following example a dispute arose because of a series of omission errors. Omissions errors can be defined as failures to follow due procedure when undertaking a task(s). Architectural and mechanical shop drawings were not checked and verified. As a result a very costly rework incidence arose, which eventuated into a dispute between parties because they were not willing to take responsibility for the error that arose. The project was a prison that was being refurbished using a traditional lump sum contract AS2124. The contract value was \$1.5 million and the schedule was 6 months. Because of the dispute the project was 8 months late. The dispute was resolved through the process of negotiation at a cost of \$200,000, which equates to 13% of the original contract value.

Two major incidents were identified as contributing to the dispute on this project. The first related to access to the site and incomplete drawings, and the second related to erroneous drawings and unilateral decision-making on behalf of the lead consultant. Figure 9.1 identifies the causal path for the initial dispute that arose because of incomplete information. Serendipitously, the previous as-built drawings for the prison did not correspond with what had been actually constructed. Penetrations were required for the installation of air conditioning (A/C) grills. The contractor was given limited access to prison cells, which began to delay the programme of works.

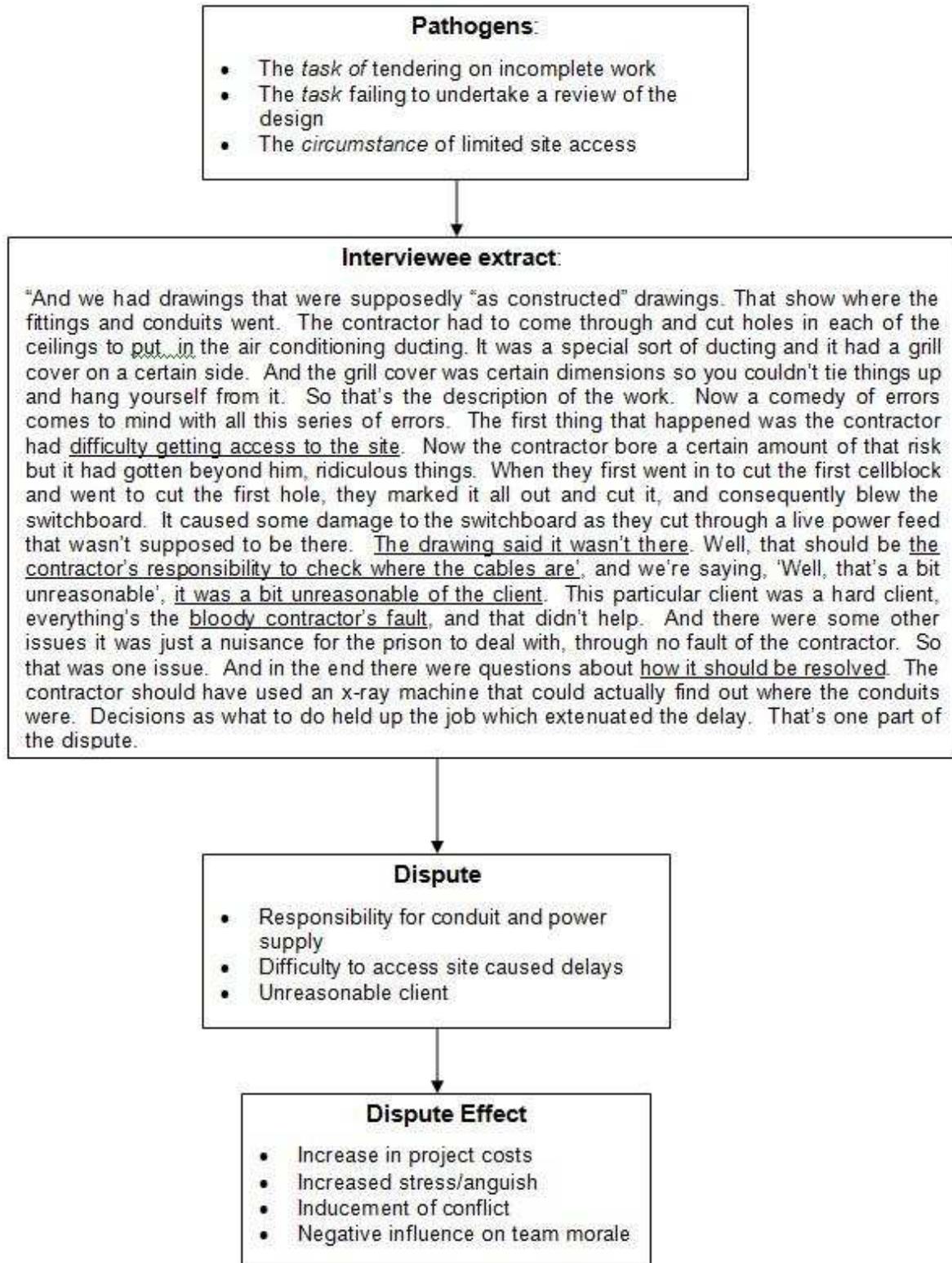
After marking out the where the penetrations were required in the ceiling slab the penetrations for the A/C grills were made. While undertaking the initial penetration electrical conduits were severed which caused an electrical fault and subsequently damaged the switchboard. A dispute arose as to who was responsible for fixing the conduit and replacing the switchboard. In addition, the issue as to how to overcome the problem associated with

electrical conduit that had not been incorporated within the 'as-built drawings' took considerable time to resolve and delayed the project by two weeks with considerable costs being borne by the contractor. The costs of the rectifying the damaged works was approximately \$30,000.

Table 9.4 Summary of pathogens occurring in the 58 construction disputes

Pathogen Category	Description	Dispute Cause Examples	N	Related pathogens
Practice	<i>Pathogens arising from people's deliberate practices</i>	<ul style="list-style-type: none"> • Failure to undertake design reviews • Distribution of tentative design documents • Failure to oblige by contractual obligations 	16	(T), (C)
Task	<i>Pathogens arising from the nature of task being performed</i>	<ul style="list-style-type: none"> • Failure to detect and corrects an omission/error in design documentation • Misinterpretation of contract terms and conditions 	15	(P), (C), (CO)
Circumstance	<i>Pathogen arising from the situation or environment the project is operating in</i>	<ul style="list-style-type: none"> • Low design fees meant tasks were deliberately left out • Failure to provide access to site • Unforeseen scope changes 	19	(P), (T), (CO)
Convention	<i>Pathogens arising from standards and routines</i>	<ul style="list-style-type: none"> • Re-use of existing specification and design solutions • Failure to adhere to company polices 	5	(C), (T)
Industry	<i>Pathogens arising from the structural property of the industry</i>	<ul style="list-style-type: none"> • The use of competitive tendering resulting in selection of lowest bid • Contract forms and risk allocation (Limited incentives) 	2	(C), (CO)
Tool	<i>Pathogens arising from a characteristic of a technical tool</i>	<ul style="list-style-type: none"> • Ineffective use of CAD software (no checking for inconsistencies) 	1	(T), (P)

Figure 9.1 Causal path for a dispute: Task pathogen (author)

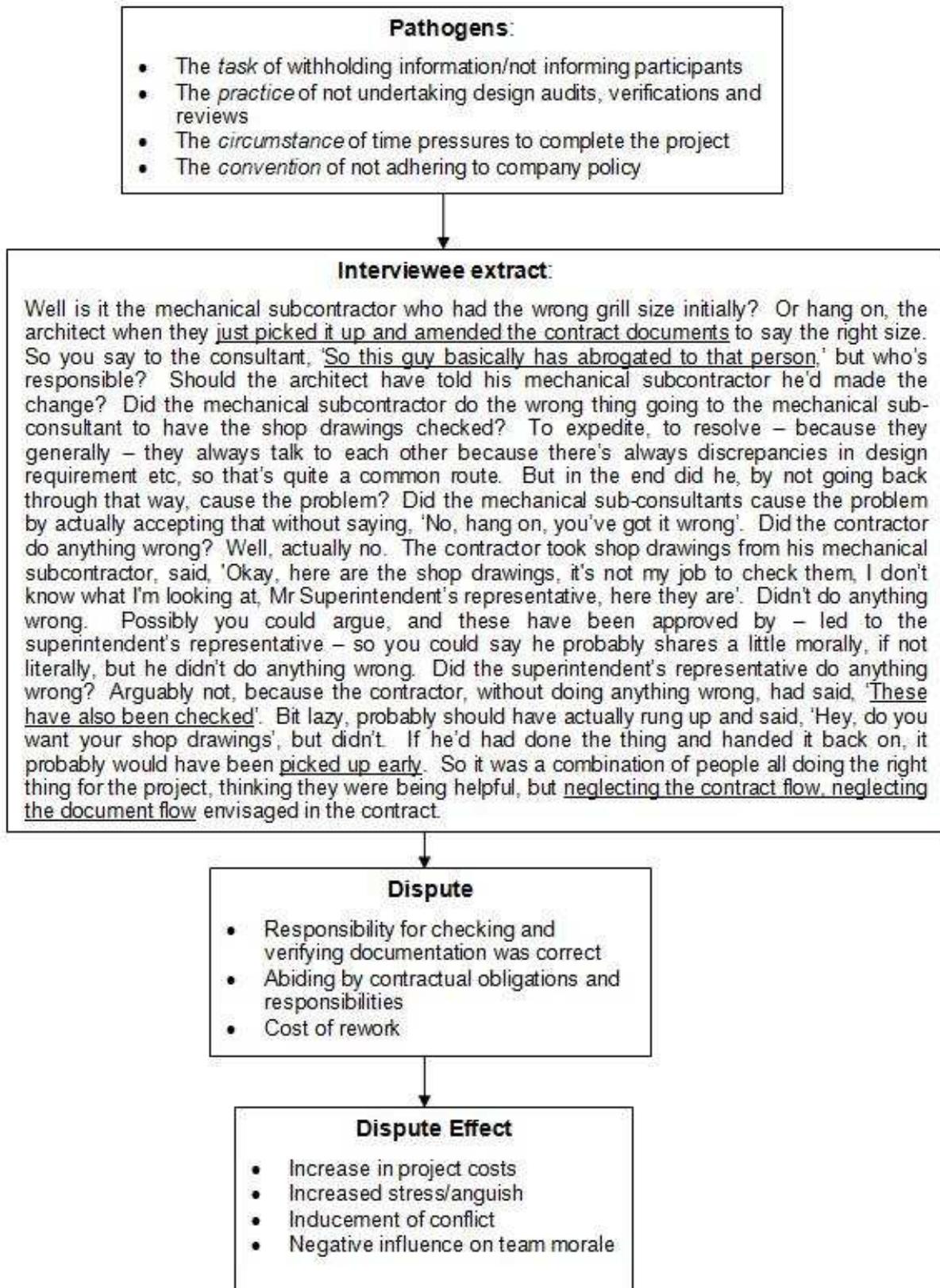


9.4.2 Practice pathogen: Failure to communicate an error

While the aforementioned dispute came to light and was trying to be resolved another began to manifest (Figure 9.2). The architectural drawings that had been produced were examined by the mechanical engineer and it was revealed that A/C grills were the wrong size on the drawings and thus would not meet the airflow requirements identified in the specification. The A/C documentation produced by the mechanical engineer simply did not marry with the architectural documentation; the A/C grills were deemed to be too small and there would not be enough perforations for the airflow required. The mechanical engineer informed the

architect in writing about this error. The architectural documentation was not amended and tenders were called from subcontractors with incorrect information present. The mechanical subcontractor who was awarded the contract was not notified of the error contained within the documents. Shop drawings were produced by the subcontractor and instead of providing them directly to the contractor to gain the necessary approvals as noted in their contract; they were bypassed and given directly to the mechanical consultant for approval. The subcontractor did this because they had a close working relationship with the mechanical consultant. In addition, they needed the shop drawings to be approved as soon as possible so as not to delay their programme and the project. The project was experiencing considerable delays at this point. Despite the mechanical engineer informing the architect of the error, it was revealed that the architect had amended the grill sizes to match their drawings without informing any other project team member. The mechanical engineer had assumed the architectural drawings had been altered as requested, but unknowingly they had not. Instead the architect had unilaterally made the decision to opt for the smaller size A/C grills without consulting the necessary parties. The mechanical consultant approved the shop drawings and failed to notice that the A/C grills were the size originally specified by the architect. In fact, the shop drawings were not distributed to the architect for checking. No detailed checking had been undertaken. The drawings were passed on to the project superintendent's acting representative who approved the drawings without also checking them. The contractor on receiving the shop drawings also stated they had been checked by them, when in fact they had not been. Thus, on the basis of the approvals received the A/C grills were manufactured and delivered to site.

Figure 9.2 Causal path for a dispute: Practice pathogen (author)



During the installation of the A/C grills the subcontractor noticed they were too small as penetrations were larger than the grill size. For some unknown reason, penetrations were cut as required for the large size A/C grills specified by the mechanical consultant. The cost of manufacturing the A/C grills was \$50,000. They did not fit and were inadequate. The architect apparently abrogated their responsibility for the problem by explicitly stating the

architectural documentation were correct and if the shop drawings had been distributed to them then the error would have been identified.

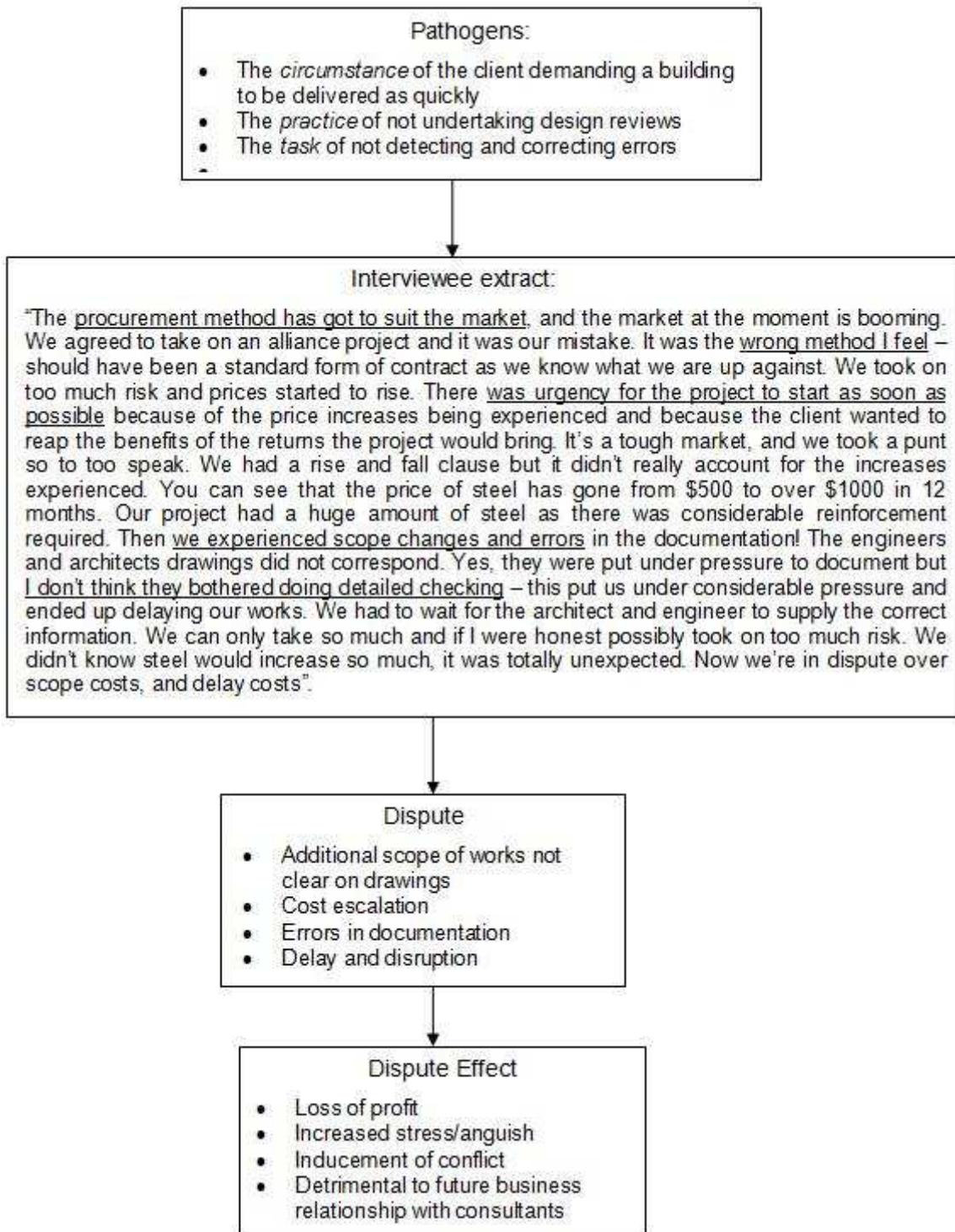
9.4.3 Circumstance pathogen: Appropriate procurement selection

In the next example the pathogen of circumstance is described, as noted in Figure 9.3. The project was procured using an alliance contract and the client placed considerable pressure on the project team to deliver the project within a specified time period and perhaps, according to the contractor established an unreasonable programme which they accepted to undertake. Such pressure placed considerable strain on the design and engineering team, especially with a skills shortage being experienced. The design team were not able to meet the required schedule and as a result it was perceived that they adopted a work *practice* of purposefully not checking what they had designed with one another so as to meet their deliverables. The contractor made the following comment:

“We’re subjected to liquidated damages in our contract but designers weren’t. There was no stick in place to whack them with, they don’t have penalties. They just send crappy documentation and expect us to cop it.”

This set the scene for a battleground on the project despite an alliance being in place. The contractor accepted the terms under the contract but did not expect to be subjected to documentation that was so indecorously put together. Because the documentation was incorrect, scope changes had to be made, which had an impact on the programme and the contractor’s costs. Relations became strained and a great deal of tension was present at site meetings. It was perceived that personal agendas begun to take a foothold, so it was agreed by the project manager and consultants that the problems were to be resolved through negotiation.

Figure 9.3 Causal path for a dispute: Circumstance pathogen (author)



9.5 Personality, Behaviour and Tension

Of the 41 interviews, 14(34%) made reference to issues surrounding the personality type and behaviour of individuals as 'triggers' to conflict and disputes. Table 9.5 presents a sample of the comments made by interviewees. In particular, it can be seen that interviewees make reference to the stance that representatives of organizations take when dealing with problems that arise. Considering the comments, it is suggested that people engage in disputes on behalf of their employing organisation rather than on behalf of themselves. People however have to resolve conflict, and few people are able to entirely eliminate personal feelings toward each other in a conflict situation even when they are acting as representatives of an organization. When 'the language of blame' begins to govern

relationships, identifying any form of 'wrong-doing' will bring out the worst in people as they may become frustrated, demoralized, anxious or bolshy.

Inter-personal conflict is a natural product of inter-organizational conflict, and personality and behaviour have a significant impact upon the effectiveness on the resolution process. When rational approaches to resolving conflict fail then the entire process becomes emotional and personal rather than rational and logical. For example, the following statement was made by a private sector client:

"So you can have a fight over the facts, and then you can have a fight over personal issues because the other person's got an entrenched position for whatever reason. Either their ego or they're going to get the sack or they're going to lose their performance pay. It can become very emotional. It doesn't matter if you're right or one party might be perfectly correct, but the other one can't afford to lose".

It was revealed that it was not uncommon for allegiances that formed between parties to go against the expected hierarchical patterns. For example, in the dispute over the A/C grills noted above, the contractor took sides with the subcontractor who was being blamed by manufacturing the wrong size A/C grills, even though they did not abide by their contract obligation to provide shop drawings directly to the them. It was found that the main reason for the existence of tension was the occurrence of unexpected problems, and the uncertainty surrounding the location of blame and the resultant financial responsibility for it.

Table 9.5 Personality and behavioural observations

Position	Personality Related Comments
Architect	"Sure look absolutely, again its personalities, especially when you're on the work place physically doing the jobs. Some supervisors or site managers may not be as helpful as what the jobs need to know. I've worked with guys in the past where a contractor comes in and asks a question and they just simply say well there's the drawings' you go and work it out. I think that's a very stupid approach; at the end of the day if a contractor comes to ask you a question, there's a reason why they're asking the question, obviously they don't understand".
Consulting Engineer	"I think all the good intentions in the world can't avoid a dispute if someone is being unreasonable. I think that's what it comes down to in the end.
Project Manager	"The builders play games, but they bluff, they threaten, they try and trick you. Then they try and manipulate the situation".
Public Sector Client	"What I'm trying to get at is that the thing is always unique what you're doing. And I think people get a lot of satisfaction out of achieving. So if you get a destructive element in there, that doesn't do anybody any good. And the destructive element would usually evolve because of power games or egos or money. This is typical of contractors".
Public Sector Client	"If your contractor's starting to hurt, he's starting to bleed or haemorrhage because he's not making enough profit be prepared for a fight"
Private Sector Client	"One of the other precipitating factors of this dispute was the contract manager concerned; he was belligerent to a point. The superintendent's representative was belligerent. Both of those worked for the contractor. The contractor was stubborn and right from the commencement of the contract they were at each other in a combative manner".
Quantity Surveyor	"I mean often the builder will get into trouble through poor planning and try and shoot it back somehow to the client but he doesn't shoot it back under the guise of poor planning or site related factors, he tries to re-badge it and make it the client's fault. It's just a tactic, there's no direct factor, there's no outcome, it's just a claim and you just reject it unless it's something to do with us and I can't think of site management factors that relate to claims between the client and the builder that I can relate to and sub contractors is the same, that's their problem. They are disputes I believe that certainly the item 13 they're disputes between the subcontractor and the main contractor".
Contractor	"When people start dodging the bullet and pointing every which way to try and blame everyone else but themselves, that's when really the disputes tend to escalate a lot further. At least that's from my personal experience".
Contractor	"Willingness to accept accountability absolutely yeah and that's one of the, well yeah that would be one of the major driving elements, because most people don't want to put up their hand saying I made a mistake. That's the hardest part for a lot of people to actually do, say I stuffed up".

The technical aspects of problems that arose in the disputes identified were perceived to have been solved relatively smoothly. Yet most of issues identified involved some redistribution of rewards, and so there were inevitably winners and losers. The tensions that arose between winners and losers were largely a response to the profit motive of the employee's organization, however there also appeared to be a personal explanation. Personal tensions appeared to escalate as they increasingly recognized the growing inappropriateness of the modes of operation, but at the same time wanted to continue following them.

Interviewees noted that a number of reasons contributed to conflict in construction projects which included the competitive relationship between consultant and contractors, contractual complexity and risk allocation, and the ambiguity inherent within contract documents. Such reasons should not be seen as causes of conflict but the latent conditions that act as stimulus for tension as well as contributing to the likelihood of problems. It would appear that unexpected problems are a major source of conflict because they introduce a need for change. This can result in the nature of the original contract being changed and forcing re-negotiations to occur. Disagreements can arise and manifest as a dispute if there is perceived to be inequity in the proposed outcome. Without unexpected problems the project team members would have no opportunity to allay their concerns and thus would have to adhere to their original contractual obligations. In doing so, tensions would be suppressed and conflict avoided. While this is an ideal, the very nature of the environment within which construction projects are procured precludes this situation. Unexpected problems will always arise, but it is how people react and deal with them that determine how effectively they are resolved.

9.6 Project Participants Contribution to Disputes

Interviewees were asked to determine the activities and behaviours various project participants such as clients, design consultants, site management and subcontractors contributed to disputes. Table 9.6 presents a summary of the key issues identified. Considering the findings from the focus group and the in-depth analysis of dispute events that were undertaken common issues have emerged, for example, inappropriate procurement method, erroneous documentation, scope changes, and poor planning and resource availability. However, there are some issues that did arise that had not been previously identified such as inaccurate pricing of scope changes, limited management experience particularly problem solving skills, no adherence to quality assurance by the contractor, and sabotage though this was mainly a factor that added to the development of an adversarial relationship developing. Each of these issues will be examined in the context of the interviewees who raised these points.

An architect and contractor made comment about the inaccurate pricing of scope changes and how this contributed to a dispute they had been involved with. It was perceived that quantity surveyors were too reliant on 'pricing books' such as Rawlinsons and Cordells and the bills of quantities (BoQ) for pricing scope changes. While the BoQ serves a purpose for pricing variations for items of similar nature it does not take into account the extent and complexity of the work that is required. It was perceived that costing of scope changes based upon rates taken from price books did not reflect market conditions. The contractor commented:

"We had undertaken work that had not been allowed for, and we added in some extra supports and had to change a structural wall. Now the QS priced the additional work that was done and was way off the mark. He was \$12k off. We had the paper work to prove how much it really cost. We should have just agreed the price before the work was done, but if we we'd have been delayed, the work had to be done".

In this instance the contractor did not follow due procedure and their contractual obligation. While having the right intention and trying to act in the best interests of the client by not delaying the project, the contractor's actions backfired.

Having limited management experience, particularly in the area of problem solving was identified by a private sector client as being a contributing factor to a dispute that they had been involved with. It was perceived that the contractor's site management team had an inability to communicate with the client about how the project was being managed. An area that emerged to be of great concern to the client was resourcing and procurement of materials. The client was experienced and felt that they had to 'hold the hand' of the contractor when problems arose. The contractor could not manage their subcontractors and the project became delayed. Promises were made by the contractor to ensure progress would be made but the hurdles that confronted them were too large. A new contractor was brought to finish off the works. The client did acknowledge that they may have expected too much from the contractor, but the contractor gave several assurances that they could deliver the project.

On several occasions interviewees mentioned that 'non adherence to quality assurance' was a factor contributing to disputes. Non-conformance (e.g., defects), poor quality work and poor supervision of subcontractors were issues identified. In one instance, a structural engineer inspected site and found that there was not enough reinforcement being used in a concrete slab. What transpired is that the supervisor had been referring to a drawing and schedule that had been superseded. The drawing that had been issued for construction had been documented by the contractor and issued to relevant parties. The dispute concerned the date when the revised drawing were issued. Additional reinforcement needed to be ordered and a delay would be incurred. The dispute was resolved amicably and the contractor accepted responsibility for the error.

In the next example, a contractor requested a one month extension of time (EOT) before commencement of the works on-site because of impassable roads due to inclement weather. The EOT was granted by the project manager. The contractor asked for a further extension of time because there was a power problem on-site. The claim was denied as the project was too far behind schedule and there was no just case for such an application. About a week after the claim had been denied, the project manager was informed by the contractor that power had been completely lost on the site:

"We had a suspicion that the power supply was deliberately sabotaged by the subcontractors. Because the community they were working in is what we call a dry community, no alcohol and they wanted beer. So you sabotage the power, dear me, there's no power, my tools don't work, the air conditioning doesn't, we're not living in adequate conditions, let's all go to the pub 500 miles away until they fix it. That was our suspicion and the contractors, but we couldn't prove it"

A further EOT was granted to the contractor and some additional work was requested to be undertaken by the client. The contractor asked for an EOT for undertaking this additional work but it was denied because the work could have been undertaken concurrently within their original scope and the critical path was not affected. The project manager stated that if the critical path had been affected then the contractor would have been granted another EOT. The contractor failed to deliver the project by the revised date and then was subjected to liquidated damages. The contractor made an argument for prolongation costs which were equal to the liquidated damages but this was rejected. A representative of the contractor who was a licensed arbitrator threatened the project manager with arbitration. The project manager rang the contractor's general manager and stated:

"Every dealing we have with your company ends up being adversarial. We have an on-going adversarial relationship and is there something behind it. Is there something we are doing wrong?"

The project manager wanted to resolve the issue that had arisen in a reasonable manner. The general manager stated that he was not fully aware of what had transpired and stated that the person the project manager had been dealing with was leaving the company. The general manager withdrew the claim that had been submitted, as there was not enough supporting evidence. The owner of the company spoke with the project manager and

suggested that they solve the dispute in an amicable way. The project manager was cognisant of the impact that the liquidated damages would have on the contractor and imposing them would damage any future dealings with them. Through an intensive period of negotiation the dispute was finally settled; liquidated damages were not applied and no prolongation costs were paid.

Figure 9.4 summarises the relationship between the key pathogens that have emerged from the interviews and focus groups. The circumstance within which a project is procured influences the work practices adopted and how tasks are performed. When a dispute arises the circumstance may influence an individual's behavioural adaptation to an issue through the existent culture, strategy and policies that prevail within an organization and those that are subsequently transferred to the project.

Figure 9.4 Interrelationship of pathogens (author)

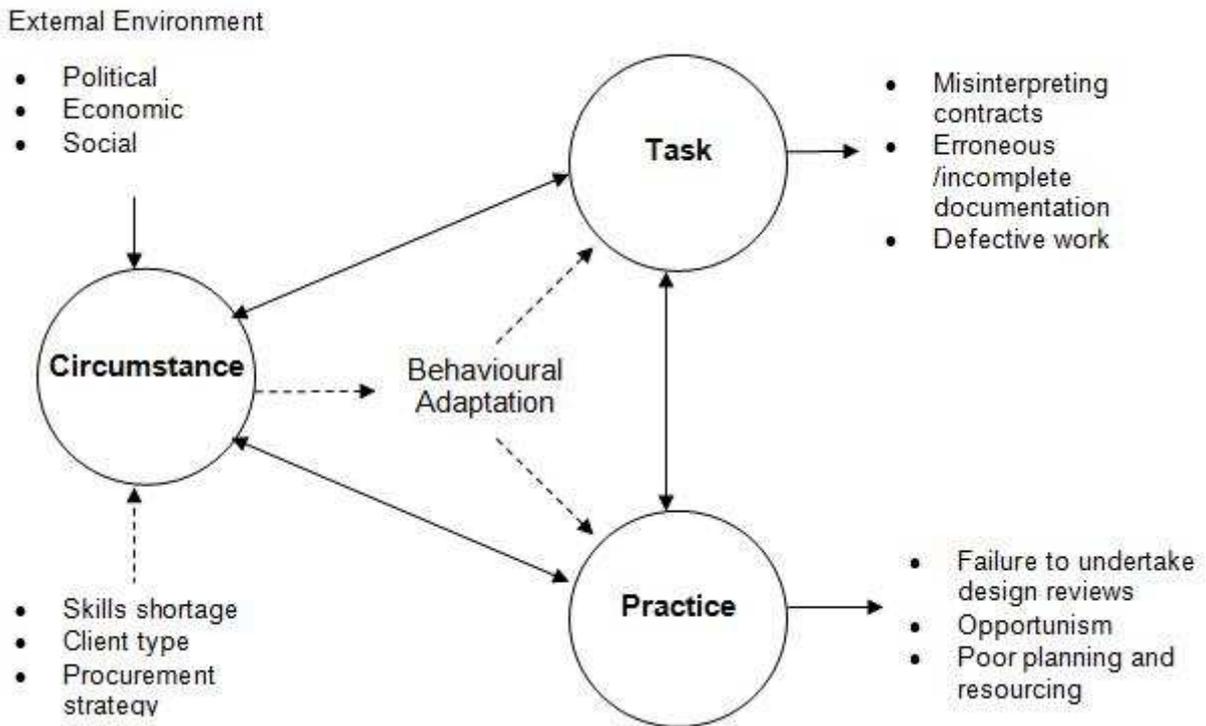


Table 9.6 Perceived general practices and behaviours of project participants that contribute to disputes

Client	Design Team	Site Management	Subcontractor
<ul style="list-style-type: none"> • Belligerence • Changing requirements • Non-involvement of key stakeholders in the decision-making process • Expectations of the project team to deliver services in more timely manner • Lump sum requirement (competitive tendering) • Use of non-standard forms of contract and imposing risks on contractor • Incomplete scope • Inappropriate procurement method • Ambiguous contract clauses • Unfamiliarity with the design, construction and procurement process 	<ul style="list-style-type: none"> • Inaccurate pricing of scope changes • Erroneous/incomplete documentation • Use of generic specification • Lack of design checks, verifications and reviews • Abrogation of responsibilities • Lack constructability of the design • Failure to respond to queries in a timely manner • Lack of coordination and integration between architectural/engineering drawings • Design fees and only minimal requirements • Minimal risk assessment • Poor development of a functional brief • Poor evaluation of tenders • Recommendation of lowest bid 	<ul style="list-style-type: none"> • Lack of resourcing on projects • Unrealistic estimating • Opportunistic behaviour • Attitude of “them and us” • Accepting too much risk • Inadequate planning and scheduling • Refusal of payments to subcontractors • Nominated subcontractors • Lack of ability to communicate with the design about technology related issues • Limited management experience, particularly problem solving skills • Lack of adherence to quality systems • Poor coordination of subcontractors • Unrealistic programme • Lack of involvement of specialist subcontractors • Working conditions and safety issues • Personality type 	<ul style="list-style-type: none"> • Defective work • No adherence to project protocols • Lack of planning and resourcing of works • Poor procurement of key materials • Damage to other works • Safety issues • Lack of adherence to quality assurance • Failure to adhere to the programme provided by the contractor • Financial capacity • Sabotage (deliberate acts)

Considering these underlying latent conditions it is suggested that strategies for avoiding disputes should initially focus on these areas. Strategies for avoiding disputes were solicited by interviewees so as to identify pragmatic practices that could be readily adopted and possibly have a significant impact. Nevertheless, the reduction of issues such as scope changes, rework, and an overall improvement in productivity and performance will require the construction industry to make a dramatic 'paradigm shift'. From being essentially adversarial where there are only 'winners' and 'losers' to one that is based upon solidarity and collaboration where mutual gains can be attained and sustained for the benefit of all parties. This will require organizations to transform their businesses in terms of relationships, behaviours, processes, communications and leadership.

9.7 Dispute Avoidance: Design Management and Project Delivery

A number of strategies that could be used to reduce and possibly avoid disputes are identified in Table 9.7. It is suggested that not one individual strategy will prevent a dispute but rather a combination, and possibly all. Three key words tended to dominate the dialogue as to how to avoid disputes: unequivocal risk allocation (including assessment and management), improved quality of documentation and a fully defined project scope. Intertwined with these terms were comments regarding the educating the client about the construction procurement process and relationship contracting (e.g., alliancing and partnering). While acknowledgement of the benefits of alliances were highlighted there was perceived to also be a great deal of scepticism about the use of relationship based contracting. For example, a private sector client stated:

"There's one big elephant in the room, if I can put it that way, as far as alliancing is concerned and that is the profit share. When you get down to the basic reason anybody gets into an alliance from a contractor's point of view it is to make money and that has to be the controlling interest. I think there's a lot of lip service going around about the interest in what the client's interested in and all the rest of it, but the basic point is that the contracting company plus its shareholders are interested to see the maximum return and they should be looking for that at every stage of the game".

Emphasis on the role of relationship building with other forms of procurement method and the behavioural adaptation of individuals was made as a contractor stated:

"With alliances you're deliberately building a relationship. You would expect it to be better from that perspective and it's generally true, 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. You can have a great relationship on a fixed price contract. But at the end of the day it comes down to personalities, not the procurement strategy."

Interestingly, in this instance, the notion of formal versus informal relationship development is raised. Many consulting and contracting firms have extensive experience working with the same firms in WA so there has been ample opportunity to establish and maintain relationships with one another. Such relationship development and maintenance appears to be a missing attribute of organizational consciousness for firms. But when a problem does arise it is ultimately how organizations and their employees deal with the situation that determines the outcome.

Table 9.7 Suggested strategies for avoiding disputes

Design Management	Procurement Strategies
<ul style="list-style-type: none"> • Constructability input • Design audits, reviews, verifications • Risk assessment/management (e.g., documentation) • Specialist input of services subcontractors input into the design • Team building to encourage open communication and coordination • Third party reviews of design and documentation • Bills of Quantities to form part of the contract 	<ul style="list-style-type: none"> • Non acceptance of lowest tender with greater emphasis on 'value for money' • Project post mortems (learning) • Negotiation • Relationship contracting (e.g., alliances and partnering) • Use of design and construct • Standard forms of contract • Prequalification • Contractual incentives • Agreed fixed profit margins

The issues surrounding the production and management of contract documentation has been a leitmotiv throughout this research and previous studies that have been undertaken. Consequently, it was not surprising that interviewees placed increasing emphasis on developing documentation that was comprehensible and could be understood by the contractor and subcontractors. A structural engineer made the following statement:

“Making sure design documentation is appropriately presented in a stage of completion that you can get clear scope definition for what’s required to be done. So for example, if you’re producing design documentation for a structural package, that you have sufficient details, enough for the scope of work to be clearly defined under a Subcontract Agreement.”

Not updating and modifying drawings when issued may have catastrophic consequences on a projects cost and schedule, as a contractor may commence works using drawings that are wrong. Acknowledging that this is a problematic issue and which could be rectified using integrated computer-aid design systems the following was noted by a contractor:

“In some cases it could be items such as architectural drawings getting updated and engineering drawings not being updated, for whatever reason, might have been time constraints or might have been just people don’t think that something may not affect the engineering drawings when in fact it does. And so my advice would be every single time an architectural plan is updated, that the changes should be documented or well documented, whether the preliminary drawings or final drawings have been issued or not, once it’s been issued for whatever reason, then they should be clouded and a clear documentation of exactly what was changed on the drawing. You can do it now with the press of a button! What happens in that situation is sometimes the architectural drawings get updated, they think it doesn’t, or even when they do think it involves engineering, they send those through to the engineer and for us it’s like trying to find a needle in a haystack, you don’t know exactly what’s changed”.

Following on with the theme of documentation and integrating the concept of constructability, the following comment was surprisingly made by an architect:

“But the best way is probably to have the designers and the builders work together as a team during the development of at least the detail design. Because in my experience it’s not design that’s an issue, it’s not design, the grand design; it is the detail in the documentation where errors come in”.

Bills of quantities (BoQ) are fundamental for itemizing the materials and labour (and their costs) required to construct, maintain or repair a structure. The BoQ traditionally identifies the particulars required by the Conditions of Contract, with a detailed specification for the work. Determining the precedence of such documents in interpreting the contract may create difficulties, since the BoQ will be a specially written or "one-off" document in contrast to the printed standard conditions. The normal rule (in absence of express terms) is that specially prepared documents will take precedence over standard printed conditions (See J Evans & Sons (Portsmouth) Ltd -v- Andrea Merzano Ltd (1976)). Mistakes in the bill descriptions or quantities are unlikely to be remedied as a legal rectification of the terms of the contract to reflect the true intention of the parties. It is more likely than not, that the common intention will be that the tendered price should prevail, rather than a price revised to account for the error. Most standard forms of contract, which adopt BoQ make provision to deal with errors in bill descriptions and quantities, distinct from the effect of variations. However, BoQ's have been sidelined by many clients as they are considered to be too expensive and time consuming to produce. Though, when they are produced they invariably do not form part of the contract. The following observation was made by a quantity surveyor (QS):

“In my experience you can pretty much put a RIP sign over bills of quantities these days. They're not considered to be an explicit part of the contract anymore. What's wrong with clients spending money over the bills of quantities these days so that contractors can price the job from the bill instead of wasting time, money and resources and chancing their arm and their fate doing take-offs with increasingly sophisticated construction works.”

Needless to say, the production of BoQ does have a role to play in reducing errors in contract documentation. The QS can act as buffer, in that they are able to identify anomalies and ambiguities in the documentation when preparing the quantities for pricing by a contractor and thus potentially minimize the impact of a dispute that may arise downstream during construction.

10. RESEARCH LIMITATIONS

While the research has been able to determine the causal nature of disputes there are some limitations that need to be acknowledged. First, the inconsistent definitions of 'dispute' between studies make research findings difficult to compare and generalize. Focus groups were only undertaken with clients and contracting groups as they were identified as the main parties of a dispute during the analysis of litigation cases within WA. Input from consultants, however, may have provided a more balanced perspective as to the perceived causes and costs of disputes. The sample size of 41 was not representative by respondent type and only confined to WA, so generalizations are not able to be made in the wider context, specifically as traditional lump sum procurement methods with an AS2124 contract were prevalent within the projects sampled. The examples derived from the 58 projects were the views of those interviewed, so there is a potential for bias and misinterpretation with respect to the causes of the dispute. The direct cost of disputes provided by interviewees was deemed to be *only* indicative as no quantifiable data was readily available. Consequently, caution should be given to the estimates, but those provided do enable some indication of the possible emotional stress and financial strains that are imposed upon organizations by disputes.

11. CONCLUSION

The construction and engineering literature is replete with studies that have attempted to address the causes of disputes in construction. There is, however, limited knowledge available about the costs of disputes. In this research an indicative dispute cost, excluding the cost of the contractual claim, was obtained. It was revealed that dispute costs varied with the resolution method used. Obviously, litigation was the most expensive option for parties being as high as 30% of original contract value, the next being mediation being approximately 13% and adjudication 0.15%.

While a considerable amount of knowledge has been accumulated about dispute causation; they continue to prevail and disharmonize the process of construction with considerable financial and emotional cost. The reason as to why disputes still continue to occur is that many firms have failed to learn from previous experiences and continue to adopt work practices that are opportunistic, as well as possessing a 'blame culture' that is used to dominate and control in an oppressive tyrannical manner instead of taking responsibility for their actions. This invariably translates to individuals' behaviour and how they respectfully solve problems with other individuals.

An underlying condition contributing to how individuals address problems that arise pertains to the circumstances within which the project is being procured. The adoption of adversarial practices such as competitive tendering for contractors and subcontractors often leads to the lowest price being adopted. In hindsight, however, many clients and consultants have often regretted this choice when expected performance levels (in terms of time, cost quality, safety and even information flows) are not achieved. A re-examination of original selection processes often reveals decisions are dominated solely by price competition. This is particularly the case for consultants who are also often forced to competitively tender for their services and as a result provide minimal services for the fees charged, which often results in documentation being substandard. To obtain 'best value' there needs to be shift toward negotiation rather than the use of competitive selection so as to ensure firms who have the capability and experience are able to undertake the project at hand are selected. While negotiation is probably amenable to many private sector clients, those from the public sector will have to confront issues surrounding probity.

There is a need for greater use of non-traditional forms of procurement method, which by default promote the use of constructability. A significant proportion of the dispute examples provided pertained to traditional lump sum contracting. This procurement route by its very nature is adversarial and therefore it is not surprising that disputes occurred, though it should be acknowledged that many successful dispute free projects have been procured using this method. It is suggested that greater involvement of the contractor as well as specialist subcontractors such as hydraulic, mechanical and engineering services providing input into design and the documentation process would reduce the incidence of errors, scope changes and disputes.

At a fundamental level firms need to implement stringent policies and procedures that must be adhered too at all times (e.g., quality systems), but at the same being cognisant of not initiating blame. When an individual is deemed to be recalcitrant (e.g., due pressures beyond their control) and 'procedural violations' arise, then behaviour modification should be perfunctory through systemic intervention. Behaviour after error occurrence is influenced by the presentation of positive heuristics, for example, "I made an error; I can learn from this!" Such positive heuristics are presented to facilitate emotional coping after error occurrence, thereby aiding people to consider that errors can also be interpreted as informative feedback.

Learning from mistakes is pivotal to dispute avoidance. The use of communities of practices within organizations and projects can provide an opportunity to share knowledge, solve problems, and derive innovative solutions. The transformation from an adversarial culture to

one of solidarity and collaboration can enable such discourse and learning to take place between individuals and organizations through *situated cognition*, which is necessary for dispute avoidance and resolution.

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APPENDIX A - RESEARCH INSTRUMENT

DISPUTES IN CONSTRUCTION PROJECTS

INTERVIEW PROTOCOL

MUST DO:

1. Before the interview commences make sure the *plain language statement* and authorization from the interviewee are sought. Also, ask their permission to tape record the interview. Notify interviewee that their interview will be digitally transcribed and distributed to them for vetting/approval.
2. Ask the interviewee to select a *recently* completed project or one that they are currently involved with.
3. State that we would like the interviewee to identify any specific examples of disputes that they have experienced *in the selected project* and suggest what the antecedents of the specific event were (i.e. did it have a negative impact on project performance).
4. Before the interviewee provides details about specific dispute events, however, some background information about the project is first sought.

DISPUTES IN CONSTRUCTION PROJECTS

Ref:

Date:

Start Time:

Finish Time:

Interviewer:

Interviewee:

Gender:

Organization:

Position:

Organization type (i.e. client, architect, engineer, etc):

Industry experience:

☞ For the purposes of the interview, the interviewee will be informed that a “dispute occurs when the parties cannot resolve an issue relevant to the performance of the project in a proactive, timely and mutually acceptable manner, and each party forms an entrenched and contrary opinion with respect to that issue that requires resolution.”

BACKGROUND INFORMATION

1. Description of the project (project type/purpose/procurement method/alliance):

2. Project value: \$ _____

3. Project duration: _____

4. Expected/actual completion period: _____

5. Delays (If so, why/not):

6. Cost overruns (If so, why/not):

7. Approximately proportion of the project's contract value did *direct* cost of the dispute(s) account for?

8. What do you consider to be the indirect costs associated with disputes?

10. What do you consider to be the main *client related factors* that contribute to disputes in projects that you have been involved with (e.g., inappropriate site investigation)?

11.ditto *design team factors* (e.g. production of poor contract documents, restricted access) team members etc:

12.ditto *site management related factors* (e.g., poor planning)

13ditto *subcontractor related factors* (e.g., inadequate managerial and supervisory skills)

APPENDIX B - SAMPLE OF SECURITY OF PAYMENTS LEGALISATION CAUSES

Table B. Example of selection of adjudication decisions made under the 'Queensland Security of Payment Legislation' in 2008

Project type	Nature	Claim value	Contract value	Adjudication award	Causes of dispute
Commercial - Residential	Concreting	\$32,727		\$32,727	Failure of payment
Commercial – Retail	Plastering	\$11,303		\$11,303	Defective work
Industrial – Power Station		\$2,202,381		\$816,039	Incomplete documentation caused scope changes
Commercial - Residential	Consultancy (Electrical/ HVAC)	\$26,026		\$26,026	Incomplete documentation caused scope changes
Commercial - Residential	Concrete flooring components	\$93,629	\$308,400	\$80,280	Dispute over whether or not payment invoice was received
Administrative - Civic	Supply and install 'Tilt up' concrete panels	\$63,652		\$63,652	Subcontract terminated (unreasonable), weather (safety), defects, poor workmanship
Commercial - Residential	Supply and install the tensioned ground anchors	\$60,408	\$145,000	\$60,408	Change of scope and defective work
Commercial - Residential	Design and construct	\$255,833		\$118,534	Existence of contract; lack of documentation
Commercial - Residential	Supply and installation of joinery	\$555,013	\$1,263,820	\$425,123	Variations, ambiguity of contract, incomplete drawings, workmanship, out of sequence works, excessive overtime, changing critical path, slow response for information
Commercial - Residential	Provision of safety railing to building roofs	\$15,930		\$14,539	Change of scope

Project type	Nature	Claim value	Contract value	Adjudication award	Causes of dispute
Commercial - Retail	Bulk earthworks	\$325,396	\$1,699,222	\$289,406	Variations - unforeseen underground conditions (rock, acid, sediment basin)
Industrial - Warehouse	Manufacture and erection of structural steel	\$42,565		\$37,004	Delays due to shortage of labour, incorrect materials, incorrect drawings, on-site rectification needed.
Commercial - Offices	Installing plasterboard	\$6,898		\$6,898	Defective work and incomplete documentation
Commercial - Offices	Internal ceilings, cornicing.	\$9,243		\$9,243	Defective work
Commercial - Offices	Supply of windows/doors	\$44,000		\$44,000	Change of scope
Commercial - Offices	Supply and install wall sheets and ceiling detail	\$14,095		\$14,095	Damage to site and defective work
Commercial - Subdivision	Civil works and drainage	\$97,608	\$320,097	\$97,608	No evidence tendered for failure to pay
Commercial - Offices	Unknown	\$24,924		\$24,924	Change of scope
Commercial - Residential	Supply and installation of fire doors	\$25,317		\$25,317	Failure to serve payment schedule
Commercial - Offices	Construct and erect steel framework	\$13,183		\$13,183	Failure to install according to plans
Watermain construction	Civil works: application of epoxy coatings	\$88,776		\$88,776	Change of scope

Project type	Nature	Claim value	Contract value	Adjudication award	Causes of dispute
Commercial - Office	Block laying	\$29,914		\$29,404	Defective work, failure to clean up site, delays, cost of repairs, incorrect invoice amounts.
Administrative - Authorities	Civil engineering works	\$114,334		\$11,434	Problems with drawings, variations
Commercial - Residential	Concrete work	\$32,727		\$32,727	No payment schedule served
Unknown	Rental of plant and equipment	\$68,504		\$51,534	Payment claim not validly served, no documents confirming claims
Industrial - Factory	Plumbing works	\$9,089	\$29,277	\$9,089	No reasons given by adjudicator
Commercial - Residential	Plumbing works and hydraulics	\$161,791	\$2,280,000	\$8,456	Incomplete work
Commercial - Residential	Provision of project management services	\$55,886	\$266,750	\$55,886	No reasons given by adjudicator
Residential	Sealing of expansion joints and wet areas	\$3,161		\$3,161	Defective work
Water main	Built pipeline	Unknown		\$11,122,646	Latent conditions (rock) and change of scope
Educational - School	Roofing	\$9,915	\$13,980	\$9,915	Standard of work, variations, cost of variations
Hospital	Linings and ceiling works	\$204,315		\$204,315	Changed scope of works, fitness for purpose, utilization of respondents staff and interest
Commercial - Retail	Unknown	\$39,243		\$39,243	No reasons given, seeks to deduct

Project type	Nature	Claim value	Contract value	Adjudication award	Causes of dispute
					some labour and plant costs.
Hotel/Motel/Resort	Construction of ceilings & partitions:	\$187,040		\$187,040	Progress payment, defective work
Hotel/Motel/Resort	Landscaping works	\$10,884	\$174,738	\$10,884	Failure to pay on schedule
Industrial - Warehouse	Construction and associated works	\$35,773		\$21,013	Change of scope
Commercial - Residential	Project management	\$40,540		\$40,540	Cost escalation
Commercial - Residential	Building services	\$51,728		\$51,728	Change of scope and defective work
Administrative – Civic	Guttering	\$3,960	\$4,382	\$3,960	Change of scope
Commercial - Retails	General construction	\$807,491		\$189,933	Change of scope
Administrative -Authorities	Supply and installation of shade sails	Unknown	\$77,000	\$8,741	Change of scope
Commercial - Retail	Roofing	\$14,893		\$8,843	Termination of contract, defective work, delays
Commercial - Retail	Refurbishment	\$40,296	\$231,530	\$40,296	Change of scope and defective work
Commercial - Residential	Carpentry	\$11,769		\$11,521	Change of scope and defective work
Commercial - Residential	Construction	\$310,994		\$310,994	Change of scope and defective work
Industrial - Warehouse	Floor sanding	\$10,495		\$9,892	Defective work

Project type	Nature	Claim value	Contract value	Adjudication award	Causes of dispute
Industrial - Warehouse	General construction	\$63,518		\$62,224	Value of work excessive, variation not approved, back-charges, defective work
Commercial - Offices	Installation of anchors and whalers	\$550,286		\$550,286	Defective work and cost of rectification
Commercial - Offices	Supply of labour for concrete work	\$66,633		\$34,453	Change of scope
Industrial - Factory	Site clean services and bobcat work	\$3,557		\$3,557	No valid reason given by respondent

APPENDIX C - SAMPLE CHARACTERISTICS

Table C. Summary of sample characteristics from interviews

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
<i>Director, Housing Construction</i>	Public Sector Client	25	Administrative - Authorities	Design and Construct	AS4902	3.5m	8	Contractor commenced work without being awarded contract	Arbitration	Reluctant agreement to split 50/50	Difficulty to determine
			Administrative - Authorities	Traditional Lump Sum	AS2124	8.5m	18	Extension of time (EOT) and prolongation claims for 5 months	Negotiation	Reluctant settlement	Difficulty to determine
			Administrative - Authorities	Traditional Lump Sum	AS2124	1m	6	Contractor released from contract "with no further cost"/"at no cost"	Negotiation	Contractor was paid for work but not extra work of the subcontractor (S/c)	Difficulty to determine
			Administrative - Authorities	Traditional Lump Sum	AS2124	0.25m	6	Contractor accused of lying about obtaining quote from a supplier	Negotiation	Quote obtained from supplier	Difficulty to determine
<i>Manager, Procurement and Construction</i>	Public Sector Client	20	Administrative - Authorities	Traditional Lump Sum	AS2124	1.5m		EOT and scope change claims for erroneous documents. Limited access also imposed by the client	Negotiation	Agreed to redesign and vary work. A schedule growth of 8 months was experienced	200k
			Administrative - Authorities	Traditional Lump Sum	AS2124			Claim for work not included in the original tender submission	Litigation	Settled during litigation	10m
			Administrative - Authorities	Traditional Lump Sum	AS2124			Head contractor to do some of forward earthworks	Negotiation	Redesign and delays experienced	-

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
Senior Contracting Advisor	Public Sector Client	20	Administrative - Authorities	Traditional Lump Sum	NPWC3	1.2m	11	Scope change to omit 37% of works. Builder contracted to do \$700K of work	Negotiation	Contractor conceded that they were not entitled to all variation claims	-
			Hospitals/ Health	Traditional Lump Sum	AS2124 and AS2545	6m	18	Contractor refusal to pay supplier	Litigation	S/c commenced proceedings against contractor for \$6K	7k
Project Director	Private Sector Client	15	Reservoir and Dams	Traditional Lump Sum	Eng& Con Contract	4m	12	Large variation claim after contract finished.	Negotiation	Left in abeyance for several years, settled on a % basis	0.4m
			Water Treatment Plant	Traditional Lump Sum	Bespoke		6	Contractor was mismanaging their monthly finances monthly, internal disputes	Negotiation	Contractor underpricing the contract, bankruptcy	-
			Bridge Construction	Traditional Lump Sum	Bespoke		6	Contractor disputed the buildability of complex reinforced-concrete design	Negotiation	Agreed that contractor would enforce and fund their own suggestion	-
Project Manager	Private Sector Client	20	Pumping Station	Alliance Contract	Bespoke	500m	86	Disagreement whether a direct cost reimbursable or use of a schedule of rates contract	Mediation	Egoism, self protection, ineffective communication	10m
Contracts Consultant	Private Sector Client	5	Reservoir and Dams	Traditional Lump Sum	AS4000			Superintendent disputes the quantity of excavation work done by contractor	Negotiation	Different measuring methodologies resulted in	-

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
										different quantities	
Services Consultant	Private Sector Client	30	Wharves	Design and Construct	AS4000	30m	72	Dispute with client over \$1.8 million variation due to environmental factors	Mediation	Settled and agreed \$187K	60k
Project Director	Private Sector Client	20	Office Refurbishment	Traditional Lump Sum	AS4000	1.3m	3	Perception of s/c incompetence (poor workmanship)	Determination	S/c removed from site	140k
Arbitrator & Mediator	Private Sector Client	16	Health Facility	Traditional Lump Sum	AS2124	4.5m	18	8 variations worth in excess of \$300K were disputed. The prime cost of the fire services was disputed after completion	Arbitration	\$30K paid and EOT awarded (entitled)	0.5k
			Pumping Station/Water Treatment, pipeline	Traditional Lump Sum	AS2124	90m	15	Dispute involved lawyers, an analysis of programme, pricings, actions and site minutes	Mediation	Agreed and sought to rectify within a day because of potential costs that could be incurred by parties	7m
			Commercial - Offices	Traditional Lump Sum	AS2124		15	Contractor disputed the S/c earthworks claim (quantity and type of removal)	Mediation	Both parties settled	
General Manager	Project Management Consultant	35	Railway	Alliance		167m	24	Client expectations of contractor not met. Cost growth and significant schedule growth	Litigation	Contractor replaced and costs of project are in excess of \$400m. The cost of the dispute are not know but it was	50m

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
										estimated to be in the region of \$50m	
			Railway	Design and construct		400m	48	All the risk placed on contractor, time-barred to price risks and make claims	Litigation	Claims, disagreements, disputes with contractor and S/c. Client should have an idea of the direct cost but will not disclose.	Difficulty to determine
<i>Mediator/ Arbitrator</i>	Architect	20	Commercial - Offices	Construction Management	AS4916 Amended			Several unresolved disputes within the project. Planning and resourcing of project	Negotiation	Contractor was replaced	
			Authorities - Diplomatic	Traditional Lump Sum	Partnering Charter with AS2124	50m	48	Very few problems of a severe nature encountered in this project. Disputes arose because of contract documentation errors.	Negotiation	Problems were resolved informally	-
<i>Project Director</i>	Architect	10	Educational - School	Traditional Lump Sum	AS2124	25m	24	Dispute over \$1.1 million in variation claims and EOT	Adjudication	Dispute resolution provisions in contract were followed	20k
<i>Director</i>	Architect	5	Domestic - Residential	Design and Construct (Cost plus)		0.4m	9	Disputes with S/c over workmanship. S/c did not turn up on-site when supposed to do so.	Negotiation	Poor workmanship and incomplete work. Client moved-in when incomplete	-

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
<i>Director</i>	Architect	20	Commercial - Development	Traditional Lump Sum	AS2124	2.5m	8	Contractor did not return to complete the work	Negotiation	Contractor was paid for work done. Another contractor engaged to complete works	-
			Commercial - Development	Traditional Lump Sum	AS2124			Contractor failed to provide the architect a program of works. Dispute as to who had control of nominated S/c	Negotiation	Contractor provided an outdated programme and their own S/c to conduct the nominated works	-
			Domestic - Residential	Negotiated cost-plus based				Defective works: client required bench top to be replaced after it was damaged	Mediation	Architect mediated; client was considered to be unreasonable and persisted with action despite advice	5k
			Administrative - Civic	Traditional Lump Sum	AS2124			Client wanted plasterboard to corridor redone due to poor workmanship	Mediation	Architect advised client that work was satisfactory	-
<i>Director</i>	Project Planners	10	Educational - University	Traditional Lump Sum	AS2124	20m	36	Variation claim to cover delays due to the procurement of a special feature	Adjudication	No delayed allowed for due to specialised design feature. Contractor awarded \$2 million for the costs of delay and disruption	30k

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
Director	Quantity Surveyor	5	Commercial - Retail	Design and Construct	AS4902	55m	36	Dispute occurred over the extent/scope of work required in the refurbishment of a shopping complex. Contract documents contained errors.	Litigation	Resolved in the courts. Legal fees considered to be considerable	15m
Director	Quantity Surveyor	10	Commercial - Residential	Construction Management		35m	36	Dispute occurred between the contractor and unionised S/c. Contractor submitted an \$8m claim for loss and expense due to disruption	Mediation	This dispute took more than two years to resolve.	Difficulty to determine
Director	Quantity Surveyor	20	Authorities - Civic	Traditional Lump Sum	AS2124	80m	36	Client back charged contractor \$420K for rectifying mistakes	Negotiation	Contractor refused to pay as their contract was discharged and a new contractor brought. Client pursued litigation by settled through negotiation	1.6m
			University - Educational	Traditional Lump Sum	AS2124			Contract documentation contained many errors and was poorly coordinated. The design consultants disagreed with this view	Negotiation	Considerable amounts of rework were experienced. Cost and schedule growth because the documentation was difficult to understand	Still in progress
Electrical Engineer	Electrical Subcontractor	15	Industrial - Processing Facility	Design and Construct		33m	24	Electrical S/c contract was discharged for poor workmanship: damaged	Negotiation	New S/c employed. Cable costs had to be	180k

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
								to cable		paid for by the S/c	
<i>Principal</i>	Consultant Engineering	22	Commercial - Retail	Traditional Lump Sum	AS2124	18m	24	Contractor deviated from structural design and failed to consult with the engineer	Negotiation	Structural failure occurred. Nobody was injured. Costs of rework	
			Commercial - Retail	Traditional Lump Sum	AS2124			Air chiller machine failed - Mechanical engineer and supplier blamed	Mediation	Considered to be an design oversight	-
			Commercial - Offices	Traditional Lump Sum	AS4122			Consultant Engineer and the client could not agree on alternative terms 1/2 way through the design process.	Negotiation	Consultant engineering firm decided not to continue with the project	-
			Administrative - Civic	Traditional Lump Sum	AS2124			Structural engineer could not agree with alternative conditions being imposed upon them when the design was complete	Negotiation	Consultant engineering firm decided not to continue with the project	-
			Administrative - Civic	Traditional Lump Sum	AS2124			Electrical contract damaged work on-site and the contractor claimed from insurance	Litigation	Insurer successfully sued the electrical consultant	Difficulty to determine
			Administrative - Civic	Traditional Lump Sum	AS2124			Client misinterpreted the roof aspect of the structural engineers scope	Negotiation	Structural engineer found technical solutions and required additional fees	-

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
			Entertainment	Traditional Lump Sum (Proposed)		30m	36	Client wanted the project completed for \$30 million. The structural engineering firm, acting as project managers as well, claimed the project could not be completed for <\$50 million	Negotiation	It was estimated that \$4m had been spent on the design and redesign to try and meet the client's demands. The dispute was to do with what was feasible within the budget. Additional fees were required due to the amount of re-design that had been undertaken	Difficulty to determine
Operations Manager	Consult Engineering	10	Hotel/ Motel/ Resort	Traditional Lump Sum	AS2124	Proposed 0.75m	6	Client disputed magnitude of design relative to the project's scale. Architect required additional fees	Mediation	Architect appreciated cyclonic design but because of the scope of design client ceased project	-
			Industrial - Warehouse	Traditional Lump Sum	AS2124	1.5m	9	Over design: Client found it difficult that a wall required significant piers, rods and footings	Negotiation	Required time-consuming explanations to educate client about design and cost	-
			Commercial - Recreational	Traditional Lump Sum	AS2124			Contractor did not consider connecting wind post columns to roof where necessary	Negotiation	Roof blew off in a recent storm	-

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
Director	Consulting Engineering	25	Administrative - Authorities	Traditional Lump Sum	AS2124			Dispute over who pays for contractor-imposed design changes	Negotiation	Due to lack of contractor involvement in tender there were divergent views on how to solve a design problem that emerged during construction	-
Project Manager	Contractor	20	Educational - School	Traditional Lump Sum	AS2124	25m	24	Dispute about request for information not being answered and the quality of the contract documentation. Quality of S/c work questioned by the client	Adjudication	Issue about quality assurance	35k
Project Manager	Contractor	15	Commercial - Retail	Traditional Lump Sum	AS4000	1.3m	5	Disputes over project budget and EOT claims due contract documentation being incomplete; difficult to plan and resource work	Negotiation	Resolved w/no cost impact	-
Project Manager	Contractor	9	Commercial Retail	Traditional Lump Sum	AS2124		6	Client selected non-standard paint, dispute whether painter performing or not	Mediation	Project fell 6 weeks behind, client understood struggle, no LD	-
			Commercial - Offices	Traditional Lump Sum	AS2124		13	Architected disputed design errors identified by the contractor that were contained in the contract documents. The architect claimed that these should have been allowed for in their	Mediation	Architect accepted responsibility and scope changes approved. Cost of scope changes were borne by the client. The client is considered bringing	-

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
								tender		an action against the architect.	
			Commercial Offices	Traditional Lump Sum	AS2124	8m	9 On-going	Contractor believed the designers should drive tenant to finalise functionality of building	Negotiation	Contractor did nothing for fear of resentment from the design team. Still in negotiation as the contractor does not want to undertake unnecessary scope changes	-
General Manager	Contractor	10	Railway	Design and construct		400m	48	All the risk placed on contractor, time-barred to price risks and make claims	Litigation	Claims, cost blowouts, disagreements, disputes with the contractor	On-going
	Contractor		Hospitals/ Health	Design and construct		1800m	60	Contractor in dispute that the client: Do not want to initiate scope changes so as to reflect leading practice	Negotiation	If the contract promotes the right to change then will lead to significant claims and disputes. Important to get it right first time	On-going
Commercial Manager	Contractor	20	Road Construction	Design and Construct	Modified AS4300	225m	36	Client interpretation of contract different to that of the contractor	Mediation	Client changing specification and scope of work	Difficulty to determine

Position	Organisation Type	Experience (Years)	Project Type	Procurement Method	Contract Type	Contract Value (\$)	Duration (Months)	Dispute Description	Resolution	Comment	Estimated Cost (\$)
<i>Project Manager</i>	Contractor	10	Commercial - Retail	Design and Construct	Modified AS4300			Formwork S/c did not perform and almost \$3 million was deducted from their account	Mediation	Contractor did most work. S/c was struggling financially	-
	Contractor		Hospitals/Health	Traditional Lump Sum	AS2124	10.5m	18	Client initiated changes and it was hard to agree on price and time	Mediation	Project completed, lawyers still working to settle accounts	On-going
	Contractor		Railway	Design and construct		400m	48	All the risk placed on contractor, time-barred to price risks and claims	Litigation	Claims, cost blowouts, disagreements, disputes with the contractor	On-going
<i>Project Manager</i>	Contractor	10	Hospitals/Health	Traditional Lump Sum	AS2124	16m	18	Political dispute whether or not to initiate a scope change that would cost extra \$6 m	Negotiation	Client could not administer the contract until this political situation had been rectified	-
<i>Project Manager</i>	Contractor	5	Commercial - Offices	Traditional Lump Sum	AS2124	26m		Disputes involving EOT from demolition work that needed to be undertaken. Architect did not understand what was required	Negotiation	Settled very quickly and in an amicable way. Suggested that parties were open to discussion and wanted to resolve the matter as quickly as possible.	-

APPENDIX D - SAMPLE OF INTERVIEWEE STATEMENTS

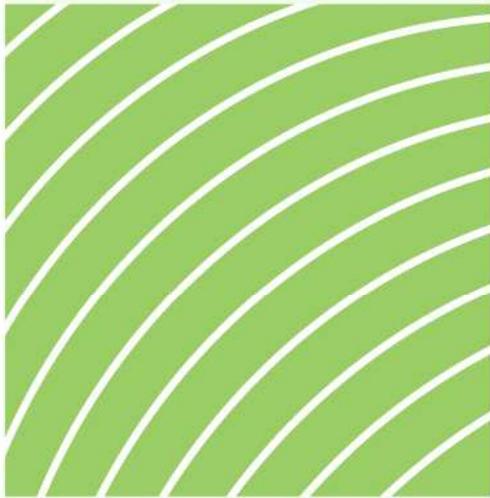
ID	Organization Type	Comment
1	Contractor	<p><i>Scope changes</i></p> <p>“I think it’s trying to let a contract too early can cause scope changes and lead to disputes. If you let it too early it’s a matter of then, you can’t define the scope clearly and its then on what choice contract basis you use to let it, whether it be an early contractor involvement, or somebody trying to advance too far down the track to hire a contractor in to define scope, if you see what I mean”.</p>
2	Contractor	<p><i>Standard forms of contract</i></p> <p>“If it’s a standard form people tend to know the basis of it; whereas with the bespoke contract it depends on your familiarity with that client and you know how they’re written. But there can be grey areas. They may not apply to them and they might not understand risks that they’re taking. We prefer to use standard forms as we are familiar with the clauses; they’ve stood the test of time. When you get bespoke contracts clauses can be interpreted differently and that’s when you get problems”</p>
3	Contractor	<p><i>Contract documents</i></p> <p>“The documents we get are terrible, and cause most of the disputes I’ve encountered in projects. In particular, architects use too many standard specifications for different jobs and then go a change things as we progress through the job”</p>
4	Quantity Surveyor	<p><i>Poor planning</i></p> <p>“I mean often the builder will get into trouble through poor planning and try and shoot it back somehow to the client but he doesn’t shoot it back under the guise of poor planning or site related factors, he tries to re-badge it and make it the client’s fault”</p>
5	Client	<p><i>Scope changes</i></p> <p>“Eventually there was a dispute over payment of variations. There was about eight variations which was disputed whether they were approved or not and how they should have been approved then there was a dispute over when practical completion was achieved and that impacted on the fact that they couldn’t put people in the aged care home until practical completion was achieved because of the liability they would have had so that had to be determined and other items that were under contention were, the main one was floor levels in the bathrooms which didn’t drain to the outlets and the painting that didn’t comply with the specification, mainly in the bathrooms but throughout the building extensions so that was just a summary of things”.</p>

ID	Organization Type	Comment
6	Contractor	<p><i>Defining scope</i></p> <p>“Ultimately, it’s about scope. Within scope is inadequate time to deliver, inadequate provisions under the contract, things like rise and fall in this market, escalation is horrific, and under the contract there was a mechanism for rise and fall, but it was inadequate to meet the project, and the escalation of costs is what’s happened in Western Australia. So at least there was some provision, but historically, if you did it again, there would be probably a greater provision under the contract, and it’s caused a lot of grief with our costs, but also our subcontractor’s costs, because we’ve had record cost escalation of major projects up to a percent a month, so we haven’t had those costs and we haven’t been able to recoup those costs, and thus, that’s been a mechanism for major dispute on the project.”</p>
7	Architect	<p><i>Defining scope</i></p> <p>“The client or the principal is, as I’ve already said, can contribute to issues by not clearly identifying their requirements”.</p>
8	Contractor	<p><i>Contract documents</i></p> <p>“Once you’ve got vagaries and ambiguity in documentation and it’s been priced, then that’s a recipe for dispute”.</p>
9	Contractor	<p><i>Misinterpretation</i></p> <p>“If I had to summarise it, it effectively comes down to the individuals involved more than anything else, the issues at hand will usually stem from documentation discrepancies and of the various interpretation of that discrepancy and generally it’s got to do with money.</p>
10	Consulting Engineer	<p><i>Skill and experience</i></p> <p>“There is a massive gap in experience with engineers. Often experienced engineers are coupled with new ones and ‘sold’ as being experienced.</p>
11	Consultant Project Manager	<p><i>Fees and experience</i></p> <p>“...if they’ve got a fairly challenging and demanding project, but because they’re not willing to pay the right fees they select people that aren’t experienced in the type of project or they haven’t got the resources to deliver the project”.</p>
12	Public Sector Client	<p><i>Personality and Behaviour</i></p> <p>“One of the other precipitating factors of this dispute was the contract manager concerned; he was belligerent to a point. The superintendent’s representative was belligerent. Both of those worked for the contractor. The contractor was stubborn and right from the commencement of the contract they were at each other in a combative manner, Ok?”</p>

ID	Organization Type	Comment
13	Consulting Engineer	<p><i>Poor planning and Resourcing</i></p> <p>Part of that problem is that some builders don't let their orders to their subcontractors quickly enough and so they're always rushing behind, trying to appoint someone, partly because of, again, lack of resources – you can't find people – but not committing to getting someone involved in the job early enough; 'cause the subcontractors, at the end of the day, they have more experience and understanding of design problems for their specific discipline than a designer would or the builder would, so they're the key to the job.</p>
14	Private Sector Client	<p><i>Poor Planning</i></p> <p>Company used experienced engineers that ultimately didn't know how much time they had and were thus surprised when confronted with the reality that there was not a lot of time to muck around.</p>
15	Private Sector Client	<p><i>Fees</i></p> <p>"The parties that are involved in contract tend to be, I guess, rely on the experts that they employ, the consultants that they employ. However the consultants have a vested interest in, just by the nature of their fees, to actually continue with contractual claims and the sort".</p>

13. AUTHOR BIOGRAPHIES

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