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**Constructing Projects in a Dynamic  
Environment:**  
**A Focus on Relational Contracting**

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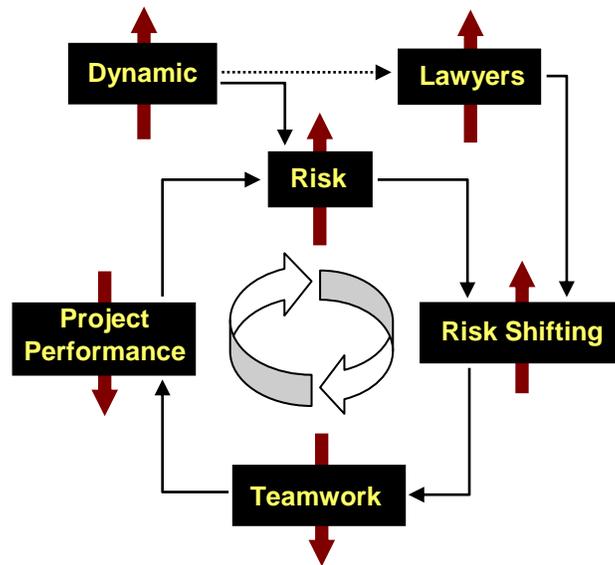
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# 1.0 Introduction

“Disputes will continue as long as people fail to trust one another.” (DART 1994)

If disputes in the construction industry will result in the absence of trust, then the following questions must be asked. What has caused this lack of trust? What can we do to build an environment where trust is commonplace? Let’s start by looking at the first question. Trying to determine the causes of declining trust is a very complicated topic that is affected by many factors. The following diagram (Figure 1) illustrates the author’s general perception of the factors that have lead to this environment.



**Figure 1.** Factors Leading to Growth in Disputes and Decrease in Trust

To begin, construction projects have continually become much more dynamic in nature over the last four decades. Often the environment in which construction projects are accomplished today involves completing complex, uncertain projects within tight budget and time constraints. Second, the industry as a whole has become much more dynamic as illustrated by its continual fragmentation (McGuinn 1989) which contributes specifically to increased complexity—more parts, more interfaces. In this dynamic environment

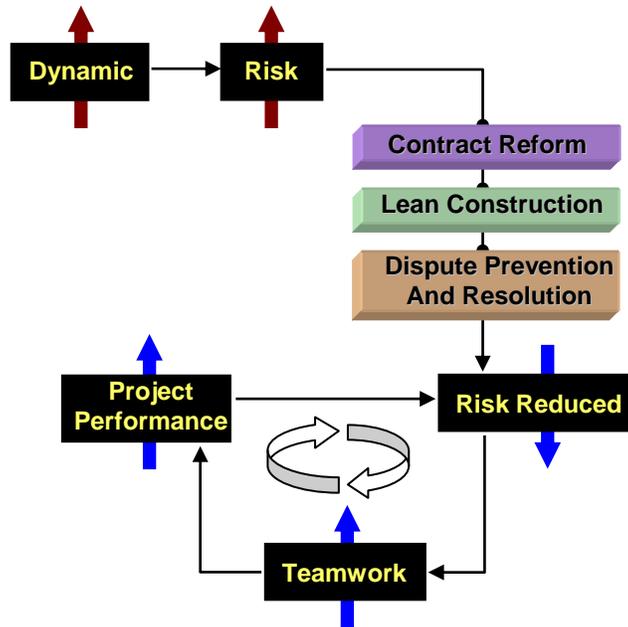
clients often attempt to reduce costs and reduce design/construction time while still demanding high quality finished products. As projects become more dynamic some industry thinkers argue that conventional project management thinking and techniques progressively fail. One of the primary reasons for that failure is said to be the neglect of work flow variability in the way projects are structured and managed (Howell 1999). Not surprisingly, this neglected work flow variability combined with the pressures imposed by clients result in the generation of increased risk for the project participants. In reaction to this increased risk, the party in position of power (client or general contractor) often proceeds to shed this risk by unfairly allocating it to parties who are not in the best position to manage it (Howe 2003).

As a byproduct of the changing nature of projects and the desire to shed risk, the need for lawyers emerged. The role of lawyers in this process is important and needs to be analyzed. Lawyers, in an attempt to fulfill their professional responsibility, draft contracts in the best interest of their clients. This is generally done by drafting contracts that shed risk and set the defense for potential future litigation. However, if the contract is created in the best interest of their client, it is probably not in the best interest of the other parties nor the project. As stated by Uff (2001), a lawyer's, "role in construction law matters should be in drafting contracts to facilitate the smooth operation of construction projects, the appropriate placing of risk, and minimizing the incidence of disputes. Unfortunately, since the earliest days of construction contracts, the contribution of lawyers has been in ensuring that the interests of their particular client are protected... The question we need to ask is whether lawyers undertaking such drafting are in the right job." What the correct role of the lawyer should be or whether lawyers should even be drafting the construction contract is an interesting question that needs further analysis, but the result of their biasness is not in doubt. By drafting imbalanced contracts, 'doing their job', lawyers imbed mistrust into relationships and, therefore, reinforce adversarial attitudes where individuals focus on protecting and maximizing their own gains. This environment obviously hinders the possibility for creating a collaborative environment where decisions are made in the best interest of the project.

Given all these factors, it is not surprising that project performance is negatively affected and that conflicts often arise between the parties involved in construction projects. More often than not, these conflicts lead to heated disputes and, ultimately, litigious claims that are not only economically detrimental to project participants, but are disastrous for building trust and maintaining critical relationships. Even worse, as project performance decreases, risk in future projects is increased due to growing mistrust. This feeds a continuous vicious cycle where parties in the position of power attempt to shed more risk, teamwork continues to decrease, and project performance steadily declines.

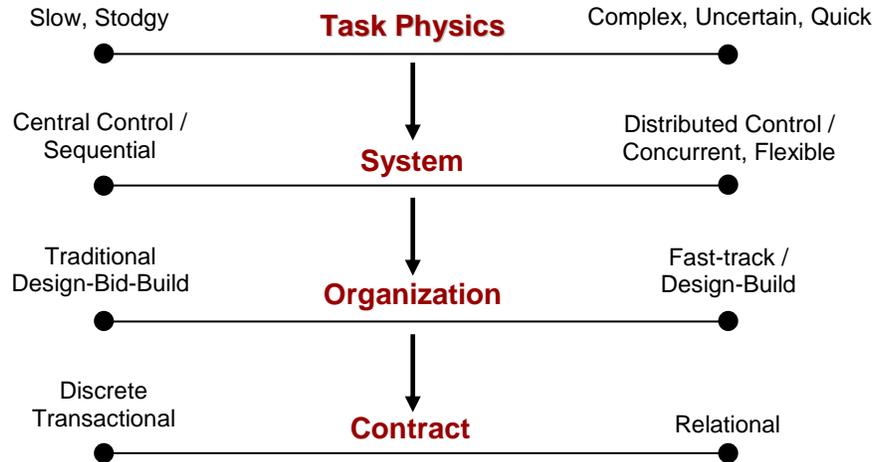
Now that the framework has been introduced for why trust has declined and disputes have increased, the question of how to improve the situation can be explored. Over the years different initiatives have been developed to try to address the aforementioned problems that have arisen due to the increased dynamic nature of projects and the increased risk that has resulted. These innovations have tended to fall within three main areas: contract reform, dispute prevention (i.e. partnering) and resolution (i.e. ADR), and more recently the philosophy of management (i.e. lean construction). The parties developing these new innovations have been searching for the “silver bullet”- the miracle cure that will produce better projects and solve this epidemic of antagonistic relations. Unfortunately, it seems that in an attempt to find this silver bullet, the groups working on the three previously mentioned areas of reform have tended to maintain divergent paths; each valiantly attempting to solve the whole problem individually. While important advances have been made in each area towards the goal of completing quality projects while mitigating costly claims, no one initiative is the ultimate answer. Creating the perfect contract or developing the best philosophy of management cannot individually solve the problems inherent in the construction industry. The “true” silver bullet involves merging the innovations from these three divergent paths into a comprehensive approach to project management that addresses the construction contract, relationship building, and the actual work. It will be through this integration of innovations in contract reform, dispute prevention and resolution, and philosophy of management that creating successful projects and building long-term relationships will become more of a reality

than the current dream. The effects of integrating these innovations into a single comprehensive approach are illustrated in Figure 2 below.



**Figure 2.** Integration of Innovations Necessary to Maximize Project Performance

It is important to note that these initiatives have developed in response to the failure of traditional mechanisms to handle the increasing dynamic nature of construction projects. Of course, not all projects are dynamic in nature and different strategies are needed to address projects that range from “slow and stodgy” to “complex, quick, and uncertain”. In all cases, therefore, it should be the physics of the task that drive the strategy for project completion. Figure 3 represents the science behind developing a strategy for completing individual projects. Note that the task physics (goals) drives system selection, organization of the team, and finally the type of contract needed. This document is concerned with addressing the growing number of projects that lie within the dynamic end of the spectrum.



**Figure 3.** Determining Project Formation and Delivery Strategy (Ballard, Howell 2003).

This paper is intended to be the first step in the overall goal of investigating how to integrate Lean Construction, an innovative management philosophy, with the other two currently divergent paths: contract reform and dispute prevention and resolution. In order to begin this journey, it is critical to understand the different initiatives that are taking place in each of these areas. The purpose of this paper is to study innovative contracts and illustrate how they have evolved to meet the demands of dynamic projects in the construction industry. Specifically, two new relational contracting developments: the NEC Engineering and Construction Contract (Great Britain) and Project Alliancing (Australia) are described and compared to today's traditional standard forms of contract.

## **2.0 Three Areas of Innovation in Project Management**

In an attempt to solve the problems of a construction industry riddled with complexity, uncertainty, mistrust and conflict, groups around the world have developed innovations that can be grouped into three general areas: contract reform, dispute prevention and resolution, and philosophy of management. While this paper focuses on innovative contract reforms, a major premise of the paper is that the ultimate solution for the problems associated with managing dynamic construction projects will not come from one individual area. Instead, it is necessary to begin integrating the innovations from each area in order to maximize the potential for completing a successful project. For instance, creating a good contract is critical and combining that with a plan to prevent and resolve disputes is a step in the right direction. However, if it is not complemented with a sound philosophy of management, that creates a reliable flow of work, then the potential for overall project success is reduced. What follows are descriptions of dispute prevention and resolution, Lean Construction (an innovative management philosophy), and contract reform (relational contracting).

### ***2.1 Dispute Prevention and Resolution***

In the last few decades the United States construction industry has become an entangled mess of adversity, disputes and costly claims. Paul Levin, a former arbitrator for the American Arbitration Association, states that, “In the last 30 years, as construction projects became larger and more complex, the volume of disputes and litigation grew substantially” (Levin 1998). Given this situation, clients, contractors, and subcontractors are beginning to understand that animosity and litigation are not effective ways to deal with construction problems. According to Rubin et al (1999), things are slowly starting to change. Rubin states that, “the 1980’s can be characterized as the era of hardball construction litigation, conducted by pitbull attorneys, and encouraged by more-than-willing clients. What followed in the early 1990’s was a quiet revolution shifting the focus to alternative dispute resolution of construction disputes.” The following are

descriptions of some of the innovative dispute prevention and resolution techniques currently used in the U.S. and global construction industries.

Probably the most well-known dispute prevention technique used in the construction industry is project-specific Partnering. With the fragmentation of the construction industry and the low-bid environment used on public and many private projects, long-term relationships are very difficult to form. Developed by the U.S. Corps of Engineers, Partnering involves creating a better relationship between the owner and contractors from the outset of the project. The ultimate desire is to take all the project participants' separate objectives and align them into one coherent team-oriented plan. Typically, the partnering process involves getting all the primary stakeholders together at a workshop or retreat at the beginning of the project. During the gathering, the participants discuss potential problem areas and develop channels for effective communication. By providing a system to get to know and understand each other, clients who use partnering hope to reduce disputes and animosity between themselves and their construction team. Often, though, the problem is that "too many people pretend to partner for the sake of political correctness and, when something goes wrong, automatically regress to their old litigious ways." (Harding 2001). Therefore, the key to partnering success is that each project participant must be committed to working in an environment of teamwork, mutual trust, and reduced conflict.

In the past, almost all disputes that could not be resolved ended up in costly, time consuming litigation. Besides the cost and time disadvantages, adversity is a likely result of pursuing litigation. Consequently, Levine (1998) believes "the key to a successful project is the successful resolution of contract disputes without resorting to litigation." Preventative techniques, like partnering, can be effective at reducing disputes, but it is impossible to completely eliminate disputes. Rubin *et al.* (1999) states that, "While claims and disputes remain inevitable, proactive dispute management can lead to quick resolution and more rewarding use of resources." Therefore, in order to more effectively deal with disputes, the following alternative dispute resolution (ADR) techniques have been developed (Hillman 2004):

- Dispute Review Boards:
  - Used to resolve disputes very quickly
  - Generally consists of three people (one chosen by the client; one chosen by the general contractor; and the third chosen by the first two members of the board)
  - Board members remain knowledgeable about the job
  - Judgments can be advisory or binding
- Mediation:
  - Requires a neutral third-party facilitator to mediate
  - Voluntary and non-binding process; all parties must agree to judgment
  - Proceedings are confidential in order to encourage the parties to speak openly about the dispute
  - Parties remain in control of the process and can craft their own terms
- Arbitration:
  - Can consist of one or more arbiters that are knowledgeable concerning the construction industry
  - Less expensive, faster, and more predictable than litigation
  - Judgments are binding and are generally not reviewed by the courts

## ***2.2 Lean Construction (Philosophy of Management)***

As explained in the previous section, tools such as Partnering have been developed in an attempt to improve relationships in a construction industry filled with mistrust. While Partnering is focused on adjusting the adversarial attitudes of the people, Lean Construction, instead, focuses on improving the reliability of the actual work being done. As explained by Greg Howell, co-founder and COO of the Lean Construction Institute, “The first goal of lean construction must be to fully understand the underlying ‘physics’ of production, the effects of dependence and variation along supply and assembly chains. These physical issues are ignored in current practice which tends to focus on teamwork, communication and commercial contracts.” Howell continues to state, “Partnering makes great sense from an activity perspective. But few realize Partnering is a solution to the

failure of central control to manage production in conditions of high uncertainty and complexity” (Howell 1999). In other words, while Partnering is effective at getting people to work together in difficult situations, it does not address the actual issues that are making the situations difficult. Lean Construction, a new project delivery system, directly addresses these issues and attempts to eliminate them.

Lean Construction is a production management-based approach to project delivery -- a new way to design and build capital facilities. Lean production management has caused a revolution in manufacturing design, supply and assembly. Applied to construction, Lean changes the way work is done throughout the delivery process. Lean Construction extends from the objectives of a lean production system - maximize value and minimize waste - to specific techniques and applies them in a new project delivery process. As a result:

- The facility and its delivery process are designed together to better reveal and support customer purposes. Positive iteration within the process is supported and negative iteration reduced.
- Work is structured throughout the process to maximize value and to reduce waste at the project delivery level.
- Efforts to manage and improve performance are aimed at improving total project performance because it is more important than reducing the cost or increasing the speed of any activity.
- "Control" is redefined from "monitoring results" to "making things happen." The performance of the planning and control systems is measured and improved.

The reliable release of work between specialists in design, supply and assembly assures value is delivered to the customer and waste is reduced. Lean Construction is particularly useful on complex, uncertain and quick projects. It challenges the belief that there must always be a trade between time, cost, and quality.

### **2.3 Contract Reform (*Relational Contracting*)**

Dynamic projects require contracts that are designed specifically to handle high amounts of complexity and uncertainty within tight budgets and schedules. As will be explained further, traditional contracts are not well suited for this purpose and, therefore, a different type of contract is needed to handle the challenges that dynamic projects impose. In response to this situation, ‘relational contracts’, such as the NEC Engineering and Construction Contract and Project Alliancing, have begun surfacing and these contracts are proving to be very successful at meeting these new demands. For this reason, the characteristics of relational contracts will be analyzed to illustrate why they are much better suited for handling dynamic projects. A thorough analysis of both the development of the theory of relational contracts, as well as a comparison to discrete contracts would require individual papers of their own. Therefore, in recognition of the depth of these topics, only specific issues related to the discussion surrounding construction contracts are addressed. For more information on the relational theory of contracts readers are referred to Campbell (2004).

In all construction projects ‘change’ is a defining characteristic and is almost inevitable. This is especially true as projects become more dynamic. The real question is whether the contracts used today to govern these dynamic projects embrace change or if they try to treat change as if it is an anomaly. Many traditional contracts do not embrace change and instead attempt to specify all possible eventualities by drafting contracts to prepare for the worst case scenario. Unfortunately, the focus of these contracts is on “the bump at the bottom of the cliff” which leads to difficulty (Cockram 2002) and not on the cooperation that is necessary to diffuse these problems before they get out of control. Campbell (2004) addresses the need to embrace change through cooperation when he writes, “Any substantial building works contract produced by any of the trade bodies, in which the precise quantification of the amount of work, time taken, and materials needed can really be revealed only in the course of actually doing the work, contains extensive price and time adjustment provisions in recognition of this. Contracts of this nature are

not efficiently governable by the classical law of contract. That law typically turns on the imposition of strict liabilities. Breach leads to the award of purportedly precisely quantified damages in compensation of certain, foreseeable losses. This remedy can not efficiently govern contracts characterized by complex (*ex ante* unspecifiable) obligations and asset specific investments. Rather, they can be governed efficiently only if the parties adopt a consciously cooperative attitude” (Campbell 2004). McInnis (2004) echoes this sentiment when he states that “The success of the contractual relationship depends less upon what has been agreed than upon how the parties will agree to handle events in the future.” This is one of the fundamental issues that separates relational contracts from traditional, more ‘discrete, transactional’, types of contracts.

Ian Macneil, one of the leading proponents of ‘the relational theory’, describes throughout his many publications, a spectrum of contracts that run from discrete, transactional contracts on one end to relational contracts on the other. McInnis (2004) describes how Macneil defines the difference between the two types of contract by stating, “Discrete contracts have certain characteristics: typically short duration, limited personal interaction, precise party measurement of easily measured objects of exchange, and minimal future cooperation. Relational contracts according to the theory would exhibit opposite characteristics.” Macneil continues to assert that by nature, contracts are cooperative, “The first thing to note about contract is the fact that it concerns social behavior... The next thing to note is that the kind of social behavior involved is cooperative social behavior, behavior characterized by a willingness and ability to work with others... contract involves people affirmatively working together” (Campbell 2004).

Because of the aforementioned characteristics of both types of contract and the following difficulties associated with designing and constructing dynamic projects, relational contracts seem to be more appropriate as a contracting mechanism than traditional contracts. First, dynamic projects that involve any combination of complexity, uncertainty, and time pressure inherently can result in multiple possible outcomes. Discrete contracts try to specify every possible contingency and assign liability in the event change occurs. The goal of trying to achieve “100% planning is never achieved in

life” (Campbell 2004). Relational contracts, on the other hand, accept change and focus on cooperation to administer change over time. Second, in the face of disputes discrete contracts rely on costly, time consuming procedures involving third parties to provide judgment, while relational contracts focus on team problem solving and self-enforcing disputes to make timely decisions. Finally, as a result of the lack of cooperation characterized in discrete contracts, parties tend to focus on local optimization, thus affecting the performance of the project overall. Relational contracts, however, are focused on teamwork and collaboration which leads to optimizing the project as a whole. Macneil addresses this critical topic when he states that in relational contracts, “there can be present a ‘sense of productive increase from the relationship which can dwarf variations in shares received by parties.’ This anticipatory, commonly held ‘sense’ of the parties may virtually obliterate any present separation as maximizers, thereby making them effectively a single maximiser” (Campbell 2004).

Now that some theoretical advantages have been described concerning the use of relational contracts as the framework for dynamic construction projects, the remainder of this paper will focus on specific examples of relational contracting innovations in use today.

## **3.0 Innovative Forms of Contract Reform**

Carefully crafting responsible construction contracts is critical for the overall success of a project, as it sets the tone for the rest of the project. It is paramount that owners understand that “the scenario for construction claims is invariably written right into the contract documents. Long before men and machines reach the jobsite, conditions for claims and disputes have often been signed by both parties” (Rubin et al. 1999). Some clients have figured this out and have begun searching for new innovative forms of contract. The following sections describe the historical basis for emergence of these innovative contracts as well as offer two examples of new relational contracts: the NEC Engineering and Construction Contract (Great Britain) and Project Alliancing (Australia). Both represent significant departures from traditional contracting and recognize the critical need for a new contract that supports the current demands of today’s construction landscape.

### ***3.1 Historical Basis of Emergence***

New innovative forms of contract, like Project Alliancing and the NEC’s Engineering and Construction Contract, have developed in response to the changing environment of the construction industry. The paragraphs that follow describe the significant changes that have taken place in constructing capital projects in the United States and all around the world. This transformation is the historical basis for the emergence of these new innovative contracts.

The “Golden Age” of the U.S. construction industry is considered by some to have been in the 1960’s (McGuinn 1989). During this time the design and construction environment was such that amiable relationships generally existed between all of the project participants. In general, construction projects and processes were not complicated. The construction players were few and developed long-term relationships. Owners accepted the fact that undertaking construction projects contained inherent risks and, therefore, accepted a certain amount of errors. Claims were not prevalent and,

amazingly, design and construction firms worked together to maximize project performance (McGuinn 1989). The focus of the construction industry was on teamwork and the overall success of the project.

What does the construction industry look like today, four decades later? Stated in one word: different. Strong relationships and trust between owners, contractors, and subcontractors has been replaced with growing distrust and conflict. It is becoming increasingly more difficult to deliver successful construction projects due to the inherent complexity of the projects and the ever-shrinking budgets and time requirements imposed by owners. In addition, the construction industry has continually fragmented into narrow specialty areas that have resulted in an ever-growing number of potential participants. This environment is difficult enough for the contractors and subcontractors, but when combined with the fact that owners now also expect perfection in the contractor's performance, it is not surprising that contract disputes and claims have become commonplace. The Dispute Avoidance and Resolution Task Force illustrated the deterioration of relationships in the construction industry when it stated that "much of the United States construction environment has been degraded from one of a positive relationship between all members of the project team to a contest consumed in fault finding, and defensiveness which results in litigation. The industry has become extremely adversarial and we are paying the price" (DART 1994).

In an ideal environment construction projects would be team endeavors where the unique skills of each member are used to maximize project performance. Unfortunately, today, parties enter most projects guarded and suspicious of each other's motives before design and construction even begins. This is due to the fact that, instead of focusing on creating a good framework for developing good relations between the parties involved, contracts are generally legal shields, written in a biased manner to try to protect the drafter. For the most part this is due to an overall lack of trust of one another. Owners often use contracts in an attempt to shed unbearable risk to contractors through the form of harsh exculpatory contract clauses. This subsequently leads to large contractors passing the same risk onto the shoulders of smaller subcontractors who are the least able to financially bear the risk.

Often owners feel that the shedding of risk to the contractor through clear documentation in the contract will reduce the number of claims. This is not correct. Not only does it not prevent disputes, it actually causes increased antagonistic relations between the owner and contractor that are clearly not in the best interest of the project (Steen 1994). Besides increased conflict, Ruben et al. states that, “harsh contracts discourage responsible bidders” as well as “attract those bidders willing to take any kind of chance, or those who expect from the outset to make up their dollars via claims” (Rubin et al. 1999). In fact, as explained at the 5<sup>th</sup> Annual meeting of the American Bar Association’s Forum on the Construction Industry, “the General Committee of the Forum on the Construction Industry has identified the use – more accurately, the abuse – of the risk allocation process as one of the principal causes of the present morass in the construction industry” (McGuinn 1989).

Another significant problem is that selection of project participants is now rarely based on qualifications, but instead on lowest tendered price. This lowest bid is seen by many owners as the best value option, but when conflicts arise resulting in costly litigious claims, the real cost of the project is much higher than the initial winning bid. The failure to understand that bid price does not equal project cost is a major cause of this overall downward spiral (Egan 1998).

Given these problems, it is evident that there is a tremendous amount of dissatisfaction concerning the performance of projects conducted using traditional contracts and contracting methodologies. The environment in which construction projects take place has been drastically changing, but for the most part the tools used to manage the projects have not. While most of the construction industry seems resigned to the fact that there’s no better answer and continues to experience the negative ramifications of traditional practice, there are progressive groups searching for better answers. These parties have begun creating new innovative relational contracts and contracting methods to address the inherent problems of traditional standard forms of contract.

### **3.2 New Engineering Contract (NEC)**

For decades, relationships in typical construction projects in the United Kingdom have been damaged by the prevalence of antagonistic attitudes instead of being developed with teamwork and trust. The UK's *Construction News* reported that "construction has become more confrontational than ever with contractors, subcontractors and developers locked in a spiral of escalating contractual disputes, some of which threaten the very existence of the protagonists involved...Not only has there been an alarming increase in their number, there has been an equally worrying escalation in their financial scale" (UK: Comment 1990). Sir Alan Cockshaw, former President of the Institution of Civil Engineers, recognized the need for change in the UK when he stated that "projects of all kinds will only be successful in the future if the relationships between the client, the designer, the contractor and the supply chain are closer than ever before... We must move further away from the adversarial approach which has increasingly beset our industry" (Cockshaw 1995). In response to this type of sentiment, a commission was formed to develop a new and innovative construction contract that would help improve project performance, build stronger relationships, and better enable construction project participants to achieve desired objectives. In 1993, this commission published the NEC Engineering and Construction Contract (ECC) that featured a contract with three main advantages over current contracts: better clarity and more flexibility while providing a stimulus to good project management. What follows is a description of the NEC ECC's development, the main characteristics of the NEC ECC, and how it differs from traditional standard forms of contract.

As previously described, the global construction industry has been undergoing significant changes over the last few decades and the United Kingdom is no exception. Amazingly, though, the tools used to govern the design and construction process have not matched this substantial shift in the construction industry. According to Dr. Martin Barnes, the lead architect of the ECC, since the 1860's, civil engineering contracts in the United Kingdom have gone through "a period of stagnation unparalleled in any other mainstream industry." In 1985, due to this sense that current contracts had become practically obsolete, Dr. Barnes was charged by the legal affairs committee of the Council of the

Institution of Civil Engineers (ICE) of Great Britain to develop “a revolutionary form of contract that promotes a project management approach to administer a contract, that can be used for every part of every construction or engineering project, and that is simple, clear, and written in ordinary language” (Thompson 2000). After eight years of development, in 1993 the team published the New Engineering Contract, which was renamed the NEC Engineering and Construction Contract in the second edition.

At about the same time as the release of the NEC ECC, another UK initiative had begun at the request of the British government. The prominent study, championed by Sir William Latham, began due to “the perception that the industry's affairs were conducted in too adversarial a fashion, to the detriment of clients, of whom the Government is probably the largest” (Cottam 1993). The purpose of the initiative was to explore the problematic nature of the construction industry, its corresponding lack of efficiency, and offer recommendations for improvement. The resulting document, *Constructing the Team*, contained radical, yet sensible recommendations that Latham argued needed to be adopted to change the construction industry’s antagonistic atmosphere. As part of the document, Latham recommended thirteen specific elements that are necessary in a successful modern contract. These thirteen principles are shown in Figure 4. Latham then advocated the use of the new NEC ECC by stating that, “The approach of the New Engineering Contract is extremely attractive... The New Engineering Contract contains virtually all of these assumptions of best practice, and others, which are set out in the core clauses, the main and secondary options” (Latham 1994).

Since its release, the ECC has proven to be extremely popular with the groups that are using the new contract. According to Dr. Barnes, “the proof of the pudding is clearly in the eating, as there has been no authenticated case of an organization trying out the NEC and not continuing to use it” (Barnes 2000). In order to understand why the NEC ECC is such an attractive contracting option, its main advantages need to be examined. The ECC is a family of documents that was developed to improve upon existing standard forms of contract in the following three ways: 1) better flexibility, 2) greater clarity and simplicity,

and 3) provides a stimulus to good project management (NEC 1995). Each of these items is now explained in further detail.

- The Most Effective Form of Contract in Modern Conditions Should Include:**
1. A specific duty for all parties to deal fairly with each other, and with their subcontractors, specialists and suppliers, in an atmosphere of mutual cooperation.
  2. Firm duties of teamwork with shared financial motivation to pursue those objectives. These should involve a general presumption to achieve "win-win" solutions to problems which may arise during the course of the project.
  3. A wholly interrelated package of documents which clearly defines the roles and duties of all involved, and which is suitable for all types of project and for any procurement route.
  4. Easily comprehensible language and with Guidance Notes attached.
  5. Separation of the roles of contract administrator, project or lead manager and adjudicator. The Project or lead Manager should be clearly defined as client's representative.
  6. A choice of allocation of risks, to be decided as appropriate to each project but then allocated to the party best able to manage, estimate and carry the risk.
  7. Taking all reasonable steps to avoid changes to pre-planned works information. But, where variations do occur, they should be priced in advance, with provision for independent adjudication if agreement cannot be reached.
  8. Express provision for assessing interim payments by methods other than monthly valuation i.e. milestones, activity schedules or payment schedules. Such arrangements must also be reflected in the related subcontract documentation. The eventual aim should be to phase out the traditional system of monthly measurement or remeasurement but meanwhile provision should still be made for it.
  9. Clearly setting out the period within which interim payments must be made to all participants in the process, failing which they will have an automatic right to compensation, involving payment of interest at a sufficiently heavy rate to deter slow payment.
  10. Providing for secure trust fund routes of payment.
  11. While taking all possible steps to avoid conflict on site, providing for speedy dispute resolution if any conflict arises, by a pre-determined impartial adjudicator / referee / expert.
  12. Providing for incentives for exceptional performance.
  13. Making provision where appropriate for advance mobilisation payments (if necessary, bonded) to contractors and subcontractors, including in respect of offsite fabrication materials provided by part of the construction team.

**Figure 4.** What a Modern Contract Should Contain (Latham, 1994)

**Better flexibility-** While conventional standard forms of contracts are designed to handle only specific types of projects, the ECC was designed for flexibility on multiple fronts, including (NEC 1995):

- Project type- contract can be applied to civil engineering, building, and mechanical and electrical projects.
- Contractor design responsibility- will work for projects where the contractor has no design, partial design, or full design responsibility.
- Different contract types- competitive bidding, target cost, cost reimbursable, and management contracts.
- Contract designed to be used in multiple countries

In fact, by 2000 the ECC had been used in up to 20 countries for a variety of project types including building projects, civil engineering projects, and mechanical and electrical projects (Barnes 2000).

**Greater clarity and simplicity-** The ECC was crafted to make the contractual language simpler to read, thereby increasing the clarity and reducing the confusion and disputes commonly caused by complicated traditional contracts. The specific ways that the ECC intends to achieve simplicity is as follows (Broome 1997 and NEC 1995):

- Using simple language that is easily translated into other languages and avoiding legal jargon.
- Traditionally long sentences and clauses are broken up into shorter sentences and subdivided into an easier to read, bulleted format.
- Clauses contain less text and are not cross-referenced.
- Ambiguous words or statements are avoided, such as ‘fair’, ‘reasonable’, and ‘opinion’ in order to reduce the subjectivity of contractual terms.
- The family of contracts includes add-on subcontracts that are developed to seamlessly interlock with the main contract between the owner and contractor. This avoids the confusion of having numerous different forms of contract between all the various project participants.

As far as clarity is concerned, the ECC is a dramatic improvement over traditional forms of contract used in the U.K. In a comparison study of the clarity of the ECC versus traditional contracts, the University of Birmingham's Jon Broome and Ross Hayes interviewed 81 ECC users (clients, contractors, and subcontractors) and found that the clarity of the ECC outperformed other contracts in the following ways (Broome 1997):

- *Clearer risk allocation*: All possible 'compensation events' (i.e. change orders) are listed very precisely and in the same place in order to clearly display the employer's and, therefore, the contractor's risks.
- *Clearer roles*: Each party's duties and responsibilities are clearly laid out to avoid any confusion.
- *Clearer procedures*: The framework of the contract is based on flow charts that map out the procedures for all the parties given all possible events. This allows for a clearer document that eliminates procedures that are illogical or open-ended. These flowcharts are included in the contract document set as an additional source to make understanding the procedures even easier.
- *Clearer payment for change*: A comprehensive Schedule of Cost Components (a list of pre-agreed upon contractor costs for resources) is used to pay contractors for compensation events that occur during the course of a project.
- *Clearer guidance*: The ECC is accompanied by critical Guidance Notes that describes the purpose of using the NEC ECC, gives definitions for key terms, and provides narrative to explain all clauses and options.

A significant result of the ECC's simplicity and clarity is reduced 'gamesmanship'. By using the ECC, the Broome's interviewees responded that that "the scope for playing (games) is reduced...if you are to play them, then you have to be much cleverer...and the rewards for playing them is less" (Broome 1997).

**Provides a stimulus to good project management-** According to the NEC ECC Guidance Notes, a stimulus to good project management "is perhaps the most important characteristic of the ECC. Every procedure has been designed so that its implementation should contribute to rather than detract from the effectiveness of management of the

work” (NEC 1995). Traditionally, contracts are adversarial in nature and used as weapons, so, therefore, most projects are successful when contracts are kept in the drawer. If the contract is used in these cases, then it tends to be part of a dispute or claim. The NEC ECC, on the other hand, is designed to be used and to promote effective project management. As opposed to traditional contracts, the ECC contract becomes a useful, productive part of the construction project that is designed to prevent and resolve disputes. One way in which the ECC provides a stimulus to good project management is through the requirement for all disputes to go through a specific adjudication procedure before moving on to a secondary form of tribunal (i.e. arbitration or litigation). This helps to solve disputes quickly and reduces costly litigation.

Some of the current problems with traditional contracts are illustrated by the *Construction News* when it states that, “In pursuit of legal exactitude, there appears to be an effort towards envisaging all possible contractual escape routes and sealing them up with even longer and more complex drafting. In contrast, the managers responsible for conducting construction projects are seeking simple, easily comprehensible statements of contractual responsibility within which they can apply their expertise to overcome problems” (UK: Editorial Comment 1991). The innovative NEC ECC addresses these concerns. Each of the advantages described above help to set the foundation for a project that is less adversarial, where project participants work together to prevent problems and, consequently, build strong relationships. In fact, Dr. Barnes reports that, “in nearly all cases, the users of the NEC report a real improvement in relationships and an improved outcome for both the client and the contractor” (Barnes 2000).

With the momentum seemingly building from Latham’s recommendations and the ECC’s growing popularity, things seem to be changing for the better in the UK construction industry. Barnes concludes that, “whether with the help of the NEC or not, it is now foreseeable that the abandonment of adversarial attitudes and practices will eventually be complete” (Barnes 2000).

### **3.3 Project Alliancing**

Developed by British Petroleum, Project Alliancing is a contracting strategy widely employed by Australia's public sector to handle high visibility, complex capital works projects. Project alliancing is a dramatic departure from traditional contracting methods in that it calls for project participants to work as an integrated team where the commercial objectives (i.e. profit) of all parties are tied to the actual outcome of the project. In this arrangement all decisions are made "best for project" and not "best for individual" since the alliance either wins or loses as a group. What follows is a description of how and why BP developed project alliancing, the main characteristics of project alliancing, and how it differs from traditional standard forms of contract.

In the early 1990's British Petroleum (BP) faced a daunting situation. Known oil reserves in the North Sea had become uneconomical to exploit due to their smaller size and competition began appearing from other attractive drilling locations around the world (Knott, 1996). It became apparent that the only way to profitably tap into these reserves was to somehow reduce the high project development costs. Not surprisingly, BP's first attempt involved the traditional approach of trying to engineer a cheaper project through the use of the latest technology. While important, this strategy provided only minimal reductions in development costs and was not the answer to the problem. BP began to realize that something more drastic needed to be done. BP decided to explore a departure from its standard business strategies, such as competitive bidding and traditional risk allocation contracts that generally resulted in mistrust and conflict. To prove that it was serious, BP chose a notoriously problematic oil reserve named Andrew field as its showcase trial project. John Martin, BP Project Manager, states, "An even more radical formula was called for, a complete departure from the usual style of oil industry contracting, one which required a step change in behavior. The adversarial relationships between oil companies, contractors and suppliers had to be confined to the history books – we believed that only by working in close alignment with our contractors could we hope to make Andrew a success. To this end, behavior was identified as the essential

partner for technology; the twin building blocks which if brought together could be capable of producing extraordinary results” (Knott, 1996).

The determination that a radical change in behavior was necessary was a critical breakthrough in BP’s search for a more effective contracting method. From this, BP realized that its new contracting strategy would need to create an environment that somehow necessitated commitment to teamwork, relationship development, and trust. In order to accomplish these lofty aspirations, BP’s project team knew that it had to figure out a way to align each project participant’s commercial interests to the actual project outcome. The traditional practice of contractors making suboptimal project decisions in order to protect their profit had to change. To accomplish this transformation for the Andrew field project, BP developed a new “painshare – gainshare” compensation program. This program involved complete open-book accounting, *sharing* all “uninsurable” risk between all project members, and setting an initial target cost generated by the whole project team. This target cost would then be compared to the final cost and the under or over-runs would be shared by all project participants. In other words, the team would win or lose financially as a group depending on the overall project performance. Another critical aspect of BP’s new contracting strategy involved team member selection. The seven main contractors that formed the alliance with BP were not selected competitively based on cost, but instead on virtue since project performance was now the undisputed main priority around which everything else centered.

The results of the Andrew field project clearly illustrate the resounding success of BP’s new relational contracting methods. Before instituting these new innovative contracting methods, but after many attempts to reengineer the project using the latest technology, estimates for the Andrew field project stood at £450 million- well above the necessary development cost to achieve profitability. To show prospective contractors BP’s sincere desire to change the way it did business, BP set an astonishing target estimate of £270 million as part of the bid documents. After contractor selection and six months of intense collaboration, the project team agreed to a target cost of £373 million; almost £80 million lower than the previous low estimate. Then, due to unprecedented dedication to

teamwork and growing trust, within 3 months after the project commenced the alliance had already revised this estimate down to £320 million and the team felt the project could be finished three months earlier than originally scheduled. Ultimately, the final cost ended up at, amazingly, just under £290 million and the project began producing oil 6 months before originally scheduled. John Martin, BP Project Manager, explained, “To achieve this degree of cost reduction and produce oil six months ahead of schedule was never in my wildest dreams at the time” (Knott, 1996).

Since the completion of the Andrews field project, many large, complex projects in Australia have been constructed using similar innovative contracting techniques. Today, the relational contract method that was born in the North Sea is called Project Alliancing. While certain elements within project alliances differ from project to project, to maximize the probability for success all project alliance projects should have the following characteristics (Ross, 2003):

- All uninsurable risk is shared between all the project participants
- Alliance participants are paid using a “3-limb, open-book compensation model” where Limb 1 fees are guaranteed and Limb 2 fees are the maximum amount that the participant can lose for target cost overruns:
  - *Limb 1*: direct project costs and project overhead
  - *Limb 2*: corporate overhead and profit
  - *Limb 3*: predetermined gainshare/painshare arrangement depending on how the final cost compares to the target out-turn cost
- Project is governed by a “Project Alliance Board (PAB)” where decisions need to be unanimous
- Project management team that handles daily issues is made up of participants from all parties; team makes decisions for the best interest of the project with no outside influence from actual employers
- All alliance disputes and conflict will be handled internally with litigation being reserved only for very rare circumstances

Project alliancing is a powerful example of relational contracting and is a dramatic departure from conventional contracting methods. A few of the main differences are highlighted as follows. Alliance members are chosen based on their credentials and ability to work in a strong collaborative project team, instead of the traditional competitive, low cost method. In an alliance, risk is shared between all the parties and not allocated to individual members. Also, the commercial interests of the alliance members are tied to the actual project outcome, which motivates alliance members to work together in order to reduce costs and maximize their potential for success. By working together decisions are made “best for project” instead of the typical “best for me” logic that runs rampant in most conventional projects. Another benefit is that the collaborative environment developed in an alliance leads to innovation as the team relies on the unique skills of the individual members to construct a high quality project for the best value. In traditional contracts, often the means and methods are prescribed to the parties that are going to do the work, which obviously stifles innovation. Finally, the antagonistic relations, conflicts, disputes, and claims normally present between parties using standard forms of contract are replaced with teamwork, trust and relationship building.

## 4.0 CONCLUSIONS

The conclusion will reflect upon the following three critical issues:

- The need for new contracts that meet the demands of today's construction climate, such as the NEC Engineering and Construction Contract & Project Alliancing
- The need for integration between three significant areas of innovation: relational contracts, dispute prevention and resolution, and lean construction
- The need for a dramatic change in behavior from the people involved in the construction industry in order to make 'change' possible

We no longer live in a world where slow, stodgy, simple projects are the norm. Most projects, today, are extremely complex with limited budgets and increasingly tight schedules. Unfortunately, the traditional standard forms of contract that were designed to handle simple, slow projects have not adapted to address these significant changes. For the most part, the solution in the past has been to leave the harsh contract 'in the drawer' and hope that it will not be needed. Partnering, improved forms of dispute resolution, and innovative management techniques have developed to try to reduce conflict, but they are only part of the solution and can not hide the inherent flaws of traditional contracts. This is due to the fact that when things do go wrong, undoubtedly the contract will not stay in the drawer and the weaknesses of the contract will be exploited by project participants to the detriment of the project and team as a whole (Mosey 2001). Simply adjusting traditional contracts is also not the answer. As Sir William Latham writes, "Endlessly refining existing conditions of contract will not solve adversarial problems. A set of basic principles is required on which modern contracts can be based" (Latham 1994). Therefore, what is needed is a substantial overhaul of current contracts or the development of new ones.

Fortunately, within the global construction industry there are groups who believe that construction contracts must begin to change. As Dr Martin Barnes states, "Civil engineering management in the next century will be dramatically different from the last,

thanks to a growing and long-overdue realization that the traditional forms of contract have had their day” (Barnes 2000). The two relational contracts presented in this paper (NEC’s Engineering and Construction Contract & Project Alliancing) are examples of innovative contracts developed by progressive organizations who understand that contracts need to adapt to meet the current and changing demands of the construction industry. Each of these contracts is a dramatic departure from traditional contracts and while the construction industry is historically slow to adapt to change, the positive empirical evidence that is growing from the use of these relational contracts will soon be impossible to ignore.

As explained in this paper, along with new relational contracts, innovations have also been occurring in dispute prevention and resolution and in the philosophy of management. Partnering and alternative dispute resolution (ADR) techniques are tools designed to prevent and resolve disputes in an effort to improve relationships and avoid costly litigation. These techniques have become very popular and have been implemented very successfully on many projects. Lean Construction, a new management philosophy, takes a different approach to solving the antagonistic nature of the construction industry. Lean Construction challenges the way projects are traditionally managed and focuses on improving the design and construction processes. Lean’s proponents argue that Partnering and ADR do not address the heart of the problem- how the actual work is done- and their development is further evidence of the fundamental flaws of traditional project management.

Each of these innovations (new contracts, dispute prevention and resolution techniques, and Lean Construction) are important steps to improving the performance of construction projects, but no single innovation is the ultimate answer. Therefore, it is critical that the progressive groups responsible for these innovations begin working together to develop solutions that integrate all of these innovative ideas into one comprehensive plan for managing construction projects. The potential to reduce animosity, build strong relationships, and ultimately improve project performance will only be maximized when this integration is completed.

While the integration of these innovations is essential, the final piece that must always be present is the commitment of the people involved in the project. While British Petroleum's achievement on Andrews Field was undoubtedly a resounding success for all project participants and a testament to the power of the new relational contracting methods, the factor that made the biggest difference was the change in behavior. As Paul Bibby, BP Project coordinator, states, "Although the economic result is satisfying, the significant change here is the teamwork. The commitment to function as a single unit started at the top and cascaded to everyone. The gainshare alone would not have achieved the same results" (Knott, 1996). In fact, none of the innovations listed above are possible without the commitment of the people involved to change their behavior. For instance, negatively amending new relational contracts, including reverting to the common practice of unfairly shedding risk, or a lack of commitment to behave differently by any member of the team, will render the new contracting models worthless for their intended purpose. Likewise, if people aren't willing to admit that there are significant problems with traditional project management methods, then promising innovations like Lean Construction will remain underutilized.

After all, as stated by W. Edwards Deming, "It is not necessary to change. Survival is not mandatory."

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