DECISION MAKING, TRANSACTIONAL COSTS AND DISPUTE RESOLUTION: IS THERE A BETTER WAY?

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Abstract

The extent to which disputes affect the construction industry has been well documented. There are a plethora of anecdotal stories, and even some data that explain how unresolved conflict can impact project cost, schedule, and quality. In response, many systems and procedures have been developed to address disputes and their resolution within the construction industry. However, no data exist that quantitatively compare these various alternatives and the real costs of resolving a dispute using methods other than litigation. Is there a better way to handle disputes and what are the implications of transaction costs in the decision-making process? Research at the Center for Construction Industry Studies (CCIS) has focused on these questions.

This paper introduces a framework for improving project decision making through dispute identification, assessment, and control. Focusing on an area of limited previous research, this paper develops a methodology for assessing dispute impacts through their frequency and severity. First, an evaluation of dispute root causes from almost 2000 litigated public sector construction cases is presented. Findings from these data indicate a reduction in litigation as a result of some innovative dispute resolution and contracting approaches. Second, an approach for identifying and capturing the transactional costs incurred to resolve disputes throughout the full spectrum of resolution techniques is expounded. Transactional cost data from both owner and contractor organizations, including direct, indirect, and hidden costs of resolution, confirm that these sums can account for a large portion of the settlement/award amount, the original claim amount, and even the total contract value when using some dispute resolution methods.

Using these trend and cost data, the overriding objective of promoting dispute avoidance/resolution in the most cost-efficient manner possible will be argued. Finally, the question "is there a better way?" will be answered.

Introduction

The construction industry has been a paradoxical leader in both dispute occurrences and dispute resolution systems for many years (Groton 2005; Keil 1999; Michel 1998). While this may or may not be an enviable position, the industry has managed to develop and adopt many unique ways to address the potential risks of disputes (Harmon 2003; Mix 1997; Peña-Mora et al. 2003; Rubin et al. 1999; Zack 1997). Additionally, many of these concepts and systems, including

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partnering, realistic risk allocation, dispute review boards, and stepped negotiations, have been successfully applied in other industries (Stipanowich 1995; Treacy 1995). However, the justification for implementing these procedures has been based primarily upon contractual requirements, governmental regulation, court order, limited previous experience, or basic reactionary instinct and not on measured cost savings.

Despite being an industry keenly focused on quantitative results, parties involved in the purchase or construction of capital projects frequently fail to analyze the actual costs associated with dispute occurrences (Adrian 1988; Diekmann and Nelson 1985). While, many industry publications and experts have deplored the trend towards increased litigation in the industry (Editorials 1994; Editorials 1997; Editorials 1999; Mays 2003; Michel 1998), little quantitative data have been collected and analyzed to prove such notions. In addition, the severity of the effects of dispute occurrences on projects has only been addressed by anecdotal stories and limited case studies. This paper attempts to address this missing information and integrate it into a larger scheme of conflict risk management.

The first section of this paper introduces the proposed framework for conflict risk management. The system, based upon concepts developed within the field of risk management, focuses on conflict identification, assessment, and control. Existing research and literature will form the basis for both the conflict identification and the conflict control components. Particular attention is given to frequent causes of disputes/claims and the typical progression of conflict resolution procedures. The other component, conflict assessment, is characterized through several recent CCIS studies examining the frequency and severity of dispute occurrences.

Dispute frequency within two public entities – the U.S. Naval Facilities Engineering Command (NAVFAC) and the U.S. Army Corps of Engineers (USACE) is presented in the second section of this paper. NAVFAC case histories were assembled from the Armed Services Board of Contract Appeals (ASBCA) case log from 1982 through 2002 (2003). USACE case histories were gathered from Engineer Board of Contract Appeals (ENGBCA), the Armed Services Board of Contract Appeals (ASBCA), and the U.S. Court of Federal Claims (USCOFC) case logs from 1980 through 2004 (Kurgan 2005). The resulting total case examination includes 666 cases from NAVFAC construction contracts and 1211 cases from USACE construction contracts. Analysis of these data focus on the frequency of dispute occurrences and how implementing certain innovative dispute resolution and contracting approaches may impact this rate.

The third section of this paper addresses the severity of dispute occurrences by quantifying the costs associated with their resolution throughout the spectrum of resolution options. In collaboration with the American Arbitration Association's National Construction Dispute Resolution Committee (AAA-NCDRC), the American College of Construction Lawyers (ACCL), the International Institute for Conflict Prevention and Resolution (CPR), and the National Academy of Construction (NAC), CCIS researchers collected data from 62 recently completed construction projects. These projects account for over $2 billion USD of total installed costs between 1996 and 2004. The data highlight the scope of the hard dollar cost impact of disputes occurrences while follow-up case study analyses reveal other non-quantifiable aspects of dispute resolution decision making.

Recommendations are given to practitioners who are responsible for managing the capital facility process at several levels, including procurement, project management, legal/contractual, and others. As the findings of this research point to the fact that resolving disputes once they occur is only half the solution, it is hoped that providing quantitative results on successful means of dispute prevention and minimization may be one method to increase the adoption of preventative and alternative dispute resolution procedures in the future. As one legal expert stated, "A particular concern [of managers who make decisions about implementing dispute resolution] is the relative costs of pursuing various alternatives. Though maddeningly elusive, such numbers may represent the essential lubricant for change in a bureaucracy demanding empirical justification for decision making (Stipanowich and O'Neal 1995, p. 7)."

Conflict Decision Making – Finding A Better Way

Construction conflict is plagued with uncertainties including unknown outcomes, unidentified monetary and resource requirements, and unspecified impacts to future business operations to name a few. Fortunately, many other areas of construction project management have already adopted risk management practices to address uncertainties which may be beneficial in conflict decision making. The Construction Industry Institute (CII) has defined traditional risk management as a process containing three steps – risk identification, risk assessment, and risk management/control (CII 1989). These same three steps can be applied to conflict resolution decision making in order to develop a system for managing project disputes. Figure 1 illustrates the merging of risk management theory with conflict resolution concepts.

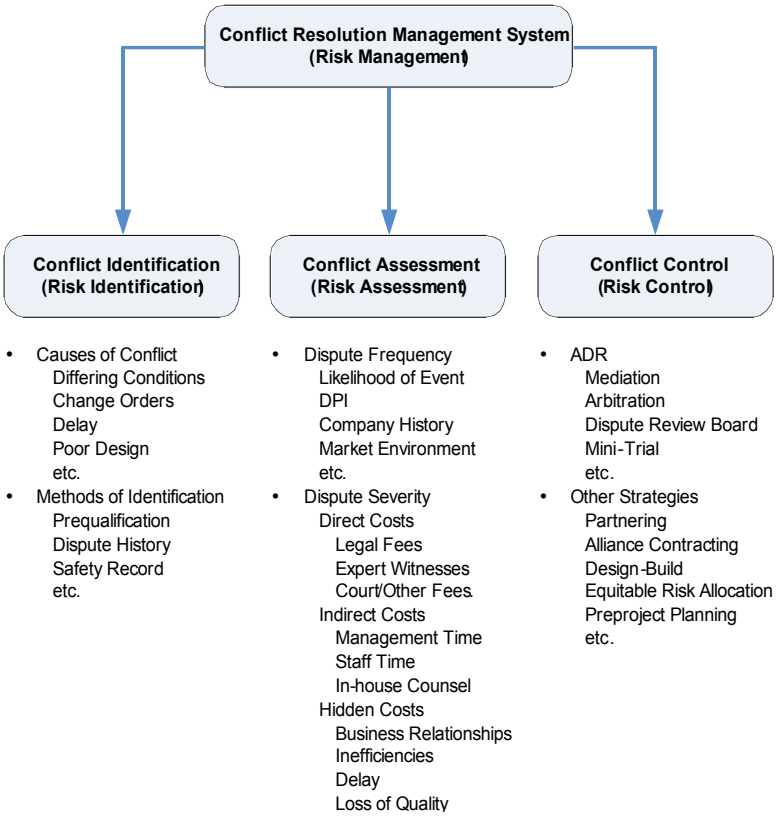

Figure 1: Application of Risk Management Theory to Conflict Resolution Management

Currently, two of the three areas of risk management steps have been well researched, documented, and to some extent executed within the construction industry disputes. The first, conflict identification, has produced countless lists and guides to the causes of disputes. These include differing site conditions, change orders, delay, and a host of other causes. In addition, other business parameters have been implemented to identify areas of potential project conflict including company history, bonding requirements, safety log, and other specific requirements usually developed in prequalification.

The second, conflict control, has also been widely explored although there is not ubiquitous use throughout the industry. Conflict control can include ADR processes like mediation, arbitration, and the like. However, it also comprises other strategies such as partnering, design-build contracting, equitable risk allocation, and others. The following two sections will explore both conflict identification and conflict control within the realm of existing research and literature.

Conflict Identification

The construction industry has traditionally been mired in adversarial relationships between owners and contractors (Fenn et al. 1997). The priorities of one party are often relegated to second, third, or even lower-level priorities for the other side, if at all. "The owner usually wishes to obtain maximum quality, functionality, and capacity at minimum cost. The contractor, while hoping to develop a satisfied client, must in the long run achieve financial goals that are advanced by expending the minimum resources required to meet a minimum scope of work (Howard et al. 1997, p. 84-85)." These priorities are unsurprisingly at conflict with one another and set the framework for a repetitive cycle of hostilities. Add in unexpected or changed conditions, additional contracting parties (i.e., designers, subcontractors, vendors/material suppliers, etc.), one-time projects, and other variables, there is little doubt to why conflict during the construction process is so prevalent.

Identifying potential conflict items at the onset of a project provides not only a basis for monitoring challenging areas during a project but also an opportunity for preventing these issues from ever becoming the basis for a claim. Many researchers have examined the causes of construction conflict and have identified numerous reasons including: differing site conditions, unrealistic expectations, change of scope, delay, workmanship/quality, weather, and many others (Adrian 1988; Fenn et al. 1997; Peña-Mora et al. 2003; Semple et al. 1994). One of the most straightforward categorizations of conflict causes in the construction industry was developed by the CII which identified three logical causal categories – people, process and project (CII 1995). In its analysis, CII found that the people factors played the biggest role in project dispute potential, while the process and project attributes played important but less influential roles respectively (Diekmann and Girard 1995).

While there seems to be little analytical literature focusing on the softer side of construction conflict (people related factors), it is no doubt that people factors have a ripple effect on both field operations and project success. The importance of field personnel resolving conflicts at the lowest possible level must not be underestimated as early resolution allows project operations to continue with minimal distractions and keeps cost and schedule impacts low. As Vorster (1993, p. 73) states, "There is a 'continental divide of dispute resolution.' Disputes resolved prior to this line remain at the job site, and settlement is under the control of those directly involved.

Beyond this [point], quantification and entitlement are argued by lawyers or consultants on an issue-by-issue basis. Resolution is neither timely nor cheap and is seldom satisfactory."

Despite the importance of the people related issues, the process related factors appear much more frequently in the literature. In fact, much attention has been given to construction contracts as both a cause and a possible solution for avoiding construction disputes. Construction contracts have been the major focus of academic journals (Jergeas and Hartman 1994; Semple *et al.* 1994), practitioner journals (Frano 1996), textbooks (Adrian 1988; Rubin *et al.* 1999), and even foreign government initiatives to decrease the amount of disputes, claims, and litigation on projects (Office of Government Commerce 2002). In addition, the role risk plays in the construction industry, as determined in construction contracts, has become an area where purchasers of capital facility construction are beginning to address many causes of conflict. Blumenfeld (2005) identifies several different project attributes which can be used to help construction parties incorporate both active and passive risk allocation strategies into their contract. This risk assessment and allocation allows all parties to know and calculate their potential exposure into their planning and budgets (Groton 2005; Pappas 2004).

The only area where literature on conflict sources is more prevalent than in the process related factors area is that in which the focus is on project specific features. While these were found to be the least influential on construction disputes in the CII research, their causes are detailed in the literature most frequently. Of particular note are the factors of design complexity, construction complexity and site limitations. In research by both Diekmann and Nelson (1985) and Semple et al. (1994), the major source of construction conflict, and hence claims, was a combination of design errors and scope increases, all of which were outside the control of the contractor. While there is some evidence the amount of conflict on construction projects can be reduced (Groton 1997; Mitropoulos and Howell 2001), there are many who believe that conflict in this industry is inevitable (Cheung and Suen 2002; Stipanowich 1996). As a result, it is necessary to encourage, develop, and utilize various methods of resolving conflict when it does occur.

Conflict Control

Information about the entire realm of construction conflict resolution options is beyond the scope of this paper; however, there are many articles (Groton 1997; Harmon 2003; Vorster 1993; Zack 1997) and textbooks (Adrian 1988; Matyas et al. 1996; Peña-Mora et al. 2003) that address these options. Instead, a brief discussion of alternative dispute resolution (ADR) options commonly utilized in the construction industry will be presented from the perspective of finding a better way to resolve inevitable conflict.

ADR is broadly defined as any method by which conflicts and disputes are resolved privately and other than through litigation in the public courts (Kovach 2004). ADR techniques can include both binding and non-binding procedures. The development of a virtual sliding scale of ADR techniques has evolved over the years including a progression from self-deterministic to third party imposed methods, including negotiation, mediation, conciliation, neutral evaluation, expert determination, adjudication, arbitration, and others (e.g., Kellogg 1999; Office of Government Commerce 2002). Figure 2 illustrates a continuum of dispute resolution procedures with control of the outcome compared to both the escalating dispute costs and hostilities.

Anecdotally, dispute resolution techniques that keep control of the dispute in the hands of the parties in disagreement incur fewer costs during the resolution process and keep hostilities to a minimum. While disputes that rely entirely on the determination of a third party (i.e., litigation and binding arbitration) have both higher costs and increased hostilities among parties.

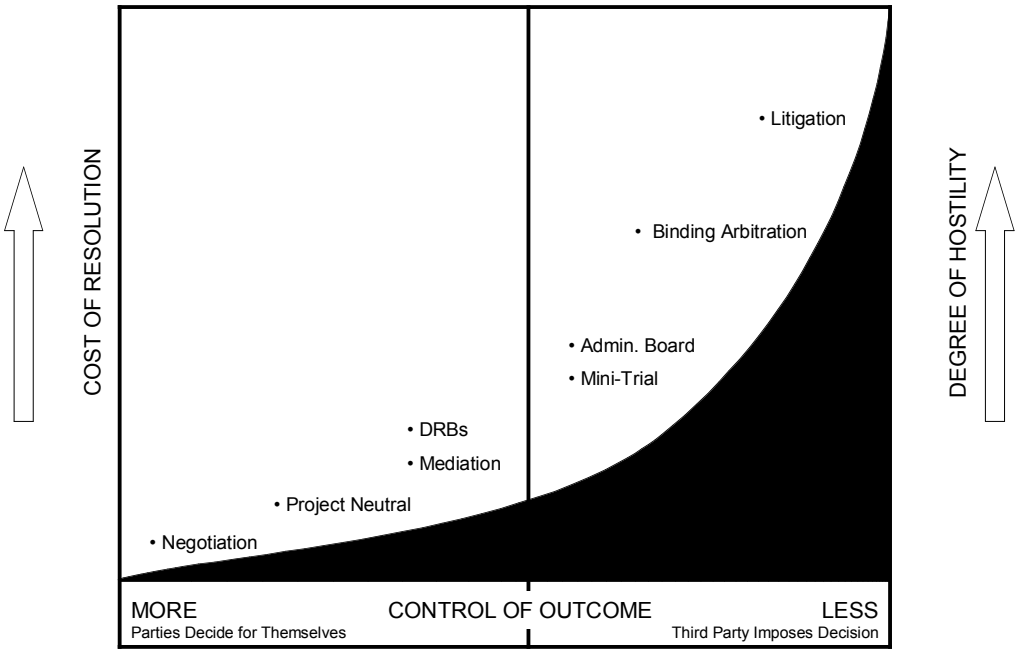

Figure 2: Dispute Resolution Continuum (Richter 2000)

The dispute resolution continuum has been adopted by many practitioners as evidenced by the multitude of contracts that spell out negotiation, mediation, and other non-binding methodologies before pursuing arbitration or litigation in what is believed to be an effort both to limit potential cost escalation and to preclude injured business relationships. Many of the construction industry standard contracts (AIA, AGC, EJCDC and CMAA) still include arbitration as an ADR option; however there is a growing movement to utilize what is perceived as less combative systems that are believed to resolve disputes quicker and more economically (Stipanowich 1996). However, little quantitative data exists to help industry practitioners make decisions about how to correctly design and implement cost effective conflict management systems at the onset of the project.

Some authors have encouraged on-site resolution of conflict including the use of stepped-negotiations, dispute review boards (DRB), and other ADR options that do not rely upon third party binding decisions as one way to reduce the overall costs and acrimony of conflict resolution (Mix 1997; Vorster 1993). Others have praised the adoption of partnering and the design–build delivery method as other ways to reduce the amount of conflict that could potentially turn into a claim and/or dispute (Fisher 2004; Grajek et al. 2000; Lazar 2000; Pinnell 1999; Schriener 1996; Voyton and Siddiqi 2004). Nevertheless, a complete conflict management system must also address conflict assessment through both the frequency and the severity of disputes occurrences.

Conflict Assessment

The only area where conflict management systems have fallen short is in the area of conflict assessment. Certainly, some companies perform conflict assessments; however, rarely is the average project assessed for dispute potential. While CII developed the Dispute Potential Index (DPI) to help project participants assess the likelihood of dispute occurrences (Diekmann and Abdul-Hadi 1994), the use of the DPI other CII dispute resolution best practices are not common (Kim 2002). Performing conflict assessment is critical to both control and identification of conflict. In addition, conflict assessment helps set the benchmark from which practitioners can measure their performance. The key to an apposite conflict assessment is the inclusion of both dispute frequency and dispute severity evaluations. The next two sections will examine both of these elements.

Dispute Frequency

It has been perceived that there has been a rise in overall industry litigiousness within the last few years (Fisher 2004; Mays 2003); however, these perceptions have been based upon the personal beliefs of a small cross-section of industry professionals. A pair of recent CCIS sponsored studies examined almost 2,000 public-sector construction litigation cases over the last 25 years to see what trends could be found. The first study examined the U.S. Naval Facilities Engineering Command (NAVFAC) (Kilian 2003), while the second looked at the U.S. Army Corps of Engineers (USACE) (Kurgan 2005).

NAVFAC Study

Reviewing NAVFAC's ASBCA case history from 1982 through 2002, 666 "first time litigated" cases were collected and analyzed to perform a review, trend analysis, and classification of construction contract litigation (Kilian 2003). As part of the trend analysis on the data extracted from the total population, the overall period of study (1982–2002) was subdivided into two smaller periods (1982–1992 and 1993–2002) to differentiate where the emergence of design–build and partnering practices in NAVFAC construction contracts occurred. These data are represented in a year-by-year frequency chart as given in Figure 3, showing frequency of decisions rendered on an annual basis by the ASBCA from 1982 to 2002.

A statistical verification of means was performed in order to determine whether or not there was a downward or upward trend associated with a given variable by utilizing an analysis of variance (ANOVA) with a level of significance of 0.05 for all testing. The mean number of cases for the period covering 1982 – 2002 was 31.7/annum. The mean number of cases for the period covering 1982 – 1992 was 37.9/annum, and the mean number of cases for the period covering 1993 – 2002 was 24.9/annum. An ANOVA yielded a p-value equal to 0.050, indicating that the null hypothesis of the two time periods having equal means was false. Or in other words, the results indicated that there was a significant difference between the two means and that there has been a reduction in the frequency of litigation for the two periods in question. It should be noted that the volume of construction in dollars has remained fairly consistent, controlling for inflation, during the study period.

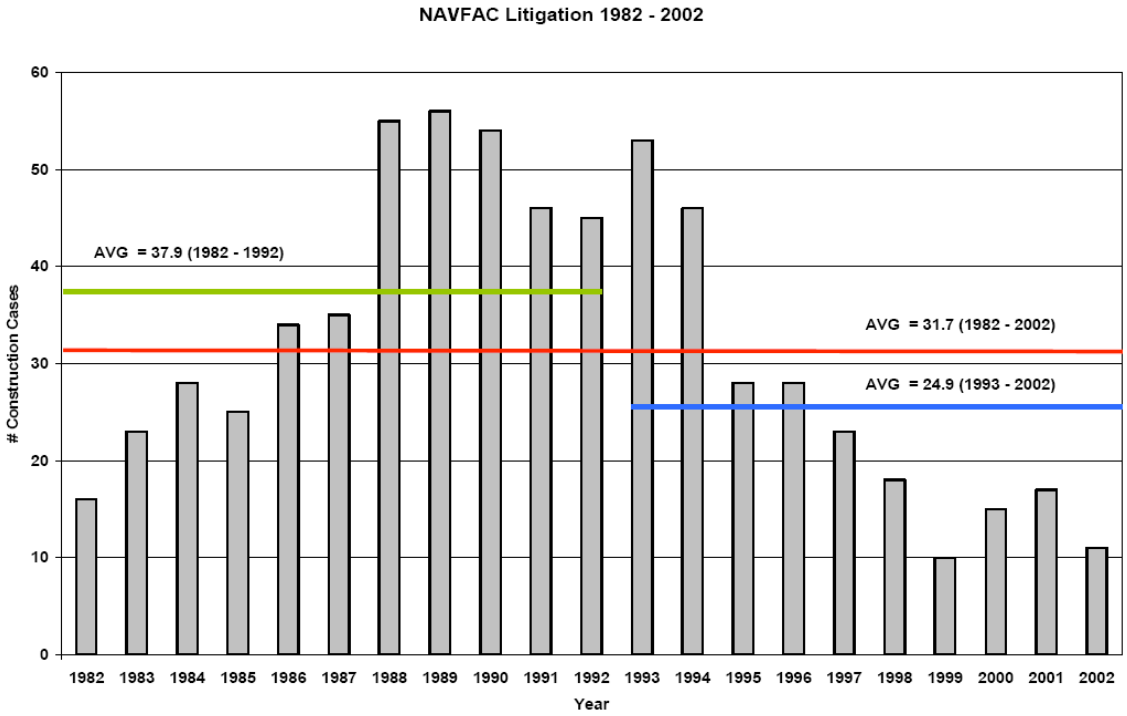

Figure 3: NAVFAC Total Litigation 1982-2002 (Kilian 2003)

On the surface it appears that there may be a relationship, beginning in 1993, between the implementation of NAVFAC's partnering program and design–build contracts and the declining number of cases. Both of these initiatives were implemented in 1991 and 1992, respectively. However, it should be noted that the numbers of cases are recorded by decision not award date. There is an average lag associated with each of the years reported. For these reasons, it may not be accurate to assume that the partnering and design–build initiatives match directly with the numbers reported in Figure 3.

The out-year numbers (1993–2002) and the overall downward trend may be due to a number of factors including the successful implementation of partnering, the more frequent awarding of design–build and cost plus contracts, best value selection, and a possible paradigm shift in internal policy on the part of NAVFAC towards its claim settlement process. In the course of this research, the researchers found nothing to contradict these possibilities. However, no specific causal link between the trend and the above cited practices was made. It stands to reason that the use of partnering and design–build would lower the instances of litigation as they both provide an opportunity for improved communication and problem solving based upon intuitive reasoning.

USACE Study

A similar analysis was performed for the USACE (Kurgan 2005). Case decisions from the Engineer Board of Contract Appeals (ENGBCA), the Armed Services Board of Contract Appeals (ASBCA), and the U.S. Court of Federal Claims (USCOFC) were collected. The number of USACE construction cases litigated to a decision between 1980 and 2004 totaled 1211 from these three venues. The breakdown for the 1211 cases includes 309 ENGBCA decisions, 770 ASBCA decisions, and 132 USCOFC decisions. The case decisions are depicted

in a year by year frequency chart shown in Figure 4. The chart depicts the total number of decisions rendered per year from 1980 to 2004. The mean number of cases decided annually between 1980 and 2004 was 48.4/annum. The mean number of cases decided between 1980 and 1992 was 67.3/annum, and the mean number of cases decided between 1993 and 2004 was 28.0/annum.

An analysis of variances (ANOVA) was conducted to determine if there was a statistically significant difference between the means of the cases from 1980 to 1992 and 1993 to 2004. Again, the level of significance was set at 0.05 and the null hypothesis as the means of the two time periods being equal. The ANOVA for the total number of USACE cases litigated yielded a p-value less than 0.001; showing that the difference between the mean of cases from 1980 to 1992 and 1993 to 2004 was statistically significant. As in the NAVFAC study, the USACE study reveals a marked decrease in the number of construction claims litigated after 1993. Again, construction budgets during this time frame remained fairly constant.

There may be any number of reasons for the decrease in claims litigation against USACE. USACE began its partnering program in 1988 and design-build procurement in 1992 and it appears that both initiatives may have had a significant impact on the number of litigations against USACE. The increased use of partnering and design-build delivery methods is a strong candidate for the reason behind the decline. However, other factors such as increased use of Alternative Dispute Resolution (ADR) and USACE internal claims settlement policies can also affect the rate of litigation. Again, the practices of partnering or design-build delivery cannot be directly linked to the decline of litigation, but intuitive reasoning leads to the conclusion that partnering and design-build delivery have had a significant impact on the decline of litigation.

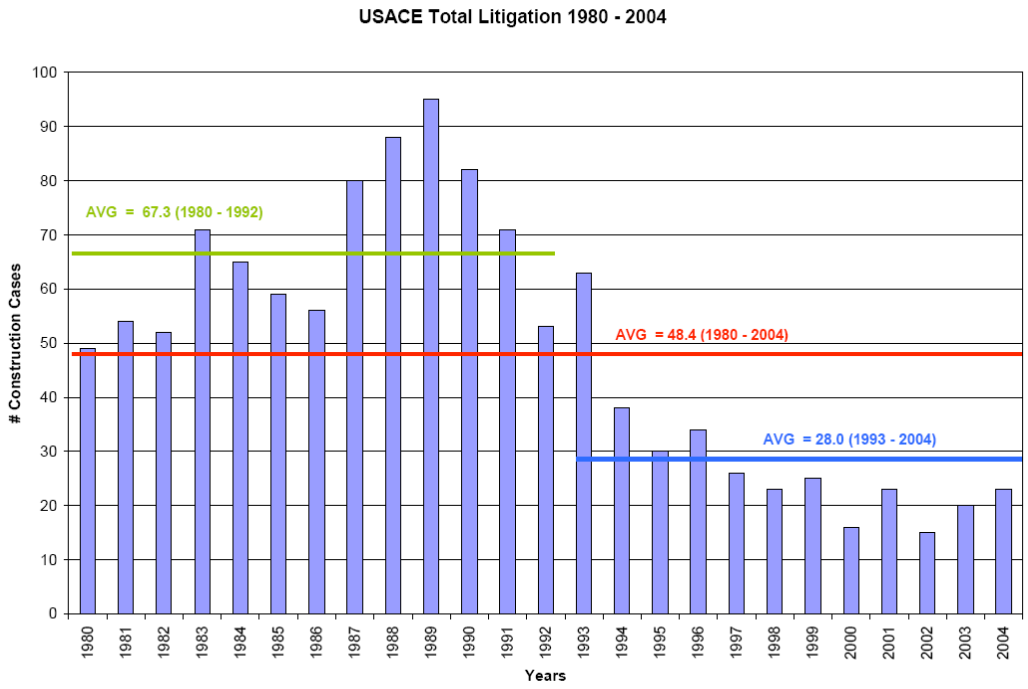

Figure 4: USACE Total Litigation 1980 – 2004 (Kurgan 2005)

Both the NAVFAC and the USACE studies reveal a reduction in the amount of construction related litigation. While these two public entities have implemented many systems that could explain these reductions, there is also some cross-disciplinary corroboration that supports this reduction trend as well. The adoption of the 1990 Civil Justice Reform Act and the 1998 Alternative Dispute Resolution Act opened the door for a wider variety of dispute resolution options for all parties involved in federal litigation. Recent estimates of the percentage of cases which actually make it to trial range between 2% and 5% (Harmon 2003; Stipanowich 2004). However, this still leave anywhere from 20 to 50 times that amount of conflict which must still be resolved outside the courthouse. How can one assess the severity of these non-traditional resolution methods? Transactional costs may prove to be an answer.

Dispute Severity – Transactional Resolution Cost

Given the movement away from litigation and towards less combative ADR techniques, it is necessary to develop a system to analyze both the quantitative and qualitative impacts of varying dispute resolution selections. While there is a significant amount of literature on qualitative reasons for selecting ADR tools (Cheung and Suen 2002; Evans 1993; Goldberg et al. 1999), there is little information about the quantitative reasons for selecting one method over another. The study described in this section examines the transactional costs incurred while resolving a dispute regardless of the method of resolution employed.

Transactional costs, in this paper, are defined as the costs that are incurred because of the presence of a dispute including direct costs (such as fees and expenses paid to lawyers, paralegals, accountants, claims consultants, and other experts), indirect costs (such as salaries and associated overhead of in-house lawyers, company managers, and other employees who have to assemble the facts, serve as witnesses and otherwise process the dispute), and (to the extent they can be measured) hidden costs (such as the inefficiencies, delays, loss of quality that disputes cause to the construction process itself, and the costs of strained business relations between the contracting parties).

Transactional costs do not include monies paid out in "settlement" of a dispute because these are, in general, amounts that have been recognized as being owed. Currently, transactional costs play an important role in a party's decision to accept/reject a settlement offer because of the additional expenditures to pursue the dispute further. Transactional costs are also a proposed method by which practitioners can evaluate which ADR techniques truly save money and time. The term transactional costs, although related, are not to be confused with the term Transactional Cost Economics (TCE) detailed by O. E. Williamson (1979).

While many companies take proactive steps to document the occurrence of events that may eventually lead to a dispute, the line between when this practice stops being a project management practice and starts becoming a transactional resolution cost is fuzzy at best. Perhaps this is why no literature exists which attempts to quantify these costs. While sophisticated contractors and owners may create accounting codes at the beginning of a project to account for management and staff time spent managing potential disputes, the majority of companies do not document the additional time and money spent on resolving a dispute until lawyers become involved and litigation or arbitration is foreseeable. The following study is an exploratory attempt to quantify the costs associated with resolving a dispute once resolution

responsibility has left the project team (e.g., upper management and/or legal counsel become involved in resolving the dispute).

Data Collection

In collaboration with the American Arbitration Association's National Construction Dispute Resolution Committee (AAA-NCDRC), the American College of Construction Lawyers (ACCL), the International Institute for Conflict Prevention and Resolution (CPR), and the National Academy of Construction (NAC), this CCIS research study collected data from 62 projects from 57 companies through electronically mailed surveys, personal interviews, and web-based questionnaires. This is a convenience sample, not randomly selected. From that data set, 16 projects were removed because of missing, invalid, or unusable data. From the 46 usable records, Table 1 shows a listing of the basic summary measures for the data set. An important condition of the below data is that the transactional costs listed are only those collected in "hard dollar" figures. Monetary estimates of injured business relationships, tarnished reputations, and other more difficult or qualitative issues are not included. These items are addressed in separate case study analyses.

Table 1: Descriptive Statistics of Transactional Cost Study Project Data

n=46	Total	Mean	Median	Standard Deviation (_)
Contract Value	$ 2,079,350,072	$ 45,203,262	$ 7,750,000	$ 81,771,464
Claims and Counter Claims	$ 605,999,426	$ 13,173,901	$ 1,050,000	$ 35,235,842
Transactional Costs	$ 35,070,399	$ 762,400	$ 95,500	$ 1,343,409
Settlements/Awards	$ 227,581,416	$ 4,947,422	$ 287,500	$ 13,550,094

From this data set, over $35 million USD were observed in transactional costs to resolve disputes once they left the project team. Looking at the aggregate data (the sum total of all the costs), that equates to 15% of the settlements/award amounts, 6% of the original claims, and almost 2% of the entire contract amount expended on transactional costs. Table 2 show a more detailed analysis of these figures by looking at the mean, median, and range numbers for these same measurements.

Table 2: Transactional Costs as a Percent of Contract Amount, Original Claim, and Settlement/Award

	Mean	Median	Range Minimum	Range Maximum	Aggregate
Transactional Cost / Contract Amount (n=46)	15%	2%	< 0.1%	429%	2%
Transactional Cost / Original Claim (n=46)	29%	12%	1%	197%	6%
Transactional Cost / Settlement Amount (n=41)	78%	22%	1%	1140%	15%

While the sheer volume of transactional costs is staggering, it is important to note that this data set only consists of projects where disputes occurred. While the estimate of how frequently disputes (claims that rise beyond the project team level) occur has never been widely studied, the authors estimate that this range of 10% to 30% of all construction projects based upon experience and anecdotal information. Thus when considering the construction industry

accounts for almost $1.1 trillion USD of the U.S. economy each year (U. S. Census Bureau 2005), the money spent on transactional costs for dispute resolution may total $1 to $6 billion USD or more each year.

Understanding the scope of the effects of transactional costs on the entire industry is just one level of assessing the data. Understanding how the relationship between the final method of resolution, the disputing party, and the perceived dispute complexity interacts with transactional costs, may help industry practitioners (especially those responsible for contract drafting and/or dispute resolution) make better decisions about preventing and resolving conflict.

Effects of ADR Method Selection

One of the main goals of studying the transactional costs of dispute resolution is to see if selecting different dispute resolution methods has a significant impact on the costs of resolution. Referring back to the conflict resolution continuum (Figure 2), the related costs and hostilities of dispute resolution efforts are shown to escalate from negotiation to mediation, and up through 3rd party imposed methods (i.e., arbitration and mediation). However, there is a lack of quantitative data that gives some estimate as what these costs may total.

Using an analysis of variance test (ANOVA) to test for difference in means, the significance level was chosen to be 0.10 because of the exploratory nature of the research. Additionally, two cases (one resolved through a dispute review board and one through litigation) were removed from the database, and the remaining 44 projects with final methods of dispute resolution being negotiation, mediation, or arbitration were analyzed. Table 3 shows the ANOVA results for this statistical analysis with the null hypothesis being the means were equal. While the results were not found to be significant at the 10% alpha level (p-value = 0.1571), there are several findings of interest.

Table 3: ANOVA Summary for Final Settlement Method vs. Total Transactional Costs

Groups	*Count*	*Average*	*Variance*
Arbitration	11	$ 1,167,182	3.2325E+12
Mediation	15	$ 1,212,433	3.1418E+12
Negotiation	18	$ 330,199	4.5114E+11

P-value
0.1571

First, the mean amount spent on mediation is almost identical to that spent on arbitration for this sample. The authors, based upon follow-up interviews and further examination of the data, believe that this is due in large part to the situation in which many of the disputes were settled in mediation. Some were part of court-ordered mediation while others had gone through a prolonged document discovery and deposition phase before resolving their dispute in mediation. Second, the differential between what mean transactional costs were expended through negotiation compared with those spent through mediation and arbitration were quite large. While one would expect this amount to be less, an analysis of the size of disputes resolved through these methods may be beneficial. Figure 5 shows a box plot of the dispute amount and the final method of resolution chosen for the same 44 projects analyzed above.

Figure 5: Median Claim Amount by Final Resolution Method

The median claim sizes were $1.8 million USD, $1.05 million USD, and $250,000 USD for arbitration, mediation, and negotiation respectively. As one might expect, larger claims were settled by arbitration while smaller claims were settled through negotiation. However, it is interesting to note the wide range of dispute amounts resolved through mediation. Additionally, the median transactional costs for arbitration, mediation, and negotiation were $271,000 USD, $106,000 USD, and $51,000 USD respectively.

Effects of Disputing Party

When negotiating the resolution of a dispute, one of the factors that sometimes plays into a parties' equation when deciding whether to continue forward with increasing hostilities or deciding to settle is what will it cost to pursue the dispute further. In other words, will prolonging the dispute yield a better result than resolving the matter through the current settlement offer? While the answer to the question is sometimes irrelevant (e.g., when settling matters of law and not fact), most parties to a dispute will determine some sort of cost to benefit ratio. However, one thing that is rarely added into this calculation is the effect of what side of the dispute the party is on.

Utilizing 34 of the collected survey responses (those responses from owners and contractors), an ANOVA test was performed with a 0.10 level of significance. The null hypothesis was established as the mean of the two parties' transactional costs divided by the original claim amount was equal. Table 4 shows the ANOVA tabulation for this statistical analysis.

Table 4: ANOVA Summary for Owner vs. Contractor Transactional Costs as a Percentage of Original Claim Value

Groups	*Count*	*Average*	*Variance*
Owner	14	16%	0.0457
Contractor	20	39%	0.2192

P-value
0.0999

The difference between the means for the owner and contractor transactional costs divided by the original claim value was found to be statistically significant for α equal to 10%. The mean value

for the owner group was 16% while the contractor group was 39%. This is a difference of almost 2.5 times. That means for every dollar in dispute a contractor will spend 2-1/2 times more money to resolve the dispute than the owner will for this sample. To many practitioners this may not be a surprise; as contractors, frequently the claim initiators, have the burden of proof. It is the contractor who must perform large amounts of legwork and extra "legal" actions to prove they are owed compensation while owner organizations can wait to take action until the contractor has prepared adequate backup for the claim. Additionally, it is the owner, especially public entities, who generally wield the "power of the purse string" and have the financial resources to stall dispute resolution efforts until it is in their advantage.

Effects of Perceived Dispute Complexity

The last analysis presented within this paper examines how a dispute's perceived complexity affects the amount of money expended on transactional costs of resolution. One would think that the more complex a dispute is perceived to be, the more money would be expended in order to resolve it. Increased time, money, and resources would be expected for more complex disputes because of the very nature of compiling together large volumes of project documentation and throngs of project participants to form a coherent representation of the facts and events. Additionally, assembling and educating individuals away from the project site (company executives, lawyers, expert witnesses, etc.) about the particulars of the dispute takes considerably more time than one might estimate. While these data show that this is true (a mean of $529,000 USD for average or less complex disputes and $1,576,000 USD for greater than complex disputes), this is misleading. Instead, Table 5 shows an analysis of the total transactional costs divided by the original claim amount.

Table 5: ANOVA Summary for Dispute Complexity vs. Total Transactional Costs Divided by Original Claim Amount

Groups	*Count*	*Average*	*Variance*
Average or Less Complexity	22	39%	0.2048
Greater than Average Complexity	13	17%	0.0467

P-value
0.1029

Using a single factor ANOVA test with a level of significance of 0.10, the null hypothesis was set with the means be equal. What the authors found was that the P-value was 0.1029, indicating a significant difference between the means for more complex and less complex disputes when looking at the total transactional costs divided by the original claim amount. The mean percent of money expended on less complex disputes was 39%, while larger more complex disputes only spent 17% of the original claim on transactional costs.

Conclusions

One industry expert has cited that nearly $5 billion USD is spent on construction litigation alone each year and that this number will increase 10% each year (Michel 1998). If this is the figure for merely construction litigation, imagine how much is expended on resolving conflict as a whole since 95% of disputes never make it to trial (Stipanowich 2004). Fortunately, there is an increasing movement towards conflict resolution systems outside of the court room. However, little quantitative data about their use and costs have been documented in the literature.

This paper and the research studies it presents focus on discerning the extent to which unresolved conflict affects the construction industry. The development of a framework for quantifying the frequency and severity of disputes is an important step towards understanding how project conflict management should be addressed in the future. The NAVFAC and USACE research studies have found, for these two public sector entities at least, that construction litigation is on the decline – part of which may be attributed to the implementation of design-build contracting and partnering. However, the transactional costs of dispute resolution efforts research study reveals that the costs of resolving conflict once it has left the job site is quite large no matter what method of resolution is chosen. Thus both the NAVFAC/USACE and the transactional cost study data point towards the necessity of assessing and managing construction conflict risk throughout the lifecycle of a project.

Recommendations to Industry Practitioners

One of the main criticisms in the area of dispute prevention and resolution has been the lack of quantitative data. In 1997, an ENR editorial wrote, "Here is construction, the nation's second largest industry, arguably the most important, accounting for about 8% of GDP, and we still don't know definitively whether we've had any success combating lawsuits (Editorials 1997, p. 62)." Eight years later this is still true. Before improvements can be completely realized within the construction industry, some benchmarks must be made – a point of reference to see if improvements have been made must be established. Industry participants must strive to collect as much data and information as possible concerning disputes. Companies must evaluate their dispute history and see how money spent on transactional costs of resolution might be better spent on preventative measures. Owners, contractors, and subcontractors alike must review their contracts and tailor each contract to the specific project. Boilerplate contracts have potentially devastating consequences when risks are not adequately assessed and managed. Lastly, conflict is inevitable and parties must work to establish dispute management systems that can resolve conflict at the lowest levels possible. Resolving a dispute after a project has been completed with lawyers, judges/arbitrators, and jury members far removed from the actual project costs everyone money, time, and a lot of aggravation.

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