The Potential Use Of Insurance As A Risk Management Tool For ADR Implementation In Construction Disputes

Xinyi Song[1], Feniosky Peña-Mora[2], Carlos A. Arboleda[3]

Robert F. Conger[4] and Carol Menassa[5]

[1]PhD student in Construction Management, Civil and Environmental Engineering Department, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL 61801, USA, Phone 217/819-1088, FAX 217/265-8039, xsong5@illinois.edu

[2]Edward W. and Jane M. Gutgsell Endowed Professor of Construction Management and Information Technology, Civil and Environmental Engineering Department, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL 61801, USA, Phone 217/244-0187, FAX 217/265-8039, feniosky@illinois.edu

[3]Visiting Assistant Professor in Construction Management, Civil and Environmental Engineering Department, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL 61801, USA, Phone 217/244-4257, FAX 217/333-9464, carboled@illinois.edu

[4]Consulting Actuary, the Tillinghast business of Towers Perrin, 71 S. Wacker Drive, Suite 2600, Chicago IL 60606, USA, Phone 404-791-9375, Fax 312-201-6333, bob.conger@towersperrin.com

[5]PhD Candidate in Construction Management, Civil and Environmental Engineering Department and Masters of Science in Finance Student, College of Business, University of Illinois at Urbana-Champaign, Urbana-Champaign, IL 61801, USA, Phone 217/333-2071, FAX 217/265-8039, menassa2@illinois.edu

ABSTRACT

Alternative dispute resolution (ADR) techniques are being widely adopted in construction projects to help handle disputes in an effective way. However, there are costs related to ADR implementation as it requires expenditures to cover the expenses incurred by the owner's/contractor's employees and third party neutrals. The exact amount of these costs won't be known until the actual occurrence of disputes during the construction phase. Rather than setting aside a certain percentage of contingency fee from the beginning of a project to deal with potential disputes, pre-arranging ADR implementation cost through a fixed cost investment in an insurance-like product may relieve project participants from constant anxiety over what will happen in the future, enable more efficient use of funds, and compensate unknown ADR implementation cost that may be incurred (perhaps up to a specified limit). The fundamental idea of this paper is to compare the known cost of purchasing insurance for ADR implementation versus the unknown cost of bearing the risk of uncertain numbers and costs of disputes. Mathematical calculations are presented in an illustrative construction project to perform the decision making process of risk

management, and to show project participants the trade-offs of investing a certain amount of premium in exchange for compensation from the insurance company in the uncertain event of an unknown ADR implementation cost that may be incurred during the construction phase.

INTRODUCTION

Nowadays, along with the inherent intricacy and magnitude of construction projects comes increasingly complex and litigious construction contracting, which furthermore leads to complex disputes (Harmon 2003). Because court proceedings are increasingly costly and time consuming, most construction contracts today contain some provision for Alternative Dispute Resolution (ADR), which is a contractual means to resolve disputes without going into the classic courtroom setting (Kovach 2004). Common ADR methods include negotiation, conciliation, mediation and the many types of arbitration. Although ADR is recognized as a more effective and less adversarial technique over litigation in construction dispute resolution (Treacy 1995), when a dispute does occur, implementation of ADR requires expenditures to cover the expenses incurred by the owner's/contractor's employees and third party neutrals (Menassa and Peña-Mora 2007). Often, a Dispute Resolution Ladder (DRL) is proposed for ADR implementation where a broad spectrum of ADR techniques is organized in a stepped manner (Peña-Mora et al 2003, Caltrans 2000, USACE 1989). When disputes escalate from lower stage to upper stage, the expenses and antagonism also increase. Because the number of disputes and the amount of ADR implementation costs in each dispute won't be known until the actual occurrence of disputes during the construction phase, project participants face the uncertainty of potential dispute resolution costs, repeated an uncertain number of times over the life of a project.

In the construction industry, where frequency of disputes could be high; the costs of dispute resolution processes can vary widely. According to Cheung and Yiu (2006), the occurrence likelihood of construction disputes lies within the range of 0.997 to 1.000 for traditional design-build projects in Hong Kong. Gebken II and Gibson's research (2006) shows that the transactional costs for dispute resolution could be as high as 2 percent of the entire contract amount. According to basic principles of risk management, large valued potential losses with significant uncertainty as to likelihood and/or magnitude may be more effectively managed when transferred to a third party through the purchase of insurance (Pritchett et al 1996) -- transferring the uncertain potential cost of ADR implementation to a third party by paying a certain amount of a premium throughout the project. Most people and organizations are risk averse to some degree, which means they are willing to pay a fixed insurance premium that is in excess of the mean expected value of claims in exchange for shedding some uncertainty about the future. Some authors refer to this as an exchange of a certain loss (the premium) for an uncertain loss (Pritchett et al 1996). For example, people purchase health insurance to cover uncertain medical costs they might incur in the future, even though the annual premium for most policyholders is greater than the expected mean claims per year. The transfer of risk through the purchase of insurance contrasts with the traditional practice of retaining the risk by

paying losses from the project's own funds, which is referred to as "self-insurance" in risk management.

PROBLEM STATEMENT

The traditional "wait-and-see" model of self-financing dispute resolution costs is structured like a self-insurance program; in this wait-and-see model, project participants normally set aside a certain amount of money, in most cases as part of the contingency fee, to deal with potential disputes. However, one problem is that it is difficult to predict the frequency and severity of disputes and therefore the likelihood and magnitude of incurring ADR costs. There are numerous factors affecting the occurrence of disputes. According to Peña-Mora et al. (2003), the possibility of dispute occurrence varies with the project characteristics; there are twenty-five potential sources of dispute in construction projects, from organizational issues to both external and internal issues. Thus, even for a well-organized and well-managed project, the contractual DRL may not always the best method to resolve all kinds of disputes. Disputes can escalate to higher steps and there always lies the chance of incurring an unexpected high ADR cost. Similarly in health insurance, there is no guarantee that a person will not have a serious accident or illness during a certain period of time even he/she appears to be very healthy. People choose to manage this risk by purchasing health insurance, thereby transferring the risk of incurring high medical expenses to the insurance company. Drawing on this analogy from health insurance, the new insurance model proposed in this paper is aimed at shifting some of the financial aspects of the risk (of uncertain numbers and costs of disputes) to a third party through purchasing insurance. The risk transfer process does not eliminate the possibility that a dispute will occur and ADR expenses will be incurred, but it reimburses the costs associated with that ADR process. In return for this transfer, an insurer receives a premium (Myhr and Markham 2003). The fundamental idea of this paper is to compare the known cost of purchasing insurance for ADR implementation versus the unknown cost of bearing the risk. Compared to the traditional contingency fee, investing in ADR as an insurance product that compensates some or all unknown ADR costs that may be incurred not only prevents project participants from constant anxiety over what will happen in the future, but also permits productive use of funds that otherwise might be tied up in the contingency fund.

INSURABILITY OF ADR

Not all risks are insurable by private insurers (Pritchett et al 1996). A risk that is perfectly suited for insurance would meet six ideal requisites: it must have a large number of similar exposure units; the claims must derive from a fortuitous loss outside the control of the principal; the losses should be definite; it must have a determinable probability distribution; it must be catastrophe unlikely, and last, it must have economic feasibility (Pritchett et al 1996).

For the first requirement, according to law of large numbers (Tijms 2007), as a sample of observations is increased in size, the relative variation about the mean declines. Because insurance premium rates are based on predictions of the future which are expressed quantitatively as expected losses, expected losses must be

calculable within a reasonable degree of accuracy (Pritchett et al 1996). If there are significant numbers of projects to be insured which require similar dispute resolution processes, then the average number and cost of dispute occurrence can be more accurately predicted for the universe of upcoming projects by analyzing and modeling statistical data on similar projects and past experience, even though the number and cost of disputes on a single project are not susceptible to forecast.

Regarding the second requirement, fortuitous means the risk assumed by an insurer must involve only the possibility, not the certainty, of loss to the insured; and that the insured will not cause the loss to occur nor dictate the amount of its cost (Pritchett et al 1996). For ADR implementation, although potential disputes occurrence arise from many factors, project participants do have a great deal of influence on the occurrence and resolution of a dispute. Thus, this characteristic of ADR creates some potential moral hazard, which the insurance company will seek means to manage and control. However, this "non-fortuitous" aspect of ADR actually addresses another important potential function of insurance: to prevent potential losses. Similar to periodic physicals in health insurance, the availability of ADR insurance offers the opportunity for the insurer to provide value-added services, or require the use of protocols that are intended to improve project management and project communication processes, and therefore reduce the likelihood of a dispute occurring in the first place.

The third requirement means loss must be definite in time, place, and amount (Pritchett et al 1996). In a construction project, there will be detailed contract provisions regarding recordkeeping and resolution processes for construction disputes, and in a DRL there will be very specific time and cost limits for each step of the ladder.

For the fifth requirements, loss exposure in dispute resolution (ADR implementation cost) might be significant, but rarely "catastrophic" in nature. Catastrophic in this context refers to an event that would affect many insureds at the same time. For example, hurricanes or earthquakes in homeowners insurance are considered as catastrophes because thousands of homes may be destroyed by a single event. However, an economic downturn might cause a lot of disputes in the construction industry. As Jennifer Hicks (2008) said in "A look ahead at 2009": "The world faces extraordinary economic times and the global credit crisis has caused delays or the suspension of many projects". Usually in cases of exposure to catastrophes insurance companies use reinsurance ("insurance for insurance companies") to protect themselves against losses in cases beyond their retention limit per catastrophe (Pritchett et al 1996).

As to the last requirement, for insurance to be economic feasible, in other word, to make the purchasing of insurance practical, the size of possible loss must be significant to the insured and the cost of insurance must be small compared with the potential loss (Pritchett et al 1996). The negative impact of disputes to construction projects has been discussed at the beginning of this paper; Moreover, because of the uncertainty of frequency and severity of dispute occurrence, the cost of insurance is

generally small compared to the potential ADR implementation cost. The detail will be explained later.

To sum up, ADR implementation cost, based on a reasonable fit to these six characteristics, generally meets the requisites for insurability. In another word, ADR could be insurable in the private market.

COMPARISON OF THE COST PATTERNS OF TRADITIONAL ADR AND ADR AS AN INSURANCE PRODUCT

In any construction project, the risk of incurring ADR implementation costs can be mathematically represented by: 1) the total number of disputes n occurring in the period between the notice to proceed (NTP) (t=0), and the project completion (t=T, m <T/30<m+1 months); and 2) the amount of ADR cost ci for each dispute resolution process, where i = 1, 2,…, n represents the dispute number. The frequency and severity of the disputes varies with the project characteristics, and could be estimated (on average) by knowing those characteristics of a particular project (Peña-Mora et al. 2003).

Assume that for a specific project, the expected number of disputes is E(i), and the expected average ADR cost per dispute is E(ci). In the insurance model, assume premium is paid on a monthly basis, beginning at NTP. P is the monthly premium and can be calculated using Pure Premium Method, which calculates indicated insurance rates using estimates of future claims and expenses, typically based on an examination of historical claims and expense experience, and also includes a profit loading factor (Myhr and Markman 2003). Basically pure premium equals to the product of loss frequency and loss severity. Here loss frequency refers to the likelihood of dispute occurrence (E(i)) and loss severity is the estimated ADR cost (E(ci)), which is the product of cost per day and the estimated dispute resolution duration. As demonstrated by Song et al (2008), the expected total ADR cost is:

$$PP = E(i) \times E(ci) \qquad \text{Eq. (1)}$$

Add an Expense Loading Factor (ELF) to cover the expenses and the target profits of the insurance company, the Gross Premium (GP) should be:

$$GP = \frac{PP}{1 - ELF} \qquad \text{Eq. (2)}$$

GP is the indicated total premium for project participants to pay the insurance company for their ADR implementation insurance (Here the time value of money is not considered for the convenience of the discussion). The monthly premium P then should be:

$$P = \frac{GP}{m} \qquad \left(m < \frac{T}{30} < m + 1\right) \qquad \text{Eq. (3)}$$

When the project begins, assume there are n disputes and the amount of ADR cost for each dispute resolution process is ci, where i = 1, 2,…, n. Then the total ADR implementation cost is:

$$C = \sum_{i=1}^{n} ci \qquad \text{Eq. (4)}$$

C is "out-of-pocket" money for project participants in the traditional self-funding model. With the potential ranges of *i* and *ci*, *C* could have a very wide range. In the following section, an illustrative example will be used to compare GP and *C* in different scenarios and to show how insurance replaces uncertainty for certainty.

IILUSTRATIVE EXAMPLE

Assume there is a highway bridge project where project participants decide to include a three-stepped DRL in the contract for dispute resolution. In this DRL, a dispute goes through Architect/Engineer or Supervising Officer (ADR1) to mediation (ADR2), then arbitration (ADR3) if the first two fail to provide a satisfactory settlement. More specifically, when the dispute resolution process starts, the dispute is first turned to Architect/Engineer or Supervising Officer. To calculate this expense, assume for this illustrative calculation that the unit cost is $ 500 per day for this step. If the initial attempt fails to achieve the settlement within the maximum allowable time of *d1*=60 days, the dispute escalates to the next level with mediation between the owner and contractor representative; assume the cost at this level is at a unit cost of $1500 per day and *d2*=30 days. Finally, if the dispute is not resolved at the previous levels, it is turned to the final step of arbitration. Assume for this illustration that the cost at this level is $3000 per day with *d3*=60 days.

The estimated duration of this project is *T*=1450 days after NTP (assume there are 30 days in each month, $m=48<T<m+1=49$). Based on statistical data and past experiences on similar projects, the owner estimates that the above DRL will be required to resolve a total of 20 potential disputes resulting from different dimensions of the project, and the each dispute will cost on average $63,850. Table 1 shows the general dispute exposure and expected ADR cost. According to Equation (1), the estimated pure premium (PP) is:

$$PP = E(i) \times E(ci) = 20 \times 63850 = \$1{,}277{,}000$$

Add an Expense Loading Factor (ELF) of 35% (illustrative value, including a provision for profit, assumed for this example), the Gross Premium (GP) should be:

$$GP = \frac{PP}{1 - ELF} = \frac{1277000}{1 - 35\%} = \$\,1{,}964{,}615$$

Assume that premium is paid on a monthly base at the end of the month, P=$40,929 ($1964615/48=$40,929) will be paid through the project beginning at NTP.

When the project starts, disputes occur unpredictably during construction, and may be considered as following a Poisson process (Touran 2003), at least in a first order analysis. There can be numerous scenarios regarding dispute occurrence. Assume the actual number of disputes ranges from 5 to 50. In a favorable scenario, assume all disputes can be resolved on the first step of DRL, which is Architect/Engineer or Supervising Officer, with the unit cost of $500 within a maximum of 60 days. If we assume the average time to resolve is 30 days, then the average cost per dispute is $15,000 ($500*60/2=$15,000). In an unfavorable scenario, the first two attempts

both fail to achieve a satisfying settlement within the maximum allowable time and dispute eventually goes to arbitration. Then the average cost per dispute is $165,000 ($500*60+$1,500*30+$3000*30=$165,000) assuming on average the last step uses half of the contractual 60 days. Thus the total ADR cost varies from $75,000 (5*$15,000=$75,000) ~$8,250,000(50*$165,000=$8,250,000). Figure 1 shows ADR cost in different scenarios:

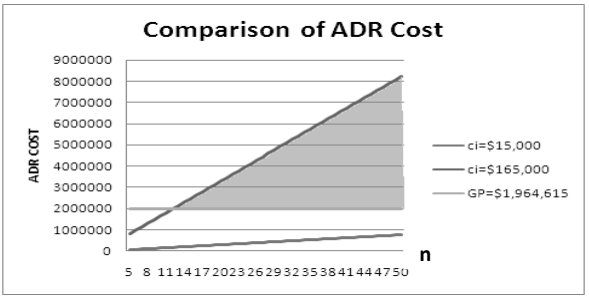

Figure 1 Comparison of ADR Cost

RESULTS

In the scenario where the average ADR cost is $15,000, meaning all the disputes are resolved on the first step at a duration of 30 days, the total ADR cost range is $75,000~$750,000 because the number of disputes may range from 5 to 50. In the scenario where the average ADR cost per dispute is $165,000, the total cost range is $825,000~$8,250,000. From Figure 1, we might easily reach the conclusion that if the combination of actual number of dispute and the average dispute resolution cost can be predicted reliably to fall in the shadowed area, then there is a motivation for project participants to consider investing in ADR insurance; if the combination of numbers and cost can be predicted reliably to fall below $1,964, there is motivation for participants to eschew insurance and proceed with the traditional model. Of course, we cannot predict the number of severity of disputes during a project. What makes insurance attractive is its ability to replace uncertainty for certainty. When preparing budget for future dispute, it is impossible to precisely predict if the number of disputes will be 5 or 50, or if they will cost on average $15,000 or $165,000, or somewhere in between. Project participants must consider all the possibilities and the aversion to some of the extreme possible outcomes, for example spending $8,250,000 on dispute resolution against the opportunity of spending $1,964,615 certain on insurance.

Predictability of cash flow may be another reason to prefer the insurance model. Figure 2 illustrates the cash flow of paying monthly premium and in the traditional self-funded dispute ADR model.

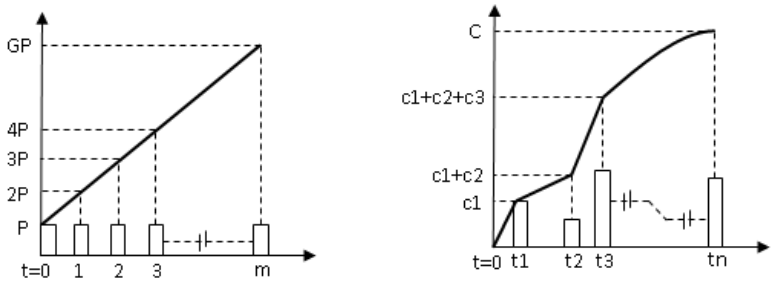

Figure 2 Comparison of cash flows of ADR Cost in two models

From Figure 2 it is clear that the timing of when ADR cost is incurred would be uneven over the project, possibly following the Poisson process, according to Touran (2003). By contrast, insurance premiums are even. Thus, it is easier to budget and plan for insurance expenditures than for ADR expenditures.

CONCLUSIONS

Because of the expense and profit load of the insurance company, self-insurance always is going to look better than insurance on an expected Net Present Value (NPV) basis. In a real project, the expectation that the project will be properly managed, and therefore that it will not be incurring huge, unexpected dispute resolution costs, might be a major reason to prevent project participants from considering investing in ADR insurance. It is very common in property and casualty insurance. For example, uninsured drivers often claim that they do not expect to incur any accidents. This paper uses an illustrative example to show different scenarios regarding dispute resolution. Figure 1 illustrates the range of ADR costs for a project, and compares that range of costs to the fixed cost insurance premiums. In a construction project, it is always difficult to know which scenario will happen until after the project. The question is: would project participants rather try to budget for an unknown cost in a wide range, or pay for insurance and be certain. As for the insurance company, by having enough different projects to insure they can average out the risk in the pool.

Table 1 General Conflict Exposure

Dispute	Sources of disputes	Time of occurrence from NTP (days)	Duration of dispute resolution process (days)			Time of resolution from NTP (ti)	Expected total cost of ADR Implementation ci ($)
			ADR1	ADR2	ADR3		
1	Miscommunication	100	40	-	-	140	20,000
2	Design error	170	60	30	30	290	165,000
3	Contract type	274	60	10	-	344	45,000
4	Contract type	289	20	-	-	309	10,000
5	Delays	316	60	30	27	433	156,000
6	Quality	367	60	30	22	479	141,000
7	Miscommuni-cation	368	20	-	-	388	10,000
8	Management	372	50	-	-	422	25,000
9	Design error	593	60	30	-	683	75,000
10	Miscommuni-cation	630	15	-	-	645	7,500
11	Management	632	35	-	-	667	17,500
12	Delays	650	60	30	12	752	111,000
13	Management	697	60	-	-	757	30,000
14	Miscommuni-cation	709	25	-	-	734	12,500
15	Design error	762	60	30	40	892	195,000
16	Quality	778	60	30	30	898	165,000
17	Miscommuni-cation	892	30	-	-	922	15,000
18	Delays	948	45	-	-	993	22,500
19	Management	968	60	11	-	1039	46,500
20	Management	994	15	-	-	1009	7,500
						TOTAL	1,277,000

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