Use of insurance in managing construction risks: Evaluation of Contractors' All Risks(CAR) insurance policy

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Abstract

Contractors' All Risks (CAR) insurance is an all inclusive insurance cover used in construction contracts. This research evaluated the efficiency of use of this insurance policy for civil engineering projects in Sri Lanka. It identified in addition, the factors affecting the efficiency of use of CAR policy. Data collected through a survey was used to identify the above factors and appraise the level of efficiency.

Using secondary data, it was found that, Third Party damages were high as 85%, where 94% of them were house damages. 47% of CAR claims were settled by the insurer. However 73% of that were under settled. That means totally 34% of claims were under settled 53% of claims were rejected by insurers. Poor knowledge & experience on risk management of local contractors, insufficient and erroneous supplementary data were the reasons for this and considerable percentage was rejected due to foreseeable damage. On the other hand insurers also significantly concerned on continuing the business with contractors and accept risks as it is, rather than concentrating on magnitude of the risk.

Background

There has been a considerable interest in the concept of Risk in recent years, with the perception that we live in a 'risky society' (Beck & Gidden cited Green 1997). Akintoye and Macleod (1997) observed that risk is inherent in all human endeavours, including construction activities, and the risk element involved are diverse and varied. Risk in construction has been the object of attention mainly because of its association to time and cost over-runs.

Transferring construction risks in to an insurance policy is an accepted method worldwide. Among the insurance policies used in construction, Contractors' All Risks (CAR) policy is the most popular. This paper evaluates its efficiency in use mainly for civil engineering projects in the Sri Lankan construction industry.

Risk Management and Insurance in Construction

According to Flanagan and Norman (1993) and Tar and Carr (2000) the construction industry is subject to more risk and uncertainty than many other industries. The development of a construction project from inception to completion takes a long time and involves many phases. It brings workers with different skills and interests together; need an efficient procurement system; and involves the use of large and diverse set of equipments. All of these complex requirements have to be handled with proper co-ordination to provide a smooth flow of activities. It is necessary to identify and analyse the risks that may appear during this process. This construction environment is still compounded by many external, uncontrollable factors that can generate risk. Risk can manifest itself in numerous ways, varying over time and across activities (Flanagan and Norman, 1993).

Construction projects are sensitive to an extremely large matrix of hazards and risks, due to some of the inherent characteristics of construction projects, which can be listed out as follows: (Bunni, 1991)

a) The time required to complete a construction project is comparatively high.

b) Human resource requirement is diverse and changes over time and from phase to phase.

c) Projects are geographically dispersed and sometimes located in isolated regions of diffi cult terrain.

d) A large diverse pool of materials are required with advanced and complex technology.

e) Extensive interaction among the parties involved in construction lead to team work and inherent conflicts.

Controlling the project risk has a positive effect on the control of project objectives such as timely completion, within the specified budget and requisite performance (Dey 2002). Briefly, the control of

project risks means the control of the project itself. According to a study of Kerzner (2001), risk management includes several related actions involving risk: planning, assessment (identification and analysis), handling and monitoring. Raftery (1994) illustrated it as the risk management due to the systematic way of identification, analysis and response to risk. Kartam and Kartam (2001) argued that managing risks means minimizing, controlling, and sharing of risks, and not merely passing them off to another party. Risk management is a process having several stages as given below (Flanagan and Norman 1993).

Risk identification	Identify the sources and types of risks
Risk classification	Consider the types of risk and its effects on the person or organization
Risk analysis	Evaluate the consequences associated with the types of risks, or combination of risks, by using analytical tech niques. Assess the impacts of the risks by using various risk measurement techniques
Risk attitude	Any decision about risks will be affected by the attitude of the person or organization making the decision
Risk response	Consider how the risks should be managed by ei ther transferring it to another party or retaining it

Success of a project highly depends on the efficiency and effectiveness of handling the risk involved with it (Ren 1994 cited in Ahmed, Ahmad & Saram1999). Akintoye & Macleod (1997) identified risk response as risk allocation. Generally, risk allocation, or risk response take any one or combination of risk retention, risk reduction, risk transfer and risk avoidance,

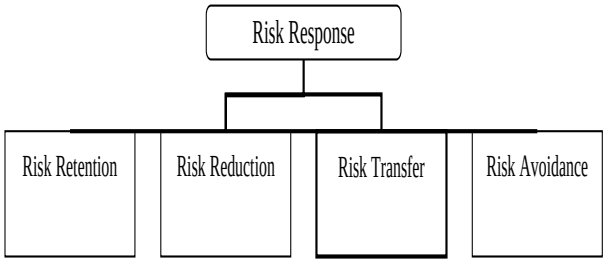


Figure 1: Risk Response (Flanagan & Norman 1993, p. 61)

as shown in Figure 1.

Risk retention, according to Williams and Heims (1989) becomes the only option when risk avoidance or transfer is impossible; avoidance is undesirable; possible financial loss is small; probability of occurrence is negligible; and risk transfer is uneconomical. Akintoye and Macleod (1997) have found that construction firms within construction industry tend to treat risk allocation in different ways, but mainly through risk transfer.

In practise, contractors usually use three methods to transfer risks; through an insurance; through subcontracting; or by modifying contract conditions. Out of these, insurance is one of the commonly used risk transferring method. Odeyinka (1999) observed that the insurance is one of the main methods of construction risk transfer in the Nigerian construction industry. In the Sri Lankan construction industry as well, risk is managed mainly through insurance.

According to Wikipedia (2007), Insurance is defined as the equitable transfer of the risk of a potential loss, from one entity to another (generally an insurance company), in exchange for a premium. Insurer, in economics, is the company that sells the insurance. 'An insurance contract is said to be uberrimae fidei 'based upon good faith between the parties'. The assured must therefore make a full disclosure of every material fact that is known' (Ashworth 2001, p.306).

Insurance not only transfer risks, it is also assist the contractor in risk management by recognizing potential risks and reducing the probability of such risks. The willingness of Insurer to write an insurance coverage reflects favorably on Insured's efforts at risk prevention (Flanagan and Norman 1993). According to McNamee, (1999) risk management practice of the past largely focused on hazard insurance and probable loss. But today it focuses on the broad issues of general management.

It could be seen from the foregoing that risk management is not only insurance but insurance forms a very important component of the risk management process. In reality, insurance is a fall back measure after other measures have been taken to reduce risk. Its position in the total risk response spectrum of Construction project can be illustrated using figure 2.

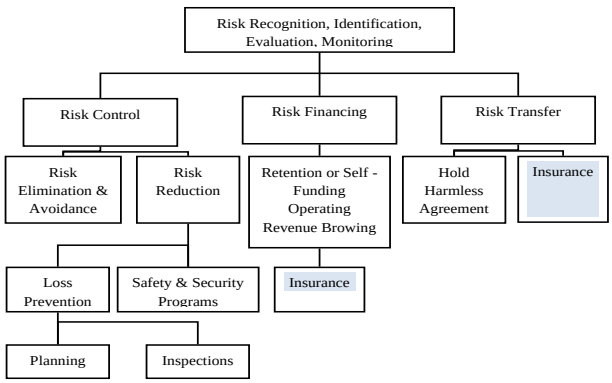


Figure 2: Position of Insurance in the Construction (De Silva 2003, p.8)

Among the insurance covers used in construction, Contractors' All Risk (CAR) policy has been accepted worldwide as a comprehensive cover by which all

the material damages and third party damages are included. The CAR policy used is Sri Lanka is almost the same as that of other countries.

Methodology

In order to evaluate the efficiency of CAR insurance policy in managing construction risk, the study focused on current civil engineering projects. Data from hundred and eighty nine (189) CAR claims were collected from seventeen civil engineering projects by purposive sampling technique. Data comprised of the types of claim, amount claimed, amount settled, reasons for under-settlement or rejection and details of transferred amount including whether the remaining cost of damage had been transferred to any party other than the Insurer.

The data that were collected from the claims were analysed in different categories as follows

1. An overall analysis of all the claims.

2. In two groups based on CAR policy categoriza tions, as material damages claims and third party damages claims.

3.In two groups based on sources of risk, as Act of God (AOG) and Act of Man (AOM)

When a claim is submitted it will be accepted and paid fully, or settled partially or rejected outright. One of the objectives of this study is to analyze the reasons behind under settlement or rejection. Therefore the reasons for above two types of events were analyzed separately and presented in this paper.

In addition, remaining amount of material damages claims and third party damages claims were to understand how the contractor manages the remaining expenses. Subsequently, interviews were carried out with twenty five professionals, who are in the construction and insurance trade. The objective of the interview is to interpret the results obtained from the analysis of claims The factors identified were ordered by significance from the importance revealed by the respondents, using t-test . In this analysis, μ_0 (Mean of the hypothesised population) was fixed at 3 as the definition given in the rating scale, 3 = ***"Neutral"***.

Findings

This section presents the results of the interviews and documentary survey. Interviews helped in identifying some major factors which affect the efficiency of insurance usage. Data collected through documentary survey revealed present condition of the insurance claims and how claims were settled. Table 1 shows the profile of claims arising out of CAR insurance policy is of third party liability type.

Table 1: Profile of the claims of the sample

Claim Type	Numbers of Claims	Percentage
Material Damage	028	13.90%
Third Party Liability	161	86.10%
Total	**189**	**100.00%**

4.1 Factors Affecting the Selection of CAR Insurance Policy

All of the major contracting companies selected for the study considered insurance as an important means of transferring construction risk. The main reasons for selecting an insurance policy are given in Table 2.

All four factors were identified as critical at the 95% confidence interval according to the ratings given in the opinion survey. All the critical factors are presented according to a ranking to show their importance as perceived by the respondents.

Table 2 One-sample t-test for factors affecting the selection of CAR insurance policy.

	Factor	Mean	Significance	t – Value	Rank
i.	Client's Requirement	4.9167	.000	23.000	1
ii.	Conditions of Contract	4.6667	.000	11.726	2
iii.	Contractor's Own Interest	4.5833	.000	8.204	3
iv.	Knowledge and Experience	4.1667	.001	4.841	4

According to Table 2, client's requirement has been considered as paramount. CAR insurance mainly provides protection to the works, and material, equipment and machinery connected with it. Therefore, in some projects, the client himself has obtained the CAR insurance cover for the project. Client's requirement has been an encouragement for the contractors to select the CAR policy.

Conditions of Contract specifically dictate that an Insurance policy to be obtained for a project. This factor has ranked second. Contractor's own interest to obtain CAR insurance was ranked third with a valid significance level. Knowledge and experience has ranked fourth with less significance than other factors. However, foreign contractors were shown higher significance level in knowledge and experience than the local contractors. However, this factor is very important because, lack of knowledge and experience has always been a serious problem at deciding deductibles and endorsement, taking safety measures, keeping records and evidence and claiming for damages.

4.2 Contractor's Perspective in Selecting an Insurance Company

Among the sample of projects, about 70% of the contractors have directly approached the insurance companies to obtain a policy. Only 30% of the Contractors have used the services of an insurance broker. Lack of knowledge and work load of the contractor were the most noticeable reasons for using an insurance

broker. Six factors became important according to the suvey when selecting an insurer for a project. These factors are listed in the order of significance (Based on the t- test) in Table 3.

Table 3 One sample t-test for factors influencing the selection of an insurance company

	Factor	Mean	Significance	t - Value	Rank
i.	Wordings of the Policy	4.9167	.000	23.000	1
ii.	Premium	4.5000	.000	9.950	2
iii.	Quality of service	4.3333	.000	9.381	3
iv.	Reinsurance	4.1667	.000	7.000	4
v.	Economic Potential	3.9167	.001	4.750	5
vi.	Reputation	2.6667	.266	-1.173	6

According to the results of the t-test, reputation of the insurance company has not shown any significance while other factors are being significant. However, the reputation showed a considerable significance among foreign contractors.

The wordings of the insurance policy is considered to be the most important factor in selecting an insurance company. It is due to the fact that the policy must be in accordance with Conditions of Contract and prior approval is needed from the Engineer. Premium became the second most important factor because profit is the main concern of the contractor. Premium reflects the insurer's willingness to take contractor's risk. Premium depends on the insurer according to their pricing strategies. The other factor identified was insurer's willingness. This factor has shown higher significance.

The economic potential of an insurance company reflects its financial strength. Therefore, under an insurer with a sound financial strength, the claimant is on a better wicket. Therefore, contractors had given attention to this factor as well. According to t-test, reputation shows less than moderate significance since it has a minus t value. But, it cannot be rejected since the significance level lies inside the acceptable region. Foreign contractors have considered reputation of the insurer as an important factor.

4.3 Insurer's Willingness to Take on Contractors' Risks

Preparation of Maximum Probable Risk (MPR) for a project is very rarely carried out in the Sri Lankan insurance industry. According to the views of domain experts, it is very important to carry out the site inspection based on scientific risk assessment methods to calculate the premium. However, in the Sri Lankan context premium is decided by the market competition rather than the scientific appraisal. This study reveal six factors that an insurer consider important in providing the cover (refer Table 4).

Table 4: One Sample t-Test for Insurer's considerations

	Factor	Mean	Significance	t - Value	Rank
i.	Magnitude of Risks	4.9167	.000	13.500	1
ii.	Cooperation	4.5000	.000	11.129	2
iii.	Next Job	4.3333	.000	9.000	3
iv.	Contractor's Performance	4.1667	.001	4.743	4
v.	Contractor's Reputation	3.9167	.096	-1.861	6
vi.	Insurance Broker	2.6667	.000	-9.000	7

Magnitude of the risks found to be the major factor influencing the decision to provide an insurance cover. To calculate the premium, risks of a project has to be analyzed using statistics. Good cooperation between the insurer and contractor affects the efficiency in the use of insurance. From the contractor's point of view, good cooperation among parties is very beneficial not only in deciding the premium, but also for the settlement of claims. The possibility of a long term relationship with the contractor has shown a very high level significance according to the t-test. Reputation of the insurance broker also affects the willingness of the insurer to provide a cover for a project. If the insurer feels that the broker is a very important party, there can be some advantages to the contractor.

4.4 Risks Covered on CAR insurance

The claims on CAR policy can be mainly categorized into two as third party damage and material damage. The study shows that 85% of the claims are for third party damages. It is due to the fact that civil engineering projects disclose considerable interaction with the third party. Location of the sites also have an influence on the damages to the third party. For instance, road construction projects in an urban area would have a considerable number of third party damages, while an irrigation projects in an isolated area would not have any third party damages.



Figure 3: Composition of Claims on the Basis of Policy Sections

Claims can also be divided into two categories based on the source of risk, as Act of God (AOG) and Act of Man (AOM). Study found that the AOM claims are considerably higher than the AOG as given in Figure 4. However, when material damages are taken separately the phenomena is the reverse order. The AOG claim to be 89% against the AOM which is only 11% (refer Figure 5).

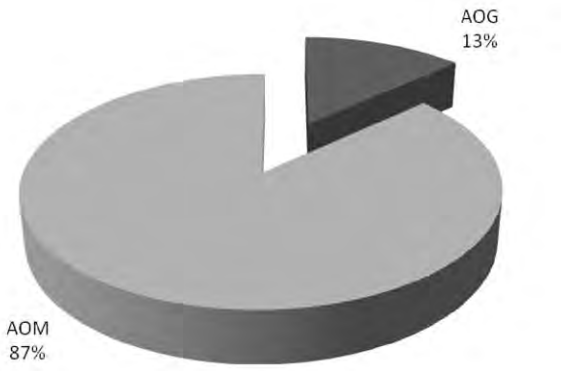


Figure 4: Composition of Damages based on Source of Risk

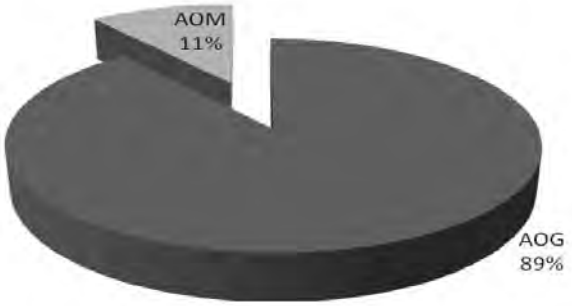


Figure 5: Composition of Risk Source of Material damages claims

A single cause, rain and floods, found to be the most frequent source of damage for material damage claims as in Figure 6. It shows 68% of damages are due to floods and rain. The fact that civil engineering projects are geographically scattered and hence their inevitable exposure to the environment is the reason to this phenomena. Damages to houses and boundary walls found to be the most frequent in third party claims. It is as high as 94% of all third party claims. Third party claims were found to be high in road construction projects, water supply projects and flood control projects. Damages to electrical posts, damages to aerial and under-ground telecom cables and damages to hume-pipes comprises mainly the other frequent damages in civil engineering project.



Figure 6: Most frequent damage of Material damage claims

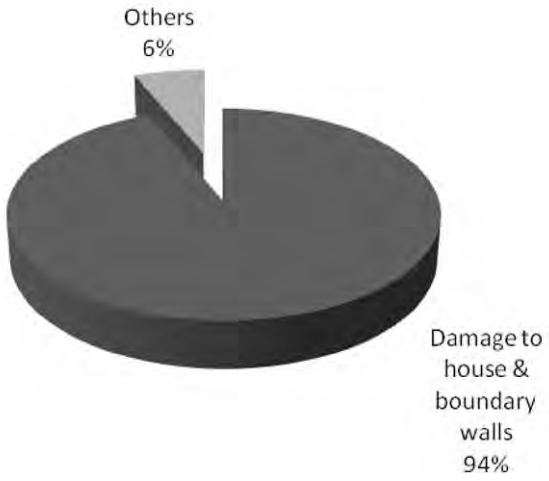


Figure 7: Most frequent damage of Third party claims

4.4 Settlement of Claims

Out of all claims, the percentage 'rejected' is above 50%. Therefore, in order to discover it further following figures were drawn as given in Figure 8, the percentages of rejected claims were 68% and 43% respectively for material claims and third party claims. Figure 9 shows the proportion of rejected claims under AOG and AOM respectively.

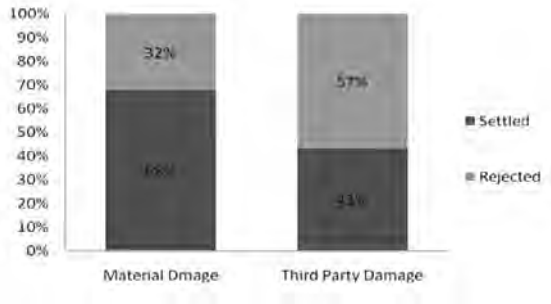


Figure 8: Proportion of rejected claims based on the damage

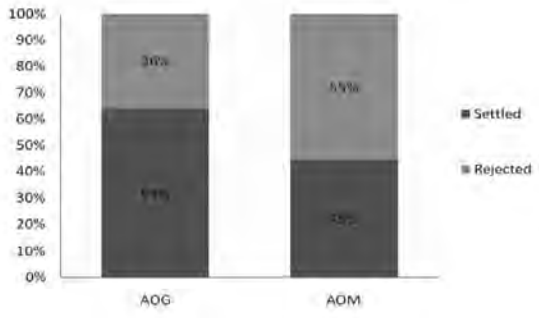


Figure 9: Proportion of rejected claims based on Source of Risk

Distribution of the settled amounts compared in Figure 10. According to that percentage of settlement x, 80% < x < 100% band seem to be the highest in all type of claims. In AOG claims, settlement has taken place above the 40% band. Among AOG, damages

due to floods and rain are the most frequent and since they are sudden and unforeseeable, claims were settled with a reasonable proposition of the claim. Table 5 shows sample parameters of the settled amount distribution.

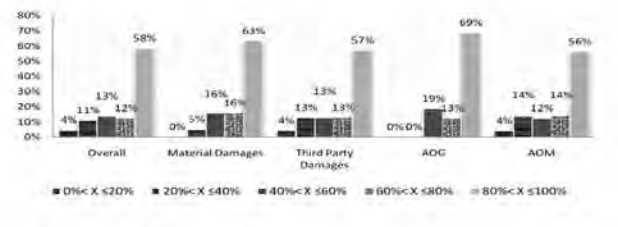


Figure 10: Distribution of claim settlement percentages

When the settled claim amounts are statistically analyzed, it was found that AOG as a category which has the highest success percentage as given in Table 5. Accordingly, to AOG has the highest mean settlement of 0.84. Lowest is shown from AOM at 0.73.

Table 5 Sample Parameters of Settled Amounts (Only for settled claims)

Sample Parameter	Overall	Material Damages	Third Party	AOG	AOM
Mean	0.7562	0.8194	0.7390	0.8463	0.7365
Median	0.8882	0.9333	0.8604	0.9667	0.8405
Mode	1.0000	1.0000	1.0000	1.0000	1.0000
Range	0.8571	0.6115	0.8571	0.5000	0.8571
Minimum	0.1429	0.3885	0.1429	0.5000	0.1429
Maximum	1.0000	1.0000	1.0000	1.0000	1.0000
Count	89	19	70	16	73

Table 6 presents parameters of settled amounts against claimed amounts. It shows a lower mean value of overall settlement at 0.35. Means of material damage claims and AOG shows higher values over third party and AOM.

Table 6 Sample Parameters of Settlement (including rejected claims)

Sample Parameters	Overall	Material Damages	Third Party	AOG	AOM
Mean	0.3561	0.5560	0.3213	0.5416	0.3278
Median	0	0.6404	0	0.6414	0
Mode	0	0	0	0	0
Count	189	28	161	25	164

4.5 Reasons for rejection and under settlement

Examining the reasons for rejection or under-settlement of a claim is very important from a contractors perspective. He can avoid such pitfalls in his future claims and also it will increase the efficiency of use of the CAR policy. In this assessment, only the most significant reasons for rejection and under-settlement are reported.

Figure 11 Summarises the reasons for rejection of a claim. Overall, the most significant reason found to be that the amount adjusted below deductible amount (Amount adjusted BDA). In the material damages claims and claims on AOG, insufficient supplementary data was the major reason for rejection. Amount adjusted BDA was the most significant reason for third party claims and claims on AOM

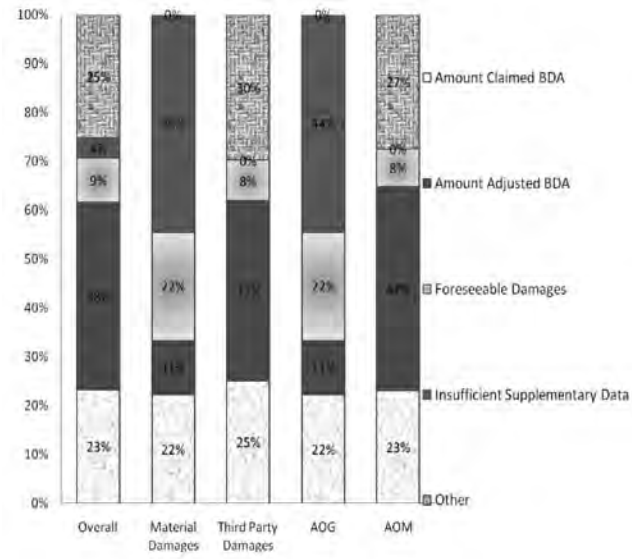


Figure 11: Reasons for Rejection of a Claim

The most significant reason for under-settled claims was that the insurer's estimate was lower than the claimant's estimate. Figure 12 presents this scenario. It was very significant in third party claims

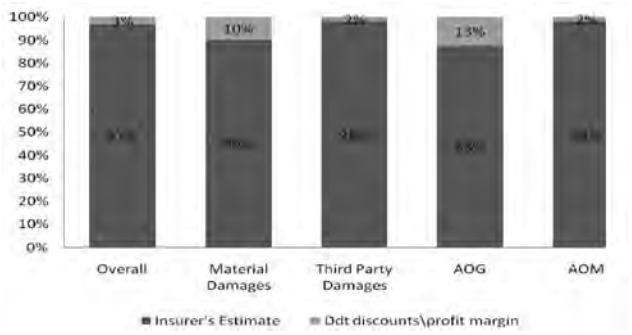


Figure 12: Reasons for Under-settlement

Another significant reason for rejection as much as 22% for material damages is that the source is a foreseeable damage. These reasons reflect the claimant's lack of knowledge and attention to insurance policy agreement wordings. It was revealed that most local contractors had not known the policy, until their claims were rejected.

In order to understand the reasons for rejection and under-settlement, the fully settled claims were analyzed in detail.

By considering twenty-four cases of 100% settlements, there were certain attributes, which were behind the success of the claim. They are; 1).Such claims estimated the amount accurately within the current market price levels and supporting documents, 2). Sometimes, the claimant obtained assistance from the insurer in preparing the claim, 3). Contractor had

kept up a very responsive cooperation with the insurer, 4). Claimant had revealed all the information regarding the project to the insurer, 5). If there was any discrepancy a negotiated settlement was sought. These five attributes are very useful for contractors in winning a claim.

4.6 Remaining Cost of Claims

After the claim was settled partially, it was found that there was a considerable remaining amount other than the deductible amount agreed. Even if the claim is fully settled, there is a deductible amount which is a liability to the contractor. If the claim is rejected, the full amount claimed is taken as remaining cost. In this study, it was discovered that in every claim, except in a few, the contractor had to suffer losses.

There was a very low probability shown for transferring remaining cost of CAR claims that were under-settled or rejected. However, there was a question, “was the amount settled for the claim sufficient enough to cover the actual loss?” It was difficult to elucidate, when taking into consideration the cost of administration.

Conclusions

As a result of using the FIDIC and ICTAD standard forms of contract, most of projects implemented in Sri Lanka, CAR policy has become a mandatory insurance requirement. CAR policy covers most of the risks specified in projects. Client’s requirements and the Conditions of Contract were the most significant factors influencing the contractor to obtain a CAR insurance policy. However, foreign contractors showed an interest in obtaining CAR insurance on their own. From the contractors point of view, wordings of the policy was more important than the premium. In addition to wordings and premium, quality of the service of the insurer, strength of re-insurers, economic potential and reputation of the insurer are the other factors which are important in deciding an insurance firm. Willingness of the insurer to take on contractor’s risks mostly depend on the magnitude of the risks, followed by the potential for long term corporation and future projects.

In order to appraise the efficiency of the use of CAR insurance policies, 189 claims from ongoing civil engineering were analyzed. The Most frequent type of damage found to be third party property damage and the source of risk, Act of Man. When the most frequent risk was considered, damages due to floods and rain found to be the most frequent. In third party claims, damage to houses and boundary walls was high as 94%. Overall, the percentage of settlements was only 47%.

In order to increase the efficiency of use of CAR insurance, insurance companies should investigate the site in order to assess the risk, before computing the premium. Local contractor’s knowledge and experience on risk management seem to be poor compared to foreign contractors. It was seen that claims without proper documentation will be either rejected or under-settled. Therefore contractors need to maintain records through out the project. In drafting a claim a legal and domain expert’s advice would be very useful.

Insurance companies and contractors should maintain a cordial relationship by means of active communication especially with underwriters, loss adjusters, etc. Contractors should implement maximum safety measures as a priority especially if it can be foreseen as a potential risk of damage.

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References

Ahmed, S.M., Ahmad, R. & Saram, D.D. (1999) Risk management trends in Hong Kong construction industry: a comparison of contractors and owners perceptions, Journal of Engineering, Construction and Architectural Management, vol.6, no. 3, pp. 225-234.

Akintoye, A.S. & MacLeod, M.J. (1997) Risk analysis and management in construction, International Journal of Project Manage ment, vol. 15, no. 1, pp. 31-38.

Ashworth, A. (2001) Contractual Procedures in the Construction Industry. 4th ed, Longman, London.

Bunni, N.G. (1986) Construction Insurance, Elsevier Applied Science, Essex.

Bunni, N.G. (1991) The FDIC Form of Contract, 4th edn, BSP Professional, Oxford.

De Silva, C. (2003) Risk Management in Engineer ing Projects [Brochure], Road Development Authority, Sri Lanka.

Dey, P.K. (2002) Project Risk Management: A Combined Analytic Hierarchy Process and Decision Tree Approach, Cost Engineering, vol. 44, no. 3, pp. 13-26.

FIDIC (1987) Conditions of Contract for Works of Civil Engineering Construction. 4th edn

Flanagan, R. & Norman, G. (1993) Risk Management and Construction, Blackwell Science, Oxford.

Green, J. (1997) Risk and the construction of social identity: children's talk about accidents. Sociology of Health & Illness, vol. 19, no. 4, pp.457- 479. Retrieved March 03, 2007, from Blackwell synergy database.

Kartam, N.A. & Kartam, S.A. (2001) Risk and its Management in the Kuwaiti Construction Industry: a Contractor's Perspective, International Journal of Project Management, vol. 19,no , pp. 325-335.

Kerzner, H. (2001) Project Management, John Wiley & Sons Inc, New York.

McNamee, D. (1999) Risk Management Today and Tomorrow, The Building Economist, vol.7, no. 2, pp. 04-16.

Odeyinka, H.A. (2000) An evaluation of the use of insurance in managing construction risk, Construction Management and Economics, vol. 18, no. 5, pp. 519-524.

Raftery, J. (1994) Risk Analysis in Project Management, E& FN Spon, London.

Tah, J.H.M. & Carr, V. (2000) Information Modelling for a Construction Project Risk Management System,Engineering, Construction and Architectural Management, vol. 7, no 2, pp. 107-119

Wikipedia 2007, Insurance. Retrieved March 23, 2007, from http://en.wikipedia.org/wiki/Insurance

Williams,C.A. &Heims,R.M. (1989) Risk management and insurance, McGraw hill, New York, USA.