STUDY ON PERFORMANCE OF CONSTRUCTION INSURANCE IN MANAGING CONSTRUCTION PROJECT RISK

Habarakadage Shyamalie Thanuja Abeywardena

(158950 V)

Degree of Master of Science in Construction Project Management

Department of Civil Engineering

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree Master of Science

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Declaration

I hereby affirm that this dissertation report is an outcome of my own effort for the best of my knowledge and it contains my own work done for the fulfillment of requirement for the higher degree of Master of Science in Construction Project Management. It does not include any written material previously submitted for the award of any preliminary degree, higher education or published by any other person or institution except where acknowledgement and references are made in the text.

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The above candidate has carried out research for the Masters under my supervision.

…… ……

Signature Date

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Abstract

Due to some of inherent characteristics of construction projects it is exposed to an extremely large amount of hazards and thus to risks. As construction projects increase in size, the risk inherent in its planning, design and execution do not multiplied in proportions. Instead new risks emerge which need to be identified and taken special care. Construction insurance is widely used by means of a risk transfer option in construction industry. Hence performance of construction insurance is very much important in successful construction project risk management.

The construction industry is benefitted with a range of insurance covers available in the insurance market. Out of that Contractor's All Risk insurance and Workmen's Compensation insurance are frequently used in construction industry in Sri Lanka. It was found that although there is variety of insurance covers available in the market only a few of insurance covers are adequately acquired by project stakeholders.

In Sri Lankan construction industry risk and insurance are affected by the clauses related to risk and responsibility and insurance in FIDC and CIDA from of contract. CIDA and FIDIC forms of contract are covering range of possible risks in construction.

It was understood that the basic mechanism behind the insurance concept is risk transferring from one party to another at an affordable cost. Due to limitations in insurance policies, it is not guaranteed that loss will be covered in full amount.

Upon careful review on prevailing insurance policies it can be seen that there are various exclusions, deductibles, policy limits etc. to limit insured's liability. In practical situation most minor impacts on projects have less chances of receiving expected insurance benefits. Lager losses are having better chances being benefitted if a policy was taken with careful risk analysis and negotiation.

From the analysis it can be concluded that insurance is an important requirement in Construction Contracts. In sudden and unforeseen situations there should be way to recover the loss or damage. Insurance is the best available option for risk transfer. Comprehensive risk analysis at initial project stages and due attention of contractors on insurable risk are important measures that can be taken in effective performance of insurance.

Keywords: Construction, Insurance, Risk Management, Contractor, Employer

Acknowledgement

May this be a gratitude for those who offered me encouragement, valued cooperation, advices and assistance for achieving my objectives.

It is my foremost duty to give special thanks to my supervisor Dr.L.LEkanayake for the valued guidance and support offered.

After that, I pay my sincere thanks to the Construction Management Unit of Department of Civil Engineering, University of Moratuwa for introducing the course on Construction Project Management which is very useful in the emerging construction projects in Sri Lanka. And also, I would like to thank the staff of the Construction Project Management Unit and all who motivated and helped in many ways to conduct my research.

Specially, I would like to thank Eng. Srimal Munasinghe, Deputy General Manager, and Central Engineering Consultancy Bureau for permitting me to collect data from the CECB. In addition to that, I appreciate the staff in Central Engineering Consultancy Bureau, who assisted me in collecting data and in conducting interviews.

Ultimately, I make this an opportunity to appreciate each and every person who gave their assistance for achievement of a successful completion of this research.

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Abbreviations

FIDIC	International Federation of Consulting Engineers
CIDA	Construction Industry Development Authority
SBD	Standard Bidding Document
BOQ	Bill of Quantity
CAR	Contractor's All Risk
WCI	Workmen's Compensation Insurance
PLI	Public Liability Insurance
PII	Professional Indemnity Insurance

Chapter 1

1 INTRODUCTION

1.1 Background

Construction industry is usually exposing for more risk and complexity in many contracts. Construction insurance is a worldwide accepted method for managing the risk in the construction industry. From the perspective of project practitioners it is not much clear about the way construction insurance operates in the industry in managing construction project risk. Better understanding on construction insurance and interaction with risk management can contribute to successful risk management performance on construction projects.

The process of taking a project from initial stage to completion is complex. It requires contribution of people with different skills and interests and co-ordination of wide range of inter related activities. Complexities in projects are compounded by many external uncontrollable factors. Hence construction insurance is used as a collective form to describe various types of policies to protect construction works, erection and operation of machinery.

Construction insurance plays an important role as it covers financial loss, product liability, public liability and legal expenses etc. to cover up loss or damage. It is essential for the contractor to be aware of various insurance policies available for the construction industry and have knowledge to select good insurance policies for their projects.

Construction insurance is a leading risk management method in managing risks in the construction industry. Its key purpose is to transfer certain risks from clients, contractors, subcontractors and other parties involved in the construction project to insurers to provide contingent funding in time of difficulty. A typical construction project will consider insurance on material damage, third party liability, material in transit, damage to construction plant, non- negligent indemnity, Consequential losses etc.

Because an insurance policy is a type of a Contract, duties of the insurer and insured person are largely contained within that contract.

An insurance policy is a contract of "Utmost good faith", this means that the insurance company and the insured person have certain very important obligations that do not exists in normal contracts.

In contracts, risk of accidental damage during construction stage of projects is managed through relevant risk management clauses in the forms of contract. Effective risk management reduces exposure to risk and mitigate loss. The responses to risk are Risk absorption, Risk mitigation, Risk transfer and Risk avoidance.

The main aim of the research is to conduct an investigation into how insurance is used as a risk management tool in Sri Lankan construction industry and to provide an overview on drawbacks of traditional construction insurance practice. A better understanding of construction insurance can contribute to successful risk management performance on projects.

In summary there is a need to conduct an investigation on performance of construction insurance in risk management in the construction industry and examine the interaction between construction players and insurance companies with respect to risk management and insurance.

1.2 Objectives

The main objective of this research is the study on how insurance is performed in construction project risk management and has following sub objectives;

- Identify types of insurance commonly used in Sri Lankan construction industry

- Find out gaps and drawbacks of current construction insurance practice

- Recommend suitable changes on current construction insurance practice for successful construction project risk management

1.3 Methodology

The research was carried out using following approaches in order to achieve the aims and objectives of the research.

The first was to undertake a literature search on previous publications on construction project risk management especially considering insurance as a major risk transfer tool in the construction industry. Many literature sources were used as references such as academics periodicals, research journals, government publications, past dissertations and Internet resources.

Qualitative and Quantitative data were used for this research. As an approach to the research and data collection questionnaires were developed based on the project objectives in order to identify most significant type of insurance used in industry and the role of insurance as a means of managing construction project risk. Interviews were supplemented where necessary in order to gather opinions of project practitioners.
In this study Data from fifty (50) insurance policies were analyzed.

In addition, data received on insurance claims form contractors and insurance companies were analyzed. 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.

Final recommendations prepared based on the outcomes of the above analysis.

1.4 Main Findings

It was understood that the basic mechanism behind the insurance concept is risk transferring from one party to another at an affordable cost. Due to limitations in insurance policies, it is not guaranteed that loss will be covered in full amount.

Upon careful review on prevailing insurance policies it can be seen that there are various exclusions, deductibles, policy limits etc. to limit insured's liability. In practical situation most minor impacts on projects have less chances of receiving

expected insurance benefits. Lager losses are having better chances being benefitted if a policy was taken with careful risk analysis and negotiation.

The contractor's due attention on insurance policy is very much important. There can be losses due to lack of Contractor's early and due attention on insurance policies. Also there can be losses due to Contactor is not following adequate insurance claim procedures such as delays in informing damage, lack of records etc.

Insurance market is very competitive and there is a tendency to offer low quotations than the rates calculated based on risk analysis. Cheap policies may contain too many restrictive conditions on claims in case of a loss or damage.

CIDA and FIDIC forms of contract are covering range of possible risks in construction. It was found that in practice contract conditions are not amending considering risks which should be covered particular to specific project

1.5 Arrangement of the Report

Chapter 1: Provides background of the study, project objectives, and approach to the study. Further main findings of the research also stated under this chapter

Chapter2: Summarizes findings on similar areas of study with respect to risk management and insurance

Chapter 3: Illustrate methodology and data collection in detail

Chapter 4: Analysis and discussion of data collected

Chapter 5: Conclude findings of the research based on project objectives

Chapter 2

2 LITERATURE REVIEW

2.1 General

This chapter comprises study of the risk management strategies and construction insurance that applied in the construction industry. Many researchers have done different researches to investigate interaction between construction project risk management and construction insurance. Better understanding on construction insurance and interaction between risk management and insurance can contribute to successful risk management performance on construction projects.

2.2Definition of Risk and Uncertainty

The term Risk and Uncertainty can be defined in different ways. A number of authors state that uncertainty should be considered as separate form of risk because two terms are distinctly different. In most cases project risks can be identified from experience gained by working on similar projects.

According to definition a risk in any project, which is introduced in the book of Project Management Certificate Examination, by PMBOK Guide, Project Management Institute, a risk in any project is an uncertainly event or circumstance, which results to negative or positive impact on the aim of a project.

According to Smith (2014) uncertainty can be regarded as the chance of occurrence of some event where the probability distribution is genuinely not known. This means that uncertainty relates to the occurrence of an event about which little is known, except the fact that it may occur. Those who distinguish uncertainty from risk define risk as being where the outcome of an event or each set of possible outcomes can be predicted on the basis of statistical probability. Smith (2014)

The Oxford Advanced Learners Dictionary (2010) defines risk as the possibility of something bad happening at some time in the future; a situation that could be dangerous or have a bad result.

The process of risk management is broken down in to Risk Management System in figure 2.1which shows sequence of dealing with risk. (Flanagan and Norman, 1993)

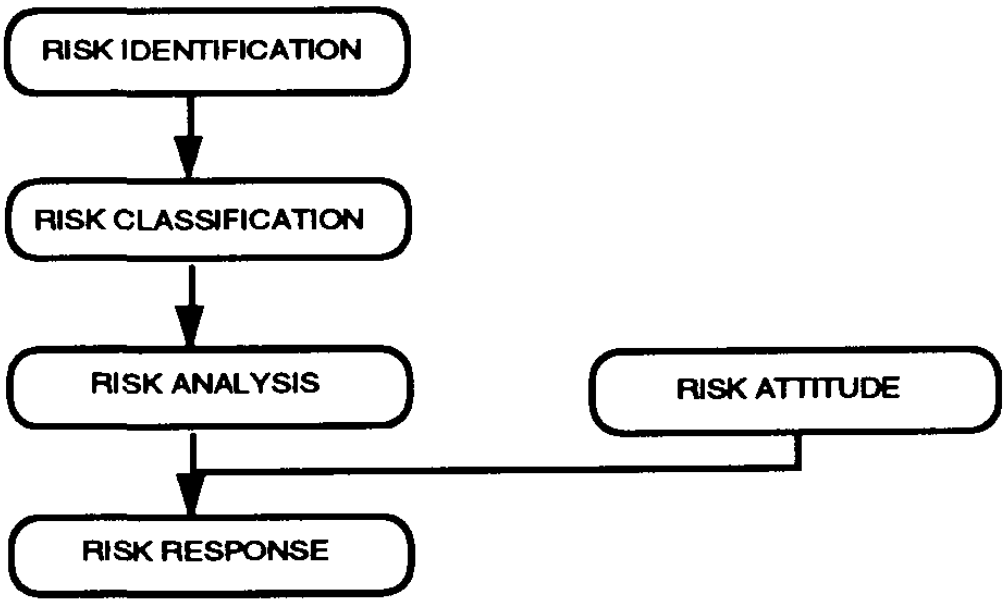

Figure 2.1: The Risk Management Framework (Flanagan and Norman,1993)

Risk Identification	Identify the source and type of risks
Risk Classification	Consider the type of risk and its effect on the person or organization
Risk Analysis	Evaluate consequences associated with the type of risk, or combination of risks, by using analytical techniques
Risk Attitude	Any decision about risk will be affected by the attitude of the person or organization making the decision
Risk Response	Consider how the risk should be managed by either transferring it to another party or retaining it

2.3Risk response strategies

According to the PMBOK guide (5^{th} edition), if treats or risks may have occur negative impacts on project objectives three strategies; avoid, transfer, and mitigate will apply. The fourth strategy, accept; can be used for negative risks or threats as

well as positive risks or opportunities. Each of these risk response strategies have varied and unique influence on the risk condition.

Avoidance and mitigation strategies are usually good strategies for critical risks with high impact, while transference and acceptance are usually good strategies for threats that are less critical and with low overall impact.

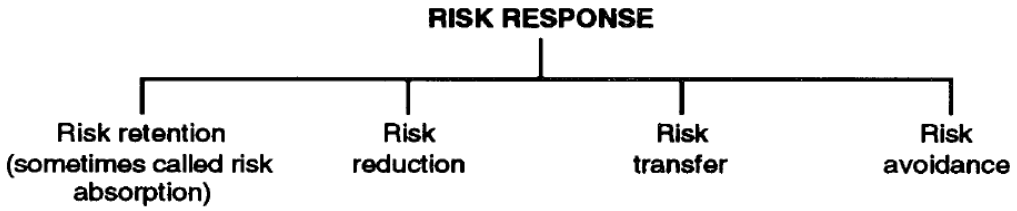

Figure 2.2: Risk Response Strategies, (Source: Flanagan and Norman, 1993)

Risk avoidance

Risk avoidance is a risk response strategy whereby the project team acts to eliminate the threat or protect the project from its impact. It usually involves changing the project management plan to eliminate the threat entirely. The project manager may also isolate the project objectives from the risk's impact or change the objective that is in jeopardy. Examples of this include extending the schedule, changing the strategy, or reducing scope. The most radical avoidance strategy is to shut down the project entirely. Some risks that arise early in the project can be avoided by clarifying requirements, obtaining information, improving communication, or acquiring expertise. (PMBOK guide 5th edition)

Risk transference

Risk transference is a risk response strategy whereby the project team shifts the impact of a threat to a third party, together with ownership of the response. Transferring the risk simply gives another party responsibility for its management—it does not eliminate it. Transferring does not mean disowning the risk by transferring it to a later project or another person without his or her knowledge or agreement. Risk transference nearly always involves payment of a risk premium to the party taking on the risk. Transferring liability for risk is most effective in dealing

with financial risk exposure. Transference tools can be quite diverse and include, but are not limited to, the use of insurance, performance bonds, warranties, guarantees, etc. Contracts or agreements may be used to transfer liability for specified risks to another party. For example, when a buyer has capabilities that the seller does not possess, it may be prudent to transfer some work and its concurrent risk contractually back to the buyer. In many cases, use of a cost-plus contract may transfer the cost risk to the buyer, while a fixed-price contract may transfer risk to the seller. (PMBOK guide 5th edition)

Risk mitigation

Risk mitigation is a risk response strategy whereby the project team acts to reduce the probability of occurrence or impact of a risk. It implies a reduction in the probability and/or impact of an adverse risk to be within acceptable threshold limits. Taking early action to reduce the probability and/or impact of a risk occurring on the project is often more effective than trying to repair the damage after the risk has occurred. Adopting less complex processes, conducting more tests, or choosing a more stable supplier are examples of mitigation actions. Mitigation may require prototype development to reduce the risk of scaling up from a bench-scale model of a process or product. Where it is not possible to reduce probability, a mitigation response might address the risk impact by targeting linkages that determine these verities. For example, designing redundancy into a system may reduce the impact from a failure of the original component. (PMBOK guide 5th edition)

Risk acceptance

Risk acceptance is a risk response strategy whereby the project teams decide to acknowledge the risk and not take any action unless the risk occurs. This strategy is adopted where it is not possible or cost-effective to address a specific risk in any other way. This strategy indicates that the project team has decided not to change the project management plan to deal with a risk, or is unable to identify any other suitable response strategy. This strategy can be either passive or active. Passive acceptance requires no action except to document the strategy, leaving the project team to deal with the risks as they occur, and to periodically review the threat to

ensure that it does not change significantly. The most common active acceptance strategy is to establish a contingency reserve, including amounts of time, money, or resources to handle the risks. (PMBOK guide 5th edition)

2.4 Construction Project Risk

A project is a temporary endeavor undertaken to create a unique product, service, or result. The temporary nature of projects indicates that a project has a definite beginning and end. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met or when the need for the project no longer exists.

Every project creates a unique product, service, or result. The outcome of the project may be tangible or intangible. Although repetitive elements may be present in some project deliverables and activities, this repetition does not change the fundamental, unique characteristics of the project work.

An ongoing work effort is generally a repetitive process that follows an organization's existing procedures. In contrast, because of the unique nature of projects, there may be uncertainties or differences in the products, services, or results that the project creates.

From this definition which gives under PMBOK guide -5thedition of a construction Project, we can conclude three major characteristics as follows,

01. Projects are Temporary
02. Unique product, Service or Result
03. Progressive Elaboration

2.5 Construction Project Risk Management

The Construction Project Risk management means with classification, analyzing, planning, identification assessment, and response and avoidance strategies of risks.

Construction projects can be unpredictable. Managing risks in construction projects has been recognized as a very important process in order to achieve project objectives in terms of time, cost, quality, safety and environmental sustainability.

Construction project Risk management is probably the most difficult aspect of project management. A construction project manager must be able to recognize and identify the root causes of risks and to trace these causes through the project to their significances. Furthermore, risk management in the construction project management context is more comprehensive. Hence there should be a systematic way of identifying, analyzing and responding to risks to achieve the project objectives. It is essential to use risk management from the early stages of a project is essential.

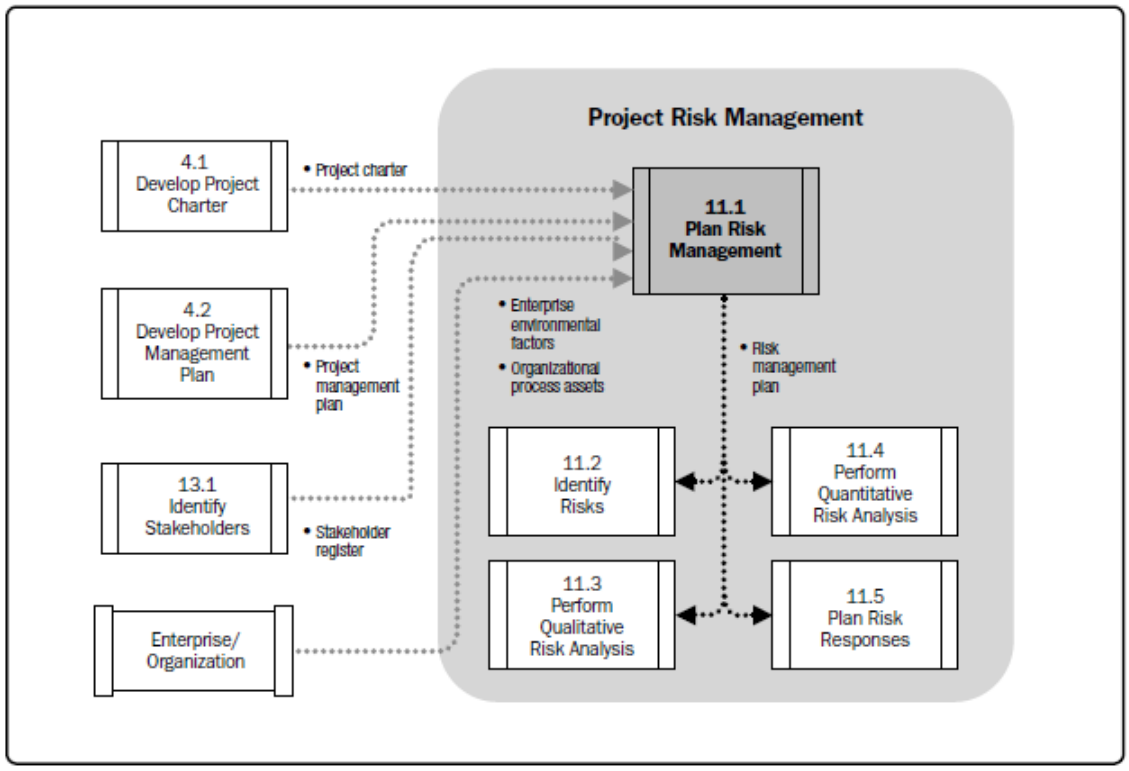

Figure 2.3: Project Risk Management – Flow Diagram

(Source PMBOK guide -5th edition)

2.6Risk Allocation and Transferring in Construction Contracts

Any construction project involves risk and there is no way to eliminate all risks associated with a specific project. All that can be done is to regulate the risk allocated to different parties and then to properly manage the risk. Owners tend to shift most of the project risk to another contracting party (Usually the Contractor) (Ramy & Fransis, 2002)

Ramy & Francis (2002) concludes that to reach a better risk allocation process, a trust relationship between the contracting parties should exist first and can be done through following stages.

- A clear understanding of the risks being born by each party and who owns or can manage the risk.
- More time and effort in the front- end of a project and sufficient experience to manage or mitigate the risks and administrate the contract.
- A negotiation phase prior to the start on the contract should exist, this phase is required to build a trust relationship between the contracting parties, and then this negotiation phase can be part of the contract itself.
- Adequate risk – sharing or Risk-reward system should exist to share the benefits if the risk does not occur during the project lift cycle.

Transferring risk does not reduce the criticality of the source of risk; it just removes it to another party. In some cases transfer can significantly increase risk because the party to who is being transferred may not be aware of the risk they are being asked to absorb. (Flanagan and Norman, 1993)

In practise, contractors usually use three methods to transfer risks; through an insurance; through sub-contracting; or by modifying contract conditions. Out of these, insurance is one of the commonly used risks 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. (Perera, 2008)

The commonest form of risk transfer is by means of insurance which changes an uncertain exposure to a certain cost. (Flanagan and Norman, 1993)

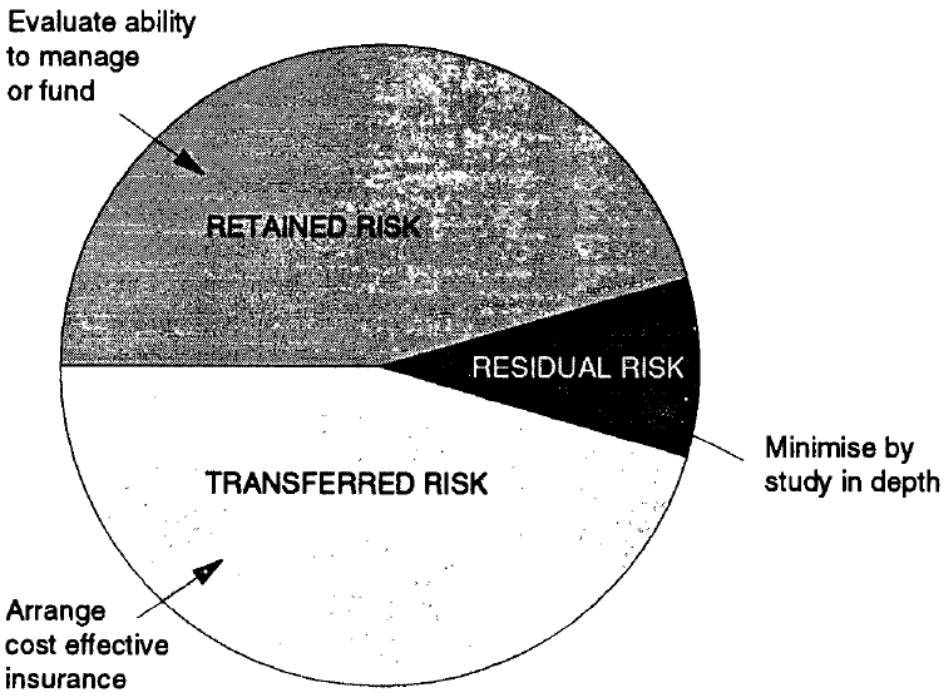

Figure 2.4: Risk on construction projects

(Source: Flanagan and Norman, 1993)

2.7 Construction Insurance

Construction insurance encompasses all contracts of indemnity within the activities of the construction industry where insurance is chosen as the medium through which liabilities are shifted. It involves not only many branches of insurance but also many disciplines and professions.

The concept of construction insurance stems from four inherent characteristics of the Construction contract which are peculiar to it and distinguish it from other types of contract. These are as follows :(Bunni, 2003)

1. Construction contracts include the traditional requirement imposed on the contractor to complete the works, in all but few specified circumstances, whatever the difficulties and cost. This requirement is usually stipulated in the relevant conditions of contract.

2. Vast sums are normally associated with many construction projects. In recent years, the size and cost of construction contracts have escalated to such an extent that few, if any, employers, owners or financiers can absorb the financial implications of failure.

3. An artefact of civil engineering and, to a lesser extent, of building construction is a unique object, which cannot be displayed to the buyer prior to purchase. Construction projects are, therefore, different from manufactured products and other consumer articles,

4. There is a complex matrix of hazards and risks that could lead to personal injury and/or physical damage during the construction period and beyond. Difficulties generally arise in construction projects due to their inherent characteristics. However, when hazards eventuate and risks materialise through events that could result in costly losses, which must be absorbed by the contractor while carrying out his legal obligation to complete the works. These difficulties could and sometimes do cripple the contractor financially and lead to disruption of the construction programme and, in extreme cases, to his insolvency. This also applies to the owner and the design team, but probably to a lesser extent, although equally detrimental.

2.8 Principles of Insurance

Principles of insurance can be distinguished throughout the wording of the three documents associated with insurance, namely: the proposal form, the policy and any endorsement issued, either with the policy or subsequently. Generally accepted insurance rules are summarized as follows:

2.8.1 Insurable Interest

A fundamental requirement of insurance law is that the insured must have an insurable interest in the subject matter of the insurance. The contractor has an insurable interest in the goods, works, plant and the site in its possession. The

employer of the contractor is usually the legal owner of the site and hence there is contractual right to the goods on site, establishing a sufficient legal relationship to establish an insurable interest. (Gould, 2003)

2.8.2 Utmost Good Faith

Every person who enters in to contract of insurance has a legal obligation to act with utmost good faith towards the company offering the insurance. The insurance company also has a responsibility to act with good faith in all its dealings with the insured. (Gould, 2003)

Breach of the duty of good faith in relation to insurance policy can arise in number of ways such as follows,

- When filling the proposal form, wrong declaration of risk situation, wrong ground conditions, wrong flood risk potential, proximity to sensitive third party structures etc.
- When a claims lodged for an event that has not happened, or for an item that has not been lost or damaged.
- When a false statement is made relating to the risk potential, circumstances leading to the loss itself or relating to what happened after the loss.

2.8.3 Fortuity Doctrine

A fortuitous event is one “Happening by chance or accident” or “occurring unexpectedly or without known cause”.

Insurance is not available for losses that the policy holder knows of plans, intends or aware are substantially certain to occur.

Losses that are not fortuitous are not covered because the risk feature inherent in insurance is lacking.

The requirement of fortuity thus assures an insurance company will not pay for certain and inevitable events. (Gould, 2003)

2.8.4 Non-Disclosure

The most important aspects of the principle relating to the duty imposed on the insured are,

To disclose all facts known to the insured that are material and not to make a statement that amounts to a misinterpretation of a material fact.

Such non – disclosure or misinterpretation would enable the insurer to avid the contract. Claims already settled will therefore need to be repaid, and refund the premium will be required. The insurer will not be entitled to damages. (Gould, 2003)

2.8.5 Subrogation

Transfer of rights and remedies of the insured to the insurer who has indemnified the insured in respect of the loss.

The principle of subrogation provides the insurer with two benefits (Gould, 2003):

- To stand in the shoes of the insured and avail himself of all the rights and remedies available to the insured against the third parties and the action by the insurer is brought in the insured's name and the third party can raise any defences which would have been available against the insured.

- To recover from the insured any benefit received by the insured from third parties which reduces the loss covered by the insurance.

2.8.6 Contribution

If an insured subject matter is covered against a peril for the benefit of an insured party by more than one policy, and if that peril eventuates into a loss, the insured cannot recover from more than one insurer.

Contribution ensures that insured do not make a profit out of insurance. Co – insurance arises when the insured buy two or more policies for which add up to the total value of the property. When there is a loss each insurance company will pay the proportionate amounts that they are responsible for. (Gould, 2003)

2.8.7 Proximate Cause

The active, efficient cause that sets in a sequence of events which brings about the results without the intervention of any force started and working actively from a new and independent source. (Gould, 2003)

Proximate cause must be established in order to decide whether a claim is covered by the policy. The policyholder is required to demonstrate that an insured peril has caused the loss or damage claim.

If the insurer then wants to reject the claim, they must demonstrate that exclusion applies.

2.8.8 Warranties

A warranty is a term of the insurance policy which if broken entitles the insurer to terminate the contract from the time of the breach regardless of whether the breach is material. In the law of insurance the term "warranty" is therefore used in a similar sense to that more readily associated in general contract law with the term "condition". Breach of a warranty justifies the injured party's refusal to further performance (Gould, 2003).

2.9The Insurability of Risks

Insurable risk means a pure risk which can be covered by insurance. It has to be sudden and accidental, with statistics available for insurers to put on past events and create a good premium.

Not all risks are insurable and while the principle of the equitable contribution of many for the benefit of an individual suffering a loss is the corner-stone of insurance philosophy, certain limitations must, of necessity, be put on that principle to make the insurance transaction viable. (Bunni, 2003)

The limitations are as follows: (Bunni, 2003)

1. The principle of insurance is based on the theory of probability and, therefore, there must be an element of uncertainty relating to the matter to be insured, i.e. accidental or fortuitous in character.

2. An insurable risk should preferably be measurable in quantitative terms and in such a way that the theories of probability and the law of large numbers may be used. Without this stipulation, the premium required to insure the risk could not be scientifically calculated. Insurance becomes lottery in the absence of such calculations. It is, however, important to note that, if the extent of the risk is unquantifiable, it is the assessment of the premium and not the insurability that is in question.

3. An insurable risk should preferably be such that it is acceptable to the insurance market through appropriate risk selection methods. The objects insured must be numerous enough and homogeneous enough to allow sufficient selection.

4. An insurable risk should preferably be such that one can determine whether loss has in fact occurred and the cause of the resultant damage. The extent of the damage should also be capable of assessment.

Fortunately, most risks in construction contracts fall within the limits set out and are Therefore, insurable.

2.10The Un-insurability of Risks

Bunni (2003) classified uninsurable risks with four categories as outlined hereunder:
1. Foreseeable risks: An insurer will argue that if a contractor stores cement in an uncovered condition during a rainy season, then any damage caused is foreseen to be inevitable and, thus, is not the liability of the insurer. On the other hand, if the cement was stored in a watertight shed and the roof of the shed blows away under severe wind, then the contractor will argue that this is unforeseen damage.

2. Unquantifiable risks: A consequential economic risk is unquantifiable, even in a certain circumstance. It is, therefore, very rarely covered. However, the word ‘consequential’ must not be confused with ‘consequence’ as in risks resulting as a

consequence of defective design, material and/or workmanship because these risks are quantifiable and their limit is the value of the contract which is insured. Such damage resulting from, or occurring as a consequence of these defects is insurable and the intention of a good insurer must always be clear in this respect. Insurance policies must be written in clear and precise language at all times but more especially so when dealing with this issue because, otherwise, it could result in a dispute if repair to a resultant damage is costly.

3 Political risks and risks on an international scale: War is a good example of these risks that is normally uninsurable. The reason is that the principle of the contribution of many for the benefit of an individual suffering loss breaks down in such a situation, unless governmental institutions carry out the insurance.

4 Causation: To prove the cause of any damage on a project is to establish the responsibility and liability for it and to establish whether or not the damage is covered through the provisions of the insurance contract. If such a cause cannot be proven for any particular risk, the risk becomes uninsurable.

2.11 Types of Insurance Policies Used in Construction

Construction insurance has been traditionally transacted by issuing a number of insurance policies for the benefit of each of the parties involved in the particular project under construction. The type of insurance generally required in connection with a construction project can be divided into two basic categories. The first is property insurance; the second is liability insurance. (Bunni, 2003)

2.11.1 Property insurance

Property insurance mainly provides protection to the works and any material, equipment and machinery connected with Construction Contracts. Contractors' All Risks Insurance Policy and Erection All Risks Insurance Policy are typically belongs to this category.

2.11.2 Liability insurance

Liability insurance is intended to provide protection to the insured party against specific legal liabilities to which the insured may become exposed as a result of activities ending in bodily injury and/or property damage. Public Liability Insurance would apply in which case there are legal liabilities towards third parties. In the case of the design professional, legal liabilities incurred in the course of his professional work are covered under Professional Indemnity Insurance.

2.12 Benefits of Insurance

2.12.1 Business Risk

The success of any business is based on mitigation and controlling risk it encounters. Insurance allows businesses to take necessary risks without fear of huge financial loss.

2.12.2 Safety by Awareness

Insurance is not just about paying losses that occur but also preventing losses in the first place from occurring. Insurers are better educated and aware of the causes of various losses and they can offer professional assistance for avoiding the most common causes of losses. Insurance companies generally require assessments as part of the process for getting coverage. This helps to bring awareness of the risks you have and help you plan ahead to mitigate those risks.

Insurance companies organize information for policy holders and prospective clients. This information keeps the public informed about their risks and raises awareness of issues.

2.12.3 Providing Security

Insurance helps in decreasing the likelihood of financial hardship in case of a disaster or loss. Life as well as businesses today faces lot of uncertainties. There is always a fear of sudden loss. There may be a fire in factory, storm in the sea or loss of life. In all these cases it becomes difficult to bear the loss. Insurance provides a cover

against any sudden loss. This stability translates to the ability to continue to invest in the economy, which stabilizes the financial situation of the entire country and greatly influences foreign trade relationships.

2.12.4 Spreading Risk

The basic principal of insurance is to spread risk among a large number of peoples. A large number of persons get the insurance policies and pay premium to the insurer .whenever a loss occurs, it is compensated out of fund to the insurer. This helps in spreading risk from one individual to society at large.

2.12.5 Investment

Lenders do not provide funds and support for individuals and businesses unless they have some evidence that their investment is safe because they do not want to risk financial loss. Insurance shows lenders that they have some guarantee of getting money back in the event of a disaster. This makes it more likely that the lender will invest because they see you as less of a liability. It also encourages safe &profitable long term Investment as traditional insurance policies are viewed both by the distributors as well as the customers as a long term commitment; these policies help the policyholders meet the dual need of protection and long term wealth creation efficiently.

2.13 Perspective on Risk and Insurance from Client's, Contractors and Insurers

There are many parties involved in the construction industry such as clients, contractors, subcontractors, insurers, and suppliers. Different parties involving in constriction are having different perspectives on insurance according to their background and benefits.

The different parties have different knowledge and perceptions of risks, which interact with their various objectives and priorities. The risk is best placed with that party involved in the management of a project who is best able to manage the factor which gives rise to it (Flanagan and Norman, 1993).

2.13.1 Clients

The clients of the industry ultimately pay the bill and it is important to understand their needs and expectations (Flanagan and Norman, 1993). From clients' perspective, the risk management process should start from briefing of project to the handover to users. Clients are the first party to conduct the risk management process and involve contractors during the construction stage or at an earlier stage according to the procurement method. For example, construction and design would involve contractors from the design stage.

Clients can have very deferent objectives. But their needs can be grouped under the headings of time, cost and quality. Time can mean both the need for rapid construction and completion on stipulated date. Cost means obtaining value for money and completing the project within the budget. Quality is used to cover technical standards including such areas as safety and fitness for purpose. The relative importance of time, cost and quality will vary from client to client (and between similar clients in different countries).what is however, certain is that the clients of the industry don't need surprises. They want to achieve their desired objectives and to this end a professional approach to risk management is required. (Flanagan and Norman, 1993)

A traditional view is that the more risk is transferred away from the client, the safer and more secure his budget will be such as insurance. However, this should be balanced with the overall cost of risk transfer.

2.13.2 Contractors

The contractor's perceived risk as the likelihood of unforeseen factors occurring, which could adversely affect the successful completion of the project in terms of cost, time and quality.

Contractors are generally agreed that the industry within which they work is associated with high risk and risk management as being essential to their overall construction activities in order to minimize business losses. By means of analysis and

control of the risk that they are exposed to, they can maximize their business profitability. (Akintola and Malcolm, 1997)

Construction insurance policies must be specially designed to respond to the particular circumstances (Bunni, 2003). It means an insurance policy needs to be specially designed according to the nature of project, the types of procurement and construction contract. In this respect, contractors should be innovative and have the ability to negotiate with the insurers improved conditions of insurance, which are adapted to the changed needs as well as obtain best premium reduction through implementing proper loss control and risk management measures via their experienced expert team.

A contractor is expected to be familiar with a wide range of construction insurance policies. The contractor should also be aware of the quality of the various insurers in respect of their financial strength / claims paying ability and market reputation. The quality of insurance can only be tested when the insurer is called upon to pay a justifiable claim.

Contractors play an important role in the decision of the value of items to be insured and the negotiation of premium to be paid. Price alone should not be the determining factor in the decision to accept an insurance cover. The standards for contractors to choose insurers include not only premiums, but also service of claim settlement and risk management support.

3 RESEARCH METHODOLOGY AND DATA COLLECTION

3.1 General

It can be seen that Construction Insurance application is increasing in Sri Lanka with increasing construction contracts and it has become a mandatory requirement in construction contracts. Clients in many cases found it's essential to cover their liabilities through insurance.

This section describes all the procedures that were undertaken to achieve the objectives set for this study. The procedures that were adopted including all the information relevant to the needed data, where those data were obtained and how they were obtained are discussed. The methods that were used to obtain the sample size as well as data collection are discussed.

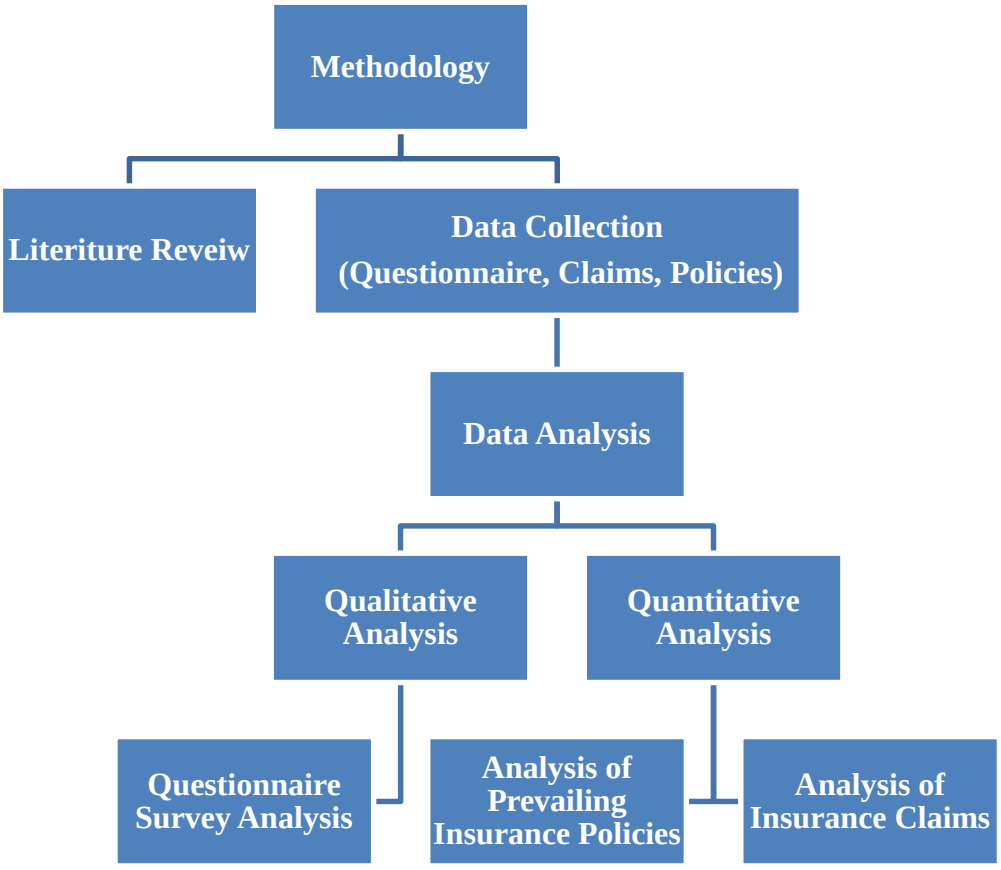

Figure 3.1: Flow Chart of Research Methodology

3.2 Research Methodology

The research was carried out using following approaches in order to achieve the aims and objectives of the research.

The first was to undertake a literature search on previous publications on construction project risk management especially considering insurance as a major risk transfer tool in the construction industry. Many literature sources were used as references such as academics periodicals, research journals, government publications, past dissertations and Internet resources.

Qualitative and Quantitative data were used for this research. As an approach to the research and data collection questionnaires were developed based on the project objectives in order to identify most significant type of insurance used in industry and the role of insurance as a means of managing construction project risk. Interviews were supplemented where necessary in order to gather opinions of project practitioners.

In order to study the performance of construction insurance in managing construction risk, the study focused on current civil engineering projects. Data from fifty (50) insurance policies were analyzed. Relevant insurance clauses of contract documents and Bills of Quantities also analyzed together with insurance policies.

In addition, data received on insurance claims form contractors and insurance companies were analyzed. 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.

Final recommendations prepared based on the outcomes of the above analysis.

3.3Data Collection for Questionnaire Survey

As a qualitative method of data collection a questionnaire was developed with the purpose of collecting views, knowledge and suggestions of professionals in the field.

The questionnaire was prepared basically to achieve objectives and in order to identify most significant type of insurance used in industry and to grab key issues in performance of Construction Insurance in construction project risk management.

Sample

The questionnaire was distributed among sixty project practitioners such as Clients, Contractors and Consulting Engineers. Contractors having CIDA registration grade C1 to C7 were selected as respondents for questionnaire survey. Project Managers of Contracting parties who are having experience over 10years were asked to fill the questionnaire. Consulting Engineers with more than 10 years of experience and Engineers having more than 10 years of experience representing Employer were asked to respond to the questionnaire. Interviews with project practitioners were supplemented where necessary in order to gather their opinions on performance of insurance in managing construction project risk.

Questionnaires were distributed via electronic mail and facsimiles and their responses were used for the analysis.

3.4 Data Collection under Prevailing Insurance Policies

Prevailing insurance policies issued for building constructions, road constructions, were analyzed in detail with the intension of finding out current practices and issues in providing construction insurance policies for construction projects.

Data from fifty (50) insurance policies were analyzed. Out of that twenty seen(27) Contractor's All Risk Policies, twenty (20) Workmen Compensation Policies and Two (2) Professional Indemnity Insurance Policies and One(1) public liability insurance policy were subjected to analysis.

Prevailing insurance policies that have been issued by different insurance companies such as Ceylinco, Janashakthi, Sri Lanka Insurance, LOLC, Union assurance etc. were used for analysis.

Collected insurance policies were issued on behalf of building constructions and road constructions in large scale as well as small scale.

Projects in which Contractor's All Risk insurance policy, Workman Compensation policy, Professional Indemnity Policy, Public Liability Insurance Policy were subjected to analysis as follows.

Building Construction Projects (0 -10 million) :5 Projects

Building Construction Projects (10 -100 million) : 15 Projects

Building Construction Projects (Above 100 million) : 5 Projects

Road Construction Projects (0 -10 million) : 5 Projects

Road Construction Projects (10 -100 million) : 5 Projects

Road Construction Projects (Above 100 million) : 15 Projects

Other than above relevant insurance clauses of Contract Documents and Bills of Quantities were collected with respect to collected insurance policies.

3.5Data Collection on Insurance Claims

Data received on insurance claims form contractors and insurance companies were analyzed. 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.

Data received on insurance claims were basically with regards to Contractor's All Risk Insurance policies. Hence the data that were collected from the claims were analyzed in different categories as overall analysis of all the claims and based on Contractor's All Risk policy categorizations, as material damages claims and third party damages claims.

Following table shows data in which insurance claims from contractors and insurance companies which were subjected to the analysis.

Table 3.1: Summary of Collected Insurance Claims from insurers and contractors

	Type of Claim	**Amount Claimed**	**Amount Settled**	**Reasons for under settlement or rejection**	**Remarks**
01	Material damage; 250MVA transformer damage after commissioning	7,470,690	nil	Insurers liability expire "once a part of contract work taken over or put in to the service". MR100 endorsement.	rejected
02	Material Damage: Plant & machinery damage by fire	186,000	156,000	Deductible 10% or 30,000/=	Deduct only the deductible
03	Material Damage: Plant & machinery damage	15,000	nil	Claim amount within policy deductible of Rs.50,000/=	rejected
04	Material damage; Underground fire detection system cable damage	970,472	372,727	Unrealistic claim amount adjusted to Rs.422,727/=. Policy deductible 10%orRs.50,000/=	

	Type of Claim	Amount Claimed	Amount Settled	Reasons for under settlement or rejection	Remarks
05	Material and plant & machinery damage due to flood	5,485,127	339,650	Claimed for plant and machinery damage but it was not insured. It was covered only the BOQ value without cover for plant and machinery under section1 of the policy. Rs.522,000/= Estimated amounts for material damage were unrealistic.	Settled after deducting 10% or 50,000/= policy deductible
06	Principal's property damage (a retaining wall) due to construction work	No Claim		Principal's properties were not insured under issued policy.	Insured principal's property can be insured under section 1.
07	Material damage; construction work (road construction) due to landslide	369,000	nil	Claim amount within policy deductible of Rs.500,000/= against landslide peril	MR111; Removal debris from landslide

	Type of Claim	Amount Claimed	Amount Settled	Reasons for under settlement or rejection	Remarks
08	construction plant and machinery (engine driven welding plant) damage	369,000	nil	Plant and machinery not insured under issued policy	The claim could obtained if they insured the plant and machinery under CAR policy
09	Material damage; construction work damaged due to flood.	211,487	nil	Policy deductible 10% Rs.150,000/=. Estimate adjusted to Rs.82,982/= due to unrealistic estimate i.e. Quantities and rates	Adjusted amount Rs.82,982/=
10	Third party property (CEB power line post) damage under section II	89,350	39,350	policy deductible 10% or 50,000/=	Settled after 10% or 50,000/= deductible
11	Claim due to flood situation	123,000	25,000	Not Provided	
12	Claim due to theft	284,563.29	231,563	N/A	
13	Claim due to theft	62,345.00	8,500	Unable to prove purchase of some of the goods	

Chapter 4

4 DATA ANALYSIS AND DISCUSSION

4.1 Introduction

Construction insurance is important as a means of covering unexpected financial losses faced by Contractors and Employers. In this Chapter Data collected through planned methodologies described in Chapter 3 have been analyzed considering fifty numbers of prevailing insurance policies, details on fifteen numbers of insurance claims and sixty numbers of questionnaires distributed through project practitioners such as Contractors, Consultants and Clients. Also this chapter discusses respondents understanding and views on use of construction insurance in managing construction project risk.

4.2 Analysis of Responses Received to Questionnaire Survey

1. Respondent's Profile

Information of respondents who participated in the study was influenced by Consultants, Contractors and Clients as described under chapter 3.Experience of respondents was significant with most of them having experience of over 10years.

2. Question: Followings are insurance policies usually concerned in construction projects. Rank them based on most purchased on a scale of 1 to 5.

Following table presents information on available insurance covers and the extent of their use in the construction industry. Types of insurance covers available for use for as risk transfer option in the industry were extracted from literature and insurance companies.

For ranking purpose the Relative Frequency Index (RFI) was used. The RFI is calculated as follows.

RFI = ∑W / A x N

W = Weight given to each variable by respondents

A = Highest Weight, N = Total Number of respondents

For the purpose of this research,

N (Contractors) = 20, N (Consultants) = 20 and N (Clients) = 20

5 = Very Frequent, 4= Frequent, 3= Average, 2 = Rarely and 1= None ,A = 5

Table 4.1: Respondents level of use of insurance covers

	Insurance cover	$\sum W$	RFI	Rank
01	Contractor's All Risk Policy	350	1	1
02	Workmen Compensation Policy	330	0.943	2
03	Plant and Machinery Insurance Policy	210	0.6	4
04	Erection All Risk Insurance Policy	190	0.543	5
05	Professional Indemnity Insurance Policy	220	0.629	3
06	Public Liability Insurance Policy	150	0.429	6

The above results reveal that there are various insurance covers used for various purposes in the construction industry. Among those insurance covers Contractor's All Risk insurance cover and Workmen Compensation Cover are most frequently used in the industry. Also according to resent results of researches carried out by various researchers CAR policy covers most of risks specified in projects. Further Workmen Compensation Policy, Plant and Machinery Insurance Policy, Erection All Risk Insurance Policy, Professional Indemnity Insurance Policy and Public Liability Insurance Policy are also used in the industry.

3. Question: According to your understanding what is the purpose of providing insurance covers in construction

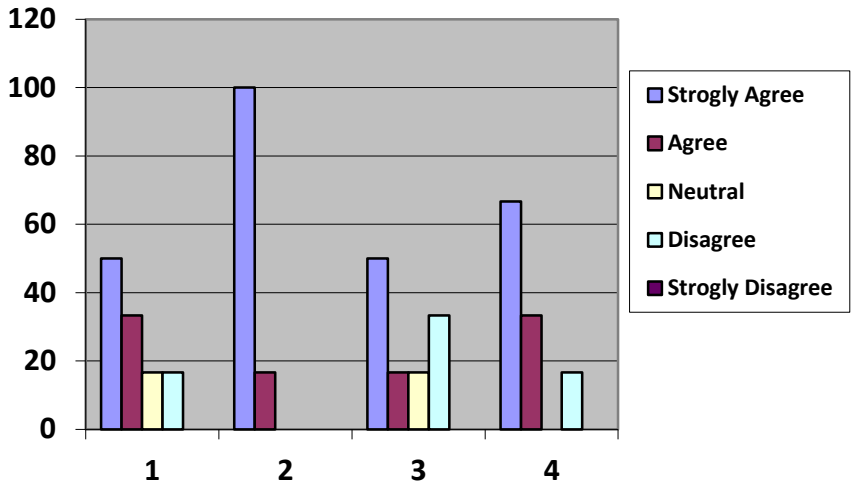

Figure4.1: purpose of providing insurance covers in construction

1. To meet the demand of the client *2. In order to transfer risk*

3. To reduce the impact of any disaster during construction

4. To meet tender and contract requirements

Majority of respondents answered the purpose of providing insurance covers as a means of transferring risk.

4. Question: Which of the following problems or concerns are faced with respect to insurance?

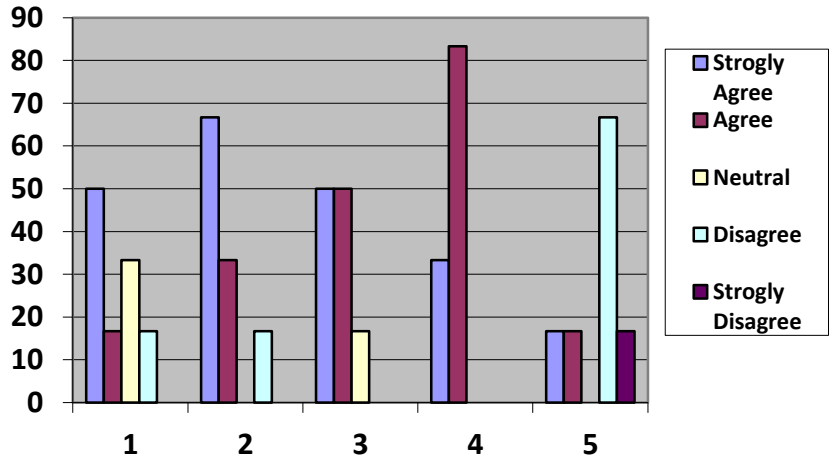

Figure 4.2: problems or concerns are faced with respect to insurance

01. Rising cost of premiums *02. Complex policy language*

03. Lack of proper coverage or exclusion *04. Lack of knowledge in insurance*

05. Fewer companies willing to insure

According to respondents' usual problems or concerns faced with the insurance are complex policy language and lack of knowledge in insurance.

5. ***Question: What is your idea on contractual clauses on insurance in FIDIC and CIDA Conditions of Contracts?***

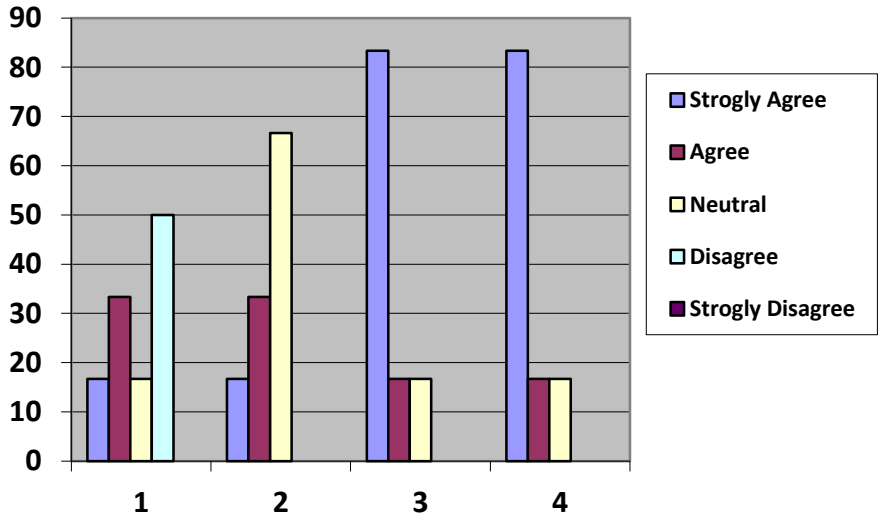

Figure 4.3: Idea on contractual clauses on insurance in FIDIC and CIDA Conditions of Contracts

01. *Contractual clauses on insurance in FIDIC and CIDA Conditions of Contracts sufficient to cover the risks of construction projects*
02. *Amendments are needed in general for current Condition of Contracts which are in practice*
03. *Contract Conditions need be changed as specific to the project and it should be done by Client through risk analysis at Project Procurement stage*

04. Contract Conditions need to be changed as specific to the project and it should be done by appointing an expert by Client

Results of the above analysis reveals that Contract Conditions need to be changed as project specific and it should be done by client through risk analysis at project procurement stage. It's better to appoint an expert by client on this purpose.

6. Question: Please comment your idea on following statements 1-8

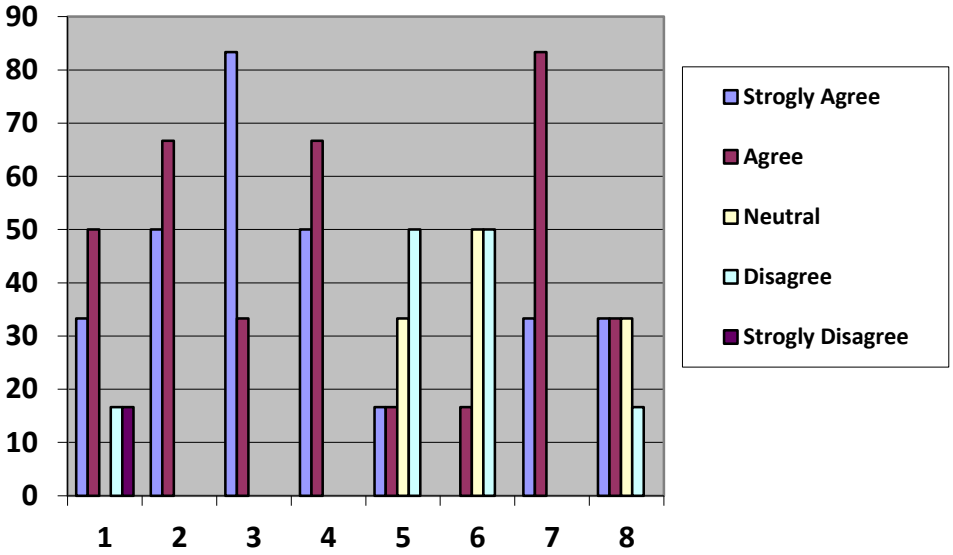

Figure 4.4: Idea on following statements 1-8 regarding Insurance

01. It is essential the Contractor to interact with insurance companies in risk identification, allocation and preparing insurance policies before or during construction

Most of the respondents agreed with this comment. Contractor's interaction with insurance companies is essential in construction contracts.

02. Insurance companies should visit sites during construction

According to comments received it very much important insurance companies to visit construction sites during construction in order to evaluate possible risks on the project.

03. *Contractor's proficiency in risk management plays an important role in project management activities*

    It is a strongly agreed fact that the contractor's proficiency in risk management is very much important in successful project management.

04. *Insurance claims are difficult*

    Respondents were reasonably agreed with this comment on insurance claims

05. *Most insurance companies who do construction insurance business in Sri Lanka, understand the needs of Contractors*

    According to respondents most of insurance companies do not understand the need for Contractors. As result risk transferring through insurance might not be successful as expected.

06. *In Sri Lanka insurance companies are familiar with the background of construction companies*

    Respondents were disagreed with this comment. Hence it is clear that there is a gap in view of construction insurance between insurance companies and construction companies in Sri Lanka

07. *Insurance companies in Sri Lanka do not provide risk management service effectively*

    Most of the respondents were agreed with this comment. Hence there is a problem with effective risk management through insurance.

08. *Disclosure of facts when obtaining a quotation for insurance may lead to high premium. It is rather better to request insurers to guess the risk and quote*

    Some respondents believe disclosure of facts when obtaining a quotation for insurance may cause to high premium. This may lead to claim reduction in case of a loss or damage which was not covered under the policy.

7. Question: What are the difficulties encounter when making a claim against a loss or damage?

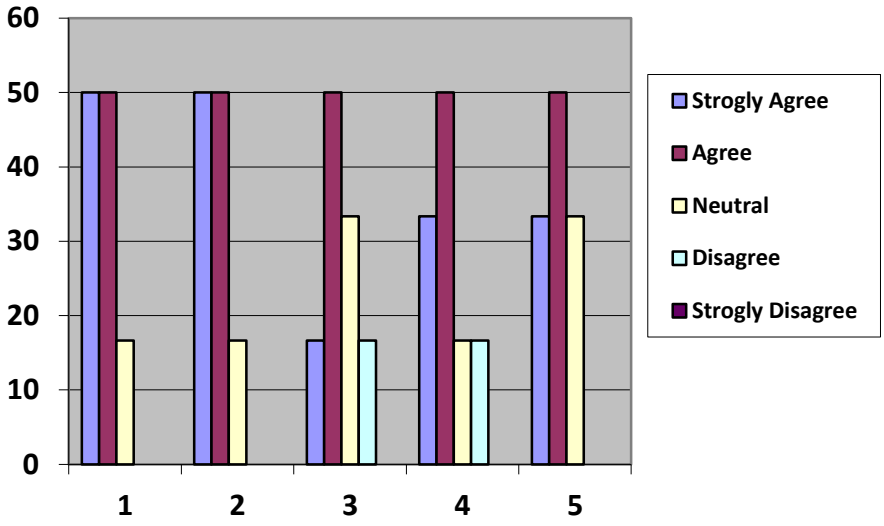

Figure 4.5: Difficulties encounter when making a claim against a loss or damage

01. There are more sensitive exclusions

02. Due to deductibles claims cannot be done for small defects

03. There are many written formalities which should be followed when making claim

04. Time consuming procedures to be followed when making claim

05. Time to time project changes to be notified to the insurer

A result of this analysis reveals that all above facts are agreed with respect to making a claim against a loss or damage.

8. Question: Do you think premium amounts charged by insurance companies when purchasing insurance policies are reasonable

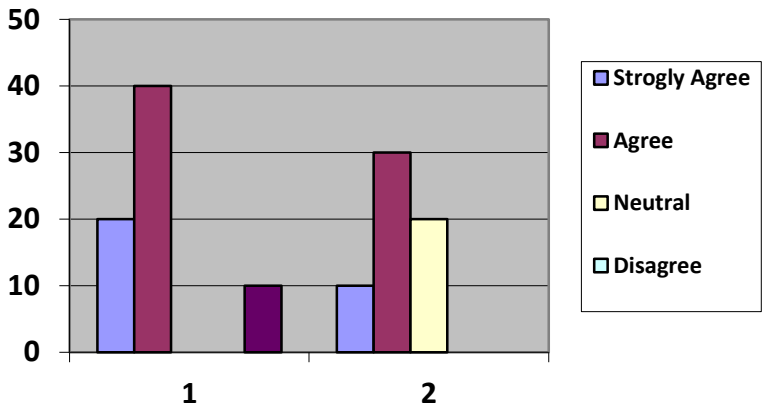

Figure 4.6: Reasonableness of premium amounts charged by insurance companies when purchasing insurance policies

01. Yes,

02. No,

Most of respondents agreed that insurance companies are charging reasonable premium as the cost incurred with respect to bearing risk.

9. Question: Do you think Contractors can retain the premium and manage the risk by themselves effectively

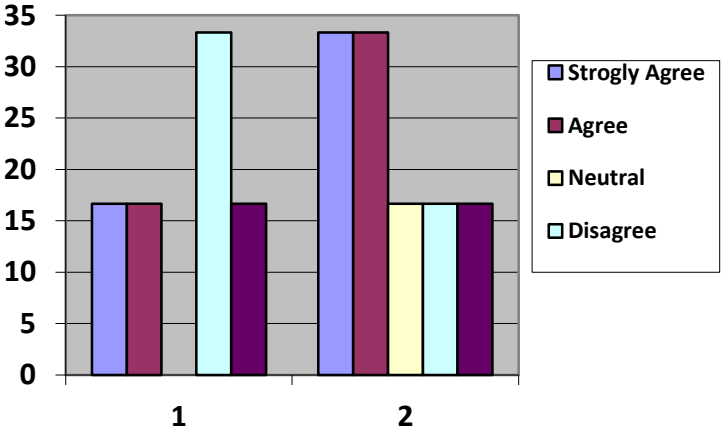

Figure 4.7: Effectiveness of premium and manage the risk by themselves

01. Yes. Loss can be covered and risk can be managed with retained premium

02. No .Insurance is necessary to cover loss in certain situations.

According to above results respondent's answer was as the insurance is necessary to cover loss in certain situations.

10. Question: Do you think there are any other better solutions other than Construction Insurance to transfer construction project risk?

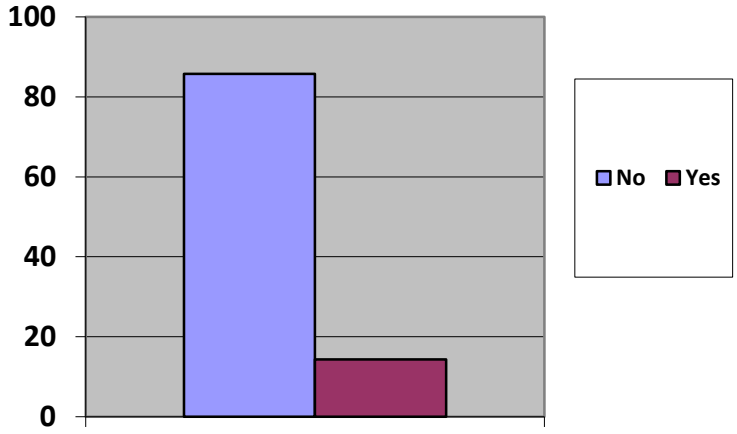

Figure 4.8: any other better solutions other than Construction Insurance to transfer construction project risk

Respondent answer was insurance is the best possible option for risk transfer in construction contracts.

4.3 Analysis of Prevailing Insurance Policies

Since insurance plays a vital role in risk handling and risk transferring, the construction industry is benefited with range of insurance covers available in the market.

It was found that following construction insurance policies are frequently available in the insurance market in Sri Lanka.

- Contractor's All Risk Insurance Policy
- Workmen Compensation Policy

- Professional indemnity Policy
- Public Liability Policy
- Plant and Machinery Insurance Policy
- Erection All Risk Policy

According to literature and responses received from the industry Contractor's All Risk (CAR) insurance is very frequently used while other are used on average or seldom.

All insurance policies are generally begun by declaring to give broad coverage for a variety of risks and potential damages. However, upon more careful review it can be seen that most policies are considerably scale back that declared coverage through exclusions, deductibles, policy limits and others to limit the insurer's liability.

4.3.1 Contractor's All Risk (CAR) Insurance

Contractor's All Risk (CAR) Insurance provides coverage for physical loss or damage to the property (material damage) as well as damage to the third party. The CAR policy insures against material damage in construction by all sudden, accidental and unforeseen causes other than specified excluded perils. The third party liability cover insures against accidental bodily injury or illness to third parties as well as accidental loss or damage to property belonging to third parties, caused by an accident at the construction site. Risks often covered under a CAR policy include Earth quick, Volcanism, Tsunami, Storm, Cyclone, Flood and Inundation as well.

Section 1 and Section 2 extracted from insurance policy are as follows,

4.3.1.1 General Exclusions

The company will not indemnified the insured in respect of loss, damage or liability directly or indirectly caused by or arising out of or aggravated by

(a) War, invasion, act of foreign enemy, hostilities (Whether war be declared or not), civil,war,rebilion,revelution,insurrection,mutiny,riot,strike,lock-out,civil commotion, military or usurped power, a group of malicious person or persons acting on behalf of or connecting with any political organization,

conspiracy, confiscation, commandeering ,requisition or destruction or damage by order of any government de *jure* or *defacto* or by public authority;

(b) Nuclear reaction, nuclear radiation or radioactive contamination

(c) Willful act or willful negligence of the insured or of his representatives

(d) Cessation of work whether total or partial

4.3.1.2 Section 1 – Material Damage

Special executions to Section 1:

The company shall not, however be liable for;

(a) The deductible stated in the schedule to be borne by the insured in any one occurrence;

(b) Consequential loss of any kind or description whatsoever including penalties, losses due to delay, lack of performance, loss of contract;

(c) Loss or damage due to faulty design

(d) The cost of replacement, repair or rectification of defective material and /or workmanship, But this exclusion shall be limited to the items immediately affected and shall not be deemed to exclude loss damage to correctly executed items resulting from an accident due to such defective material and/or workmanship;

(e) Wear and tear, corrosion, oxidation, deterioration due to lack of use and normal atmospheric conditions

(f) Mechanical and/or electrical breakdown or derangement of construction plant ,equipment and construction machinery;

(g) Loss of or damage to vehicles licensed for general road use or waterborne vessels or aircraft;

(h) Loss or damage to files, drawings, accounts, bills, currency, stamps, deeds, evidence of debt, notes ,securities, cheques;

(i) Loss or damage discovered only at the time of taking an inventory

(j) Buildings constructed of cadjan and materials stored in buildings of same or similar construction

Table 4.2: Analyzed insurance policies under material damage

Items under material damage	**Project 1**	**Project 2**	**Project 3**	**Project 4**	**Project 5**
Contract Work	1,102,673,146	10,308,902	78,427,521	98,773,609	4,393,127, 630
Construction Plant and equipment	Nil	Nil	Nil	150,000	Nil
Construction machinery	14,500,000	Nil	Nil	350,000	61,047,180
Clearance of Debris	5,000,000	Nil	250,000	Nil	Nil
Contractor or principal property	2,000,000	1,000,000	500,000	900,000	Nil
Employer's risks covered	Earthquake Volcanism, Tsunami, Strom, Cyclone, Flood, Inundation	Earthquake Volcanism, Tsunami, Strom, Cyclone, Flood,	Earthquake Volcanism, Tsunami, Strom, Cyclone, Flood, Inundation	Earthquake Volcanism, Tsunami, Strom, Cyclone, Flood, Inundation	Strike, Riots and Civil commotion Earthquake Volcanism, Tsunami, Strom, Cyclone, Flood, Inundation

According to analysis of existing insurance policies it is clear that Contract Work, Construction Plant and equipment, Construction machinery, Clearance of Debris, Contractor or principal property are covered under material damage. Contract works covers the contract permanent works, partially completed works and associated temporary works. Generally all BOQ items are indemnified under this category.

Removal of debris and cost of demolition that are the resultant of loss or damage are not included in the contact BOQ. The cost of demolition and removal of debris from the site is added to the sum insured to a specified limit defined in the policy.

It is necessary to cover construction equipment that would be used in a project unless equipment is not covered under any other policy such as an umbrella cover. The equipment should be insured at new replacement cost not at the depreciated value.

It is clear that certain Employer's risks are covered under material damage. But Employer's risks such as Strike, Riots and Civil commotion are not covered under all policies.

4.3.1.3 Section 2 – Third party liability

Special exclusions to Section 2

The company will not indemnify the insured in respect of

1. The deductible stated in the schedule to be borne by the insured in any on occurrence;
2. The expenditure incurred in doing or redoing or making good or repairing or replacing anything covered or coverable under section 1 of this policy;
3. Damage to any property or land or building caused by vibration or by the removal or weakening of support or injury or damage to any person or property occasioned by or resulting from any such damage(unless specially agreed upon by endorsement)
4. Liability consequent upon

a. Bodily injury to or illness of employee or workman of the Contractor(s) or the Principal(s) or any other firm connected with the project which or part of

which is insured under Section 1 or an employee or workman of the aforesaid;

b. Loss or damage to property belonging to or held in care, custody or Control of the Contractor's the Principals or any other firm connected with the project which or part of which is insured under section 1 or an employee or workman of one of the aforesaid;
c. Any accident caused by vehicles licensed for general road use or waterborne vessels or aircraft;
d. Any agreement by the insured to pay any sum by way of indemnity or otherwise unless such liability would have attached also in the absence of such agreement

4.3.2 Workmen's Compensation insurance

Worker's compensation insurance is essential for construction projects to safeguard the interests of workers and contractors. Workmen compensation laws have enacted to give statutory protection to employees injured on the job. Worker's Compensation insurance provides medical care and other benefits for the contractor's employees in the event that they are injured on the job.

Table 4.2: Schedule IV of the Workmen's compensation ordinance as amended by the workmen's Compensation (Amendment) Act .No.10 of 2005

Monthly wages of the workman injured	Death of Workman	Permanent Total Disablement of Workman	Half-Monthly compensation or temporary disablement of workman
Rs Rs	Rs	Rs	Rs
0- 2500	181,665.00	196,083.80	1320.00
2501- 5000	258,640.80	295,075.00	1804.00
5001- 7500	330,968.00	351,461.00	2186.80

7501- 10000	407,427.90	444,494.60	2733.50
10001- 12500	478,495.60	519,593.80	3231.80
12501- 15000	522,495.60	550,000.00	3561.80
15001- 17500	549,631.50	550,000.00	3890.70
17500- 20000	549,631.50	550,000.00	4221.80
20001 and above	550,000.00	550,000.00	5500.00

Exceptions under Workmen's Compensation Policy,

a. Any injury by accident or disease directly attributable to war, invasion act of foreign enemy hostilities(Whether war be declared or not)civil war mutiny insurrection rebellion or military or usurped power
b. The insured's liability to employees of contractors to the insured
c. Any employee who is not a 'workman" within meaning of the laws
d. Any liability of the insured which attaches by virtue of an agreement but which not have attached in the absence of such agreement
e. Any sum which the insured would have been entitles to recover from any party for an agreement between the insured and such party

4.3.3 Professional Indemnity Insurance

Professional Indemnity policy covers the design claims in case the construction manager acted negligently .These type of insurance coverage are adopted by the construction companies for financial protection. In design and built contracts the Contractor should obtain a professional indemnity cover. The Contractor's All Risk insurance will not cover professional indemnity although it is stated as design is covered. The Professional Indemnity insurance cover should commence from the date of commencement of the design by Design Engineer.

4.3.4 Public Liability Insurance Policy

Public liability is a legal ability to pay compensation to third parties arising in connection with the business activities of the insured.

It is important to note that all the project stakeholders should have knowledge on available insurance covers and extent of their coverage. Clients, Contractors and consultants should consider covers that address most emerging risks in their project undertakings when acquiring insurance covers.

4.3.5 Premium of Insurance Policies

Incurrence business is profit driven like in other businesses. Hence insurance companies compete with each other based on their service and premiums. Probability of risk or severity of risk and appropriate risk management system affects the insurance premium.

Contractors should have the ability to negotiate with the insurers to obtain best premium through implementing proper loss control and risk management measures via their experienced expert team.

Following table shows premium amount charged for CAR insurance and workmen's compensation insurance against insured sum for several building projects as well as road projects.

Table 4.3: Premium amounts charged against insured sum for CAR policies

S/N	Type of Project	Insurance policy	Sum Insured	Premium Charged	Percentage of Premium
01	Project 1- Building	CAR	554,788,254.35	1,210,349.32	0.2
02	Project 2- Building	CAR	83,177,521.00	79,177.52	0.1
03	Project 3 - Building	CAR	46,456,975.10	53,348.37	0.1

S/N	Type of Project	Insurance policy	Sum Insured	Premium Charged	Percentage of Premium
04	Project 4 - Building	CAR	53,158,887.00	67,407.41	0.1
05	Project 5 - Road	CAR	2,088,852.00	8,519.00	0.4
06	Project 6 - Road	CAR	27,200,000.00	732,697.00	2.7
07	Project 7 - Road	CAR	1,923,445,950.00	1,543,899.48	0.08
08	Project 8 - Road	CAR	1,411,599,562.40	1,136,519.43	0.08

Table 4.4: Premium amounts charged against insured sum for WCI policies

S/N	Type of Project	Insurance policy	Sum Insured	Premium Charged	Percentage of Premium
01	Project 9- Building	WCI	90,000,000.00	21,263.21	0.02
02	Project 10- Building	WCI	4,020,000.00	21,283.06	0.5
03	Project 11 - Building	WCI	11,520,000.00	26,681.77	0.2
04	Project 12 - Building	WCI	6,258,000.00	23,990.40	0.4
05	Project 13 - Road	WCI	138,024,000.00	28,375.20	0.02
06	Project 14 - Road	WCI	7,958,400.00	18,720.96	0.2
07	Project 15- Road	WCI	9,049,500.00	21,253.06	0.2
08	Project 16 - Road	WCI	102,500,000.00	242,021.46	0.2

From an insurance aspect risk forms the basis of premium calculation. The insured pays premium to the insurer for the benefit of transferring obligations, in respect of certain risks to him. Above table shows percentage of premium amount out of the insured sum for several building projects and road projects. It can be seen that most of time the percentage of premium range from 0.1% to 0.2%.But for several projects premium amount is much higher than this range. For several projects premium amount is much lower that the range. Calculation of the premium amount is based on "Probable Maximum Loss" or "Estimated maximum Loss" for particular Project.

Probable Maximum Loss of a particular project is calculated based on Risk exposure of a particular project. On other hand the premium amounts is based on the insured's ability to cope with risk. If all possible risks to be transferred to the insurer the premium become higher. Some times in order to survive in insurance market insurers offer lower premiums imposing additional restrictions on insurance policy.

4.3.6 Deductibles under insurance policies

Deductibles are usually included for insurance contracts to eliminate small claims and to ensure that the insured will comply with their own obligations to avid claims by taking precautions to prevent loss reasonably.

Below table shows deductible amounts for material damage items as well as third party damage items.

Table 4.5: Deductible amounts for material damages and third party damages

	Premium Charged	**Sum Insured**	**Deductibles**
Project 01	79,177.52	78,427,521	10% or Rs.35,000.00 whichever is higher on each and every claim
Project 02	1,210,349.32	554,788,254.35	10% or Rs.50,000.00 whichever is higher on each and every claim

	Premium Charged	**Sum Insured**	**Deductibles**
Project 03	53,348.37	42,906,975.1	10% or Rs.50,000.00 whichever is higher on each and every claim
Project 04	67,407.41	52,158,887	10% or Rs.25,000.00 whichever is higher on each and every claim
Project 05	732,697	7,000,000	10% or Rs.25,000.00 whichever is higher on each and every claim
Project 06	1,453,379.35	717,703,478.04	10% or Rs.25,000.00 whichever is higher on each and every claim

According to above table it is clear that deductible amount is normally 10% of the claimed amount. Although it is mentioned in contract documents to consider deductible amount as 5%, it is not practicable insurance market.

The relationship between the deductible imposed and premium charged is important. As the deductible amount increases the premium charged in respect of relevant insurance decreases. There should be a lower limit and higher limit. Lower limit ensure encourage effective protective measures to be implemented on site to reduce the probability of occurrence of damage. There should be higher limit in order to prevent the loss of benefit of insurance.

4.3.7 Additional Risks covered and restrictions under insurance policies

Additional forms are attached to the policies to modify it either unconditionally or with some condition

Reasons for using additional conditions

-To limit damages caused by certain event

- To prevent additional loss or damage by adequate risk management methods

-To reduce premiums as workable

Above restrictions are imposed on insured as Endorsements. Additions or deletions could be implemented through endorsements issued with the policy and the premium paid in respect of the final cover will depend on the extent of cover purchased. Therefore it is important when examine any insurance policy to look for the endorsement issued if any, and to consider their implications.
Different conditions, methods of insuring produce Number of endorsements or additional policies such as,

MR 002 – Cover or cross liability
MR003 - Maintenance Visits Cover
MR 004- Extended maintenance cover
MR103-Exclusion of Loss or damage to crops, forests and cultures
MR106-Warranty concerning sections
MR109 - Warranty concerning construction material
MR108-Warranty concerning construction plant, equipment and machinery
MR110- Special conditions concerning safety measures with respect to precipitation, flood and inundation
MR 107-Warranty concerning camps and stores
MR111 -Special conditions concerning removal of debris from landslides
MR112-Special conditions concerning fire-fighting facilities and fire safety on construction sites
MR120 - Vibration, removal or weakening of support

Following Conditions and Exclusions were found in most of CAR insurance policies related to building and road construction projects.

1. Safety and other sign boards written in Sinhala, Tamil and English relevant to the construction should be displayed at the construction area
2. No liability admitted to the third party vehicle parked within the radius of 25feet from the construction site
3. Steps must be taken to avoid unnecessary entrance of outsiders / third parties to the construction area
4. All the construction works should be carried out according to the method statements, specification and according to the approved construction drawings / methods
5. Proper necessary shoring method to be adhered
6. Theft and burglary excluded
7. Loss or damages due to wear and tear excluded

4.3.8 Insurance Clauses in Standard Forms of Contracts

Risk and Insurance clauses published in CIDA Standard Bidding Documents and FIDIC contract document are widely used in Sri Lanka as the basic document in Construction Contracts.

The following clauses are identified regarding risk and insurance in the Standard Bidding Documents published by CIDA and FIDIC,

Table 4.6: Relevant Risk & Responsibility and Insurance clauses in FIDIC and CIDA/ SBD 02 guidelines

	CIDA/ SBD 02	FIDIC
Risk and Responsibility	Clause 17	Clause 17
Insurance	Clause 18	Clause 18
Force Majeure	Clause 20	Clause 19

FIDIC and CIDA contract conditions are more or less same. Hence CIDA guidelines with respect to risk and insurance will be discussed under this study.

Clause 17.0of FIDIC Guidelines: Risk and Responsibility

17.1 Contractor's Care of the Works

This clause describes that the Contractor is liable for the value of work done if he has received payments for such works from the commencement date until the work is taken over by Employer. After taken over certificate is issued there may be outstanding work that has to be done by the Contractor. After taking over certificate is issued when carrying out outstanding work, if any loss or damage happens, such loss or damage shall be indemnified by the Contractor.

17.3Employer's Risk

(a) war ,hostilities (whether war be declared or not), invasion or act of foreign enemies.
(b) Rebellion, terrorism, revolution, insurrection, military or usurped power or civil war, within the country;

(c) Riot, commotion or disorder within the country by persons other than the contractor's personnel and other employees of the contractor and subcontractor.

(d) Munitions of war, explosive materials, ionizing, radiation or contamination by radio activity, within the country, expect as may be attributable to the contractor's use of such munities, explosive, radiation or radio activity.

(e) Pressure ways cause by aircraft or other aerial devices travelling at sonic or supersonic speed.

(f) Use or occupation by the employer of any part of the permanent works, except as may be specified in the contract.

(g) Design of any part of the works by the employer's personnel or by others for whom the employer is responsible; and

(h) Any operation of the forces of nature which is unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventative precautions.

Clause 18.0 of FIDIC Guidelines: Insurance

Clause 18.2: Insurance for Works and Contractor's Equipment

The insurance cover produced by the Contractor should cover loss or damage from contract commencement date until the performance certificate is issued by the Employer.

The contractor's equipment shall be insured as effective while it is being transported to the site and until it is no longer required as Contractor's equipment.

Clause 18.3: Insurance against injury to persons and damage to property.

According to contract conditions it is responsibility of the Contractor to obtain insurance policy including third party as well. Well known Contractor's All Risk policy facilitate this requirement.

The Contractor's All Risk policy has been broadly discussed under section 4.3.1of this analysis.

Clause 18.4: Insurance for Contractor's Personal

The Contractor shall effect and maintain insurance against liability for claims, damages, and losses and expenses (including legal fees and expenses) arising from injury, sickness, disease or death of any person employed by the contractor or any other of Contractor's personal.

The employer and the engineer shall also be indemnified under the policy of the insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the employer or of the Employer's personnel.

The insurance shall be maintained in full force and effect during the whole time that these personnel are assisting in the execution of the works. For a subcontractor's

employees, whether the insurance has been effected by the sub-contractor or not, the contractor shall be responsible for compliance with this clause.

CAR insurance deals with third parties claims resulting from an accidental damage to their persons or properties due to accidents occurring at the insured worksite directly connected with the construction works.

The insurance taker could happen to be the main contractor or the promoter and all the intervening parties being insured. It provides cover to any party with an interest in the construction project to be carried out. Client, contractor or subcontractors, frequently including all the suppliers of materials and equipment and rarely the Engineer, Consultant or Architect.

Insurance Companies usually do not include the Engineer among the insured parties. Because, if they did, all the losses resulting from defective design would be indemnified with no possible appeal, excepting special cases of proven negligence, which is extremely difficult to prove.

4.3.9 Analysis of Insurance Policies with SBD Guidelines:

Following Standard Bidding Documents published by Construction Industry Development Authority (CIDA) are followed by contractors in local projects under measure and pay works contracts.

CIDA/SBD/01-Standard Bidding Document Procurement of Works (Works contacts between Rs.10 million and Rs.100 million)

CIDA/SBD/02 - Standard Bidding Document Procurement of Works for Major Contracts (Works contracts over Rs.100 million)

CIDA/SBD/03 - Standard Bidding Document Procurement of Works for Minor Contracts (Works contracts up to Rs.10 million)

CIDA/SBD/03document describes risk and responsibilities of Contractor and Employer under Clause 12 and insurance under Clause 13.Under Risk and Responsibility clause Contractor’s care of the works and conditions under force majeure situation is described.

Under insurance clause the Contractor shall insure for loss or damage to the works, material and plant for 110% of the Initial Contract Price in the joint names of the Employer and Contractor.

Contractor's equipment should be insured for full replacement cost. It is a requirement to mention the minimum amount for insurance for Contractor's personal as well as loss, damage, death or injury to third parties or their property.

According to Clause 13.2 of CIDA/SBD/03 if the contractor fails to insure as stated in contact conditions, the Employer may insure the same and recover the premium with an additional charge of 30% as a deduction from any other monies due to the Contractor.

Hence it is mandatory to contractors to obtain Contractor's All Risk Policy and Workmen's Compensation Policy under Conditions of Contract.

CIDA/SBD/01 document describes Employer's and Contractor's Risk under clause 10, 11 and 12 of Conditions of Contracts. This document clearly defines Employer's risk and Contractor's risk under clause 11.1, 11.2 and 12.1.

Under insurance clause (Clause 13) the Contractor shall insure for loss or damage to the works, material and plant for 110% of the Initial Contract Price in the joint names of the Employer and Contractor.

The maximum deductible for insurance of the Works and Plant and Materials is generally 5% of Initial Contract Price as per the document. Practically the deductible amount becomes 10% of the Initial Contract Price. The minimum cover for loss or damage to Equipment is replacement cost.

The maximum deductible for insurance of Equipment is 5% of the minimum cover for Equipment. As observed with available insurance policies 5% is not practicable..

The minimum cover for insurance of other property (other than the Site) and the minimum cover for personal injury or death for third party and employees of the

Employer and other persons engaged by the Employer in the Works is should be defined by Employer at tender stage.

Normally above requirement is covered under third party liability under Contractor's All Risk Policy. But as observed the third party liability under CAR insurance policies do not cover personal injury or death for employees of Employer and other persons engaged by the Employer in the Works. The third party liability under CAR policy covers only third party property and bodily injury. It excludes bodily injury or illness of employees of Contractor(s) or the Principal(s).Hence although the above condition is mentioned under contract conditions the coverage not exist unless insured under separate cover.

According to Clause 13.4 of CIDA/SBD/01 if the contractor fails to insure as stated in contact conditions, the Employer may insure the same and recover the premium from any other monies due to the Contractor.

It is mentioned as a condition not to make alteration to the terms of insurance without approval of the Engineer.

CIDA/SBD/02 document describe risk and responsibilities and insurance in more descriptive manner more or less similar to FIDIC Conditions of Contracts. Risk and responsibility is described under Clause 17 of Conditions of Contract.

Under insurance clause (Clause 18) the Contractor shall insure for loss or damage to the works, material and plant for 115% of the Initial Contract Price in the joint names of the Employer and Contractor. The Contractor within 14 days from the Letter of Acceptance shall insure in joint names of Employer and Contractor against all loss or damage from whatever cause arising other than Employer's risks.

According to clause 18.2 of CIDA/SBD/02 document the Contractor shall obtain third party insurance including Employer's property as effective until the performance certificate is issued.

The third party insurance shall be for a limit per occurrence of not less than the amount stated in Contract Data, with no limit on number of occurrences. As observed in several insurance policies there is an aggregate amount under each category as third party bodily injury and property damage. This is contradicting with the Conditions of Contract. In that case insurer will not liable for amounts which exceeding the aggregate limit. Hence that additional amount will be cost to the Contractor.

Although it has been mentioned in Contract Conditions to obtain third party liability including Employer's personal, under available CAR policy it is not insurable. Hence the Employer's personal should be covered under a separated cover.

Contractor's Personal shall be insured under Clause 18.3 of Conditions of Contracts by obtaining Workmen's Compensation policy.

According to Clause 18.4 of CIDA/SBD/02 if the contractor fails to insure as stated in contact conditions, the Employer may insure the same and recover the premium with service charge of 5% from any other monies due to the Contractor

4.4 Analysis on Insurance Claims

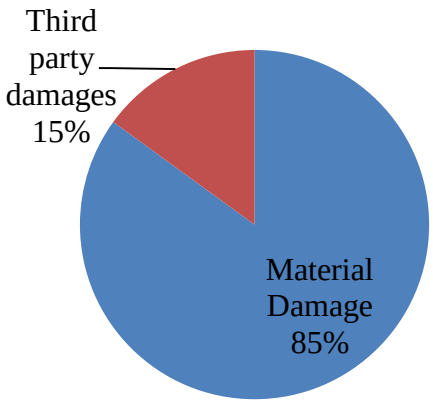

Figure4.9: Composition of claims based on type of risk covered

Data received on insurance claims were basically with regards to Contractor's All Risk insurance policies. The claims on CAR policies can be mainly categorized as third party damage and material damage. Out of collected data on insurance claims

85 % claims were for material damage 15% claims were due to third party damages as shown on figure 4.1 .

Table 4.7: Analysis of Insurance Claims

	Type of Claim& Claimed Amount	**Amount Claimed**	**Percentage of Amount Settled**	**Reasons for under settlement or rejection**	**Remarks**
01	Material damage; 7,470,690	nil	0%	Insurers liability expire "once a part of contract work taken over or put in to the service". MR100 endorsement.	rejected
02	Material Damage: 186,000	156,000	84%	Deductible 10% or 30,000/=	Deduct only the deductible
03	Material Damage: 15,000	nil	0%	Claim amount within policy deductible of Rs.50,000/=	rejected
04	Material damage; 970,472	372,727	38%	Unrealistic claim amount adjusted to Rs.422,727/=. Policy deductible 10%orRs.50,000/=	

	Type of Claim& Claimed Amount	**Amount Claimed**	**Percentage of Amount Settled**	**Reasons for under settlement or rejection**	**Remarks**
05	Material and plant & machinery damage due to flood 5,485,127	339,650	6%	Claimed for plant and machinery damage but it was not insured. It was covered only the BOQ value without cover for plant and machinery under section1 of the policy. Rs.522,000/= Estimated amounts for material damage were unrealistic.	Settled after deducting 10% or 50,000/= policy deductible
06	Principal's property damage (a retaining wall) due to construction work No Claim			Principal's properties were not insured under issued policy.	Insured principal's property can be insured under section 1.
07	Material damage; construction work (road construction) due to landslide 369,000	nil	0%	Claim amount within policy deductible of Rs.500,000/= against landslide peril	MR111; Removal debris from landslide

	Type of Claim& Claimed Amount	**Amount Claimed**	**Percentage of Amount Settled**	**Reasons for under settlement or rejection**	**Remarks**
08	construction plant and machinery (engine driven welding plant) damage 369,000	nil	0%	Plant and machinery not insured under issued policy	The claim could obtained if they insured the plant and machinery under CAR policy
09	Material damage; construction work damaged due to flood. 211,487	nil	0%	Policy deductible 10% Rs.150,000/=. Estimate adjusted to Rs.82,982/= due to unrealistic estimate i.e. Quantities and rates	Adjusted amount Rs.82,982 /=
10	Third party property (CEB power line post) damage under section II 89,350	39,350	44%	policy deductible 10% or 50,000/=	Settled after 10% or 50,000/= deductible
11	Flood situation 123,000	25,000	20%	Not Provided	

	Type of Claim& Claimed Amount	Amount Claimed	Percentage of Amount Settled	Reasons for under settlement or rejection	Remarks
12	Claim due to theft 284,563.29	231,563	81%	N/A	
13	Claim due to theft 62,345.00	8,500	14%	Unable to prove purchase of some of the goods	

4.4.1 Reasons for Rejection and Under Settlement of Claims

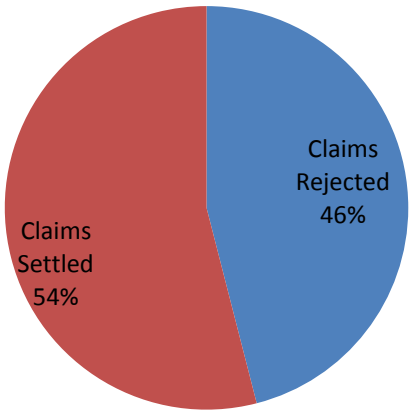

Figure 4.10: proportion of rejected claims against settled claims

Out of data on claims mention in table 4.7, as shown in figure 4.2 situations where the claims where settled by the insurer is 46%. Most of settled Claims were below 50% of the claimed amount.

According to insurance policies prepared for each project there were unique reasons to reject claims. Most of claims were below the deductible or excess limit proposed for the project. After deducting deductible amount settled amounts were very less than the claimed amount. Hence part of the loss or damage needed to be absorbed by

the Employer and the Contractor which is within the limit of deductible amount specified.

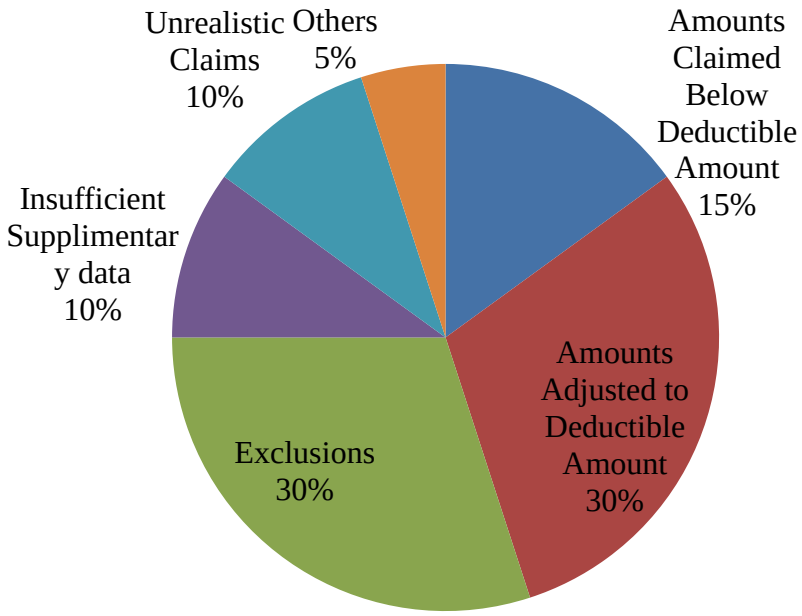

Figure 4.11: Reasons for claims rejection or under settlement

Sometimes claims may reject due to special conditions imposed on policies as endorsements. Therefore such cover restrictions need to be observed at the time of purchasing the insurance policies and maintained by the insured. Also it is the responsibility of the Employer to acknowledge on each and every condition relevant to the policy document since it directly affects the Employer.

Sometimes insured propose unrealistic claims with the intension of obtaining as much as possible out of the claimed amount. But after claim adjustment only part of the claim will be paid. If the insured is dissatisfied against the adjusted claim amount insured may appeal against claim adjustment first to insurer and subsequently to the insurance ombudsmen. No insurer will deny payment on genuine claims and insurer will show the workings on the claim adjustment subjected to legal limitations.

The insured should be able to submit sufficient supplementary data for claim evaluation. Sometimes claims are rejecting due to insufficient supplementary data

provided by the insured. If the insured can avoid such pitfalls in claims efficiency in use of insurance in risk management will be increased.

Another significant reason for rejection for claims is that the source is a foreseeable damage. These reasons reflect the insured's lack of knowledge and attention to insurance policy wordings. Most contractors not known the policy until their claims were rejected.

There are certain attributes behind successful claims such as the estimated amount is correctly within the current market price and availability of supporting documents. Contractor's corporation with insurer revealing all the information is a significant factor. These attributes are very useful in successfulness of a claim.

Although legally not bound some insurers make extra payments to genuinely affected insured parties. Those payments are insurer's sole discretion and not recoverable through insurance agreements. This is done only to keep business relationship.

4.4.2 Remaining Cost of Claims after rejection or under settlement

After partial settlement or full settlement of the claim there is considerable remaining amount other than deductible amount which is a liability to the Contractor. If the claim is rejected remaining cost become the full amount. Study through above data reveals that at most of cases except few the contractors had to suffer losses. When taking in to consideration the cost of administration at a loss there is a question that whether the settled amount for the claim is sufficient enough to cover the actual loss or damage.

Summary

After above analysis it can be concluded that construction insurance plays an important role in construction project risk management. Insurance should not be taken only to satisfy Conditions of Contracts in the Contract document. Insurance should be used with understanding on concepts of insurance and probability of risk which may occur throughout project life cycle.

Identified key gaps and drawbacks of insurance through data analysis are as follows,

01. Lack of insured's attention towards insurable risks and not following adequate insurance claim procedures
02. Deductible limit 5% is not sufficient in practical situations
03. Due to competitiveness of the insurance market insurers may offer low quotations including too many restrictions
04. In practice Contract Conditions are not amending considering risks which should be covered particular to specific project.
05. Contractors equipment are not insured at full replacement value following Contract Conditions
06. Insurance policies which are in practice mainly cover the contractor's risk and leave the Employer free to takeout his own insurance for whatever risk he considered as insured
07. Most of Employer's risks are insurable but in most situations it not happens**.** Hence in events of such losses or damages the Employer have to pay for the cost of repair.

Recommendations for above identified key gaps and drawbacks are discussed under chapter 5 in detail.

It is proposed to include Employer's requirement particular to insurance aspect in tender documents. Proposed sample schedule is shown in the Appendix 2.

Chapter 5

5 CONCLUSION AND RECOMMENDATIONS

5.1Conclusions

Due to some of inherent characteristics of construction projects it is exposed to an extremely large amount of hazards and thus to risks. As construction projects increase in size, the risk inherent in its planning, design and execution do not multiplied in proportions. Instead new risks emerge which need to be identified and taken special care. Construction insurance is widely used by means of a risk transfer option in construction industry. Hence performance of construction insurance is very much important in successful construction project risk management.

Insurance companies are prepared to provide protection by taking over many of the critical risks people face at affordable cost. The basic mechanism behind the insurance concept is risk transferring from one party to another at an affordable cost. Insurers operate on the basis of probability of transforming the risk to a loss. Due to limitations in insurance policies, it is not guaranteed that loss will be covered in full amount.

There are various insurance policies available in the market. Generally polices begin by purporting to give broad coverage for verity of risk and potential damage. However upon careful review it can be seen that there are various exclusions, deductibles, policy limits etc. to limit insured's liability.

In practical situation most minor impacts on projects have less chances of receiving expected insurance benefits. Lager losses are having better chances being benefitted if a policy was taken with careful risk analysis and negotiation. No insurer will deny payments on genuine claims. In order to keep business relationship some insurers make extra payment although it is not bound legally.

When obtaining insurance policies for particular contract, the Contractor should carefully read and understand clauses in the Contract document. Period of

construction, the weather patterns in the areas of operation, the road network, streams, reservoirs/tanks, traffic congestion, monsoon pattern, terrain, ground water table and geology of the site etc. should be studied carefully by the Contractor. Risks due to natural hazards such as flood; landslide etc. should be estimated initially. Risks on third parties and surrounding properties should be analyzed very much important to cover full scope worked carefully. It believes that cofferdams are typically having high risk of damage. It is very much important to cover full scope of cover requested by contract.

In Sri Lanka most of contractors do not appoint a knowledgeable person to cope with insurance companies when obtaining insurance policies. Most of time administrative staff is dealing with insurers in obtaining insurance policies without any idea on contract requirements or conditions imposed through insurance policies by insurers.

When the policy is received the project manager should study the scope of coverage offered in relation to disclosed facts to the insurer. The claims recovery will depend on the extent of restrictive conditions imposed by insurers.

Contractor's equipment should be insured at new replacement cost and not at depreciated value. Often this is not the actual situation. Hence when equipment is damaged the insurer will only pay the depreciated rate.

Insurance market is very competitive and there is a tendency to offer low quotations than the rates calculated based on risk analysis. Cheap policies may contain too many restrictive conditions on claims in case of a loss or damage.

In contracts risks of accidental damage during construction stage of projects are managed through relevant risk management clauses in the forms of contract.

This is affected by the clauses related risk and responsibility and insurance in FIDIC and ICTAD from of contract. ICTAD and FIDIC forms of contract are covering range of possible risks in construction. When preparing tender documents Contract conditions should be amended particular to the project. It was found that in practice contract conditions are not amending considering risks which should be covered particular to specific project.

From the analysis it can be concluded that insurance is an important requirement as stated Conditions of Contract. In sudden and unforeseen situations there should be way to recover the loss or damage. Insurance is the best available option for risk transference.

Comprehensive risk analysis at initial project stages and due attention of contractors on insurable risk are important measures that can be taken in effective performance of insurance.

5.2 Recommendations

Recommendations for Clients and Contractors according to gaps and drawbacks of Construction Insurance

01. Lack of insured's attention towards insurable risks and not following adequate insurance claim procedures

As discussed in questionnaire and analysis of insurance claims under Chapter 4, the Contractor's due attention on insurance policy is very much important. There can be losses due to lack of Contractor's early and due attention on insurance policies. Also there can be losses due to Contactor is not following adequate insurance claim procedures such as delays in informing damage, lack of records etc.

There are several risks which are insurable with contractor's due attention such as damages not covered due to non-disclosure of facts when purchasing of the insurance policy. Some contractors do not disclose risks thinking they will not get low premiums and requests insurer to guess on risk and quote. This lead to increase premium since insurers have to guess about risks.

Table 5.1: Recommendations for Contractors and Employers for gap no.01

Recommendation for Contractors	Recommendation for Employers
• It is recommended to analyze risk at initial stages of the project. Hence all the possible risks can be insured with certain premium after negotiation with insurer. • Contractors should disclose facts on possible risk to the insurer without requesting insurer to guess on risk. • Experienced Project Managers, Engineers, Technical Officers should involve in risk identification process. • Increase in scope of work during performance should be notified to the insurer and the policy should be maintained accordingly. • Contractors should maintain necessary records and inform the insurer at the time of damage without any delay	• The insurance cover should necessarily cover the Principal. Cover restrictions should be studied carefully negotiates on restrictive covers and obtains best available cover in the market. • It is recommended to analyze risk at project procurement stage and include special requirements under tender documents

02. Deductible limit 5% is not sufficient in practical situations

As discussed under analysis of prevailing insurance policies, it is clear that deductible amount is normally 10% of the claimed amount in practice. Although it is mentioned in contract documents to consider deductible amount as 5%, it is not practicable in insurance market. Hence balance 5% deductible amount will be under the Contractor's cost.

Table 5.2: Recommendations for Contractors and Employers for gap no.02

Recommendation for Contractors	Recommendation for Employers
• For Employer's risk it is recommended to discuss with Employers to increase deductible limit to as practicable before tendering	• There should be a lower limit and higher limit for deductible. Lower limit ensure encourage effective protective measures to be implemented on site to reduce the probability of occurrence of damage. There should be higher limit in order to prevent the loss of benefit of insurance. Hence it is recommended to decide the limit for Employer's risks based on practical situation at the tender stage.

03. Due to competitiveness of the insurance market insurers may offer low quotations including too many restrictions

Table 5.3: Recommendations for Contractors and Employers for gap no.03

Recommendation for Contractors	Recommendation for Employers
• Contractors should not try to get cheap policies with so many restrictions. Both Contractor and Employer may suffer with such policies in case of loss or damage in such situations	• Clients should check insurance policies and check whether all to risks have been addressed as per the tender requirements and quoted rates for obtaining insurance at the tender stage against the insurance premium.

04. In practice Contract Conditions are not amending considering risks which should be covered particular to specific project.

Table 5.4: Recommendations for Contractors and Employers for gap no.04

Recommendation for Contractors	Recommendation for Employers
It is recommended for Contractors to discuss with Employers on with respect to particular requirements on insurance prior to tender submission	Clients should amend Contract Conditions particular to specific project with either consultation of expert parties. Example: For Employer's risks Employer can specify risks which should be covered under the policy.

05. Contractors equipment are not insured at full replacement value following Contract Conditions

As discussed under Chapter 4, Analysis of Insurance Policies with SBD guidelines, insurers are not insuring Contractor's equipment at full replacement cost. It is insured only at the depreciation value.

Table 5.5: Recommendations for Contractors and Employers for gap no.05

Recommendation for Contractors	Recommendation for Employers
It is recommended for Contractor's to either insure contractor's equipment at full replacement cost following contract conditions or discuss with Employer to insure only at depreciation cost with reduced premium provided that the Contractor can supplement with replacement without affecting the project or the Employer.	Clients should check whether the insurance is for new placement cost for Contractor's equipment following guidelines in Contract Conditions. Otherwise the Employer should agree with the Contractor to replace contractor's equipment at a loss or damage without affecting the project or the Employer.

06. Insurance policies which are in practice mainly cover the contractor's risk and sometimes not covering Employer's personal and Employer's property following contract conditions.

As discussed under analysis of prevailing insurance policies, the insurance should cover both Contractor and the Employer. The Employer does not always examine the necessity of insuring risks which he is exposed due to lack of knowledge

Table 5.6: Recommendations for Contractors and Employers for gap no.06

Recommendation for Contractors	Recommendation for Employers
Standard forms of contract generally require the Employer is named in joint insured in the insurance policies. But the cover is not intended to extend to his exclusive risks. It is important to have the contractor's due attention on above and insure possible risks as far as possible.	The Employer should examine the insurance policy and ask the Contractor to insure Employer's personnel and property following contract conditions.

07. Most of Employer's risks are insurable but in most situations it not happens. Hence in events of such losses or damages the Employer have to pay for the cost of repair.

In all construction contracts there are risks which must be allocated to the Employer. These Employer's risks can relate to the project itself or third parties. As discussed under insurance clauses in standard form of contracts there are Employer's risks which could be insured. If not specifically mentioned under the tender document Employer's risk may not cover within the insurance.

Table 5.7: Recommendations for Contractors and Employers for gap no.07

Recommendation for Contractors	Recommendation for Employers
It is recommended to insurer Employer's risk as far as possible and avoid unnecessary cost incur in such events of losses or damage.	It is recommended to emphasize requirements of Employer's risk under tender documents at tendering stage. It is recommended to allow costing for Employer's risks as provisional sum under the bill of quantities.

From above conclusions, it is revealed that the primary objective of obtaining insurance policy is to have broad coverage on risk, at the lowest premium. It is also the contractor's responsibility to avoid risk as far as possible in construction.

Following strategies are recommended to adopt for successful performance of construction insurance in construction project risk management.

- Insurance companies and contractors should maintain a cordial relationship by means of active communication mainly with underwriters, loss adjusters etc. Contractors should avoid foreseeable damages through satisfactory risk management practice at site.

- Provision of insurance shall be expanded in construction contracts. Contract conditions need to be changed as specific to the project and it should be done by appointing an expert by Client. It ensures insurance policies are designed according to the nature of project, the types of procurement as well as limits of insurance coverage.

- Although it is a duty of the Contractor to successful risk management of a project, insurers should visit site and evaluate potential risks assisting the contractor to manage risk successfully. It is also a duty of the insurers to have board knowledge on construction industry and contractor's requirement on risk management.

- It is important project stakeholders to have thorough idea on construction insurance, insurability of risk and principals of insurance. Careful checking of the insurance policy is required to ensure that unintended gap is not incorporated in the insurance cover.

- The sum insured is very much important since it provides the upper limit of indemnity in respect of a particular insurance policy. Therefore it is important to have the Contractor's due attention on correct sum insured. If wrong sum insured is adopted there can be gaps of recovery in a loss or damage.

- If the contractor is expected to design any part of the project or the temporary works associated with construction it is recommended to supplement the Contractor's All Risk insurance with a design insurance cover or provide professional indemnity insurance cover.

- It is recommended for design and supervision consultants to protect their firms by providing adequate professional indemnity insurance coverage to the service from legal liabilities arising from professional error, omissions and negligence of their employees.

- Contactors should be innovative, smart and have the ability to negotiate with insurers to obtain best premium reduction and improve conditions of the insurance policies implementing proper risk control measures.

- Contractors need to undertake more training and education on insurance practice and the type of policies available and appropriate for a particular risk.

- Duplication of insurance covers may occur when getting insurance for vehicles and machineries. There check already available insurance cover and avoid over lapping insurances.

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DEGREE OF MASTERS OF CONSTRUCTION PROJECT MANAGEMENT

QUESTIONNAIRE TO PROJECT CONTRACTORS, CONSULTANTS AND CLIENTS

RESEARCH TITLE: STUDY ON PERFORMANCE OF CONSTRUCTION INSURANCE IN MANAGING CONSTRUCTION PROJECT RISK.

Please answer the following questions, ticking or filling where appropriate. You may comment on more than one answer given under each question.

01. Which of the following contract group you belong to

Client/Owner [ ] Consultant [ ] Contractor [ ]

02. Followings are insurance policies typically involved in construction projects. Rank them based on most purchased on a scale of 1 to 5

	Insurance Policies	Rank					
		01	02	03	04	05	06
01	Contractor's All Risk Policy						
02	Professional Indemnity Policy						
03	Workmen Compensation Policy						
04	Erection All Risk Insurance Policy						
05	Plant and Machinery Insurance Policy						
06	Public Liability Insurance Policy						

03. According to your understanding what is the purpose of providing insurance covers as above in construction

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	To meet the demand of the client					
02	In order to transfer risk					
03	To reduce the impact of any disaster during construction					
04	To meet tender and contract requirement					

04. Which of the following problems or concerns are faced with respect to insurance?

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	Rising cost of premiums					
02	Complex policy language					
03	Lack of proper coverage or exclusion					
04	Lack of knowledge in insurance					
05	Fewer companies willing to insure					

05. What is your idea on contractual clauses on insurance in FIDIC and CIDA Conditions of Contracts?

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	Contractual clauses on insurance in FIDIC and CIDA Conditions of Contracts sufficient to cover the risks of construction projects					

02	Amendments are needed in general for current Condition of Contracts which are in practice					
03	Contract Conditions need be changed as specific to the project and it should be done by Client through risk analysis at Project Procurement stage					
04	Contract Conditions need to be changed as specific to the project and it should be done by appointing an expert by Client					

06. Please comment your idea on following statements

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	It is essential the Contractor to interact with insurance companies in risk identification, allocation and preparing insurance policies before or during construction					
02	Insurance companies should visit sites during construction					
03	Contractor's proficiency in risk management plays an important role in project management activities					
04	Insurance claims are difficult and wordings are complicated					
05	Most insurance companies who do construction insurance					

	business in Sri Lanka, understand the needs of Contractors					
06	In Sri Lanka insurance companies are familiar with the background of construction companies					
07	Insurance companies in Sri Lanka do not provide risk management service effectively					
08	Additional conditions ,clauses which are entered to the policy document should be compatible with the bidding document					
09	Disclosure of facts when obtaining a quotation for insurance may lead to high premium. It is rather better to request insurers to guess the risk and quote					

07. What are the difficulties encounter when making a claim against a loss or damage?

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	There are more sensitive exclusions					
02	Due to deductibles claims cannot be done for small defects					
03	There are many written					

	formalities which should be followed when making a claim					
04	Time consuming procedures to be followed when making a claim					
05	Time to time project changes to be notified to the insurer					

08. Do you think premium amounts charged by insurance companies when purchasing insurance policies are reasonable

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	Yes, Risk transferring to insurers with premium is much better than suffering from an un bearable loss					
02	No, even with high premiums there are many exclusions and difficulties in making a claim against a defect					
03	No, It is better to have good risk management practice at site rather than paying high premium for insurance					

09. Do you think Contractors can retain the premium and manage the risk by themselves effectively

		strongly agree	Agree	Neutral	Disagree	Strongly disagree
01	Yes. Loss can be covered and risk					

	can be managed with retained premium					
02	Yes. Even with insurance good risk management should be practiced at site					
03	No .Insurance is necessary to cover loss in certain situations.					
04	No, Risk transferring to insurers with premium is much better than suffering from an un bearable loss					

10. Do you think there are any other better solutions other than Construction Insurance to transfer construction project risk?

No [ ]

Yes [ ], what are they?

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Appendix 2

SCHEDULE FOR CONTRACTOR'S ALL RISK POLICY ACCORDING TO CIDA/ SBD 02

01. Project:

02. Period of Insurance:

03. Sum Insured:

Section 01: Material Damage

1. Contract Works

   1.1 Contract Price :

   1.2 Materials Supplied by the Employer :

2. Construction Machinery :
3. Clearance of Debris :
4. Existing Property :
5. Employer's Risks (Eg. Earthquake, Volcanism, Tsunami, Storm, Cyclone)

Section 02: Third Party Liability

1. Bodily Injury:
2. Property Damage:

04. Deductibles

Section 01: Material Damage

1. Contract Works:
2. Contractor's Plant and Machinery:
3. For losses due to all other risks:

Section 02 - Third Party Liability:

05. Territorial limits

1. Section 01: Material Damage:
2. Section 02: Third Party Liability:

06. Conditions

1. Section 01 – Material Damage:
2. Section 02 – Third Party Liability:
3. Applicable to all sections: