DISPUTES BETWEEN CONTRACTORS AND SUBCONTRACTORS IN SRI LANKAN CONSTRUCTION INDUTRSY

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May, 2016

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ABSTRACT

DISPUTES BETWEEN CONTRACTORS AND SUBCONTRACTORS IN SRI LANKAN CONSTRUCTION INDUTRSY

The construction industry includes profusion of Subcontractors employed in various projects. Moreover, a higher number of subcontractors have begun entering into the industry due to ease of entry. However, all subcontractors might not possess the required proficiency to fulfil client's necessities. Thus, various issues have aroused due to lack of proper subcontracting practices creating management of subcontractors in construction industry in Sri Lanka essential.

The study incorporated interviews and questionnaire survey to derive at the aim of this research which was to identifying the caused for disputes in subcontracts in the construction industry in Sri Lanka and propose mitigation measures. Besides, to understand the practice of subcontracting in construction industry and caused for possible disputes, a literature synthesis followed by questionnaire survey and structured interviews were executed. Similarly, literature synthesis assisted to identify causes for disputes in subcontracts. Furthermore, preliminary investigation aided in validating the findings of the literature synthesis while more issues and solutions were added by the interviewees. Consequently issues and solutions were ranked through the questionnaire survey to identify the most critical issue. Subsequently the mitigation measures were proposed to overcome the disputes in subcontracts with the aid of the findings of literature synthesis, interview and questionnaire survey.

Payment problems, coordination problems, lack of communication, quality issues, scheduling conflicts, no form of subcontract prepared for Sri Lankan usage; no compulsory subcontractor registration procedure; no practice of security of payment in Sri Lanka are major issues. Mitigation measures were suggested o overcome disputes in subcontracts by addressing the causes for disputes.

Keywords: *Subcontractor, disputes, causes, mitigation measures*

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Dedication.....

To my beloved parents ..

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LIST OF ABBREVIATIONS

FIDIC	Federation Internationale des Ingenieurs Conseils
ICE	Institute of civil Engineer
JCT 80	Standard form of building contract 80th Ed of JCT standard form of Building Contract
JCT	Joint Contract Tribunal
FCEC	The federation of civil engineering contractor's form of sub-contract
MC	Main contractor

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CHAPTER 1

1. INTRODUCTION

1.1. Background

Subcontracting is an important element of the construction industry, and its prominence has been increasing in the industry over the time. There are very few small projects that may have performed only by the contractor without involvement of subcontractors. In most of construction projects the contractors obtain the services of subcontractors to perform the specific work items that are required. The characteristics of the project dictate the type, size and capabilities of each subcontractor that may be required. (Knutson, Schexnayder, Fiori & Mayo, 2003). Job specific subcontractors are normally assembled under the general contractor who is acting as the head. While obtain the service of the subcontractors contractor use its own labour force throughout the project to carry out the works under his scope.

According to Gould & Joyce, (2009) general contractors utilize subcontractors due to various reasons such as; lack of expertise in these types of work, enabling them to limit their risk disclosure or expands their available work force so they have more chances to tender on new projects. According to Hsieh (1998), the benefit of subcontracting is that it allow the contractor to acquire various construction services proficiently from the resource market. Further it can be considered as an effective means of cost control and risk management. Xiao, Guomin, Bo and Yingbin (2013) states that there can be number of subcontractors/subcontracting organizations involve in one project subject to the size of a particular project.

“Initial research conducted into the ways in which subcontractor relations are managed by head contracting organizations found consistency in the notion that head contractors and subcontractors will more often than not choose to enter into

transactions with organizations whom they have previously been involved with" (Xiao et al., 2013). Shah (1998) stated that "general contractors and subcontractors may not cooperate in a highly recurrent way; nevertheless they entertain long term business relationships". "The typical contractor-subcontractor relationship is still traditional, cost driven and potentially adversarial" (Greenwood, 2001). However, if this relationship is effectively managed, chances for project success can be increased. Such effectiveness is controlled by the human interaction that takes place during the construction management process. "Since subcontractors secure virtually all their work through general contractors the success of the typical subcontractor depends directly on the relationships they establish and maintain with those general contractors that need their expertise" (McCord, MS and Gunderson, 2013).

The level of collaboration between representatives of the contractor and subcontractor depends on the nature and scale of the construction project. In a complex project, extensive interaction and coordination between contractor and subcontractor is required. In such circumstances, the relationship between two parties is created out of necessity. Kale & Arditi, (2001) contends that 'poor performance of either party can have profound effects on the other'. Lau & Rowlinson, (2009) have identified that working relationships are important in effecting project performance and they further elaborates that cooperation is believed to be a behavioral consequence of trust. Contractor trusts his subcontractor. This is similar to the trust held by the employer on contractor. The contractors trust in his subcontractors in their ability to perform works to an agreed level of quality within a certain time frame. Even though the appointment is based on the trust, after appointment, the contractors aim to decentralize liability from its own organization whereas continuing to meet and deliver on its own contractual obligations.

Due to various reasons, the relationship between contractors and subcontractors will breakdown throughout the construction process. The result of the breakdown is the occurrence of disputes. Any industry which involves large sums of money is

exposed to disputes, and practically unavoidable. Love, Davis & Ellis 2010, (as cited by Xiao 2013) state that while considerable amount of knowledge has been accumulated about dispute causation, disputes continue to prevail disrupting the construction process and consumes high cost in resolution.

Kumarswamy (1997) has identified root causes, which contribute to the occurrence of disputes in construction industry. These include unfair risk allocation, unrealistic time/cost/quality targets by the client, adversary industrial culture and unrealistic information expectations. According to Yiu & Cheung 2006, main factors causing occurrence of disputes can group in to two main categories as 1) construction related, variation and delay in work progress and 2) Human behavior parties, expectations and inter party problems. Each or many of these cause may effects to the relationship between contractor and subcontractor resulting disputes. According to Xiao at el (2013), ineffective management of both contractual and personnel elements of the relationship between themselves and their subcontractors significantly increase the likelihood of disputes arising. They further states that;

Disputes during the course of a large scale commercial construction project are to a certain extent unavoidable, this is due to the fact that the interaction during a construction project between the head contractor and subcontractor is mainly based around; 1) subcontract agreements and conditions of contracts; 2) Exposure to high levels of financial risk (from view point of both parties) 3) the protection of a party's own interest or motivations; and 4) constraints based around time, money and resources.

1.2. Research Problem

Commercial construction is a captivating sector in the construction industry. It provides a high-stake environment for its participants with the opportunity for great satisfaction and reward for both head contractors and subcontractors. If contractor can manage commercial construction process effectively, allowing for reward and financial gain for themselves and their subcontractors, the likelihood of

disputes occurring can be minimized. There are disputes in between contractors and subcontractors in Sri Lanka. However, there is lack of investigation on to disputes and its causes in between contractor and subcontractors in Sri Lankan context. Therefore, the research question is what are the causes for disputes between contractors and subcontractors in the Sri Lankan Construction industry.

1.3. Aim

The aim of this research is to investigate the causes for disputes between contractors and subcontractors in Sri Lankan construction industry.

1.4. Objectives

In order to achieve above aim, the following objectives was identified.

- Identify subcontracting procedures in construction industry
- Investigate the disputes between contractor and subcontractors in Sri Lankan construction industry
- Investigate the causes behind disputes between contractors and subcontractors in Sri Lankan Construction Industry
- Propose mitigation measures for dispute between contractors and subcontractors in Sri Lankan Construction Industry

1.5. Research Methodology

Stage 1: Literature Survey

This was focused on literature survey in order to identify the subcontract practices, relationship between parties and disputes. Literature survey was based on journals, research papers, conference proceedings, books, reports and electronic media.

Stage 2: Preliminary investigation

Preliminary investigation was carried out to verify the causes identified through literature survey and its applicability in Sri Lankan construction context by conducting interviews with experts in the industry. Five experts were participated

for preliminary investigation. Causes identified through literature survey were modified according to the expert's view and questionnaire was prepared.

Stage 3: Questionnaire Survey and interviews

Comprehensive questionnaire survey was conducted to identify most critical causes for disputes among contractors and subcontractors. Interviews were conducted to obtain the mitigation measures for such causes.

Stage 4: Data analysis

Data analysis was consisted of statistical analysis and content analysis. Statistical analysis was done in order to analyze the data collected through questionnaire survey and content analysis was done to analyze the data collected through interviews.

Stage 4: Conclusions and Recommendations

This stage involves drawing conclusions and making recommendations for construction industry and further studies.

1.6. Scope and limitations

The study was limited to the identification of causes for disputes in subcontracts and mitigation measures for disputes in subcontracts in Sri Lankan Construction industry. Subcontracts in building sector were only considered.

1.7. Chapter breakdown

Chapter 1: Introduction

Chapter one is introduction to the research dissertation. This chapter presents the aim and objectives, research methodology adopted, scope and limitations and chapter breakdown.

Chapter 2: Literature Review

Chapter two presents the causes identified through literature survey. Literature survey was based on journals, research papers, conference proceedings, books, reports and electronic media.

Chapter 3: Research methodology

Chapter three presents the research methodology adopted to carry out the research to achieve the aim and objectives.

Chapter 4: Preliminary Investigation

Chapter four discusses the preliminary investigation conduct to verify the findings of literature survey in Sri Lankan context.

Chapter 5: Data Collection, Analysis and Discussion.

In Chapter five, collected data was analysed and results were presented.

Chapter 5: Conclusions and Recommendations.

This chapter involves drawing conclusions and making recommendations for construction industry and further studies.

1.8. Summary

Brief background to the research topic, problem statement, aim and objectives of the research are stated in this chapter. Further, research methodology which was followed in achieving the aim and the objectives of the research and finally chapter breakdown of the research report are clearly described within the chapter. Hence, the chapter provides brief explanation to the entire research study.

CHAPTER 2

2. LITERATURE REVIEW

2.1 Introduction

This chapter mainly concerned the subcontracting practice in construction industry, disputes in subcontracts in construction industry and causes for disputes in subcontracts.

2.2 Subcontracting in Construction Industry

Subcontracting is a long-standing practice in construction industries worldwide, which has been proven to be an economical way of project delivery, especially for the specialist works in buildings (Francis, Joseph & Chan, 2006). Construction Industry Development Board in South Africa (2013) identifies subcontracting as an integral part of the construction industry. The critical importance of subcontracting to the success of construction projects has long been recognized. Gray and Flanagan (1989), in their comprehensive study of subcontracting, concluded that it would account for an increasing proportion of total construction workload. The characteristics of the project dictate the type, size and capabilities of each subcontractor that may be required (Knutson, Schexnayder, Fiori & Mayo, 2003). On commercial construction projects, general contractors subcontract between 75% and 100% of the work (Mincks & Johnston, 2011). Eccles (1981) identifies subcontracting as one of prominent characteristic of construction industry.

General contractors utilize subcontractors for various reasons such as their lack of expertise in these types of work, it enables them to limit their risk exposure or it expands their available workforce so they have more opportunities to bid on new projects (Gould & Joyce, 2009). In addition to that, Mincks and Johnston (2011) identify lower cost for subcontract work is also as a reason for the decision of subcontracting. Construction Industry Development Board in South Africa (2013)

finds that subcontracting allows the contractor to reduce operating costs. Contractors can use specialist contractor's cash flow as a means of surviving the volatility of the construction business cycle (Knutson, Schexnayder, Fiori & Mayo,2003). In the contrary Moody, Mike and Hawkins (2008) states that the primary reason for selecting sub contractors is their innovation and knowledge, not for the lowest price. Nevertheless, he suggests that high performing sub contractors use their innovation and knowledge, and can often deliver a better service at a lesser price. Low performing sub contractors offer only on low price, while high performing contractors offer value (Garrison, 2006).

Schexnayder, Fiori and Mayo (2009) identify that specialty works such as plumbing, heating, electrical, roofing, and tile work are usually more effectively performed by subcontracting. They further states that "specialty contractor" and "subcontractor" are synonymous. However, there can be situations where specialist contractors can be appointed as the employer's direct contractors in addition to the main contract to whom major portion of the project is given.

Holt (1998) state the selection of subcontractor is a critical success factor of a project. Trend of increasing subcontracting and focusing on core competences, make the organizations and projects to dependent more on their suppliers (Ahola et al., 2007). Even though the role of the subcontractor is very important in construction projects, the development of the contractor receives little interest (Miller *et al*., 2002). Therefore client organizations and principal contractors believe that subcontractors can bring added value to the construction project (Dainty *et al*., 2001).

2.3 Relationship between Contractor and Subcontractor

Since subcontractors secure almost all their work through contractors, the success of the typical subcontractor depends directly on the relationships they establish and maintain with those general contractors that need their expertise (Patrick and David Gunderson, 2013). In contrary, as the involvement of the subcontractors'

expertise is essential to construction projects, contractors successfulness is also depend on the relationship they maintain with subcontractors.

Even though the subcontract exists between the contractor and the subcontractor, the relationship between the contractor and the subcontractor has several interfaces as legal, contractual and interpersonal.

2.3.1. Legal basis of subcontracts

Construction contract normally exists between the Employer and the Contractor. Contract is legally known as a promise or a set of promises which are legally enforceable. "In a contract, a party may wish to have its contractual obligations carried out by someone else, while remaining legally responsible for the performance of those obligations. This principle is known as 'vicarious performance or subcontracting' (Murdoch and Hughes, 2008). They further explains that this principle is quite acceptable except in specific occasions i.e. subcontracting is not be permitted, when contracting party is selected because of his personnel qualification, skill or competence. Subcontract exists between the contractor and the subcontractor. Most of standard forms of contract places express terms on the extent to which the main contractor's use of subcontractors to satisfy his contractual obligations under the main contract.

2.3.2. Contractual relationship in subcontracts

Most of Modern standard form of contracts provides provisions for subcontracting. However they clearly express limits in extent of using subcontracting.

FIDIC 1999 and ICTAD/SBD/02 clause 4.4 provides that the Contractor shall not subcontract the whole of the Works and the prior consent of the Engineer shall be obtained. JCT SBC 05 clause 3.7.1 provides that the Contractor shall not without the written consent of the Architect/ contract administrator sublet the whole or any part of the Works' and the consent shall not unreasonably delayed or withheld. Sub clause 3.9 therein provides restrictions on subletting as that any subcontract must contain certain conditions that are designed to protect the Employer's

position. Employer's consent is essential to subletting under JCT, as sub clause 8.4 provides entitlement for the Employer to terminate the Contractor. By looking at the clauses in the standard form of Contracts, it is clear that, contractor's transferring of his contractual obligation to a third party is not a secret. It is acceptable and allowed for in the Contract between the Employer and the Contractor.

Contractual relationship between the main contractor and the subcontractor lies as per the terms of subcontract. Murdoch and Hughes (2008) suggest that "as a generalization, it seems that firms who merely supply materials are more likely to have their own standard terms than those who also carry out work; the later may well be employed on standard terms drafted by larger main contractors." Even though there is no standard form of subcontract published locally yet, JCT has published standard forms of subcontracts to be used with JCT main contracts, Civil Engineering Contractors Association has produced a subcontract for use with ICE Conditions. FIDIC has published a subcontract 'Conditions of Subcontract for Construction for building and engineering works designed by the employer' which can be used with Conditions of Contract for building and engineering works designed by the employer.

Contractual chain

The basic position of law is that the main contract and the subcontract are regarded as links that forms a contractual chain (Wai and Charles, 2004). The doctorine of privity of contract means that the rights and obligations of the parties to a contract apply only to contracted parties (Lee 2001). He further states that for both nominated and domestic subcontract, there is no privity of contract between employer and subcontractor. Therefore, contractually main contract affects only to the employer and the contractor whereas subcontract affects only to contractor and subcontractor. However, because of the chain liability recognized by law, subcontractor is liable to the employer. "Characteristically, the chain of liability binds the three main project parties by two separate links: one exists between

project owner and the other between main contractor and the subcontractor" (Wai and Charles, 2004). If elaborates, contractor is responsible for defective work of subcontractors' under the contract. In this case, contractual remedy taken by the employer will be passed to the subcontractor by the contractor under subcontract. However, this contractual chain is not always working, specially when two contracts are significantly different. Then the contractor may not be able to pass the liability to the subcontractor.

2.3.3. Interpersonal Relationship

Knutson et al (2006) explains that if a project is complex in nature and requires extensive coordination and consultation between construction management and subcontractor management, the relationship between the two parties is formed out of necessity. The level of interaction between the representatives of the main contractor and subcontractor will in most cases be determined by the nature and scale of the construction project.

Hsieh (1998) attributes that the institutional gaps arisen due to the lack of trust and negative attitudes between the general contractor and the subcontractors, are crucial factors affecting site productivity. The key barriers to develop trust and greater integration seem to come from the industry's traditional approach of vertically segregating the construction process. This results in a subordinate position for subcontractors within the hierarchy of relationships forming the traditional design–management– construction process. Consequently, main contractor–subcontractor–supplier relationships are often found to be strained and adversarial (Hinze and Tracey, 1994; Latham, 1994). Construction process is more exposed to uncertainty due to its unique nature therefore; contractor's and subcontractor's transactions involve a high amount of uncertainty. Kale and Arditi find that some of these uncertainties occur due to nature of the construction process and others from the uncertainty of a potential partner's performance during the construction process. The presence of uncertainty during the construction process increases the risks. Knutson et al (2006) explains that due to the general opinion

that, when undertaking construction work, contractors enter into a dangerous game of shifting liability, the relationship between head contractor and subcontractor can often be unnecessarily viewed adversarial. According to Greenwood (2001) the typical contractor-subcontractor relationship is still traditional, cost-driven and potentially adversarial. Therefore effective management of contractor subcontractor relationship plays vital role in delivering a successful project. Knutson et al (2006) suggest that the effective management of head contractor - subcontractor transactions or relationships is ultimately controlled by the human interactions.

2.4 Type of Subcontracting

Ofori and Debrah (1998) and Mbachu (2008) identifies three main categories of subcontractors in the construction sector as:

- **specialist subcontractors**; those that undertake specialist services, especially building or engineering services such as electrical, plumbing and heating, ventilating and air-conditioning (HVAC);
- **generalist and specialist trade subcontractors**; those that offer general trade services or specialise on specific trades such as painting and brickwork– many of which are general contractors that use subcontracting as a means to get work during periods of tough competition but can and often prefer to work as main contractors; and
- **labour-only subcontractors**; i.e. skilled tradesmen that provide labour-only services, while the main contractor provides the materials and supervision.

Furthermore, Hinze and Tracy (1994) divide subcontractors into three main groups based on the contractual relationship they have with Contractor. They are;

- **Domestic subcontractors**; those hired by the contractor to perform specific tasks;
- **Selected subcontractors**; subcontractors solicited from a recommended list of potential subcontractors in the tender documents; and

- **Nominated subcontractors**; nominated by the client or client's agent to undertake specified aspects of the main contract.

2.5 Standard Forms for Subcontracts

Standard form of subcontracts published in other countries are FCEC (ICE conditions), FIDIC and JCT. Practicing method of sub-contracting form are vary according to firms and projects. Some companies prepare a special contract conditions as collection of different forms.

FCEC form (The federation of civil engineering contractor's form) is specially prepared for sub-contracting work where the main contract is under the ICE conditions.

2.6 Disputes in Construction Industry

The construction of every project involves unique design, procurement and construction challenges. Different location and site conditions, construction methods, equipment and materials, and the assembly and management of a team of people to design, procure and construction makes the construction process unique. Because of this dynamic process, it requires higher members of the professionals from different disciplines to work together to continually fine-tune and adjust the detailed project requirements, project designs and construction methods, sequence, resources and logistics. Project teams are differ from project to project and composition of the team depends on nature of the project. People from different disciplines and organisations are engaged to design and construct different elements of each project. Problem solving is an integral part of managing construction projects. That helps to foster innovation, reduce rework, avoid waste, and reduce risks including those of issues escalating to become disputes requiring arbitration or litigation to resolve.

Most industries are notorious to have dispute or conflicts especially when it deals with higher financial commitments. The client is trying to accomplish the required target within budget time and quality. The contractor/service provider/supplier is

also trying to achieve this while trying to maintain their profitability. If either party feels that the other party is obstructing their goal a dispute may arise.

Construction is a very complex, high-risk, multiparty business. According to Gutierrez, Panuwatwanich and Walkers (2013) nature of the construction projects is largely fragmented as it is invariably carried out by diverse parties having different aims and objectives. They further explain "such a lack of integration typifies the nature of construction industry and arguably makes it prone to project disputes".

"Complex construction can likewise often result in complex disputes, which are predominantly arisen from the intricacy and magnitude of work, multiple prime contracting parties, poorly prepared and/or executed contract documents, inadequate planning, financial issues and communication problems" (Harmon, 2003 cited Yih, 2007,p.1).

2.7 What is a dispute?

In simple terms a 'dispute' occur when one party to the contract makes a claim on the other, which after a reasonable period for consideration by the other party is not accepted. However, making of the claim is not the part which creates the dispute but the response by the other side of adverse nature. An adverse response would falls into rejection of the claim or failure to respond within a time which is reasonable. It is considered that only by acceptance of the claim will avoid a dispute (John, 2007).

As explains by Black in 2009, a dispute is a conflict or controversy; a conflict of claims or rights; an assertion of a right, claim, or demand on one side, met by contrary claims or allegations on the other. Morgan (as cited by Gutierrez, Panuwatwanich and Walkers in 2013) finds dispute as a contentious issue that the parties to a construction contract disagree upon, or would be likely to disagree upon, and which needs to be resolved by some means or other, either within or

outside the contract. Therefore, a construction dispute can be defined as a disagreement between two or more parties where a resolution is required.

Gwyn Owen in "The Working of the DAB under new FIDIC 1999 (New Red Book)" observes that - *dispute may be said to have arisen when;*

- A final determination has been rejected
- Discussions have been terminated without agreement
- When a party declines to participate in discussions to reach agreement
- When so little progress is being achieved during protracted discussions that it has become clear that agreement is unlikely to be achieved

Dispute is defined in "Conditions of Contract for Design, Build and operate projects" (Gold Bok) First Edition 2008-FIDIC thus;

> "Dispute means any situation where (a) one Party makes a claim against the other Party; (b) the other Party rejects the claim in whole or in part; and (c) the first Party does not acquiesce, provided however that a failure by the other Party to oppose or respond to the claim, in whole or in part, may constitute a rejection if, in the circumstances, the DAB or the arbitrator(s), as the case may be, deem it reasonable for it to do so."

Alternatively, Xiao at el, (2013) explain different opinion on occurrence of disputes, particularly, in subcontracts. According to them, due to vast array of various contributors, often at various stages throughout the construction process, the relationship between head contractors and subcontractors will breakdown. They suggest that the result of the breakdown is the occurrence of disputes.

2.8 Disputes in subcontracts

In any industry, where large sums of money are involved, disputes are practically unavoidable (Xiao at el 2013). According to their viewpoint, the nature of subcontracting in the construction industry provides an opportunity for both contractors and subcontractors to gain commercial benefit. Joseph and Proctor

(1996) showed that relationship between subcontractors and contractors are often nervy and therefore prone to disputes due to a poor sense of fairness and misunderstanding of each others' needs.

They suggest that if the contractors do not effectively manage both the contractual and personnel elements of the relationship between themselves and their subcontractors, the likelihood of disputes arising is significantly increased. They further states that;

> Disputes during the course of a large scale commercial construction project are to a certain extent unavoidable, this is due to the fact that the interaction during a construction project between the head contractor and subcontractor is mainly based around; 1) subcontract agreements and conditions of contracts; 2) Exposure to high levels of financial risk (from view point of both parties) 3) the protection of a party's own interest or motivations; and 4) constraints based around time, money and resources.

According to Groton and Lawrance (2010) construction industry has long recognized the need for a speedy and expert way of addressing problems on construction project. If left unresolved, problems are likely to disrupt and delay the completion of the project. Problems that occur between contractors and subcontractors need to be dealt with at the earliest possible stage during the life of a dispute. For that identification of the causes for disputes are essential as a mitigation factor.

2.9 Causes of disputes in subcontracts

Strain in the relationships and interface problems between the main contractor and Subcontractor may develop due to various reasons. Contractual relationship and the interpersonal relationship can be disturbed resulting interface conflicts between the parties. As contractor's works and subcontractor's works are interwoven, management of smooth relationship is essential. Both the contractors are responsible for the client as a single party but internally there is a chance to point the finger to the each other. This will cause poor overall management of the

projects, poor quality products, late completion and create disappointment between the main contractor, subcontractor and clients (Othman, 2002).

Hinze and Tracey (1994) elaborates that, not all subcontractors have the same discernment of the main contractor-subcontractor relationship. For some subcontractors relationships are more successful like partnership or team arrangement while for others the relationship is more adversarial type with a greater amount of mistrust and lack of communication. Without any formal discussion taking place at prior stage between the main contractor and the subcontractor, many subcontracts are awarded. Likelihood of a occurring a conflict after construction work has begun is high in the absence of prior formal negotiations. Other reasons for these problems may also include: lack of construction work quality, scheduling conflicts, change orders, delay in progress payments which will affect the execution and completion of the construction projects (Al-Hammad, 1993). Moore et al. (1992) stated that a construction project involves so many parties, such as owners, designers, construction main contractors, subcontractors, maintenance contractors, and material suppliers etc. Because of involvement of higher number of parties, some interface problems can arise, such as the lack of cooperation, limited trust, and ineffective communication. This can ultimately leads to an confrontational relationship among all these project stakeholders. This kind of relationship induces project delays, difficulty in resolving claims, cost overruns, litigations, and compromise project quality. Studies have been carried out by various authors on disputes and interface problems in the construction related subcontracts in numerous scenarios. Factors identified by such authors are mapped and given in the table 2-1.

Table 2-1: Causes for disputes in Subcontracts

#	Cause	Author																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Payment problems	x	x	x	x		x	x			x						x			x
2	Non adherence to safety requirements	x	x																	
3	Contractor's capability and fairness	x																		
4	Insurance and bonding issues	x	x																	
5	Onerous subcontract terms	x																		
6	Delay in subcontractor's works		x										x				x			
7	Poor communication				x	x	x													
8	Incomplete work-drawings or specifications						x		x		x									
9	Assigning part of the works to new subcontractors without informing the original subcontractor																			
10	Lack of quality							x				x					x	x		
11	Act of God factors						x													
12	Variation orders						x							x						
13	Delay in approval for shop drawings, sample material and finished work						x	x												
14	Restriction Access						x													
15	Non availability of standard form of Subcontract										x								x	
16	Incomprehensive terms and conditions of subcontracts			x		x										x				
17	Scheduling conflicts				x		x													
18	Unreasonable attendance fee														x		x			
19	Builders' works																x			

20	Price escalation															x			
21	Poor coordination															x	x		

[1] McCord, MS and Gunderson, (2013); [2] Arditi, Chotibhongs, (2005); [3] Wong, Cheah , (2004); [4] Othman, (2002); [5] Hinze and Tracey (1994); [6] Al-Hammad, (1993); [7] Al-Hazmi, (1987); [8] Huang et al (2008), [9] Francis at el 2006; [10] CIBD Southafrica (2013), [11] Thomas and Tang, (2008); [12] Cooks and Williams, (2004); [13] Turner, (1983); [14] Ihsanullah, (1995); [15] John , (2007); [16] Sandun KK, (2009), [17] Tayeh, (2011); [18] Rosli and Marina (2007); [19] Paula , (1994)

2.9.1. Payment problems

Construction Industry Development Board (CIDB, 2013) identifies payment practices as one of the main sources of conflict between contractors and subcontractors.

Pay when paid clauses

A widely using payment term is 'pay when paid' clause. 'Pay when paid' clause guides the period between main contractors receiving their payment from clients and paying the subcontractors. According to CIDB (2013) the 'pay-when-paid' contract terms are very unpopular amongst subcontractors but they acknowledge that this is standard practice in the construction industry. According to them, the main reason for this clause is main contractor's law profit margin and tight cash flow. As their profit margin is low, cash flow management is a critical success factor and any delays in the payment process have significant effects on subcontractors.

According to CIDB (2013) some main contractors contend that the 'pay-when–paid' principle is often used to mitigate the risk of poor quality workmanship arising after payment for a subcontractor's (often specialised) work. However, there is the risk that if the owner does not pay the contractor, for any other reason, the subcontractor does not get paid. Hendrick and Schemm (1991) states "allocation of the risk of owner non-payment is one of the principle areas of controversy between subcontractor and contractor in reaching an agreement on subcontract language". According to Tracey (1991) this clause is recurrent problem in the subcontracts in the construction industry and pay-when paid is mentioned repeatedly as a problem in interviews.

Retainage practices

Retainage is withholding or retaining a portion of each progress payment owed to contractors and subcontractors throughout the construction project. Main contractor is paid throughout the project by the employer under the main contract by means of progress payments. Typically payments are made on a monthly basis to the main

contractor by the employer and subsequently, subcontractors are paid by the main contractors. “Extending progress payment in a project during the production has inherent risks including overpayment for the works installed, payment for defective work and the continued solvency of the parties until the work is complete” (Bausman, 2004). Retainage has changed as a common practice in the construction industry to hostage the risks (Sears at el, 2008). Employer withhold an amount as retainage from main contractor’s payment, similarly, contractors withhold a similar amount from their subcontractors. According to Bausman (2004) retainage typically ranges from 5 to 10 percent of the value of the works.

Often times the retainage amount held on a project exceeds the profit margin that subcontractors can earn on that particular project (McCord and Gunderson, 2013). Bausman (2004) suggests that typical subcontractor profit margin averages 3 to 4 percent. Normally the employer holds the retainage payment until the contractor fulfills his contractual obligations as per the contract. Similarly, main contractor withholds retainage from the payment due for each subcontractor. Reasons for withholding the final retainage payment can be are, unfinished or deficient work items, as-built drawings, operations and maintenance manuals, warranties, tax certificates, lien releases, final occupancy permit and many more like items (McCord and Gunderson, 2013). Normally retainage payment is released by the employer after defects liability period; in most cases is 12 months. Because of this final retainage payment of subcontractor’s can be held more than 12 months after project has been taking over by the employer as subcontractor finishes his works before taking over. When retainage payments are withheld for a long period of time it can be a financial hardship to the subcontractor.

As the main contractor has the responsibility to coordinate all the final close-out requirements of a project, the subcontractors depend on main contractors in releasing retainage amount. According to McCord and Gunderson (2013), some subcontractors consider these practices to be a deliberate strategy by general contractors to avoid paying the final payment for as long as possible.

Backcharging

Backcharging is a common practice of general contractors. It is used for withholding money from subcontractors for various expenses incurred by the general contractor on behalf of the subcontractor (McCord and Gunderson, 2013). As cited by Hendrick and Schemn (1991) a publication of the American Subcontractors Association provides "it is the right of the general contractor to claim additional compensation for costs for work items that should have been performed by the subcontractor. According to Clough (2005) general contractor shall notify the subcontractor to alert them the fact that their subcontract will be backcharged in their failure to perform. "the receipt of final payment is often a 'day of reckoning', that is subcontractors discover the contractor's backcharges for dumpster fees and scaffolding" (Tracy 1991). This may lead the subcontractor to come up with several cost issues that they feel could fairly be charged back to the general contractor for extra expenses incurred throughout the project i.e delays caused by the general contractor, sharing of manlifts, weekend work etc. (McCord and Gunderson, 2013). There can be disputes if subcontractor is not properly notified or disagree with charges.

2.9.2. Non adherence to safety requirements

Main contractors require subcontractors to provide necessary safety measures and adhere to the safety rules as per the codes, rules and laws of the country as the main contractor bears the burden to ensure safety in the job site. According to Clough et al, (2005) all main contractors require that their subcontractors actively participate in the safety management on the jobsite. According to McCord and Gunderson (2013) common areas of mandatory participation may include

- Jobsite safety orientation training for all employees
- Attendance at all scheduled jobsite safety meetings
- Submission of a job specific safety plan with signatures of all personnel
- Participation in daily jobsite exercises and stretching for all personnel

Subcontractors lack of safety management results claims, payment deductions and ultimately disputes.

2.9.3. Contractor's Capability and fairness

In a construction project main contractor's superintendent is in charge of all jobsite operations. He is responsible for scheduling subcontractors, dimensional control, quality control, safety control measures, work hours, job site access, security, inspection, etc. (McCord and Gunderson, 2013). They further elaborates that subcontractor's achievement severely depend on the competences of the particular project manager for the project. Shah (1998) suggests that subcontractors pay a higher attention on the contractor's practice in construction and management of similar projects when they decide on a subcontract price.

The superintendent is typically responsible for the scheduling of subcontract crews according to the programme which includes directing the sequence of work, time and location (McCord and Gunderson, 2013). Clough, Sears and Sears (2005) find that sometimes the work areas are not complete or another subcontractor is still working in the area when the project manager directs the subcontractor to proceed. This will make the subcontractor less productive and his resources may idle at the site. Lack of coordination between the interfaces of the various trades may cause conflicts.

Tayeh, (2009) suggests that typically the general contractor employs a project manager to administer the daily affairs of each construction project. Administrative and people management skills are very important. Tayeh states that subcontractors rely on the project manager to act in their best interest to when dealing with owner and consultant and in facilitating variations. He is responsible for process subcontractors questions, coordinate with various entities, flow of information (Gould, 2009). As each construction project is unique in nature, it has unique mixture of subcontractors who most probably have never worked together. Rahman and Kumarswamy (2005) suggest that it is the responsibility of the project manger to promote the teamwork atmosphere and facilitate a spirit of coordination on the project.

2.9.4. Insurance and bonding issues

As part of their risk management process, main contractors require subcontractor to provide commercial general liability coverage for each project. The certificates are required to provide protection for both the subcontractor and the general contractor against claims for property damage or bodily injury (Barrie and Paulson, 1992). The cost of liability insurance is considered by most subcontractors when deciding the subcontract price. When the main contractor requires more coverage than is typically carried by the subcontractor, it can increase their annual insurance premium cost (McCord and Gunderson, 2013). They further finds that these costs are typically passed to on to the main contractor if they are known at the time of their bid preparation on a particular project. However, if they are known this only after deciding the subcontract price there can be claims and disputes.

Subcontractors are sometimes required to provide performance bonds to cover any performance or payment issues that may arise as part of the subcontractor's work (Tayeh, 2009). He further elaborates that as not all general contractor require bonds and subcontractors may prepare bids on a particular project without expecting a bonding requirement. Garret (1997) suggests that this restriction can become an issue when a subcontractor is asked to provide a bond after they have submitted the bid and when they do not have enough capacity.

McCord and Gunderson (2013) state that subcontractors depend on the superintendent to interpret the drawings when there is conflicting information or when clarifications are needed. Increasingly, some general contractors consider this to be the responsibility of the subcontractor and they do not take the lead to resolve issues as they arise on job site (Gould & Joyce, 2009). McCord and Gunderson (2013) further state that when installations have to be recorrected and work redone at the subcontractor's expense, it can lead to claims and lawsuits. According to Dossick and Schunk (2007) main contractors "take a lesser role in coordination between trades and instead specify coordination as a subcontractor's requirement."

2.9.5. Onerous subcontract terms

According to Gould & Joyce (2009) one of the major reasons to use subcontracting is that it allows contractors to reduce uncertainties in the construction process and pass risk on to the subcontractor. Because it is generally believed that the subcontractor has the ability to handle some of these risks better than the main contractor. Contractual documents are the main tools used for managing the allocation of these risks, and the standard forms of contract try to allocate risk equitably between the parties.

On the contrary subcontracting can also become a potential source of risk to the contractor because of delays, poor quality and non-completion of work on the part of the subcontractor. These may hinder the contractors' ability to meet project quality, cost and time considerations and could result in penalties and client dissatisfaction. If the risks of both the parties are not put into clear terms in the subcontract it can cause claims and consequently disputes.

Many general contractors consider the subcontract terms to be non-negotiable so this can put the subcontractors in a difficult position (Clough at el, 2005). According to Mccord and Gunderson (2013) some common subcontract provisions that strain the relationship include unfair indemnity clauses, takeover of equipment clauses and termination for convenience clauses. Tayeh (2009) suggests that subcontractors often enter into subcontractors without full knowledge or understanding of the legal consequences of their terms and conditions. The more one sided and inequitable a contract relationship is the greater likelihood that such imbalance will lead to abuse problems, disputes (Hendrick and Scemm, 1991).

Unfair indemnity clauses

" The concept of indemnification arose in common law and allows the burden of loss to be shifted from one party to another"(Currie, et al, 1991). So this can be identified as method of transferring the risk. Davis and Prichard (2000) has identified the extremely unbalanced indemnity clauses are the ones which contractors require their

subcontractors to indemnify them from any and all claims that may arise from any person or entity even if the contractor is responsible.

Takeover of subcontractor's equipment by main contractor

According to Tayeh (2009) this clause is typically used by general contractors to allow them to right to utilize the specialized equipment of the subcontractor if they could not perform their work. Subcontractor may not be able to perform their work if he is terminated or bankrupted. According to Tayeh (2009) "subcontractors often take issue with this suspecting the general contractor to abuse them by exercising their right to take the subcontractor's equipment, but without cause."

Termination for convenience

These clauses allow the main contractor to terminate the subcontract for his convenience. When utilized, this one-sided caveat is considered to be heavy-handed by subcontractors and would negatively impact their relationship (Sears at el, 2008).

2.9.6. Delay in Subcontractor's work

Subcontractors' delays, in most cases, hindrance the main contractor's works as well as other subcontractors works. Non submission of programme on time by the subcontractor is a major issue (Yik et al., 2006). That could be due to negligence or lack of knowledge on planning.

2.9.7. Poor communication

Communication is the process of flowing the information from one to another. Normal communication among the contractors and subcontractors could be in any of modes such as verbal i.e. face to- face or by phone calls, or written such as normal mail, facsimile or other means (Tayeh, B. A, 2009). Poor communication between the two parties may delay work progress (Al Hammad, 1990) [cited by Al-Hammad (1993)].

Instructions or requirements from the clients may not explicitly transmitted to or shared with the subcontractor due to communication gaps. Sometimes instruction/information may reach the subcontractor at the last moment or with a

delay. Huang (2008) (cited by Tayeh 2009) identified communication problems that might lead to serious inefficiency, such as “poor planning and scheduling” and “lack of a management system updating new information”. This may ultimately cause to disputes.

2.9.8. Incomplete work-drawings or specifications

According to McCord and Gunderson (2013) the most common area of dispute between subcontractor and main contractor is about the definition of the subcontractor’s scope of work. They further suggest that in most of the cases subcontractor does not intend to include a particular item in their bid but the general contractor interpret their price to include. If the subcontractor is not fairly treated if may lead to disputes.

Clear work-drawings and specifications are important for the effective execution of the construction work as it provides exactly what to be constructed. If the work-drawings or the specifications are incomplete or unclear, it will create problems in their interpretation which will affect the quality of the project and create problems between the contractor and his subcontractor (Tayeh, 2009). Alnaitwe et. al (2007) found that the incomplete drawings affecting construction productivity. Huang et al (2008) identified unclear details in the drawing lead to interface problems between contractor and subcontractor. The low productivity leads to interface problem and cause disputes between main contractor and subcontractor.

2.9.9. Assigning part of the works to new subcontractors without informing the original subcontractor

Tayeh (2009) identifies that assigning part of the works to new subcontractors without informing the original subcontractor lead to interface problems caused by main contractors, because it results in conflict of responsibilities and authorities on the site. Huang et al (2008) emphasized that communication problems might lead to interface problems between contractors and subcontractors. Moore et al. (1992) emphasized that poor cooperation, limited trust, and ineffective communication lead to an adversarial relationship between the main contractor and subcontractor.

2.9.10. Lack of construction quality

Time, cost and quality are the main objects of any project. Once the main contractor has been awarded the construction contract, he performs the construction work in his scope while the subcontractor(s) undertake the remainder of the work. If either the contractor or any of his subcontractors makes a mistake in the execution of his construction work, it may affect the work of the other. Consequently, it will create problems between the two (Al-Hazmi, 1987). A main contractor is generally liable for defective work or material delivered by a subcontractor.

With a low threshold for subcontractors to enter into the construction market (kumaraswamy and Matthews, 2000 cited Thomas and Tang, 2008), some subcontractors may exploit the system by competing for jobs at unreasonably low prices in return for works at an inferior quality standard (Thomas and Tang, 2008). Such sub-contractors' works has certain possibility to occur disputes.

A main contractor is generally liable for the employer for defective works done by his subcontractors. It is subcontractor's duty to rectify the defective works before final payment is made and discharged from the subcontract. When a subcontractor fails to rectify defective work main contractor should carry out relevant remedial measures in full compliance with the main contract. In this respect it as also possible for some claims from the main contractor to the subcontractor.

2.9.11. Acts-of-God factors

Incidents known as Acts-of-God factors involve natural reasons, which cannot be controlled by human beings, for example, "weather problems", "geological problems", and "increase in the material price" (Huang et al 2008). Severe weather conditions may make it difficult to perform certain construction activities as planned. Consequently, quality of the work of the subcontractor may be affected with possible delays. Al-Hazmi (1987) identifies that such work and delays will create problems between the contractor and the subcontractor.

On the other hand, the contractor or his subcontractor may find out that the soil conditions is not as per soil investigations. If the contractor's or the subcontractor's bid was based on normal geological site characteristics, he may make a loss. For such reasons, conflicts will arise between the contractor and his subcontractor (Al-Hammad, 1990) [cited by Al- Hammad (1993)].

2.9.12. Non-adherence to Conditions of subcontract

The subcontractor may skip or neglect implementing some conditions of the agreed contract between him and the general contractor. If the contractor becomes aware of this neglect, a dispute problem will arise between him and the subcontractor (Al-Hammad, 1993).

2.9.13. Non-adherence to the time schedule

Once the construction project is awarded, contractor is aware of his time target. The contractor should schedule his construction activities and that of his subcontractor(s) to meet the identified project duration. If any party delays the execution of his scheduled construction activities, it will consequently delay the progress of the activities of the other party (Al-Hammad, 1993). High degree of subcontracting leads to high risk of delays and this leads to inefficiency in the construction industry (Sambasivan and Soon, 2007). Parties may attempt to blame each other for the delay of the works and consequently a conflict may occur between the contractor and his subcontractors (Al-Hammad, 1993).

2.9.14. Variations

The client may change his requirements time to time leading the consultant to issue the variations to the main contract. If the variation affects the scope of work on that section of the work carried out by the subcontractor, a problem may arise between the contractor and his subcontractor regarding on agreement the cost of carrying out the work specified in the revision (Al-Hammad, 1992). Frequent changes in design and project scopes, bring additional work and decline the business competency of the contractor. He further states that these additional works interrupt the flow of the works and make the subcontractor to claim for advance and extra payments.

Furthermore, issuing instructions for variations without considering necessary extension for the time may cause disputes.

Normally, extra works and variation works are happened in construction field due to change of client's decision or some obstructions of work proceeding. In these situations, client may give the part of work to nominated subcontractor. These provision include in condition of contract, and it must also be similar to work for which the contract bills provide for nomination. Both of these positive conditions relate to the negative provision of (JCT) main clause 13.1.3 that a variation cannot substitute nominated work for contractor's measured work of identical type in given in the contract bills (Turner, 1983). In this situation contractor may be dispute a case.

2.9.15. Delay in approval for shop drawings, sample material and finish work

According to the most of subcontracts, the subcontractor must submit shop drawings or sample materials to the contractor for his approval. The contractor, due to poor arrangement efficiency, may delay the approval of the submitted materials. In some situations that may be due to delay in approval by the consultant or owner. In such a case, a problem may arise between the two parties about the delays in the execution of the work and who causes it (Al-Hammad, 1993).

Al-Hazmi, (1987) stated that when the subcontractor finishes a section of his work, he must submit it to the approval of the contractor. If the contractor accepts this work, he in turn will submit it to the owner. The owner must approve this work before the subcontractor can proceed with the remaining portion of his work. This process is often lengthy and the subcontractor may be held back from proceeding with his work. This kind of delay may cause a problem between the contractor and his subcontractor. Alinaitwe et al (2007) indicated that the inspection delay affecting productivity. The low productivity leads to interface problem between main contractor and subcontractor.

2.9.16. Restriction Access

Tayeh (2009) identifies that because of the restricted areas on the construction site only authorized personnel are allowed to access thereto. As a result subcontractor's personnel may find it very difficult to obtain authorization to use the site even if it is necessary for their work. "On the other hand, the subcontractor may place restrictions on the contractor personnel visiting and inspecting his work" (Tayeh, 2009). In these cases access problems may arise between the contractor and his subcontractor (Al-Hammad, 1993).

2.9.17. Non availability of standard form of Subcontract

CIDB (2013) states that even though standard forms of subcontract are available, they are not widely used as contractual relationship between the subcontractors and main contractors are governed on ad-hoc basis. They identifies this is disadvantageous for subcontractors. They further suggest that there is also the risk of asymmetric information as the main contractor is likely to have knowledge of issues hidden from the subcontractor (e.g. specifications and design issues), and extracts from the tender documentation sent to the subcontractor for bidding purposes may miss out key salient clauses.

According to CIDB (2013) the key construction subcontract clauses that are frequently the subject of disputes are:

- payment provisions that allow main contractors to withhold payment for a number of reasons such as perceived poor subcontractor performance, main contractor insolvency or slow payments from employers;
- warranties, either contractual or by implication, and the duration and breadth of these warranties;
- scope of work, especially when drawings or specifications are incomplete or change substantially; and
- provisions relating to compensation and time extensions for delays not of the subcontractor's fault.

Rosli and Marina (2007) identifies the problems faced by subcontractors due to use of non standard forms of subcontracts in Malaysia are problem with payment clauses, termination clause, variation and arbitration. They further states that most of the dispute arose because lack of term and the parties are not fully understand the terms.

On the contrary, Tayeh (2009) suggests that Subcontractors often enter into subcontracts without full knowledge or understanding of the legal consequences of their terms and conditions. If there would be a standard form if subcontract published that could have used as guide to understand. The more one sided and inequitable a contract relationship is, the greater likelihood that such imbalance will lead to abuse problems, disputes (Hendrick and Schemm, 1991).

2.9.18. Scheduling conflicts

Improper project management by either the contractor or his subcontractors may lead to waste in material and labour costs and consequently causing problems between the two parties (Al Hammad, 1993). According to Othman (2002), lack of identification of responsibilities and proper records of work carried out by the subcontractors may cause disarray and confusion on site. Many subcontracts are awarded without any formal discussion taking place between the contractor and the subcontractor. This may increase the probability of a conflict after construction work has begun (Hinze and Tracey, 1994).

2.9.19. Unreasonable attendance fee

Main contractor should responsible attendance facilities which rendered to nominated subcontracting work because he entitled payments according to attendance fees (Ihsanullah, 1995). Aattendance fee also cause to disputes because of poor service and unreasonable attendance fee by main contractor. Standard Method of Measurement (SMM7) special attendance for nominated subcontractors includes scaffolding, access roads, hardstanding, positioning, storage, power and other. If the attendance to be provided is not clearly specified, unpriced risk would result disputes.

2.9.20. Builder's work

Sandun (2009) founds that the present subcontractors are facing problems in builders work also. This is specially seen in the subcontracts regarding mechanical, electrical and plumbing works.

Causes identified through literature as reasons for disputes in subcontracts are tabled with the party responsible for each reason and given in table 2-2.

Table 2-2 : Causes for Disputes and Responsible Parties

Cause	**Responsible Party**
Payment problems	Contractor
Non adherence to safety requirements	Subcontractor
Contractor's capability and fairness	Contractor
Insurance and bonding issues	Contractor
Onerous subcontract terms	Contractor, consultant
Delay in subcontractor's works	Subcontractor
Poor communication	Contractor
Incomplete work-drawings or specifications	Consultant
Assigning part of the works to new subcontractors without informing the original subcontractor	Contractor
Lack of quality	Subcontractor
Act of God factors	External factors
Non-adherence to Conditions of subcontract	Contractor, Subcontractor
Variation orders	Consultant
Delay in approval for shop drawings, sample material and finished work	Consultant
Restriction Access	Contractor
Non availability of standard form of Subcontract	External factors
Incomprehensive terms and conditions of subcontracts	Contractor
Scheduling conflicts	Contractor

Unreasonable attendance fee	Contractor
Builders' works	Contractor
Price escalation	External factors
Poor coordination	Contractor

2.10 Interface problems and disputes

As per Xiao at el, (2009) identification of main sources of problems in the contractor-subcontractor relationship, which are likely to result in disagreements or disputes between the two parties is vital.

There are several layers of relationship between the contractor and the subcontractor, if listed contractual relationship, functional relationship and interpersonal relationship. Proper management of each category of relationship is important. Even though the subcontract lies between the contractor and the subcontractor, their interface can be affected by other stake holders of the project namely, client, consultant and external factors. Client, consultant and external factors are integral part of a construction project. Therefore, study of their contribution to the maintaining the relationship of subcontract and subcontractor is important in eliminating the causes for probable disputes. Tayeh (2009) has conducted a comprehensive research investigating the relationship between Contractors and Subcontractors in Gaza Strip. The study includes the factors leading to the contractor subcontractor interface problems. He has based on previous studies of various authors to select the common factors that cause conflicts and interface problems between the contractors and subcontractor section. Tayeh has categorized them into 5 main groups as to factors caused by contractors, factors caused by subcontractors, factors caused by owners, factors caused by consultant and external factors.

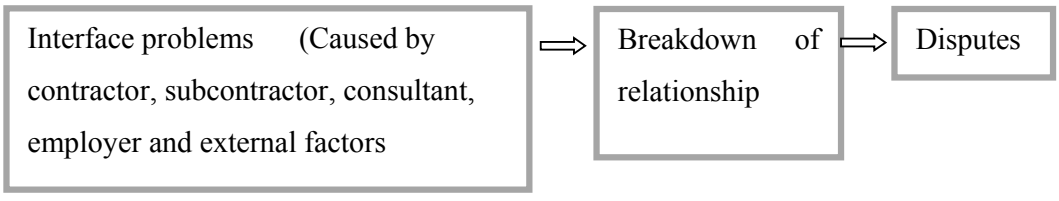

Figure 2-1: Interface problems and disputes

Table 2.3: Factors leading to interface problems

Factors leading to interface problems caused by				
Contractors	**Subcontractors**	**Clients**	**Consultants**	**External factors**
1. Assigning part of the works to new sub contractor, without informing the original subcontractor 2. Main Contractor's financial problems 3. Delay in contract progress payments 4. Delay by the main contractor in providing the necessary materials to the subcontractor 5. Low experience and low capability of the main contractor 6. Failure of the main contractor to use the insurance in case of injury of subcontractor's labor 7. Failure to provide necessary clarifications of the drawings to the sub contractor 8. Interaction of the work of subcontractors, which lead to delay of the work 9. Delay in shop drawings and sample material approval 10. Delay of the main contractor in submitting the formal documents to the supervision staff, which leads to delay in implementing the works 11. Incomplete understanding of the main contractor to the contract documents 12. Providing low-quality materials that result in low-quality workmanship 13. Awarding the specific subcontractor because of his low price only 14. Failure to provide the subcontractor with essential services such as electricity, water, etc. 15. Scheduling conflicts among the subcontractors 16. Scheduling conflicts between the contractor and the subcontractor 17. Interruptions and termination of work by the contractor 18. Failure to provide proper security for the site and plant 19. Using distant location for storage of materials 20. Frequent absence of the main contractor from the site 21. Involvement of the main contractor in several projects at the same time.	1. Non-adherence to the conditions of the contract 2. Delay of the works behind the time schedule 3. Non- adherence of the subcontractor to the time schedule 4. Lack of construction quality work 5. Neglecting the instructions of the main contractor 6. Shortage of skilled labor with the subcontractor 7. Failure to preserve and take care of the materials 8. Exhausting the plant and resources of the main contractor 9. Absence of the sub contractor from the site 10. Partnering the works to another subcontractor without getting approval of the main contractor 11. Shortage of equipment or machinery at the sub contractor 12. Changes in material and labor costs 13. Involvement of the sub contractor in several projects at the same time 14. Lack of experience of the sub contractor in similar projects 15. Neglecting the safety measures	1. Delay in releasing payments to the main contractor 2. Awarding the tender to the contractor with lowest price 3. Giving instructions to the subcontractor directly without consulting the main contractor 4. Using several variation orders 5. Objection of the owner on the implementation method used by the sub contractor 6. Delay in providing the information such additional drawings, benchmarks, set-backs, etc.	1. Delay in hand-over of subcontractor's works 2. Delay in approving materials samples and shop drawings 3. Ambiguity of the drawings and technical specifications 4. Low experience of the consultant's team 5. Contradiction among the tender documents	1. Shortage of construction materials in the market 2. Breach of the contract due to project termination 3. Closing the commercial border crossings 4. Weather conditions 5. Geological problems on the site

2.11 Conceptual model

Breakdown in contractual as well an interpersonal relationship can cause disputes between the contractor and subcontractor. Thus, causes identified from the literature as causes for disputes (section 2.10) can be combined together with the comprehensive list prepared by Tayeh in order to obtain all the facts in which roots of disputes lies. Causes were separated according to the party responsible as shown in figure 2.2. Based on that conceptual model was developed as guide for preliminary investigation.

Table 2-4 : Conceptual model

Factors leading to interface problems caused by				
Contractor	**Subcontractor**	**Employer**	**Consultant**	**External factors**
• Assigning part of the works to new sub contractor, without informing the original subcontractor • Payment problems • Contractor's delays in work and giving approvals • Insurance and bonding issues • Poor communication • Incomplete understanding of the main contractor to the contract documents • Providing low-quality materials that result in low-quality workmanship • Failure to provide the subcontractor with essential services such as electricity, water, etc. • Scheduling conflicts • Failure to provide proper security for the site • Using distant location for storage of materials • Frequent absence of the main contractor from the site • Involvement of the main contractor in several projects at the same time • Onerous subcontract terms • Contractor's capability and fairness • Restriction Access • Non-adherence to Conditions of subcontract • Incomprehensive terms and conditions of subcontracts • Poor coordination • Builders' works	• Non-adherence to the conditions of the subcontract • Delay in progress • Lack of construction quality work • Neglecting the instructions of the main contractor • Shortage of skilled labor, equipment, machinery • Failure to preserve and take care of the materials • Exhausting the plant and resources of the main contractor • Partnering the works to another subcontractor without getting approval of the main contractor • Lack of experience of the sub contractor in similar projects • Neglecting the safety measures • Lack of coordination between interfaces of main contractor's work • High rate of staff turnover • Subcontractor does not attend to testing and commissioning in as built situation	• Delay in releasing payments to the main contractor • Giving instructions to the subcontractor directly without consulting the main contractor • Objection by the owner on the implementation method used by the subcontractor • Delay in providing the information such additional drawings, benchmarks, set-backs, etc. • Short period allowed for implementing the project	• Delay in hand-over of subcontractor's works • Delay in approving materials samples and shop drawings • Low experience of the consultant's team • Contradiction among the tender documents • Variation orders	• Shortage of construction materials in the market • Breach of the contract due to project termination • Closing the commercial border crossings • Act of God factors • Geological problems on the site • Price escalation • Non availability of standard form of Subcontract in Sri Lanka

2.12 Summary

Subcontracting is vastly practiced in any construction industry. Introduction of emerging technologies and latest innovations leads to demanding of specialist skills. Thus, subcontracting has manifested to fulfill the demand of the need. This chapter elaborates the various classifications of subcontracting, causes for nominated subcontracting and the current need for nominated subcontracting. Unless subcontracting is monitored and practised thoroughly, it will give rise to various issues. Hence, the issues related to improper management of nominated subcontractors have been notified and the appropriate solutions to be considered to overcome these issues have been recognized. Thus, for desirable management of nominated subcontracting identification of issues and attaining the best solution is essential.

CHAPTER 3

3. RESEARCH METHODOLOGY

3.1. Introduction

This chapter discusses the methodology which is used in this research. The methodology includes information about the research design, data collection, questionnaire design, questionnaire content, instrument validity, preliminary investigation and the method of data processing and analysis. The questionnaire was the main approach to collect the data and perspectives of the respondents.

The purpose of any research is to discover answers to questions through the application of scientific procedures. In line with this and as stated in Chapter 1, the main purpose of this research is to investigate the causes for disputes between contractors and subcontractors and propose mitigation measures.

3.2. Research Design

Designing a research study involves the development of a plan or strategy that will guide the collection and analyses of data (Poilt and Hungler, 1985). Tan (as cited in Ekanayake, 2014) have defined research design as converting a research problem to a conclusion. Moreover, a research design signifies the combination of research approach and research technique in a collaborative manner to achieve the aim and objectives of the research successfully (Maxwell, 2004). Hence, the research approach and research techniques to be used to achieve the aim and objectives of this research have been identified.

3.2.1 Research approach

Creswell (2013) has identified the three approaches to research as quantitative, qualitative and mixed methods. Furthermore, Creswell (2013) has professed that quantitative approach is used to examine the relationship among variables which are measured so that numbered data can be analysed using statistical procedures;

qualitative approach involves collecting data through emerging questions and procedures inclusive of researcher making interpretations of the data; mixed method approach involves collecting and integrating both quantitative and qualitative data. In order to achieve the aim and the objectives of the research, the suitable research approach has to be selected accurately. Therefore it is essential to know the characteristics of each research approach. Table 3.1 depicts the characteristics of quantitative, qualitative and mixed method approaches.

Table 3.1 : Characteristics of quantitative, qualitative and mixed method approaches

Quantitative	Qualitative	Mixed
Pre-determined	Emerging methods	Both pre-determined and emerging methods
Instrument based questions	Open-ended questions	Both open and closed-ended questions
Performance data, attitude data, observational data and census data	Interview data, observation data, document data and audio visual data	Multiple forms of data drawing on all possibilities
Statistical analysis	Text and image analysis	Statistical and text analysis
Statistical Interpretation	Themes, patterns interpretation	Across database interpretations

Source : Creswell (2013)

Identifying the suitable research approach for the research plays an important role. In this research objectives backed by literature synthesis. Thus, it is necessary to know whether the collected data through literature synthesis are suitable in the context of Sir Lankan Construction industry. Therefore it is necessary to identify the relevance of the collected data towards this research through interviews. Therefore, carrying out of interviews signifies usage of qualitative approach.

To achieve objective 3 a questionnaire survey had to be carried out as a questionnaire survey enables to collect the opinions of various respondents within a short time period with ease. The distribution of a questionnaire survey to collect data enables the usage of quantitative approach for this research. Hence, this research uses a mixed method approach as it comprises of both quantitative and qualitative research approaches.

3.2.2 Research techniques

Research approach is followed by the selection of research techniques to be used for the research (MacDonald & Headlam, 2011). Moreover, MacDonald and Headlam (2011) professed that research techniques comprise of data collection and data analysis. There are various data collection techniques used by various researchers such as surveys, experiments to gather quantitative data and case study, ethnography, action research, grounded theory to gather qualitative data.

3.3. Research methodology

Figure 3.1 illustrates the research methodology carried out.

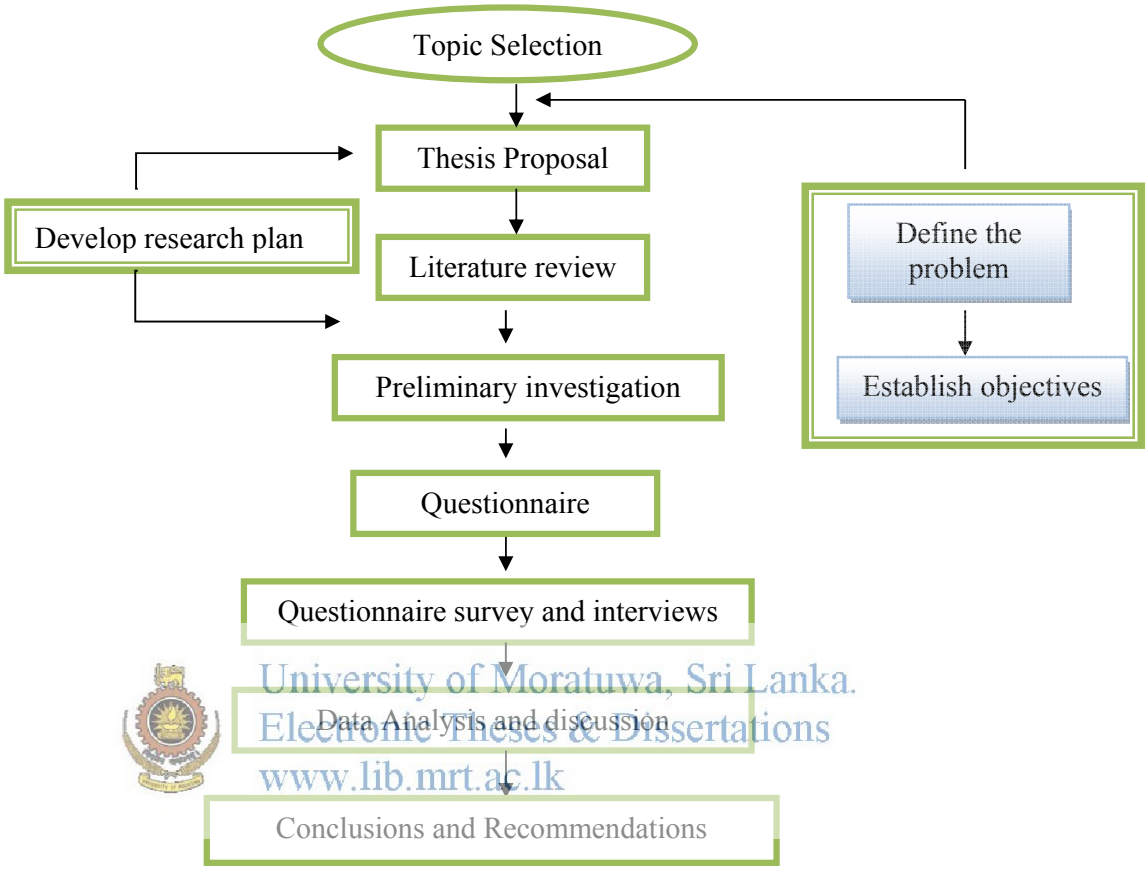

Figure 3.1: Research methodology

- **Topic Selection**

The first one is the proposal for identifying and defining the problems and establishment of the objectives of the study and development of research plan.

- **Literature review**

The second phase of the research includes literature review. A literature review report was a synthesis of information on a topic presented in an organized formal nature. Any investigation whatever the scale, which involve reading what other

people have written about the area of interest in this specific research, gathering information to support or refute the arguments and writing about their finding. It is to provide evidence that the researcher has read certain amount of relevant literature and he also has some awareness of the current state of knowledge on the subjects (Bell, 1993 cited Yih). In firstly, identify the disputes of nominated sub-contractor and in Sri Lankan construction industry. Therefore, books and journal papers are referred. Causes of disputes identified from literature review were categorized according to the party responsible for dispute. Causes for interface problems were also identified through literature survey. Then Conceptual model were prepared by combining causes of disputes and interface problems which was used as the basis for preliminary investigation.

- **Preliminary Investigation**

Preliminary investigation was done by inspecting the expert's knowledge relevant to the research question. Causes of disputes identified through literature survey (conceptual model) were given to five experts in the construction industry in order to verify the validity of such causes in the context of Sri Lankan construction industry. According to the views of the experts causes were deleted, modified, and new causes were added. The purpose of the preliminary investigation was to test and prove that the questionnaire questions are clear to be answered in a way that help to achieve the objectives of the study. The conceptual model was modified based on the results of the preliminary investigation.

Interviews were carried out in two rounds. Preliminary investigation was carried out to validate the data collected through literature synthesis, towards this research. The interviews were conducted through semi-structured interview. Semi-structured interview helps to limit the time and scope unlike an unstructured interview and semi-structured interview allows flexibility to moderate during the interview unlike structured interview. For similar kind of researches semi structured interviews had been carried out (Zou & Lim, 2006; Matthews et al., 1996; Humphreys et al., 2003).

- **Questionnaire Survey**

A questionnaire survey allows gathering large amounts of data within a shorter time period covering a large geographical area. To achieve objective 4 of the research, the solutions identified in literature synthesis and semi-structured interviews had to be ranked. In order to do so, questionnaire survey was carried out. Biong (2013), Loh and Ofori (2000), Humphreys et al. (2003), Mbachu (2008) and Enshassi et al. (2007) had used questionnaire survey in similar kinds of research. Besides, selecting the sample for the research was critical. Hence, the sample was selected through convenience sampling method considering the nature and complexity of the industry, limited time and scope. The questionnaire was based on closed ended type questions.

According to the literature review and after preliminary investigation by interviews with experts who are dealing with the subject at different levels, all the information that could help in achieving the study objectives were collected, reviewed and formalized to be suitable for the study survey and after many stages of brain storming, consulting, amending, and reviewing, a questionnaire was developed with closed questions. The questionnaire aimed to collect data on the causes for disputes between the main contractor and subcontractors.

Data collection was carried out through questionnaire survey and interviews. The questionnaire was used to collect the required data in order to achieve the research objective.

- **Data Analysis**

Data collected through questionnaire survey had to be analysed through a quantitative data analysis method. RII was the data analysis technique used for this research as it covers a broad range of statistical procedures.

Questionnaire analysis was done according to the data of questionnaire by use of Relative Importance Extent (RII) which was computed using following equation.

$$RII = \frac{\sum w}{A \times N}$$

Where;

W – is the weight given to each factor by the respondents and ranges from 1 to 5 where 1 is strongly disagree and 5 is strongly agree.

A – is the highest weight (i.e. 5 in this case)

N – is the total number of respondents

Data collected through the interview were analysed using content analysis method. Analysis was carried out manually.

- **Conclusions and Recommendations**

The last phase of the research included the conclusions and recommendations. This was done based on the data analysis with discussion of aim and objectives of projects while summarizing key findings in relation to the research questions according to industry practice.

3.4. Summary

This chapter elaborates the research methodology that was professed for this research. First and foremost the literature synthesis was carried out to get a brief understanding about the subcontracting concept practiced in other countries, to identify various issues and causes for disputes. The suitability of the collected data towards the research had to be checked through interviews thus preliminary investigation was carried out. Then data had to be collected through questionnaire survey and data had to be analysed using RII method. Content analysis was used to analyse the mitigation methods.

CHAPTER 4

4. PRELIMINARY INVESTIGATION

4.1. Introduction

This chapter discusses the preliminary investigation carried out for this research. The chapter summaries the causes for disputes identified through literature survey and findings of the Preliminary Investigation.

4.2. Preliminary Investigation

It is customary practice that the survey instrument should be piloted to measure its validity and reliability and test the collected data. The preliminary investigation provides a trial run for the questionnaire, which involves testing the wordings of questions, clarifying ambiguous questions, and testing the techniques that were used to collect data (Naoum, 1998). A preliminary investigation for the questionnaire was conducted by distributing the prepared questionnaire to a number of experts having experience in the same field of the research to have their opinions.

The piloting process was conducted through five professionals. They were asked to review the questionnaire and verify the validity of the questionnaire topics and its relevance to the research objective and give their advice. In general, they agreed that the questionnaire is suitable to achieve the goals of the study. Important comments and suggestions were collected and evaluated carefully. All the suggested comments and modifications were discussed with the study's supervisor before taking them into consideration. At the end of this process, some minor changes, modifications and additions were introduced to the questions and the final questionnaire was constructed.

4.2.2 Details of interview respondents

The semi-structured interviews were carried out among five professionals in the construction industry. Brief description about the five interviewees has been depicted in Table 4.1 as follows.

Table 4-1 : Details of interview respondents

	Interviewee A	**Interviewee B**	**Interviewee C**	**Interviewee D**	**Interviewee E**
Profession	Chartered QS	Chartered QS	Chartered QS	Chartered QS	Chartered QS
Type of Organization	Consultancy Organization	Consultancy Organization	Contractor Organization	Contractor Organization	Contractor Organization
Designation	Director	Director	Director	Senior QS	Senior QS
Experience	24 years	23 years	23 years	15 years	16 years

Changes, modifications and additions were introduced to the conceptual model and the final questionnaire was constructed. If three or above number of experts agree with the cause identified through the literature survey, it was selected for the questionnaire. Others were not selected. Causes suggested by experts other than literature findings were selected when three or more experts agree. Results of the preliminary investigation are given in the table 2.5.

Table 4.5 - Preliminary Investigation Findings

	Cause identified through literature survey	E 1	E 2	E 3	E 4	E 5	Preliminary Investigation	Resultant cause
Factors caused by main contractors								
1	Assigning part of the works to new sub contractor, without informing the original subcontractor	Y	Y	Y	Y	N	Selected	Assigning part of the works to new sub contractor, without informing the original subcontractor
2	Payment problems	Y	Y	Y	Y	Y	Selected	Payment problems
3	Contractor's delays in work and giving approvals	Y	N	Y	Y	Y	Selected	Contractor's delays in work and giving approvals
4	Insurance and bonding issues	N	Y	Y	Y	N	Selected	Insurance and bonding issues
5	Poor communication	Y	Y	Y	Y	Y	Selected	Poor communication
6	Incomplete understanding of the main contractor to the contract documents	Y	Y	N	N	Y	Selected	Incomplete understanding of the main contractor to the contract documents
7	Providing low-quality materials that result in low-quality workmanship	Y	N	Y	N	Y	Selected	Providing low-quality materials that result in low-quality workmanship
8	Failure to provide the subcontractor with essential services such as electricity, water, etc.	Y	Y	Y	N	Y	selected but modified as per respondent's opinion, is given.	Properly not document the extent to which the service
9	Scheduling conflicts	Y	Y	Y	Y	Y	Selected	Scheduling conflicts
10	Failure to provide proper security for the site	Y	Y	Y	N	N	Selected	Failure to provide proper security for the site
11	Using distant location for storage of materials	N	Y	Y	Y	Y	Selected	Using distant location for storage of materials
12	Frequent absence of the main contractor from the	N	N	N	N	Y	Not selected	
13	Involvement of the main contractor in several projects at the same time	N	N	Y	N	N	Not selected	
14	Unreasonable attendance fee	N	N	N	Y	Y	Not selected	
15	Onerous subcontract terms	N	N	Y	Y	N	Not selected	
16	Contractor's capability and fairness	Y	Y	Y	N	Y	Selected	Contractor's capability and fairness
17	Restriction Access	N	Y	Y	Y	Y	Selected	Restriction Access
18	Non-adherence to Conditions of subcontract	N	N	N	Y	N	Not selected	
19	Incomprehensive terms and conditions of	N	N	Y	Y	N	Not selected	
20	Poor coordination	Y	Y	Y	Y	Y	Selected	Poor coordination
21	Builders' works	N	N	N	Y	Y	Not selected	

	Cause identified through literature survey	E 1	E 2	E 3	E 4	E 5	Preliminary Investigation	Resultant cause
22		Y	Y	Y			Added	No proper pre-contract procedures in selecting subcontractor
23				Y	Y	Y	Added	Back to back arrangement but correspondence and information between MC and client/consultant is not revealed to SC
24			Y		Y	Y	Added	Appointing SC without getting approval from Eng/Consultant
25				Y	Y	Y	Added	Dictating relationship
Factors caused by subcontractors								
1	Non-adherence to the conditions of the subcontract	N	N	N	Y	N	Not selected	
2	Delay in progress	Y	Y	Y	Y	Y	Selected	Delay in progress
3	Lack of construction quality work	Y	Y	Y	Y	Y	Selected	Lack of construction quality work
4	Neglecting the instructions of the main contractor	N	Y	Y	Y	Y	selected but modified as per respondent's opinion	Low attention towards the instructions of the main contractor
5	Shortage of skilled labor, equipment, machinery	Y	N	Y	Y	Y	Selected	Shortage of skilled labor, equipment, machinery
6	Failure to preserve and take care of the materials	Y	Y	N	Y	Y	Selected	Failure to preserve and take care of the materials
7	Exhausting the plant and resources of the main contractor	N	Y	Y	Y	N	Selected	Exhausting the plant and resources of the main contractor
8	Partnering the works to another subcontractor without getting approval of the main contractor	Y	Y	Y	N	Y	Selected	Partnering the works to another subcontractor without getting approval of the main contractor
9	Lack of experience of the sub contractor in similar projects	N	N	N	Y	N	Not selected	
10	Neglecting the safety measures	Y	Y	Y	Y	Y	Selected	Neglecting the safety measures
11		Y	Y			Y	Added	lack of coordination between interfaces of main contractor’s work
12		Y			Y	Y	Added	High rate of staff turnover
13			Y	Y	Y		Added	Subcontractor does not attend to testing and commissioning in as built situation

	Cause identified through literature survey	E 1	E 2	E 3	E 4	E 5	Preliminary Investigation	Resultant cause
Causes for Disputes Caused by Clients								
1	Delay in releasing payments to the main contractor	Y	Y	Y	Y	Y	Selected	Delay in releasing payments to the main contractor
2	Giving instructions to the subcontractor directly without consulting the main contractor	Y	Y	N	Y	Y	Selected	Giving instructions to the subcontractor directly without consulting the main contractor
3	Objection by the owner on the implementation method used by the subcontractor	Y	Y	N	N	Y	Selected	Objection by the owner on the implementation method used by the subcontractor
4	Delay in providing the information such additional drawings, benchmarks, set-backs, etc.	Y	Y	Y	N	N	Selected	Delay in providing the information such additional drawings, benchmarks, set-backs, etc.
5	Short period allowed for implementing the project	Y	N	Y	N	Y	selected but modified as per respondent's opinion	Unreasonable time allocated for project completion
6				Y	Y	Y	Added	client's informal nomination of subcontractor those who familiar to client irrespective of main contractor's preference
7			Y	Y		Y	Added	Delay in providing Employer's requirement
Causes for Disputes Caused by Consultant								
1	Delay in hand-over of subcontractor's works	Y	Y	N	N	N	Not selected	
2	Delay in approving materials samples and shop drawings	Y	Y	Y	N	Y	Selected	Delay in approving materials samples and shop drawings
3	Low experience of the consultant's team	Y	Y	Y	Y	N	Selected	Incompetent experience of the consultant's team
4	Contradiction among the tender documents	N	N	N	N	N	Not selected	
5	Variation orders	Y	Y	Y	Y	Y	Selected	Variation orders
6			Y	Y	Y		Added	Suspension of Main contractor's work due to main contractor's default
7				Y	Y	Y	Added	Direct Payment certificates

	Cause identified through literature survey	E 1	E 2	E 3	E 4	E 5	Preliminary Investigation	Resultant cause
External factors								
1	Shortage of construction materials in the market	Y	N	Y	Y	N	Selected	Shortage of construction materials in the market
2	Breach of the contract due to project termination	N	N	N	N	N	Not selected	
3	Closing the commercial border crossings	Y	Y	Y	Y	N	Selected	Closing the commercial border crossings
4	Act of God factors	Y	Y	N	Y	N	Selected	Act of God factors
5	Geological problems on the site	Y	N	Y	Y	N	Selected	Geological problems on the site
6	Price escalation	N	Y	Y	N	Y	Selected	Price escalation
7	Non availability of standard form of Subcontract in Sri Lanka	Y	Y	Y	Y	Y	selected but modified as per respondent's opinion	Non availability of standard form of Subcontract published in Sri Lanka
8			Y	Y		Y	Added	Difficulties to obtaining approvals for tax concessions, opening of LC in case of direct import
9		Y			Y	Y	Added	Non availability of regulatory body in Sri Lanka for subcontractors

4.3. Summary

This chapter elaborates the details of the preliminary investigation carried out. Preliminary investigation was required in order to verify the applicability of findings of the literature survey to the Sri Lankan context. Five experts in the industry were interviewed and Revised Conceptual Model was prepared which was used to prepare the questionnaire.

CHAPTER 5

5. DATA COLLECTION, ANALYSIS AND DISCUSSION

5.1. Introduction

Aspire of this chapter was to present the research findings of empirical investigation. The aim of the research is to identify causes for disputes in subcontracts in construction industry in Sri Lanka and propose mitigation measures. This chapter used in achieving the final objective of this research by identifying major causes for disputes and mitigation measures in subcontracts. The chapter is structured as follows;

- Quantitative analysis - Questionnaire survey
- Qualitative analysis - Interview

5.2. Quantitative Analysis - Questionnaire survey

Questionnaires were used to identify and rank the causes for disputes in subcontracts. The questionnaire was developed based on the facts identified through literature survey as causes for disputes in subcontracts. Applicability of those causes into Sri Lankan construction industry context was validated through pilot survey conducted with experts in the construction industry.

5.2.1. Rate of response of respondents

The questionnaire was distributed among 35 professionals in Sri Lanka and overseas who have experience in the Sri Lankan Construction Industry. Thirty professionals responded out of the 35 with a response rate more than 85%. Figure 5.1 demonstrates the respondents' response and non-response percentages.

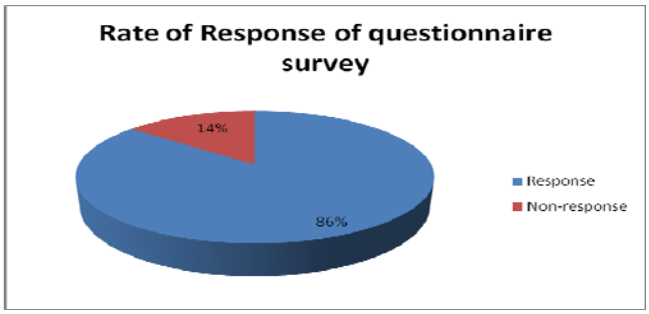

Figure 5-1: Rate of response of respondents

5.2.2. Professional background of the respondents

The background information of the respondents comprise of details on their professional background, type of the organization in which they are currently employed and work experience of the respondents. Figure 5.2 illustrates the professional background of respondents where the selected sample comprised of 36% of Quantity Surveyors, 17% of Architects, 27% of Engineers and 20% of Project Mangers.

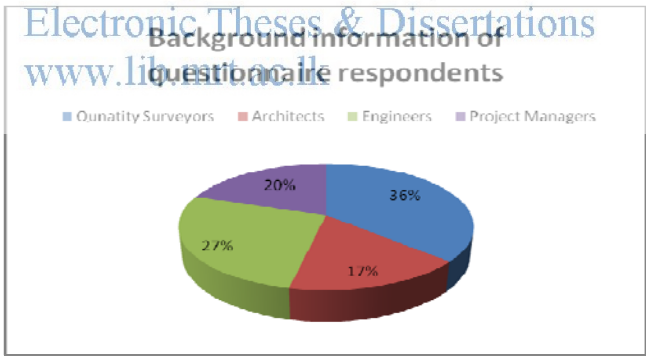

Figure 5-2: Professional background of the respondents

5.2.3. Type of organization of respondents

The composition of the respondents in relation to the type of organization is featured in Figure 5.3 where 12% of the respondents are employed at client organizations, 55% of the respondents are employed at contractor organizations and 33% of the respondents are employed at consultant organizations.

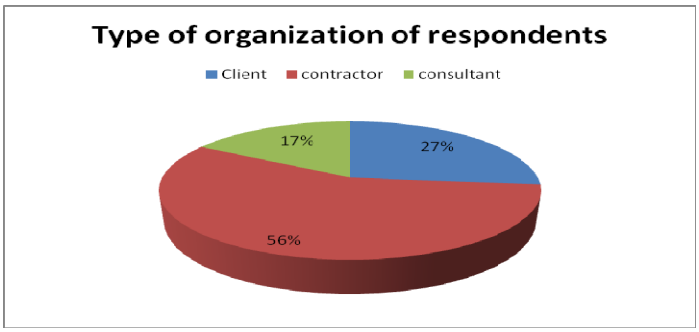

Figure 5-3: Type of organization of respondents

5.2.4. Work experience of respondents

Figure 5.4 illustrates the respondents' work experience in the construction industry. 13% of the respondents have work experience less than 5 years, 17% of the respondents have work experience between 6 to 10 years, 10% of the respondents have work experience between 11 to 15 years, 13% of the respondents have work experience between 16 to 20 years, 20% of the respondents have work experience between 21 to 25 years and 27% of the respondents have experience more than 25 years.

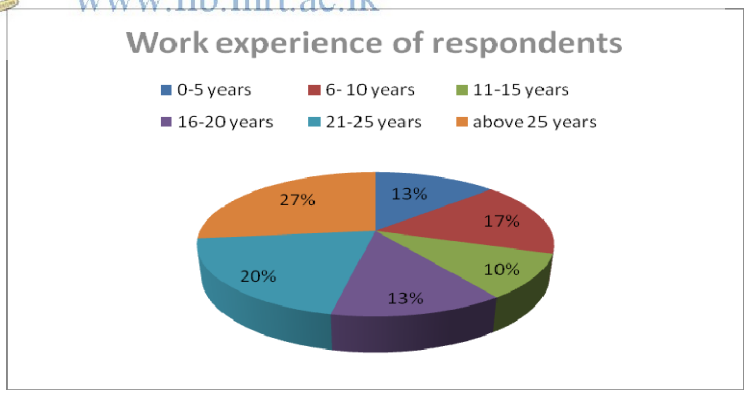

Figure 5-4: Work experience of respondents

5.2.5. Type of Subcontract used in Sri Lanka

Figure 5.5 illustrates the type of subcontract used in Sri Lankan construction industry.

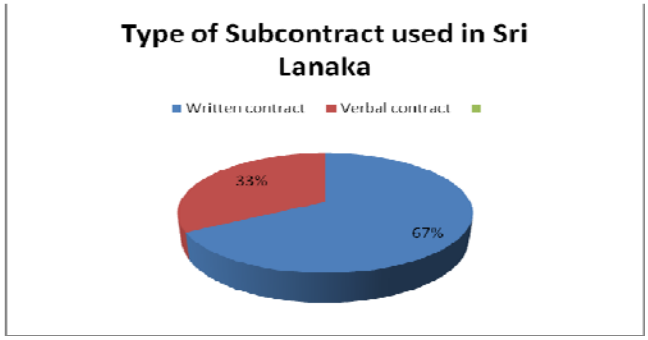

Figure 5-5: Type of Subcontract used in Sri Lanka

5.2.6. Preparation of Subcontract

Figure 5.6 illustrates the subcontract preparation details in the Sri Lankan construction industry.

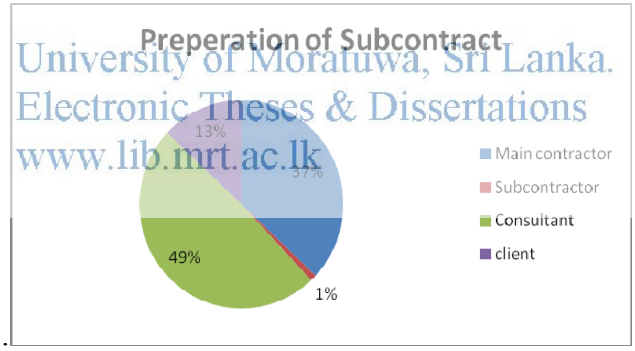

Figure 5-6: Preparation of Subcontract

5.2.7. Forms of Subcontract

There are various forms of subcontracts available in the construction industry. However, according to Figure 5.7, 9% of the respondents declared that JCT Short Form of Subcontract 2011 is used, 2% of the respondents stated that JCT Intermediate Named Subcontract 2011 is used, 1% of the respondents mentioned that JCT Intermediate Subcontract 2011 is used, 2% of the respondents declared that NEC 2013 Engineering and Construction Subcontract (ECS) is used, 63% of the respondents identified that

FIDIC Form of Subcontract is used and 23% of the respondents specified that Other Form of Subcontract is used.

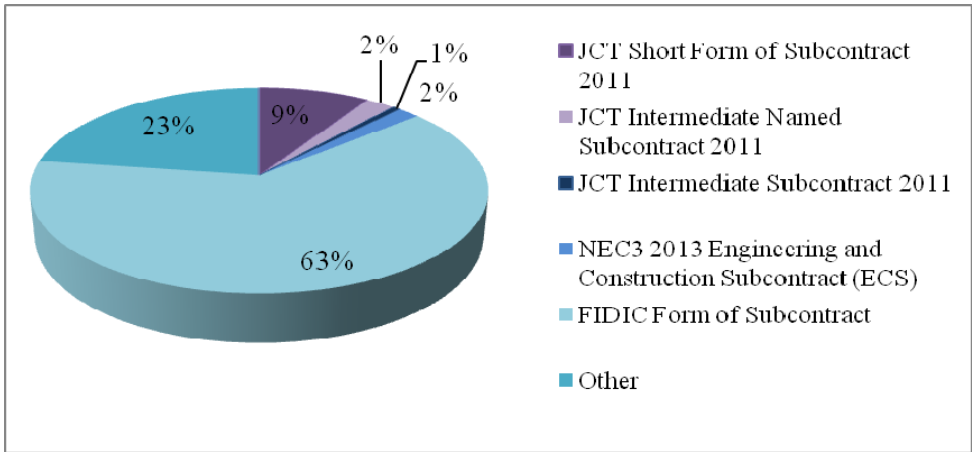

Figure 5-7: Form of Subcontract

5.3. Reasons for disputes in subcontracts

Seventeen (17) factors were identified as causes for disputes in Subcontract caused by the main contractor. Eleven (11) factors were identified as caused by the subcontractor. 8 factors were identified as causes of disputes caused by the client. Five (5) factors were identified as causes of disputes caused by the consultant and 8 factors were identified as external factors. The respondents were required to rank the criticalness of each issue and RII value was calculated.

5.4. Reasons for disputes caused by the Contractor

Causes identified through literature survey and verified through the preliminary investigation for disputes in subcontracts were listed in the questionnaire and respondent were requested to rank them according to the scale provided. Table 5.1 shows the opinion of the respondents about the causes leading to disputes caused by contractors according to relative importance index from high to low as in table 5.1.

Table 5-1: Reasons for disputes caused by the Contractor

No	*Cause*	*RII*
1	Payment problems	0.903
2	Poor communication	0.865
3	Back to back arrangement but correspondence and information between MC and client/consultant is not revealed to SC	0.832
4	Contractor's capability and fairness	0.813
5	Properly not document the extent to which the service is given.	0.787
6	Providing low-quality materials that result in low-quality workmanship	0.781
7	Scheduling conflicts	0.768
8	Assigning part of the works to new subcontractor, without informing the original subcontractor	0.716
9	Dictating relationship	0.703
10	Contractor’s delays in work and giving approvals	0.690
11	Using distant location for storage of materials	0.690
12	Restriction Access	0.645
13	Incomplete understanding of the main contractor to the contract documents	0.632
14	Insurance and bonding issues	0.535
15	Failure to provide proper security for the site	0.432
16	No proper pre-contract procedures in selecting subcontractor	0.394

From the table it is shown that payment problems is the top most reason for disputes in subcontracts caused by the contractors with RII of 0.903. From the table it can be observed that poor communication (with RII = 0.865), Back to back arrangement but correspondence and information between MC and client/consultant is not revealed to SC (RII= 0.832), Contractor's capability and fairness (RII = 0.813), properly not document the extent to which the service is given (RII = 0.787), Providing low-quality materials that result in low-quality workmanship (RII = 0.781), Scheduling conflicts (RII = 0.768), Back to back arrangement but correspondence and information between MC and

client/consultant is not revealed to SC (RII = 0.716), Assigning part of the works to new subcontractor, without informing the original subcontractor (RII = 0.703) and Contractor's delays in work and giving approvals (RII = 0.690) are key causes originated by contractors.

5.5. Reasons for disputes causes by the subcontractor

Table 5.2 shows the opinion of the respondents about the causes leading to disputes caused by subcontractors according to relative importance index from high to low.

Table 5-2 : Reasons for disputes caused by the Subcontractor

Nr	*Cause*	*RII*
1	Delay in progress	0.806
2	Subcontractor does not attend to testing and commissioning in as built situation	0.800
3	High rate of staff turnover	0.794
4	Lack of construction quality work	0.774
5	Neglecting the safety measures	0.761
6	Low attention towards the instructions of the main contractor	0.748
7	Lack of coordination between interfaces of main contractor's work	0.671
8	Shortage of skilled labor, equipment, machinery	0.497
9	Failure to preserve and take care of the materials	0.381
10	Partnering the works to another subcontractor without getting approval of the main contractor	0.348
11	Exhausting the plant and resources of the main contractor	0.335

From the table it is shown that Delay in progress is the top most reason for disputes between contractors and subcontractors. Absence of subcontractor in testing and commissioning in as built situation (RII = 0.800), High rate of staff turnover (RII =0.794), Lack of construction quality work (RII = 0.774), Neglecting the safety measures (RII =0.761), Less attention for the instructions of the main contractor (RII = 0.748), Lack of coordination between interfaces of main contractor's work are other main reasons (RII = 0.748).

5.6. Reasons for disputes caused by the Employer

Table 5.3 shows the opinion of the respondents about the causes leading to disputes caused by employer according to relative importance index from high to low as the following:

Table 5-3 : Reasons for disputes caused by the Employer

Nr	*Cause*	*RII*
1	Delay in providing the information such additional drawings, benchmarks, set-backs, etc.	0.800
2	Unreasonable time allocated for project completion	0.794
3	Giving instructions to the subcontractor directly without consulting the main contractor	0.787
4	Delay in releasing payments to the main contractor	0.774
5	Delay in providing Employer's requirement	0.684
6	client's informal nomination of subcontractor those who familiar to client irrespective of main contractor's preference	0.677
7	Late appointment of Subcontractor	0.529
8	Objection by the owner on the implementation method used by the subcontractor	0.458

From the table it is shown that delay in providing the information such additional drawings, benchmarks, set-backs, etc. (RII = 0.800) is the top most reason for disputes caused by the employer. Unreasonable time allocated for project completion (RII =0.794), Giving instructions to the subcontractor directly without consulting the main contractor (RII = 0.787), Delay in releasing payments to the contractor (RII = 0.774), Delay in providing Employer's requirement are other major reasons (RII = 0.684).

5.7. Reasons for disputes causes by the Engineer/Consultant

Table 5.4 shows the opinion of the respondents about the causes leading to disputes caused by engineer/consultant according to relative importance index from high to low as the following:

Table 5-4: Reasons for disputes causes by the Engineer/Consultant

Nr	*Cause*	*RII*
1	Delay in approving materials samples and shop drawings	**0.794**
2	Incompetent experience of the consultant's team	**0.787**
3	Suspension of Main contractor's work due to main contractor's default	**0.774**
4	Direct Payment certificates	**0.516**

Contradiction among the tender documents is the top most reason caused by consultants with RII of 0.819. Suspension of Main contractor's work due to main contractor's default (RII = 0.794), Incompetency of the consultant's team (RII = 0.787), Delay in approving materials samples and shop drawings (RII = 0.774) are other major reasons.

5.8. Reasons for disputes causes by External Factors

Table 5.5 shows the opinion of the respondents about the causes leading to disputes caused by external factors according to relative importance index from high to low as the following:

Table 5-5: Reasons for disputes causes by External Factors

Nr	*Cause*	*RII*
1	Non availability of standard form of Subcontract in published in Sri Lanka	0.897
2	Non availability of regulatory body in Sri Lanka for subcontractors	0.748
3	Act of God factors	0.671
4	Difficulties to obtaining approvals for tax concessions, opening of LC in case of direct import	0.652
5	Shortage of construction materials in the market	0.632
6	Exchange rate fluctuation/currency depreciation	0.529
7	Closing the commercial border crossings	0.413

Non availability of standard form of Subcontract in Sri Lanka published in Sri Lanka (RII = 0.897) is the main cause for disputes as there is no guidance in preparing subcontract documents. Non availability of regulatory body in Sri Lanka for subcontractors (RII = 0. 0.748), Act of God factors (RII = 0.671).

5.9. Qualitative Analysis - Interviews

Interviews were held with respondents to identify the mitigation measures for the possible disputes in subcontracts. Interview guideline was prepared based on the questionnaire. Causes identified for disputes in subcontracts were presented to the respondents to obtain their suggestions for mitigation. 6 interviews were held and content analysis was carried out in order to analyse the answer.

Table 5.6 : Content Analysis

	Causes for dispute	RII	Proposed Mitigation Measure	Nr of reference
1. Causes for disputes caused by the Contractor				
1.1	Payment problems	0.903	Have tri- party agreements (contractor/subcontractor/employer)	2
			Partnering	2
			Payment to Subcontractor –directly by the employer	1
			Prepare a policy for subcontractors by a construction industry governing body	1
			Payment terms must be mutually agreed and clearly spelled out in the Contract and strictly applied accordingly.	1
			Have back to back payment method	1
			No measures have to have a proper Cash flow taking into account delays in payment by the client	1
1.2	Poor communication	0.865	Training subcontractors on dealing their day today business	2
			Communication procedure and hierarchy must be mutually agreed and incorporated into the Contract.	3
			Communication protocol	2
			Develop better communication	1
			Contract management and contract administration – consultant to review	2
			Feedback	1
			Reduce the number of layers/ tiers of subcontracting to effectively manage the communication gap	4
			Avoid verbal instructions and issue written instructions	2
			Improve communication –language and use drawings and printed words.	1
1.3	Back to back arrangement but correspondence and information between MC and client/consultant is not revealed to SC	0.832	Need to come up with a standard conditions of contract	4
			In a back-to-back arrangement contractual requirements between MC and the Client are also applicable for the contract between MC and SC. Accordingly necessary Clauses must be incorporated into the contract between MC and SC embodying all the applicable requirements/conditions between MC and the Client.	2
			Main contract shall be provided to SC	1
			Make provisions for reveal relevant information to SC	2
			Sub contractor should at least attend all site meetings	1
1.4	Contractor's capability and fairness	0.813	Need to come up with a standard conditions of contract	3
			Main Contractor to assess and ensure the capabilities of Sub-contractors prior to entering into the Sub-contract Agreement.	1
			Make aware about common goals to be achieved	2
1.5	Properly not document the extent to which the service is given.	0.787	Need to come up with a standard conditions of contract	3
			Extent of all the requirements, services etc. must be mutually agreed and properly documented into the Contract.	4
			List of items covered under attendance shall be listed in subcontract and main contract.	2
			The specification and scope must be well written	1
1.6	Providing low-quality materials that result in low-quality workmanship	0.781	Need to come up with a standard conditions of contract	4
			Consultant and the Client to ensure the inclusion of standards and quality of the materials and prospective vendors into the Specifications which forms part of the Contract.	1
			Proper material approval procedure and proper specification to be prepared before awarding the contract	2
			Inspection of yards and workshop and quality control by the main contractor	1
1.7	Scheduling conflicts	0.768	Need to come up with a standard conditions of contract	4
			Scheduling must be mutually agreed and incorporated into the Contract.	2
			Dairy returns/daily programme to be monitored	1
			Have look ahead programme	1
			Have regular meetings	1
			Time given for SC shall match with MCs programme	1
			SC's programme shall match with MC's programme	1
			Check on availability of materials, specially imported items which may delay importation	1
1.8	Assigning part of the works to new subcontractor, without informing the original subcontractor	0.716	Prepare a policy for subcontractors by a construction industry governing body	4
			This is a very unethical practice and the Client must not grant approval to MC for doing the same.	1
			Engineer shall monitor	1
			Must establish capacity of the sub contractor and his record of finishing on time and quality	1

1.9	Dictating relationship	0.703	Training subcontractors on dealing their day to day business	2
			Dictating relationship is not acceptable. Once a contract is in place MC must respect and use the provisions of relevant clauses of the Contract for the administration of the SC.	2
			Develop interpersonal relationship	3
1.1	Contractor's delays in work and giving approvals	0.690	Need to come up with a standard conditions of contract	5
			Approval procedures inclusive of time duration etc. must be mutually agreed and incorporated into the Contract.	3
			Ask subcontractors to participate in project progress meetings	1
			Copy the correspondence to engineer/consultant	1
			Main contractor to be more efficient	2
1.11	Using distant location for storage of materials	0.690	Main Contractor to provide sufficient storage facilities within the Site (at free of cost) for the use of Sub-contractors.	2
			Storage details to be provided to SC for pricing before award the contract	2
1.12	Restriction Access	0.645	Need to come up with a standard conditions of contract	4
			Main Contractor to ensure providing unrestricted access for Sub-contractors for carrying out the works as necessary.	3
1.13	Incomplete understanding of the main contractor to the contract documents	0.632	Need to come up with a standard conditions of contract	6
			Copy of the signed Contract between MC and the SC must be forwarded to the Client/Consultants.	4
			Can discuss salient points in prior meetings	3
			All must understand the clauses. Mainly the time and quality required, and specifications	1
1.14	Insurance and bonding issues	0.535	Requirements of bonds and insurances must be mutually agreed and incorporated into the Contract.	3
			Employer can have umbrella insurance for works	2
			Demarcation of the scope of work shall be well defined	1
			Ensure enforcement of conditions agreed	1
1.15	Failure to provide proper security for the site	0.432	Need to come up with a standard conditions of contract	3
			Security requirements must be mutually agreed and included into the Contract.	1
1.16	No proper pre-contract procedures in selecting subcontractor	0.394	Prepare a policy for subcontractors by a construction industry governing body	3
			Main Contractor to ensure evaluating Sub-contractors' pre-qualifications in selecting Sub-contractors.	2
			Both technical and commercial evaluation shall be carried out by the employer/consultant	1
			Yes needs proper pre-contract procedure.	1
Causes for disputes in subcontracts caused by the subcontractors				
2.1	Delay in progress	0.806	Need to come up with a standard conditions of contract	3
			Reasonable and practicable work programme must be agreed with the MC prior to entering into the Contract.	2
			NSC's program should be in line with the MC's program	1
			Allow clauses related to liquidated damages in the tender document	1
			NSC should have a proper program	1
			Background study to check on the NSCs' history of work	1
			Allow provisions for safety when pricing	1
			Make/inculcate safety culture at sites	1
			Make MC to provide safety equipment, site doctor etc.	1
			Proper planning and monitoring and penalty clauses required	1
2.2	Subcontractor does not attend to testing and commissioning in as built situation	0.800	Need to come up with a standard conditions of contract	3
			MC to describe the requirement of attending to testing and commissioning phase of the Contract and consider implementing a penalty in the event SC does not attend to same.	1
			Use provision of Release of Retention - as suitable with the nature of the subcontract	1
			Should be in the conditions of contract	1
2.3	Lack of construction quality work	0.774	Need to come up with a standard conditions of contract	2
			MC must ensure SC is capable of carrying out the works intended to sublet to the required construction practice and standards. This can be done during the process of evaluating pre-qualifications of the SC.	1
			Implementation of quality management system	2
			Compulsory quality certification and occupational licensing	1
			Assurance of appropriate skills	1
			Adopt zero defect initiative/policy	1
			To check on quarterly reports submitted to maintain ISO standards	1
			Proper planning and monitoring and penalty clauses required	1
2.4	Neglecting the safety measures	0.761	Need to come up with a standard conditions of contract	4
			MC to clearly describe the safety measures that required to be maintained by the SC and consider implementing penalties in the event of breaching this Condition.	1
2.5	Low attention towards the	0.748	Need to come up with a standard conditions of contract	1

	instructions of the main contractor		Importance of carrying out MC's instructions must be clearly described in the Contract.	2
			Proper planning and monitoring and penalty clauses required	1
2.6	Lack of coordination between interfaces of main contractor's work	0.671	Need to come up with a standard conditions of contract	3
			MC to clearly describe the requirements of interfaces that required to be coordinated by the SC with MC.	1
			Demarcation of scope – clearly provide in the contract document	1
2.7	Shortage of skilled labor, equipment, machinery	0.497	MC must ensure SC has access for all the required resources for carrying out the part of the works intended to sublet prior to entering into the Contract. This can be done during the process of evaluating pre-qualifications of the SC.	3
			Availability of equipment machinery should be checked before hand	1
2.8	Failure to preserve and take care of the materials	0.381	MC to ensure maintaining proper supervision and implementing procedures to control the mishandling and/or grueling of plant and resources by the SC.	1
			Quality control procedure	1
2.9	Partnering the works to another subcontractor without getting approval of the main contractor	0.348	Need to come up with a standard conditions of contract	3
			MC to ensure incorporating a Clause into the Contract restricting partnering any works to another Sub-contractor without obtaining approval from the MC.	2
2.10	Exhausting the plant and resources of the main contractor	0.335	This schedule should be included in the subcontract.	3
			MC to ensure maintaining proper supervision and implementing procedures to control the mishandling and/or grueling of plant and resources by the SC.	2
3 Causes for disputes in subcontracts caused by the employer				
3.4	Delay in providing the information such as additional works, changes, benchmarks, set-backs, etc.	0.800	Need to come up with a standard conditions of contract	5
			MC to ensure incorporating into the Contract, time frame for the issuance of additional drawings, benchmarks etc. by the Client.	1
			Time issuance of the information	1
			Make provisions in the subcontract and main contractor to claim for such events	1
			Client should appoint responsible consultants	1
3.5	Unreasonable time allocated for project completion	0.794	MC to verify the fairness and agree the construction completion date at the time of signing the Contract.	2
			Review the sufficiency of time allocated for SC's work in Main contractor's programme	1
			Use reliable periods	1
			Try to commence the procurement of material early by the employer	1
			Use 'novation' in sub contracts for long lead procurements	1
			Have a master project programme prepared by employer for his reference	1
3.2	Giving instructions to the subcontractor directly without consulting the main contractor	0.787	Need to come up with a standard conditions of contract	2
			MC to ensure a Clause incorporated into the Contract between MC and the Client that restricts Client issuing instructions directly to SC.	1
			Adopt a proper communication protocol	1
			Client should not be allowed to communicate with the sub contractor	1
3.1	Delay in releasing payments to the main contractor	0.774	Need to come up with a standard conditions of contract	4
			MC to try and incorporate a Clause into the Contract between MC and the Client allowing MC to claim interest for any delay in releasing the approved payments.	2
			Prepare a project cashflow in line with the updated programme	1
			Adopt a proper payment mechanism	1
			Inform the SC/MC/engineer about the level of information required with the payment application and standard the format.	2
			Contractor to have adequate cash flow	1
3.7	Delay in providing Employer's requirement	0.684	Need to come up with a standard conditions of contract	5
			MC to ensure suitable time frame in line with the Construction Programme is agreed and incorporated into the Contract for providing Employer's requirements.	2
			Burden of delay in instructions shall transferred to the employer	1
3.6	Client's informal nomination of subcontractor those who familiar to client irrespective of main contractor's preference	0.677	Coaching	1
			MC to express strong opposition for informal nomination of SCs by the Client and advise potential disruption to the Project caused by such actions.	4
			Use technical evaluation for selecting the subcontractor	1
			Involvement of the engineer in selecting the subcontractor	1
3.8	Late appointment of Subcontractor	0.529	MC to ensure suitable time frame is agreed in line with the Completion Programme and incorporated into the Contract for the appointment of SCs.	3
			Need to come up with a standard conditions of contract	6
			Timely appointment	4
3.3	Objection by the owner on the implementation method used by the subcontractor	0.458	Need to come up with a standard conditions of contract	4
			MC to ensure SC implements construction methods to the approval of the owner.	1
			Client should not have direct contact with the sub contractor. The method statement should be submitted to consultants before hand	1
4 Causes for disputes in subcontracts caused by the consultant				
4.1	Delay in approving materials	0.794	Need to come up with a standard conditions of contract	6

	samples and shop drawings		MC and the Client to ensure suitable time frame is agreed and incorporated into the Contract for the approval of material submittals, samples, shop drawings etc. by the Consultants	4
			Communication protocol to be adopted	2
			Information flow to be formalized.	3
			Contractor to claim for extension time and cost	4
4.2	Incompetent experience of the consultant's team	0.787	Need to come up with a standard conditions of contract	3
			Client to ensure appointing a competent and experience Consultant's team for handling the Project in achieving the quality and timely completion of the Project.	2
4.3	Suspension of Main contractor's work due to main contractor's default	0.774	Need to come up with a standard conditions of contract	5
			Consultants to study and take appropriate measures to resolve the issues related MC's default and extends necessary assistance to MC towards achieving the successful contract completion prior to consider suspension of Works.	2
			Issue clear instruction on proceeding with SC work	2
4.4	Direct Payment certificates	0.516	Need to come up with a standard conditions of contract	3
			If it is against the provisions in the contract obtain consent of the SC and MC for that	2
			Should follow the agreed procedure for payment	1
5 Causes for disputes in subcontracts caused by external factors				
5.1	Non availability of standard form of Subcontract in published in Sri Lanka	0.897	Prepare a policy for subcontractors by a construction industry governing body	6
			All parties to the Contract to ensure relevant clauses are included into the Contract for the settlement of potential contractual disputes caused by the non-availability of Standard Form of Sub-contract published in Sri Lanka	3
			Prepare and publish standard subcontracts in complying with standard main contracts published in Sri Lanka	2
5.2	Non availability of regulatory body in Sri Lanka for subcontractors	0.748	Prepare a policy for subcontractors by a construction industry governing body	2
			All parties to the Contract to ensure relevant clauses are included into the Contract for the settlement of potential contractual disputes caused by the absence of regulatory body for Sub-contractors.	1
			An association of sub contractors is welcome not a regulatory body. It should be self-regulating.	1
5.3	Act of God factors	0.671	Need to come up with a standard conditions of contract	2
			All parties to the Contract to ensure the relevant Clauses are incorporated into the Contract to cover the consequences of Act of God factors.	1
5.4	Difficulties to obtaining approvals for tax concessions, opening of LC in case of direct import	0.652	Need to come up with a standard conditions of contract .	3
			Amendment to standard conditions shall be clearly incorporated	2
			All parties to the Contract to ensure the relevant Clauses are incorporated into the Contract to cover the consequences of failing to obtain approvals for tax concessions etc. subject to financial implications arising out are settled in compliance with the provisions of the Contract.	3
5.5	Shortage of construction materials in the market	0.632	Need to come up with a standard conditions of contract	4
			All parties to the Contract to agree using alternative materials available in the market for the completion of the Project subject to financial implications arising out are settled in compliance with the provisions of the Contract.	1
			Agree to pay for materials on or off iste with guarantees	1
5.6	Price escalation	0.529	Need to come up with a standard conditions of contract	2
			All parties to the Contract to ensure the relevant Clauses are incorporated into the Contract to cover the consequences of Price Escalation subject to financial implications arising out are settled in compliance with the provisions of the Contract.	1
			Pay for materials and advances on bank guarantees.	2
5.7	Crossing the commercial border crossings	0.413	All parties to the Contract to agree utilizing other available methods for the procurement of the required materials subject to financial implications arising out are settled in compliance with the provisions of the Contract.	3

5.10. Mitigation Measures for Disputes in Subcontracts

Subcontracting (nominated or domestic) is no more a new concept to the Sri Lankan construction industry. Subcontracting takes place during the construction stage as well as design stage. However, it was noted that still there is no proper guidance for the subcontracting in the construction industry. Respondents were of the view that when compare to the domestic subcontracts, occurrence of disputes are less in nominated subcontracts. Most of the subcontractors in Sri Lankan construction industry are small scale contractors. Therefore, occurrences of disputes, in most cases, are not emerged and not recorded, but it does not mean that there are no disputes. Thus there are presumptions that small scale contractors are/would be disappeared from the construction industry. However, according to the respondents, comparatively, subcontractors who are engaged to the main contractor as nominated subcontractor is more secured than the other subcontractors and face with lesser number of problems or with a lower gravity.

Most of the respondents emphasized the importance of establishing a regulating body/governing body to regularize the subcontracting practice in Sri Lanka. Respondents suggested that could be arranged by Construction Industry Development Authority who is the apex governing body in the current construction industry. Further elaborating, it was suggested by the respondent that subcontracting shall be addressed as a concept in the construction industry and policies and regulations shall be prepared to safeguard the rights of the subcontractors. They should be aimed at the "development of subcontractors" and "improving the performance of subcontractors".

With the experience in foreign countries, one respondent suggested to establish motivation factors for subcontractors aiming improving their performance while letting them to achieve their own successfulness with credibility. Different types of workplace skills development opportunities can be lead to a part qualification, a national qualification, a professional registration, or structured work internship resulting in

qualification to undertake a trade test. Such standard should be made mandatory on public sector contracts, which will motivate subcontractor's access to such skills development opportunities.

Elaborating the responsibilities of regulating body, respondents suggested providing a track record and an assessment of the performance of the main contractor with, amongst others, management of subcontractors. Such information may be taken into account in construction procurement on public sector contracts for the purpose of assessing the suitability of contractors for pre-qualification, selective tender lists or expressions of interest; and adjudication for the award of a contract.

Establishing Payment Regulations for subcontractors by an authorized body was also suggested as a remedy for payment issues. payment to subcontractors can be regilarised by including provisions such as ;

- prohibit conditional payment provisions – such as "pay when paid" provisions – except under a situation of business rescue or insolvency;
- Entitle contractors and subcontractors to progress payments – including entitlement to submit monthly
- Progress payments where a construction works related contract does not provide for regular and reasonable
- Intervals on which progress payments must be made;
- regulate that the date on which payment becomes due and payable is the date determined in the contract, which may not be later than 30 days after the date on which the contractor or subcontractor has submit an invoice or tax invoice;
- provide for interest payable on the unpaid amount of a progress payment that has become due and payable; and
- provide for requirements for a adjudication process to resolve disputes – such as delayed payments.

Programmatic interventions can be developed for providing formal training opportunities to small contractors and to subcontractors in financial and business skills (including tendering, pricing and risk management) and in business management systems. Subcontractor's previous track record and reputation for quality shall be considered when selecting a subcontractor.

Subcontractor/contractor relationship shall be developed to a path where potential for knowledge transferring i.e.; financial knowledge such as tendering, cash-flow management, and preparing payment claims; managerial knowledge including resource management, time and workflow management, health and safety management, supply chain management; technical knowledge specific to the project; and technology transfer incorporating design skills, construction techniques, materials or equipment techniques and capacities, business systems, production systems, and procurement systems.

Where knowledge transfer takes place, this would occur compliance with policy and regulatory issues for health and safety, construction project management and delivery skills, dealing with suppliers, and developing trade relationships, purchasing, supply chain management, financial management including managing cash flows and assistance by providing working capital to the subcontractors, general site management, construction techniques to comply with client requirements and soft issues relating to perspectives, behavior, and policy.

Further possible area to be addressed by the regulatory body,as suggested by the respondents, is developing programmatic interventions for providing formal training opportunities to subcontractors. Encouraging the contractors and subcontractors for long-term strategic relationships is also suggested as a dispute mitigation measure.

Most of the respondents pointed out necessitate of preparation of a domestic standard form of subcontract. As there is no standard form of subcontract published in Sri Lanka, respondents are of the view that there is no guidance for the construction industry about drafting a comprehensive subcontract document to suit with industry's requirements.

Incomprehensive terms in gray areas of the document always lead to dispute as parties have the same commercial interest. Even if the parties want to use a complete subcontract document in comply with Standard Bidding Document (ICTAD/SBD/)02 etc, it takes more time to draft and there are more possibilities for mistakes. Most of the respondents suggest that it is the Construction Industry Development Authority's responsibility to publish a standard form of subcontract. Specially, this will eliminate the use of 'back to back' arrangement and dispute arising due to variations. Clear provisions of valuing variations could eliminate the main contractor's perception of maximize their profits at the expense of the subcontractors by "squeezing" them, especially when there are changes to the scope of work.

However, until a standard form of subcontract is used, it was pointed out that parties shall be encouraged to enter into a written contract before commencement of the works. Inclusion of special project requirements mandated by the client/design team/regulations, can be included to the subcontract. As suggested by the respondents, information flow of the project throughout the subcontract shall be pre agreed which shall include but not limited to mode, level of details, responsibility, tracking, accuracy and the like. System shall be established to communicate updated drawings, specifications and programme. Subcontractor shall be provided sufficient time to price the bid. '*Adversarial Relationships shall be evicted*' because of the adversarial relationship information flow can be disturbed.

Pre-contract meeting to understand the project and develop management strategy was also suggest as a mitigation measure. Payment problems experienced by the subcontractor is identified as a major cause for disputes in subcontracts. Payment issues were explained as due to delays in making the payments to the subcontractor by the contractor and paying fewer amounts by the contractor to the subcontractor than certified by the consultant/engineer.

One respondent suggested that try party agreement between the client, main contractor and the subcontractor is proposed as the one of the suitable method to mitigate the payment disputes in the nominated subcontracts. While keeping the general rights and obligations in standard forms of subcontracts as it is, payment terms can be removed from main contractor by giving it to the client. In certain scenarios as the selection of subcontractor is done by the client, subcontractor does not trust the main contractor regarding payment. Further, main contractor is reluctant to take the responsibility for the subcontractor's work without payment rights.

However, respondents further elaborate that this arrangement cause additional contract administration works for the client which is not the scenario in general subcontracting process. According to the respondents, disputes regarding variations, time scheduling, instructions, submission and approval of drawings/materials etc can be mitigated by having a proper subcontract document. Ad-hoc subcontract documents mostly used in Sri Lankan construction industry is silent on those matters resulting disputes in post contract stage. Special attention to be paid on project specialized provisions such as limitation of services, items covered under attendance fee, builders work etc. Main contractor is responsible for subcontractors' work to the client. Line of responsibilities, especially in interfaces of main contractor's work and subcontractor's work should be clearly documented at the pre-contract stage.

In certain scenarios subcontractors enter into subcontracts in which conditions of subcontract is 'back to back' arrangement of the main contract. Subcontractors, without knowing what is there in the main contract, sign the subcontract. Therefore, when signing the subcontract, he is unaware of risks of the contractor, entitlements for claims etc. This causes lot of disputes in post contract stage. Therefore, respondents suggest in the back to back arrangement main contractor shall provide the copy of the main contract to the subcontractor before signing the subcontract.

According to the respondents, lack of main contractor's knowledge of the main contract lead to rejection of subcontractor's claims by the main contractor. One respondent suggests this is not only due to lack of knowledge but main contractor's belief that submission of claims will damage the relationship they have with the client. Had the main contractor aware of his and the subcontractor's entitlement he could have pass the subcontractor's claim to the client. Corporation of main contractor and subcontractor in such scenarios is identified as an imperative factor. Subcontract shall be prepared in a manner where all the rights and obligations of the main contractor are transferred to the subcontractor through terms of the subcontract as applicable.

Information / instruction flow of a construction project is very important. In large construction projects where around 10 to 20 subcontracts are involved, distribution of information to all the parties is complicated. One of respondent suggests that use of project basis communication protocol would overcome this issue. This has to be distributed to all the parties involved in the project at a prior stage.

Appointing authorized representatives should also be done. Designate the specific individuals (by name) who will be authorized to speak and act for the contractor and the owner. This prevents confusion by eliminating a situation where multiple individuals provide conflicting information and directives. Systems for the selection of contractors and subcontractors placing too much emphasis on price and not enough on capability or the ability of disparate organizations to work well together. The employer shall adopt proper systems and procedures for selecting, supervising and managing them.

To mitigate the disputes on insurance, it is suggested that employer shall take insurance for works and third party. Absence of governing body to administer subcontracts in Sri Lankan construction industry was identified by many respondents as a major cause for disputes. There is no legal protection for subcontractors.

According to the respondents, having standard conditions of contract would mitigate most of the contractual disputes. However, occurrence of disputes is unavoidable until

addressing the interpersonal issues at site. One respondent suggested that interface problems can efficiently manages by early addressing. The interface problems need to be immediately and carefully resolved, particularly through proper coordination, cooperation, and communication among the construction parties.

In most construction contracts in Sri Lanka, provisional sum is provided in the Bills of quantities for subcontract works. The main contractor when prepare the programme for the works, keep a provision, in most cases one single bar in the bar chart, for the subcontract works. Respondents suggested that it is the employer's/consultants' responsibility to review such provisions and advise on adequacy of duration as well as commencement date. It would support the main contractor to plan his work within the provided time frame while getting the subcontractor's work according to his programme. Maintaining high quality relationships was suggested to address coordination problems faces in construction processes by capturing the benefits of inter-organizational learning.

It was suggested that contractors and subcontractors should work out an arrangement to facilitate coordinated and proactive problem solving. To this end, regular meetings to review progress and joint site inspections to check the quality of completed works, work in progress and safety compliance may be considered. Weekly meetings called by the main contractor for subcontractors involved in the project were suggested as an extremely important coordination tool. Daily contact of the main contractor with each subcontractor is also essential if the main contractor is to keep abreast of operations, problems, and schedule compliance. This also aids him in anticipating conflicts that may be developing between two or more subs whose work interrelates. Proper planning of such activities is important and the main contractor shall employ a competent project manager and planner. Preparing look - ahead programme at least monthly intervals was suggested as efficient planning tool. The contracting parties should maintain a cooperative spirit built upon ethical behavior and fair dealings. Partnering arrangements can be adopt to facilitate the setting of common objectives, to improve communication and coordination.

CHAPTER 6

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter discusses on deriving at the conclusion of this research from the research findings attained in the preceding chapter. Thus this chapter elaborates the summary of the undergone research process which enabled to derive at the final outcome. Hence, the conclusion discusses how the objectives were persisted through the research findings. The aim of this research is to find the causes for disputes in subcontracts in Sri Lankan construction industry and enhance a better practice of management of subcontractors by identifying mitigation measures for such disputes. To derive at the aim, certain objectives were established. Hence, the conclusion describes the accomplishment of each objective together with the research findings as explained in the following text.

6.2. Overview of Research and Conclusions Drawn from Study

Construction project being unique in nature and lies in a dynamic industry is always vulnerable to disputes. If manage carelessly, involvement of several parties with multiple objectives could result waste of time and money resulting an unsuccessful project. Subcontracting is no more new to Sri Lankan Construction industry. However, it is evident that management of the subcontracts in Sri Lankan construction industry is still not properly addressed. The aim of this research was to investigate the causes for disputes in subcontracts in Sri Lanka.

To find the answers for the research question, several objectives were used. After finalizing the research proposal, comprehensive literature survey was carried out to study about the subcontracting in the context of construction contracts. Subcontract is not an isolated contract in a construction project. Client being the main stakeholder as well as the other contractual party to the main contract and the consultant being

the designer and /or administrator of the main contract can directly or indirectly have indirect relationship with the subcontractor.

Disputes can be incurred due to various reasons. Conceptual model was prepared based on the facts identified through literature as causes for disputes in subcontracts. Conceptual model was validated by five experts in the construction industry, in the preliminary investigation. Questionnaire survey was carried out to rank the causes of disputes and mitigation measures were identified through interviews.

Payment problems, poor communication, back to back arrangement but correspondence and information between main contractor and client/consultant is not revealed to subcontractor, contractor's capability and fairness, properly not document the extent to which the service is given, providing low-quality materials that result in low-quality workmanship, scheduling conflicts, assigning part of the works to new sub contractor without informing the original subcontractor, and dictating relationship of the main contractor were identified as the major causes for disputes caused by the main contractor.

Delay in progress, subcontractor does not attend to testing and commissioning in as built situation, high rate of staff turnover, lack of construction quality work, neglecting the safety measures, low attention towards the instructions of the main contractor are identified as the reasons for disputes in subcontracts caused by the subcontractor.

Delay in providing the information such as additional drawings, benchmarks, set-backs, etc., unreasonable time allocated for project completion, giving instructions to the subcontractor directly without consulting the main contractor and delay in releasing payments to the main contractor are the reasons for disputes in subcontracts caused by the client. Impacts to the main contract by those facts ultimately influence the hindrances to subcontract also.

Delay in approving materials samples and shop drawings, incompetent experience of the consultant's team, variation instruction and suspension of main contractor's work due to main contractor's default are reasons for disputes caused by the consultant.

Non availability of standard form of Subcontract in Sri Lanka published in Sri Lanka and non availability of regulatory body in Sri Lanka for subcontractors is major cause for disputes in subcontracts affected by external factors.

6.3. Recommendations

According to the finding of the research, it is noted that encouraging main contractor and subcontractor to enter into written contracts is essential to mitigate disputes in subcontracts. Reasons identified as causes for disputes shall be clearly addressed in the subcontract. Use of standard form of subcontract can eliminate the existence of loop holes in in-house drafted subcontracts. Comprehensive subcontract would mitigate the occurrence of most of the disputes as right and obligations of the parties are pre agreed. As rights, obligations, remedies in breach etc are pre-agreed, it would be easy to monitor the performance of the parties against with the terms of the contract. Publishing standard form of subcontract is essential. Subcontract always be lined up with the terms of the main contract. Special concentration should be paid in allocating the risk within the main contract and subcontract.

Establishing a regulating/governing body for the subcontract is important to safeguard the small scale subcontractors. Most of the disputes arise in subcontracts are not recorded and not resolved. Policies/regulations shall be adopted to streamline the subcontracting process and to protect subcontractors.

Selection of the subcontractor shall be based on commercial and technical evaluation. Keeping track records would ease the selection task. Subcontracting shall be converting into a knowledge transferring process. Grading system of subcontractors shall be established. Long term strategic relationship to be developed between the contractor and the subcontractor.

It is advised to establish a well organized contract administration system as a frame work within the project environment at the very beginning and ensure existence of it throughout the project. Standard conditions by and large cover most of the rights, obligations, and remedies of the parties to the contracts i.e. client, consultant, main contractor, subcontractor. In a properly established system client, consultant, main

contractor, and subcontractors are compelled to perform their obligations in a much formalized manner (use of standard documents will make it ease). Attitude revolutionize of each party is required in mitigation of the disputes.

6.4. Further research

The research opens up the path to other research areas as follows.

- Establishing an evaluation criteria for subcontractors
- Study of subcontract practice addressing subcontractor selection criteria, problems encountered by domestic subcontractors and factors considered by subcontractors in bidding

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APPENDICES
Appendix A - Questionnaire

QUESTIONNAIRE SURVEY

Disputes between Subcontracts and subcontractors in Sri Lankan Construction Industry

Dear Sir/Madam,

I am Nissanka., following M.Sc in Construction Law and Dispute Resolution, Department of Building Economics, University of Moratuwa. My research based on above topic is conducted under the supervision of Dr. (Mrs). Yasangika Sandanayake, Senior lecturer, Department of Building Economics, University of Moratuwa for award of M.Sc in Construction Law and Dispute Resolution degree. The result of this survey would be essential for the successful completion of my research.

Completion of the questionnaire would take approximately 20 minutes and all the questions can be answered with minimum effort. Further, I personally assure that all information obtained would be treated to the strictest confidential and only intended for the use of the analysis in this study. All the data will be considered on aggregated basis and no individual data will be published.

I would be much obliged to you if you could kindly allocate some time to read this questionnaire and participate by being one of my respondents to help me in this research. Your contribution is highly appreciated.

Thank you.

Yours faithfully,

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SECTION A : General Information

(General information about respondent)

1.Name : …… (optional)

2.Designation : …….

3.Company : …… (optional)

4. Experience:……

SECTION B : Contractual Relationship between the Main Contractor and the Subcontractor

Respondents are required to give answers based on their experience in past projects.

1. What is the type of subcontract used in Sri Lanka ? (written contract, verbal contract or other)

   ……

2. Who prepares the subcontract ? (Main contractor, Subcontractor, client etc)

   ……

3. What are the form of subcontract used in your past projects? (FIDIC, JCT, any other)

   ……

4. How often disputes occur in subcontracts in Sri Lanka

   ……

SECTION C : Causes for Disputes in Subcontracts

Please mark (x) in the relevant cage and propose mitigation measure.

	Causes for dispute	Strongly disagree	Disagree	Moderate	Agree	Strongly agree	Propose Mitigation measure
1.	**Caused by Main Contractor**						
1.1	Assigning part of the works to new sub contractor, without informing the original subcontractor						
1.2	Payment problems						
1.3	Contractor's delays in work and giving approvals						
1.4	Insurance and bonding issues						
1.5	Poor communication						
1.6	Incomplete understanding of the main contractor to the contract documents						
1.7	Providing low-quality materials that result in low-quality workmanship						
1.8	Properly not document the extent to which the service is given.						

1.9	Scheduling conflicts						
1.10	Failure to provide proper security for the site						
1.11	Using distant location for storage of materials						
1.12	Contractor's capability and fairness						
1.13	Restriction Access						
1.14	No proper pre-contract procedures in selecting subcontractor						
1.15	Back to back arrangement but correspondence and information between MC and client/consultant is not revealed to SC						
1.16	Appointing SC without getting approval from Eng/Consultant						
1.17	Dictating relationship						
2. Caused by subcontractor							
2.1	Delay in progress						
2.2	Lack of construction quality work						
2.3	Law attention towards the instructions of the main contractor						
2.4	Shortage of skilled labor, equipment, machinery						
2.5	Failure to preserve and take care of the						

	materials						
2.6	Exhausting the plant and resources of the main contractor						
2.7	Partnering the works to another subcontractor without getting approval of the main contractor						
2.8	Neglecting the safety measures						
2.9	Lack of coordination between interfaces of main contractor's work						
2.10	High rate of staff turnover						
2.11	Subcontractor does not attend to testing and commissioning in as built situation						
3.	**Caused by Client**						
3.1	Delay in releasing payments to the main contractor						
3.2	Giving instructions to the subcontractor directly without consulting the main contractor						
3.3	Objection by the owner on the implementation method used by the subcontractor						
3.4	Delay in providing the information such additional drawings, benchmarks, set-backs, etc.						
3.5	Unreasonable time allocated for project completion						

3.6	client's informal nomination of subcontractor those who familiar to client irrespective of main contractor's preference						
3.7	Delay in providing Employer's requirement						
3.8	Late appointment of Subcontractor						
4.	**Caused by Consultant**						
4.1	Delay in approving materials samples and shop drawings						
4.2	Incompetent experience of the consultant's team						
4.3	Suspension of Main contractor's work due to main contractor's default						
4.4	Direct Payment certificates						
5.	**External factors**						
5.1	Shortage of construction materials in the market						
5.2	Closing the commercial border crossings						
5.3	Act of God factors						
5.4	Geological problems on the site						
5.5	Price escalation						
5.6	Non availability of standard form of Subcontract in published in Sri Lanka						

5.7	Difficulties to obtaining approvals for tax concessions, opening lf LC in case of direct import						
5.8	Non availability of regulatory body in Sri Lanka for subcontractors						

Thank You.