

**INVESTIGATE THE COMMON FACTORS TO THE
CONFLICTS IN THE CONSTRUCTION INDUSTRY
SRI LANKA**

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Master of Science in Construction Project Management

Department of Civil Engineering

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“This dissertation was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Master of Science in Construction Project Management”

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Sri Lanka

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DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university to the best of my knowledge and believe it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and interlibrary loans, and for the title and summary to be available to outside organizations.


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Signature of Candidate

30/09/2021
.....

Date

The above particulars are correct, to the best of my knowledge.

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Signature of Supervisor

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Date

ABBREVIATIONS

GDP:	: Gross Domestic Product
LKR	: Sri Lankan Rupee
PMI	: Project Management Institute
PMBOK	: Project Management Body of Knowledge
CIDA	: Construction Industry Development Authority
GOSL	: Government of Sri Lanka
EOT	: Extension of Time

ABSTRACT

The construction industry environment is very complex, very competitive and very sensitive to the financial fluctuation than other industries. The conflict/dispute is any disagreement or argument on contract-related matter. Most of the dispute is a waste of resource, if not managed well. However, the disputes identified and managed well, it may be benefited to the project by alternative design and economical solutions.

The objective of this research is to identify the common causes of conflict/disputes in the construction industry which is benefited to the contract management professionals. To achieve this objective, extensive literature survey and thirty number of dispute cases were analyzed related to the construction industry. The questionnaire survey was carried out to validate the causes of disputes with the experience of the professionals in the construction industry. The questionnaires were distributed to 150 professionals in construction industry through google form & e-mails. Out of 150 professionals, 77 professionals were responded which are working for owners, consultants and contractors. The analysis was done comparing the relative importance index of the cause of dispute.

Hundred numbers of cause of disputes have been identified from the literature review and shortlisted thirty-seven (37) causes of disputes have been used for the questionnaire survey. The most common causes of disputes base on the experience of the professional are “Delay of payments” and “Delay in works progress”. However, according to the literature survey the most common causes of disputes are “Failure to properly administrator the contract” and “Ambiguities in contract document”. According to the case studies the most common causes of dispute were “Inadequate/incomplete specification” and “Extension of time to the contract”.

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Keywords: Construction Industry, Dispute, Conflict, Causes of Dispute, Sri Lanka

CHAPTER 1

Introduction

The dispute is a disagreement for any of the matter in a contract. If the dispute is not managed properly, it will be the main reason for the failure of the project and the contract. Since the management, minimizing and avoiding of the disputes is very important (Cakmak 2013). The conflicts or disputes is one of the main factors which prevents the successful completion of the projects.

The conflict has been defined (Collins 1995) as 'serious disagreement and argument about something important' and also as a serious difference between two or more beliefs, ideas or interests'. Since conflict is 'inevitable in human relationships' (Rhys Jones 1994), it is predictably preponderant in projects where human relationships proliferate, as in construction.

There are confusions among construction professionals about the differences between conflict and dispute, and these terms have been used interchangeably especially in the construction industry (Acharya et al., 2006).

However, according to Fenn et al. (1997), conflict and dispute are two distinct notations. Conflict exists wherever there is the incompatibility of interest. Conflict can be managed, possibly to the extent of preventing a dispute resulting from the conflict. On the other hand, disputes are one of the main factors which prevent the successful completion of the construction project. Disputes are associated with distinct justiciable issues and require resolution such as mediation, negotiation, and arbitration, etc.

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A dispute or conflict of a contract is any deviation of a contract or any unclear situation of the process. Most of the dispute of a contract is a waste of resources and unsettle dispute is a continues waste of the resources of all parties of the contract

(Kumaraswamy,1997). The identification of the conflict at the planning stage settlement of a conflict at the initial stage and manage it proper way will be benefitted to the project and project teams.

Some of the conflicts are benefitted to all parties. For example, "conflict" has been said to be "inevitable in human relationships" (Rhys Jones 1994) and its constructive components can contribute to synergy (Hughes 1994). In this context, Gardiner and Simmons (1995) not only saw the conflict as "a major component in project management strategy in the construction industry," but also demonstrated the need "to shift the distribution of conflict occurrences from one that peaks during construction, to one that peaks in the earlier formative stages of design when the output of conflict is more likely to be creative and complementary to the overall project aims."

As an example, some conflicts created in the industry would be an opportunity for consideration of alternative designs could result in more economical solutions. Brainstorming and other such generation of constructive conflict at even the predesign stage, may minimize the need for variations (changes) during construction that are a major source of claims and disputes.

The construction project is a multiparty, multidisciplinary process. And the interest and influence capacities of the parties depend on the project. However, commonly it can be divided into four groups as client, Contractor, Design team & consultant and materials suppliers and labour suppliers. The interest of the four groups is deferent.

The construction industry is a complex and competitive environment in which participants with different views, talents and levels of knowledge of the construction process work together. In this complex environment, participants from various professions, each has its own goals and each expects to make the most of its own benefits. The increase in the number of participants of different cultural background in the construction value chain means more business interactions and arguments, whether contractual or social, resulting in an increase in the number of construction disputes (Kumaraswamy and Yogeswaran, 1998).

The CIDA act the dispute has been defied as includes any difference of opinion between the parties to an identified construction work.

1.1 Background of the Study

According to the fifth PMBOK edition, conflicts are inevitable in the project area. Illegal demand, competition for resources, corruption in communications, and many other things can be sources of conflict.

The continuation of the PMBOK has meant that the conflicting environment could produce the effects of inefficiency. However, if they are managed diligently, conflicts can help the group reach a better solution. The project manager should be able to identify the causes of the conflict and manage the conflict effectively and minimize potential negative impacts. The project team is able to deliver better solutions and increase the chances of project success. Project managers must develop the necessary skills and experience to be able to effectively transform their conflict management style. Managing conflict in a project area involves building the trust needed by all stakeholders to be open and honest, and to participate in finding a good solution to the conflict-creating situation. Project managers strive to establish a collaborative approach between the team members involved to fully resolve issues. In cases where a collaborative approach does not take place, the project manager should return to other effective management strategies for conflict management.

The identification of the root cause for the conflicts/ dispute is the first step of conflict management. This report is mainly targeted to identify the causes for the disputes in Sri Lankan construction industry. The similar studies have been done in Sri Lankan and other countries' construction industries. The results of the studies show the nature of the dispute and the cause of the dispute have been changed with the area- wise and timely. Since the validation of the cause of the dispute is important for the risk managers and the projects managers. In this study the validation will be done through literature review, case studies and the questioners surveying. The study is covered the theoretically, actual dispute behaviours and the base on the experience of the contract management professionals.

The cause of dispute available in the construction industry is wide. The researchers have named them various names and various groups. Using the experts' knowledge and the previous studies, the selecting and grouping the cause of disputes the has been done.

However, the selecting and grouping is varied on researchers. The comparison and the ranking of the cause of disputes is a challenge due to not standardized the dispute factors.

1.2 Aim

This research is aimed to answer the question “What are the most affected areas of disputes in Sri Lankan construction industry”.

1.3 Objectives

In order to achieve the aim of the research, the following objectives are established:

- 1) To study the nature of the cause of disputes and classify to common groups.
- 2) Analyze the cause of dispute affected to the construction industry.
- 3) To identify the most common cause of dispute in Sri Lankan construction industry.

1.4 Scope and Limitation

Though this research attempted to estimate the common causes for the dispute occurred in Sri Lankan construction industry. Like all research, as this study also has some limitations. To achieve a more accurate result the studies have been done with literature review, case studies and questionnaires survey.

The literature review has been done in a dispute related to the Sri Lankan construction industry and global construction industry. The availability of the literature related to the local construction industry is very few. One of the main sources of data available regarding dispute is the global dispute report (Arcadis). This report publishes analyzed report on construction dispute in globally. However, the data related to the Asian region was not available in 2019, 2018 and 2017. They are more concentrated in Europe, Middle East and American region.

In the case study, the availability of details is limited due to legal issues. The only summary of the disputes is considered in this research. The details of the length of the dispute and value for the disputes are not available in most of the cases.

In the questionnaire, the construction industry is very large, where many sectors operate. It will be difficult to reach all types of construction stakeholders; therefore, the subjects (population) of this study are limited to only three project participants namely Owners / Developers, Moderators, and Contractors. Although the main participants participated in the study, the non-involvement of other groups may affect the results of a unanimous study of the study. Questionnaires are still distributed only through electronic media. Face-to-face interviews and regular posts have been avoided due to the outbreak of Covid 19. About 51 percent of respondents are aware of construction conflicts. However, during the data processing, responses from experienced participants were rare. For example, even if some of the respondents indicated that they had experience of conflict, they responded to all cases of conflict with a mixed response (positive or negative). This situation is likely to also limit the quality of research results.

The research will greatly benefit new professionals in the construction industry. However, the results will benefit all project stakeholders including construction planners, sponsors, owner, who may wish to successfully complete the project without hindrance.

1.5 Structure of the report

The report is organized in the following order:

- | | |
|--------------------|---|
| Chapter One | Chapter one covers the background of the study, aim and objectives, scope and limitation of the research, and the structure of the report. |
| Chapter Two | Chapter two is a review of the relevant literature of the study area. It covers the existing knowledge on the set objectives of the research. The literature review delivers the background for identification of the research gap and the preparation of the research questions. |

Chapter Three	Chapter three elaborates the research methodology and statistical analysis techniques used for the study.
Chapter Four	Chapter four presents the details of data collected in each round of the questionnaire survey and the statistical analysis explanation of the data.
Chapter Five	Chapter five presents the conclusions and recommendations of the research.

1.6 Deliverables

- The findings and recommendations of the study will fill some gaps existing in contract documents used in Sri Lanka and also it will be helpful to apply or compare construction contract document in other similar nations.
- Identification of causes of dispute will help for collaborative solutions to early risk identification and avoidance of disputes.
- The identification of the root causes and proximate causes to the conflicts and dispute will help to successfully completion of projects for all professionals who, are involved in the construction industry.

CHAPTER 2

Literature Review

The main purpose of the literature review is to gather important knowledge about the relevant subject area covered by the previous studies. In this research literature will help to identify the common causes of dispute resolution methods, the value of the dispute, length of the disputes, other related activity and effects of the dispute on the construction industry.

A wide-ranging literature review will generate a higher consistency of the study. The literature review will have considerable effects on validity. Bryman (2008) mentions several advantages to literature reviews. The main advantage is the wide range of high-quality data when there is a limit of time and cost in the study. Even though there are advantages in literature reviews, it can be noted few disadvantages too and some weaknesses can be noted. The quality of the literature cannot be controlled by unknown sources and unknown materials are some of the disadvantages of the literature review. Other hindrance is that it takes time to recognize the materials.

2.1 Sri Lankan Construction Industry

In any country, the construction industry has a considerable effect on its economy, and the industry all over the world has proven its significance through the unmatched contribution of GDP. In Sri Lanka, the contribution to the GDP has increased to LKR 683,604 Million in 2016 from LKR 177,912 Million in 2011. The contribution from GDP has increased around four times within the five-year (2011-2016) period. The annual construction cost has been in stable condition within the last three years (2016-2019) with few fluctuations (see Figure 02). The disputes of the construction industries also proportionally increased with the boom of the construction industry. The awareness of the disputes and root causes of the dispute will help properly manage the construction projects.

Table 01: The Contribution to the GDP from Construction Industry

Year	Amount (LKR Million)	%GDP	Growth
2011	177,912	6.70	9.30
2012	203,204	7.10	14.20
2013	282,742	8.70	14.40
2014	339,906	9.70	20.20
2015	595,115	6.90	(2.70)
2016	683,604	7.60	14.90
2017	674,025	7.20	4.30
2018	659,687	6.80	(2.10)
2019	683,371	6.90	4.00

Source: Annual Report Central Bank of Sri Lanka (2011 to 2019)

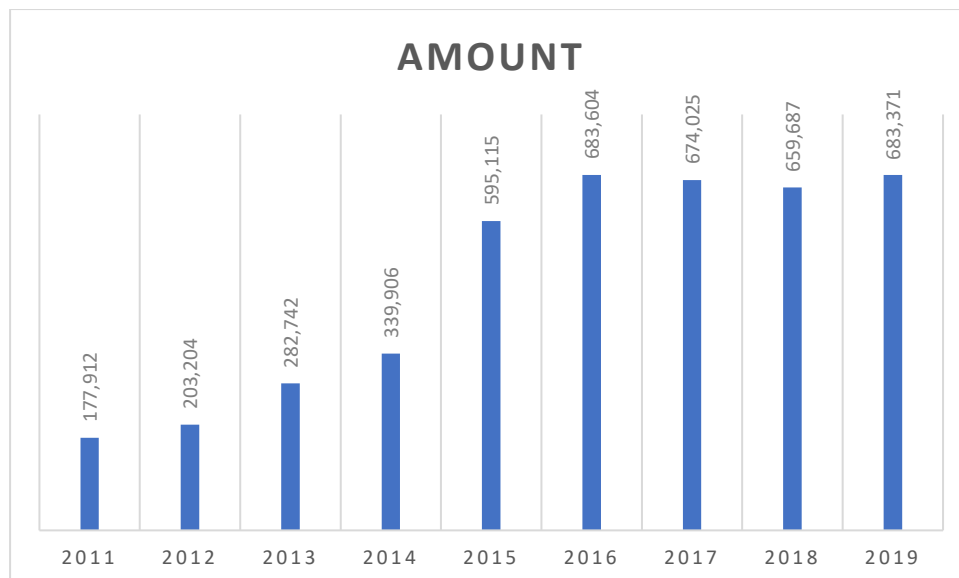


Figure 01: Contribution to the GDP from the Construction industry

2.2 Introduction to the Disputes in Construction Industry

In most of the countries, construction industries are extremely competitive, demonstrated with high risks and low-profit margins when compared with other sectors of the economy (Mochtar & Arditi, 2001). Due to this variation, dispute is unavoidable in the construction industry.

healthy conflict in the consideration of alternative designs could result in more economical solutions. Brainstorming and other such generations of constructive

conflict at even the predesign stage, may minimize the need for variations during construction that are a major source of claims and disputes (Kumaraswamy,1998).

As also indicated in Figure 03 illustrated good, bad and ugly side of the conflict and flowchart of the dispute, some claims may lead to quick settlements, since "construction claims".

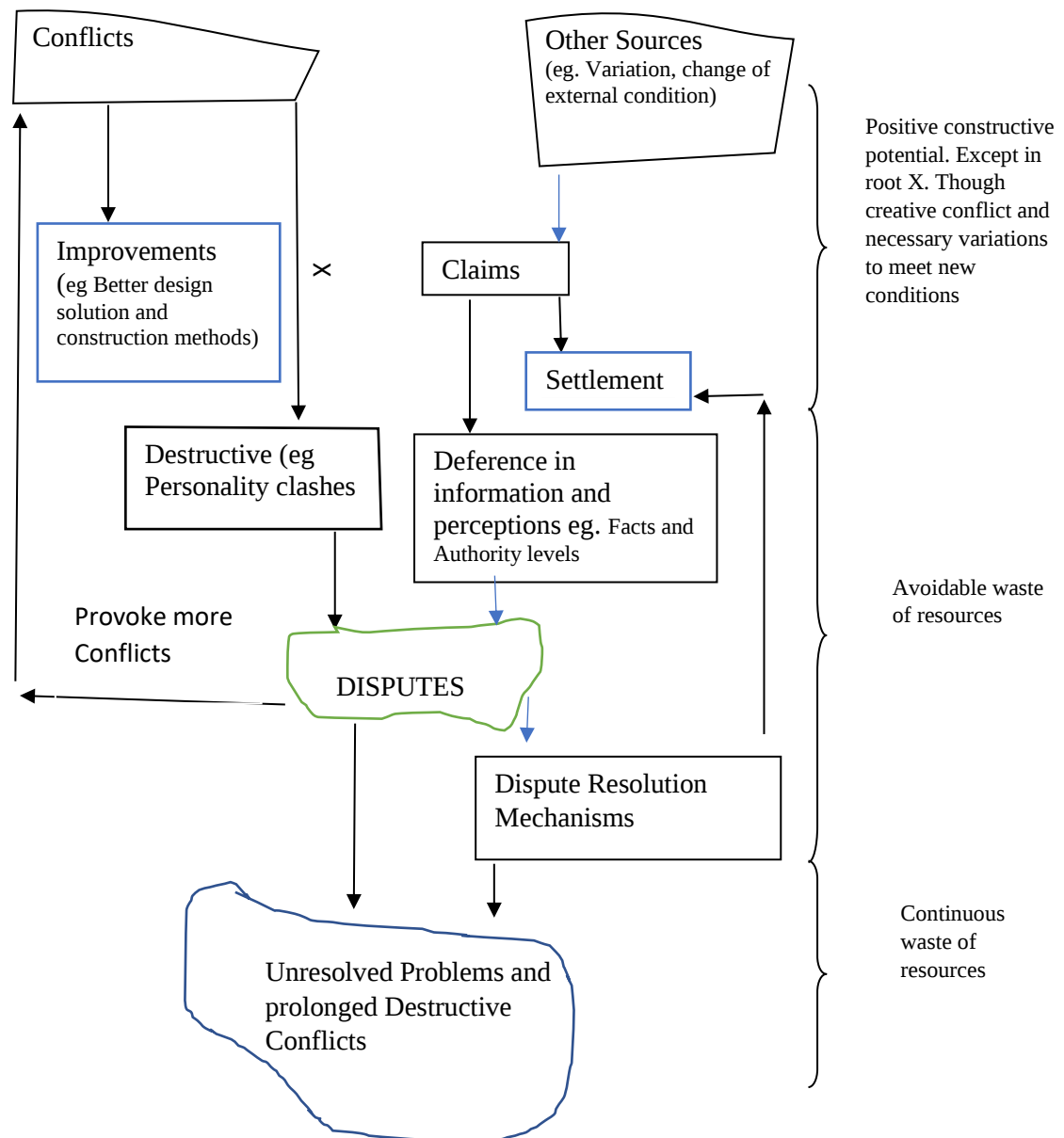


Figure 02: Beyond the Conflict the Good, The Bad and the Ugly
Adapted from: Kumaraswamy (1998)

2.3 Causes for Disputes

There has been extensive research carried out to determine the causes of disputes in the construction industry. A literature review has been conducted to overview the causes of construction disputes. Table 3 summarizes the causes of disputes which are determined by several researchers from different countries.

Table 02: Causes of disputes in the construction industry (adapted from Cakmak P.I,2013)

Researcher	Context	Causes of Dispute
Diekmann and Nelson (1985)	USA	(1) Design flaws, (2) Voluntary or compulsory changes, (3) Different site conditions, (4) Weather, (5) Strikes and (6) Value Engineering
Hewit (1991)	General	(1) Change of scope, (2) Changed conditions of contract, (3) delay contract, (4) Disruption to the works, (5) Acceleration of works and (6) Termination of the contract
Watts and Scrivener (1992)	Australia	(1) Variations to the contract, (2) Negligence in conditions, (3) Damages to the properties and (4) Delays of the works
Spittler and Jentzen (1992)	General	(1) Ambiguous of the contract documents, (2) Competitive adversarial attitude in the industry and (3) Different perceptions of fairness by the participants
Diekmann et al. (1994)	General	(1) Human Recourses, (2) Process of the works and (3) Output
Heath et al. (1994)	UK	(1) Contract terms and conditions, (2) Delays of payments and conditions, (3) Variations to the contract, (4) Extensions of time to the contract, (5)

		Nomination by the employer, (6) re-nomination and (7) Lack of availability of information
Rhys Jones (1994)	General	(1) Poor construction management, (2) Adversarial culture behaviour, (3) Poor communications with stakeholders, (4) Inadequate design details, (5) Economic environment situation, (6) Unrealistic bidding process, (7) Inspiration of legal persons, (8) Unrealistic employer expectations, (9) Insufficient contract drafting and (10) Poor workmanship of the contract
Semple et al. (1994)	Canada	(1) Acceleration of works, (2) Access restrictions (3) Unexpected weather conditions and (4) Change and increase in scope
Bristow and Vasilopoulous (1995)	Canada	(1) Unrealistic anticipations of the stakeholders, (2) Ambiguous in the contract documents, (3) Poor communications within the stakeholders, (4) Lack of team attitude within the project team and (5) A failure of the expectation of the stakeholders.
Conlin et al. (1996)	UK	(1) Payment and budget-related matters, (2) performance of the contract, (3) Delay of works and additional time, (5) Negligence in conditions of contract, (6) Quality of the works and (7) Contract administration
Sykes (1996)	General	(1) Confusions and (2) Unexpected unforeseen site condition
Kumaraswamy (1997)	Hong Kong	(1) Variability due to unforeseen global conditions, (2) Client change, (3) Estimation due to design error, (4) Unexpected site conditions, (5) Contractual ambiguity, (6) Variation due to third party

		performance, (7) Disruption of state service lines, (8) Unexpected weather forecasts, (9) Delayed integration details and (10) Delayed site delivery delays.
Yates (1998)	General	(1) The variations to the contract, (2) The ambiguities in documents, (3) Unexpected incrementation of weather, (4) Delay of issue of design details and drawings, (5) Delay of facilitating the access to the site, (6) Delay of employer's works (7) Postponement of part of the project
Al Momani (2000)	Jordan	(1) Delays in payments and cash problems of the contract, (2) Poor design, drawings and specifications, (3) Unnecessary involvement by the employer. (4) Variations due to change of employer and consultant (5) Changed of site conditions and (6) Inclement of weather
Mitropoulos and Howell (2001)	USA	(1) Uncertainty of the works, (2) The contractual issues, (3) unprincipled behaviour, (4) Contractor's cash flow issues and (5) Project cost of conflict and cultural conflicts
Brooker (2002)	General	(1) Delays of Payment, (2) Delay of progress, (3) Defects of works and poor quality of the works and (4) Errors and negligence of the professional.
Killian (2003)	USA	(1) Project management process (Transformation plan, pre-award contract, project review, pre-construction management process, and quality management process), (2) Error in design, drawings and specification (3) Contract award of works, review of procedures and evaluation procedures, contract

		familiarity with employer contract management procedures), (4) Project management (Planning, project management procedures, quality assurance and management process, and financial management process) and (5) tender document errors (submission error costs)
Sheridan (2003)	General	(1) The evaluation of variations, (2) Certification of final account and (3) Not complying with payments terms and conditions.
Fryer et al. (2004)	General	(1) Initiation of the project, briefing of details and tendering of the project, (2) Error in design, (3) Methods of the construction management operations process and (4) The project monitoring process.
Adriaanse (2005)	General	(1) The construction material, quality workmanship, (2) the delays of the progress, (3) The variations to the contract, (4) The project cost fluctuation and (5) Various explanations of the contract conditions and provisions.
Ashworth (2005)	General	(1) The condition of the contract, the method of communication, bidding practices and procedures (2) The employer changes (project scope, contract variations, the changes made in contracts documents, unfair involvements to the project management, the delays of payment), (3) The project consultants (errors in design, less experienced, and knowledge late/insufficient directions, poor contract coordination, insufficient duty brief), (4) the contractors (inadequate project management, poor planning method, the quality of works, issues with subcontractors, the delay of payment to the

		subcontractors, poor management of subcontractors), (5) the subcontractors (Not complying with conditions of contract the quality of the works) and (6) The suppliers (low quality and performance of the materials and products)
Chan and Suen (2005)	China	(1) Delays of payments, (2) the variations to the contract, (3) the extension of time to the contract, (4) the poor performance of works, (5) poor definition of the project scope (6) the unbalance risk allocation, (7) Lack of technical details, (8) Poor contract management, (9) unbalance client brief, (10) Lack of availability of details and data, (11) uncertainty of the contractual terms and conditions, (12) unfamiliarity with the local environment, (13) The procedure of the works (14) Methods of communication, (15) Unfair approach of handling disputes, (16) Poor teamwork, (17) earlier working affairs, (18) Poor knowledge in local legal system and process, (19) The knowledge of conflict of laws and (20) Awareness of the jurisdictional issues.
Cheung and Yiu (2006)	General	(1) Dependency of with other tasks, (2) Variations, (3) Issues in communications, (4) Stress of the project teams, (5) The personal conflicts, (6) Poor performance of the team, (7) Delays of payment, (8) Extension of time and (9) Not availability of contract provision for variations.
Waldron (2006)	Australia	(1) Changes in scope, (2) Different contract terms interpretation, (3) Claims on Extension of time, (4) Unexpected site conditions, (5) Incomplete,

		information and delays of information. (6) Process of authority approvals, (7) Limited and restricted access, (8) Poor quality of the design and (9) Limitation and not the availability of properties
Abd El-Razek et al. (2007)	Egypt	(1) The change of scope by the employer or consultant, (2) poor quality of design details, drawings and/or specifications and (3) shop drawings, instructions and decision making delays by the employer
Yiu and Cheung (2007)	General	(1) Additional scope to the contract, (2) The continues delays in work progress, (3) Unrealistic expectations and (5) The conflict within the project team.
Abeynayake (2008)	Sri Lanka	(1) The breaches of contract by Employer or contractor, (2) insufficient administration of responsibilities by the owner or contractor or subcontractors, (3) Errors, omission and ambiguities in drawings, design and specifications. (4) rapid changes of taxes and changes of market price
Love et al. (2010)	Australia	(1) The process of the task being, (2) The personal deliberate practices (failure of accommodating by contractual requirements) and (3) Unforeseen scope changes and site conditions.
Gad et al. (2011)	General	(1) Unfair contractual conditions, (2) The contract backgrounds, (3) Legislation and financial effects (4) Communication issues, (5) Failed to comply with technical standards (6) The unbalance procedures defined by the employer (7) use of deference currencies

Jaffar et al. (2011)	Malaysia	(1) Personal behaviour and issues (lack of constructability, clearness of the document and completeness of documents and lack of communication among stakeholders), (2) Contract related (delays of possession to the site, delay payment from employer and unclear or unfair of contract conditions) and (3) Technical matters (frailer to comply the instruction given by Architect and Engineer)
Ilter (2012)	Turkey	(1) Contract differences, (2) Delays in employer orders, (3) Insufficient / insufficient technical details and details, (4) vague and incorrect contract terms, (6) inefficiency and lack of communication, (7) unfamiliarity with local conditions and (8) lack of technology and contractor weakness

In addition to the finding of Table 02 Emre Cakmak (2013) has categorized 28 common causes for the dispute into seven main groups as summarized in Table No 3. He has used the Analytical Hierarchy process to rank the causes of the disputes in the construction industry. The researcher has used the relative intensity of importance to each cause and calculated the relative intensity of each cause. It has been found Owner related (A) 0.1993, Contractor related (B) 0.0916, the Design Related 0.1364, the Contractor Related 0.4789, the Human Behavior related 0.0263, the Project-related 0.0518 and the external factor-related 0.0156. The analysis discloses that contractor related disputes and their sub-conflict categories are the most common ones in the construction industry.

Table 03: Category of Dispute and cause of disputes (Adapted from Emre Cakmak. (2013))

Category of Dispute	Causes of Disputes
The Owner related.	1. The contract variations initiated by the owner 2. The change of scope by the employer 3. Delay of giving of possession to the site. 4. The instruction to the acceleration works. 5. The unrealistic employers'' expectations 6. The delays of payment
The Contractor related	1. The delays of the progress of works 2. The extension of time to the contract 3. The failure of contractors financial conditions 4. The contractor's technical inadequacy 5. The process of the tendering 6. The Quality of works progress by the contractor
Design related	1. Errors of the technical design 2. insufficient and incomplete technical specifications 3. poor quality of the design and details 4. Lack of availability of technical information
	1. The ambiguities in the contract documents

Contract related	2. dissimilar interpretations of the contract provisions 3. Unbalance risk allocation 4. The contract related problems
Human behaviour related	1. The adversarial/controversial cultural issues 2. lack of communication within the project team 3. Poor teamwork
Project-related	1. Unforeseen site conditions 2. Unforeseen changes of the project details
External Factor (G)	1. Unforeseen weather condition 2. Unexpected and unforeseen legal and economic issues

Conlin et al. (1996) has studied 483 dispute events from 21 recently completed projects, including five project purchase options that are the basis of a “measurement and payment contract”. and "construction and construction" contracts. They found a link between the type of purchase method used and the type and frequency of disputes. They also identified six broad groups of causes of conflict as below.

1. Payment and budget.
2. Related to the performance of the Job
3. Project delays and extension
4. Professional negligence
5. Quality of services
6. Management

Each group of causes was also analyzed into subgroups. For example, "separate contractor claims" were one of the parties to the "payment and budget" dispute group.

Certain types of conflict have been found to be more common in certain types of project purchases, for example, payment disputes and budgets were more common in "traditional purchases" agreements and Quantity Bills, while "quality" disputes were "higher" in design and construction "contracts.

Watts and Scrivener (1992) have read 72 judgments in 56 construction-related cases. They identified 59 conflict numbers and 117 major sources of conflict. The most common cause of conflict is these

1. Failure to claim by contractor or subcontractor resulting in the termination of the agreement (15%)
2. Claims from a contractor from changes (12%)
3. Claim negligence on tort in contract (11%)
- Project delay claims and damages (19%)
5. Claims for contract extension (7%)

Pilton (1994) emphasized the importance of a good project team in achieving results and preventing conflicts, "regardless of how the contract is constructed." He also lodged a serious complaint against Australia's \$ 15 million construction contract, alleging mental illness for workers because they were pressured by mistakes in paintings.

In Ontario, Canada, Bristow and Vasilopoulos (1995) identified five primary causes of claims:

1. Unreasonable and unfair expectations of participants
2. Confusion in contract documents
3. Lack of communication within project teams
4. Lack of team spirit within the project team
5. Failure to deal with changes and unforeseen circumstances within the project team and in the contract.

Semple et al. (1994) examined the sources of litigation delays and overpayments in 24 projects. While recognizing the importance of changes, additions, soil / location

conditions, and delays, they found six common contract clauses identified in the claims (related to the Canadian Fonn of Contract used) , loss of productivity, and more site); and four common causes of claims:

1. Accelerate the project
2. Restricted and limited access.
3. Unexpected weather
4. Changes in width

Diekmann and Nelson (1985) examined the occurrence, severity, and possible causal factors of claims on 22 federally funded projects. From the 427 claims, they found that

1. The error in design - 46%,
2. The mandatory changes of scope of the contract 26%.

Diekmann (1995) has studied 159 construction projects in the United State and analyse the predictability of the construction industry conflicts. A Dispute Potential Index (DPI) has been developed based on this study, sponsored by the Construction Industry Institute of Texas, as a first-order "cholesterol test" to predict the likelihood of claims and disputes on a given project. Three categories of project characteristics (i.e.,

1. Human aspects and related matters,
2. The project process related aspects
3. The project aspects

The questionnaire surveying done in the Hong Kong construction industry by Mohan Kumaraswamy 1998 found the following main categories of conflicts.

1. The contractors exaggerated claims
2. Insufficient site studies
3. Errors in design information
4. Poor and lack of communications among the team
5. Changers of the scope by the employer at the Midstate
6. Lack of details of the contract document
7. Poor design documentation
8. Contractors estimate error
9. Inadequate, incomplete bidding information and details

10. Poor contract management and administration

According to the Arcadis 2020,2019,2018,2017,2016,2015 the common disputes causes are,

1. Failure to proper administrate and management of the contract.
2. Poorly drafted or inadequate and unsubstantiated claims
3. Professionals negligence, Errors, or omissions in the contract document
4. Failure to comply with the contractual matters by the employer/contractor/subcontractor
5. Failure to understand agreed on extensions of time and compensation
6. Changes in site conditions
7. A biased action by the Project manager or the Engineer
8. The definition of the contract duration defined at the bidding stage
9. Conflicts on the interest of the project team
10. Incomplete, inadequate employer equipmentman and design information are for the design and built projects.
11. Third-party objection to the project and force majeure actions.
12. Failures to comply with the appropriate notice as per contractual conditions.
13. Changes of decision and scope by the employer.

Illankoon 2019 has done the questionnaires survey and rank the common causes as summarized below.

1. Failure to manage proper contract administration.
2. Error and/or omissions, insufficient details and information in the contract documents
3. Lack of details in employer requirement and incomplete design
4. Failures to comply with the appropriate notice as per contractual conditions by either party of the contract
5. Shortage of major materials and resources and poor construction process.
6. Deviation from contract interpretations

7. Poor interpersonal skills of the professionals and project team
8. Unscrupulous behaviour of project team and stakeholders
9. Insufficient experience of the project team on construction practices and management
10. Poor corporation within the project team and trust within the team
11. Misleading on goals and objectives of the project team
12. Resistance to changes and deal with new opportunities of the project team.
13. Inadequate project risk definitions, identification and unbalance risk allocations
14. Third-party changes (unforeseen weather conditions and sudden environmental changes)
15. Third-party and authority factors (changes of Authority regulation and conditions)

The research is done in the Malaysian construction industry by Poh 2005 and reported that disputes are

1. Unfair action by the parties.
2. Incomplete design and insufficient drawings, information and specifications.
3. The skill of the project team on project management and supervision of the project
4. Delays of issuing design information and drawings
5. Error in budget and estimates.

While (Levy 2007) identified the misunderstandings leading to disputes on construction projects in the USA were:

1. Poor plans and specifications containing errors of the documents.
2. Omissions and ambiguities at the document stage
3. Lack of coordination within the team.
4. Poor responses and non-responses to correspondence within the project parties

5. The poor definition of the responsibility of the project parties lacks proper administrations.
6. The reluctance or failure to comply with industrial standards.
7. Changes of site condition with the documentations
8. Unforeseen ground and underground conditions
9. The detection of existing building conditions in the renovation project.
10. Unauthorized extra work and change of scope.
11. Breaches of contract by the stakeholders
12. The changes, acceleration of deviation to the baseline schedule.
13. The failure of employer or sub-contractor due to financial strength of the parties.

Soekimo et.al. 2007 studied the causes of disputes on construction projects in Indonesia and categories to the five main grouped

- a) The External factors and conditions (26.79%);
- b) Change of scope and drawings, specifications (21.43%);
- c) Site conditions (19.64%);
- d) Variation of specifications and technical details (16.07%);
- e) Error in the cost estimate and legal conditions (16.07%)

The research was done by Rizwan (2014) in the Pakistan construction industry. The disputes have been categorized to Financial/Economical, Construction Related, Management Related and, Contract Related dispute causes and identify the severity and frequency of the causes.

Table 04: Dispute Calgary and Causes for the Disputes. (Adapted from Rizwan (2014))

Construction-related	Lack of skill of the Supervision
	Unrealistic and unfair anticipation
	Error in Selections of contractors and suppliers

	Unwillingness to the clarifications and information
	Lack of required human resources and machinery
	Lack of required Professional to the project
	Lack of capability of the project team
	Impractical costing
	Unclear, Unfair unbalance and Risk Allocation
Financial and Economical	Fluctuation of materials prices
	Fluctuation of the value of Dollar
	Project team default
	Insufficient financial capacity of the stakeholders
	Delay in progress payments
Management Related	Unrealistic project planning and scheduling
	Poor provisions for changes in scheduling
	Poor risk management system
	Poor communication plan and methods
	Skill and commitment to the contract administration
	Poor procurement planning and management
	Inappropriate cash flow schedules
	Inappropriate contract definitions
	Absence of key staff
Contract related	Deferent interpretation of contract clauses
	Unclear clauses of the contract agreement
	Ambiguous in the language of the contract document
	Not comply with the contract terms and condition
	Unfair and unbalance instruction of the employer.
	Exaggerated and unethical claims by the parties
	Unrealistic costing at the tender by the contractor.

It has been reported that that “Unrealistic Tender Pricing” in the construction category, “Rising Value of Dollar”, in the financial and economical category. “Inappropriate

Contract Type in management related and Exaggerated Claims” in contract-related are the most treacherous cause of disputes. (Rizwan (2014))

The researches done by Archaya (2006) on the dispute causes name as conflict factors and Common conflicting factors collected from the literature have been presented in five categories based on project participants’ activities in Table 5. They are:

- (1) Conflict related to Employer
- (2) Conflict related to the Consultant or Engineer
- (3) Conflict related to the Contractor
- (4) Conflict related to the third party organization and parties
- (5) Conflict related to other parties

Table 05: Dispute Category and Causes for the Disputes. (Source: Archaya (2006))

(1) Conflict related to Employer	Unclear employer requirements Excessive changes of scope at the construction stage Superiority orders and instruction by the employer Unclear project scope and definitions Delays of the right of access to the site Compacted site conditions The financial failure of the employer Unbalanced and unclear risks allocations Materials supply by the employer Employers decisions delays Delays of handover the site premises Issues in supply the equipment by the employer Delay in certify and settle Interim payments
(2) Conflict related to the Consultant or Engineer	Defects in design and drawings Omissions and errors in drawings and design Unexpected changes of scope Changes of site condition with documentations Excessive changes of quality of the works

	Errors and shortcomings in the specifications
(3) Conflict related to the Contractor	Contractors financial failure Delays of the progress of the work Lack of experience of the contractor Major defects in the maintenance period Interruptions and protests by the local people The inefficiency of the subcontracts Issues of payment to the subcontractors The negative mind of the works and subcontractors Poor quality of the works
(4) Conflict related to the third party organization and parties	Changes of legislation and governing codes Trade union actions and labour conflict Unforeseen adverse weather conditions and /acts of god Inflation in industry and materials prices Public disorder and third party objections Delays due to third party activity
(5) Conflict related to other parties	Errors and conflicts in decrements Change order evaluation and negotiations Site security issues Lack of communication and poor communications Safety issues and fatal accident Shortage of resources (labour, materials, tools) Contract interpretation of escalation of price Environmental impact and improvements The negative attitude of the project participants Bad effects on the environment Unnecessary correspondence Insufficient project administration Errors in materials testing technology The difference in construction technology Acceleration, slowdown or suspension of work

The summary of the causes of disputes with the rank given in each literature has been in Tables 8 and 9.

2.4 Value of the Dispute and Length of the Dispute

According to the definition of Arcdis (2019) ‘dispute’ is a situation in which the two parties differed greatly in the demand for contractual rights, which led to a decision being made under the contract, which later became a legal dispute. The amount of the dispute is an additional right to what is included in the agreement, additional work or the desired event. The length of the dispute is the period between the legalization of the contract and the time for the settlement or termination of the hearing.

The summary of the average length of the disputes and the average value of the dispute tabulated in Tables 6 and 7 and Chart 4 and 5. The duration and the value of the dispute region-wise and globally fluctuate yearly. However, according to the Arcdis 2019 value of the dispute and length of the dispute has been gradually decreased.

Table 6: The Average Dispute Value (Source Arcadis 2020)

REGION	AVERAGE DISPUTE VALUE (US\$ MILLION)				
	2015	2016	2017	2018	2019
North America	25.0	21.0	19.0	16.3	18.8
United Kingdom	25.0	34.0	34.0	17.9	17.8
Continental Europe	25.0	19.0	29.5	41.0	24.5
Middle East	82.0	56.0	91.0	56.7	62.0
GLOBAL AVERAGE	39.3	32.5	43.4	33.0	30.7

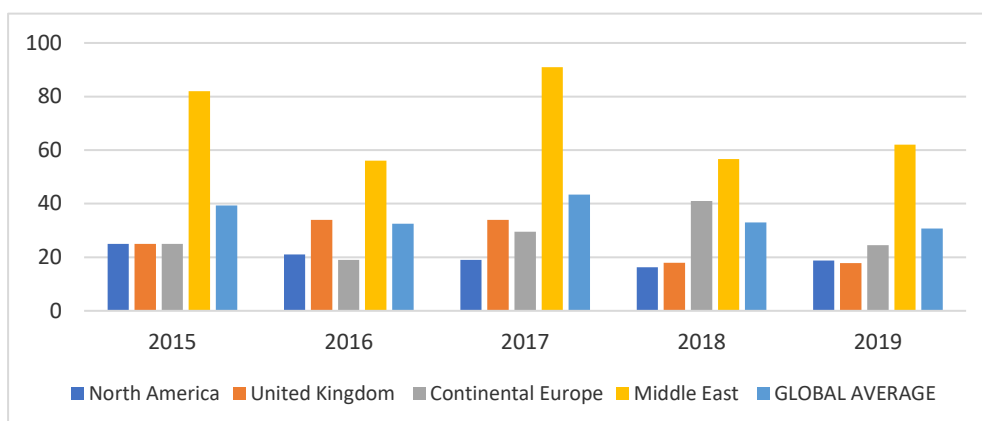


Figure 03: The Average Dispute Value

Table 07: The Average Length of the Disputes (Source Arcadis 2020)

REGION	AVERAGE LENGTH OF DISPUTE (MONTHS)				
	2015	2016	2017	2018	2019
North America	13.5	15.6	17.7	15.2	17.6
United Kingdom	10.7	12.0	10.0	12.8	9.8
Continental Europe	18.5	14.1	18.1	20.0	15.6
Middle East	15.2	13.7	13.5	20.0	17.0
GLOBAL AVERAGE	14.5	13.9	14.8	17.0	15.0

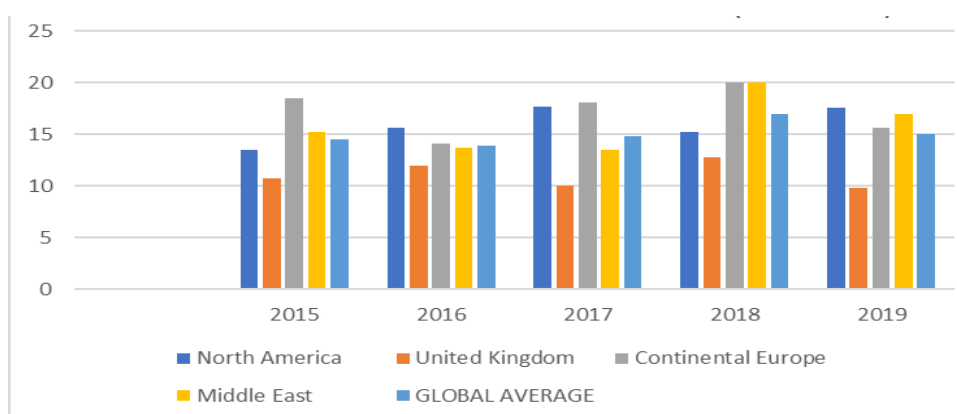


Figure 04: The Average Length of the Disputes

2.5 Dispute Resolution Process

As per the PMBOK fifth edition, conflict management and management is one of the biggest challenges for a project manager. It is necessary to draw all the skills to work with knowledge to resolve these conflicts to complete projects

The success of project managers in managing their project teams often depends largely on their ability to resolve conflicts. Different project managers can use different methods to resolve disputes. Factors influencing conflict resolution methods include:

- The significance and comparison of war,
- The pressure of time to resolve a dispute,
- Position taken by the people involved, too
- Motivation to resolve long-term or short-term conflicts.

There are five common ways to resolve conflicts. Since each one has its own location and use, this is not provided for any specific order:

- Undo / Avoid.
- Smooth / Accommodation.
- Compromise / Sync.
- Force / Direct.
- Collaborate / Solve Problems.

According to the Construction Industries Development Authority (CIDA) act, If the parties wish for any dispute relating to the construction contract, if it has not been awarded the contract it may be resolved by conciliation or arbitration by the Authority.

A person who participates in any contract relating to a designated construction project, if he or she is unable to resolve any dispute by conciliation or mediation by the Authority, may refer that dispute for consideration. The procedure for determining any dispute under this section shall be as determined.

The dispute resolution mechanism is graphically demonstrated by Cheung,1999 in figure 5. The hostility and cost will increase with steps.

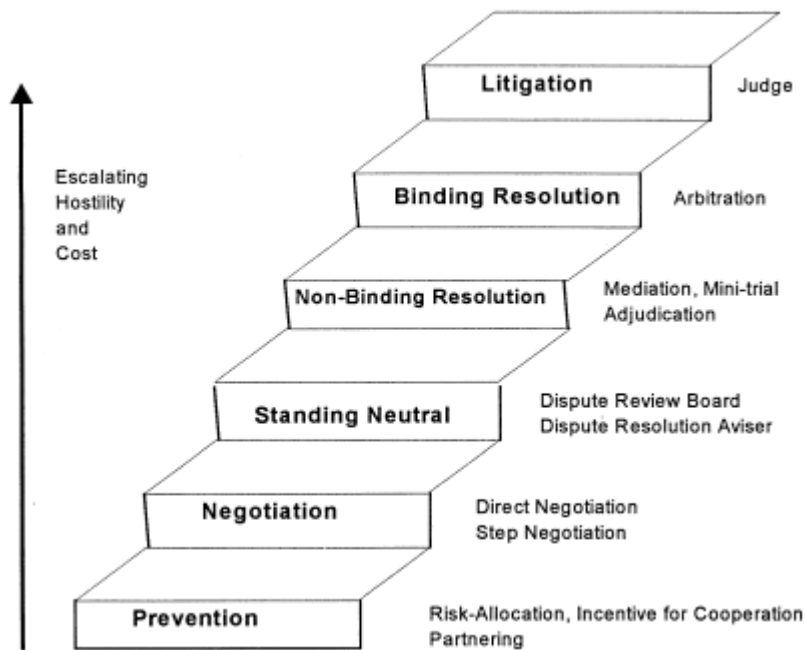


Figure 05: Construction Dispute Resolution Steps (Adapted from Cheung,1999)

2.5.1 Negotiation

Negotiation is a universal method that is the most successful disputes resolution mechanism in the contract. This method is more effective than other methods and the disputes shall be settle immediately. The other advantages of this method are cost-effective, time savings, safeguarding the relationships. This method is relatively the simplest, but it highly depends on the intentions of the disputants and their desire to put the issues behind them. [Cheung 1999].

2.4.2 Dispute Review Boards (DRB)

Dispute Resolution Board (DRB) is a dispute resolution mechanism that protects or resolves disputes during the life of a project. The purpose of the board is to try to prevent or avoid conflicts before they arise. This approach distinguishes itself from other ADR

methods because it follows a process that seeks to reduce conflicts and address them as soon as they arise [P. Chapman 2001].

2.5.3 Alternative Dispute Resolution (ADR)

Alternative Dispute Resolution (ADR) is a private and separate dispute resolution mechanism for dealing with legal disputes and avoiding going to court. The most common types of ADR are mediation, conciliation, mediation and decision-making. Although the concept of dispute resolution is another form of court system

2.5.4 Mediation and Conciliation

Mediation is defined as a structured, informal, and non-binding method of communication and it is understandable that, the most important approach to ADR [W. Hughes 2015]. Mediation and reconciliation are illegal means where groups with the help of one or more people do not take sides in their efforts to resolve them. These mediators do not sit in judgment but try to advise and negotiate impartially with the parties in order to help bring about a harmonious solution to the problem. Often, in this way, they have no power to put an end to the opposition. Mediation and conciliation are voluntary in the sense that the parties participate voluntarily and the third party simply helps them to resolve.

This process is, confidential and carried out without discrimination in any legal proceedings. Procedure is not binding unless an agreement has been reached. However, once an agreement has been reached with the signatories, this document is as binding as any other agreement.

Although the procedure is identified as irregular, the following can be identified as parts or stages of the mediation process. In the pre-mediation phase, there should be a basic agreement between the parties in the mediation process, including the identification of the mediator. Mediation can be directed directly or indirectly and may include meetings with groups, presentations made by them, a combination of facts, discussions and resolutions. Finally, the arbitrator may also wish to be involved in the

compliance process reached. Given that arbitration is an informal process, there are certain benefits that are more important than formal and legal proceedings. Low cost, low cost, and the result can be more satisfying on the sides, reducing ongoing conflicts with some of them. It also opens channels of communication and plays an active role in maintaining or improving technical relationships. In addition, the parties will empower and give them greater confidence in their ability to handle conflicts [Nicholas 2004].

2.5.5 Adjudication

“In its broadest sense, it refers to the process by which a judge decides a case before him or how a referee must decide matters before him. Specifically, adjudication can be defined as a process in which a third party is impartial in rendering a decision, which binds the opposing parties unless it is reviewed in arbitration or in court.”[Abeynayake et al, 2012].

The use of a judge is found in the various types of contracts used in the construction industry. The judge is a neutral person who is not involved in the day-to-day running of the contract. He is not a government-appointed mediator or judge. The judge has the power to benefit the parties as per the agreement. In addition, the parties have agreed in agreement that the decision of the judge will determine the matter. The decision of the arbitrator is binding on the parties, therefore, unlike arbitration, the process does not require the cooperation of both parties. The decisions of the arbitrator are usually presented as binding until the end of the contract when either party may seek a review of the decision. However, adjudication is not arbitrary and therefore not subject to the Arbitration Arbitration Act 1996 (Abeynayake et al, 2012).

2.5.6. Arbitration

Adjudication is a legal mechanism for dealing with trade disputes outside the courts, in which the parties change power by agreeing to have decisions in their disputes. (Sullivan, 2003).

Alternative arbitration (ADR) is a way of resolving disputes outside the courts. The arbitration award is legally binding on both parties and is binding on the courts. Mediation can easily be defined as the transfer of power to a third party or to a dispute resolution party by coercive decisions. The Arbitration Act No. 11 of 1995 provides the legal framework to effectively regulate the continuation of Arbitration in Sri Lanka.

The Sri Lankan Arbitration Act No. 11 of 1995 provided the legal framework for the effective implementation of the mediation process and the most likely or feasible procedure for enforcing arbitration awards. Since arbitration it provides an effective and efficient alternative to resolving trade disputes. Contract amount or disputed amount does not comply with the Mediation Act. (Abeynayake et al, 2012)

2.5.7 Litigation

Claiming is the final step in resolving if previous procedures failed to achieve the desired result. An indictment is the determination of a dispute in court before a judge and involves a complex process. The dispute is heard depending on the size of the dispute in terms of the amount of dispute. The administrative procedures of each court are governed by strict court rules. Living together through a court of law is a last resort and this often takes years and can be stressful. The process will be with the party involved to eliminate all other administrative channels seeking redress before the trial. (Kongkoon 2004).

Table 08 : The summary of the casue of dispute with rank give in literature

SE NO	Category of Dispute	Reference	Diekmann and Nelson (1985)	Hewit (1991)	Watts and Scrivener	Spittler and Jentzen (1992)	Heath et al. (1994)	Rhys Jones (1994)	Semple et al. (1994)	Bristow and Vasilopoulous (1995)	Conlin et al (1996)	Sykes (1996)	Kumaraswamy (1997)	Yates (1998)	Al Momani (2000)	Mitropoulos and Howell (2001)	Brooker (2002)	Killian (2003)	Sheridan (2003)	Fryer et al. (2004)	Adriaanse (2005)	Ashworth (2005)	Chan and Suen (2005)	Cheung and Yiu (2006)	Waldron (2006)	Abd El-Razek et al. (2007)	Yiu and Cheung (2007)	Abeynayake (2008)	Love et al. (2010)	Gad et al. (2011)	Jaffar et al. (2011)	Ilter (2012)	Emre Cakmak (2013)	Rizwan (2014)	Nirmal Kumar (2016)	Soekimo et.al. 2007	Poh 2005	Levy 2007)	Illankoon 2019	Conlin et al. (1996)	M.Kumaraswamy 1998				
		Causes of Disputes																																											
1	Owner related (A)	Variations initiated by the owner (A1)			1		3						2	1	4			1			3	3	2		1	1	1					17		5							5				
2		Change of scope (A2)	2	1					4														3			1				3			15	3	2		8								
3		Late giving of possession (A3)												10	6																	24	15												
4		acceleration (A4)		5					1																								25					10							
5		Unrealistic expectations (A5)									1													2				3					22	2											
6		Payment delays (A6)						2	8			1				1		1		3			4	1	2							7	1	42						1					
7		Negligence in tort (A7)			2							4																													4				
8		Unrealistic tendering (A8)							6												1		3																						
9		Restricted and limited access(A9)								2																3																			
10		Budget limitation (A10)										1										4																	5	11					
11		Suspension or Termination of project or part of the project (A11)		6											7																														
12		Unfair stakeholders involved in the project (A12)															3																												
13		Supremacy of owner/ consultant (A13)					3	5																												28				8					
14		Owner furnished material and equipment (A14)																																		38									
15		Delay of decision by Owner (A15)																																		13					2				
16	Engineer Related (B)	Method of quality control (B1)																3																											
17		Lack of coordination (B2)					6															4																		3					
18		Adversarial approach in handling conflicts (B3)															5							4																					
19		Delay of Instruction (B4)																																									2		
20		Delay of shop and drawings and other details approvals (B5)																					3				3															2			
21		Delays in work progress (C1)		3	4							3							2			2													2		12			10		2			
22		Time extensions (C2)					4																	2	2	2									3										
23		Financial failure of the contractor (C3)																	3		5	2														27	7	8							
24		Technical inadequacy of the contractor (C4)																											5	4	3														
25		Error in tendering (C5)																		5	1		3																						
26	Quality of the work (C6)										6																															5			
27	Contractor performance (C7)										2								4					2					1													2			
28	Contractor site management (C8)																	3		3		4	3																	5					
29	Contractor's valuation of variation (C9)																			1		3		2																					
30	Quality of materials (C10)																					1	4																			5			
31	Quality of workmanship (C11)							10														1	4	3																		5			
32	Damages to the works (C12)			3																																									
33	Inadequate planning (C13)																						4																						
34	Engineer Related (C)	Delay in paying to subcontractors (C14)																					4																				2		
35		Insufficient coordination of subcontractors (C15)																																											

Table 08 : The summary of the casue of dispute with rank give in literature

SE NO	Category of Dispute	Reference	Diekmann and Nelson (1985)	Hewit (1991)	Watts and Scrivener	Spittler and Jentzen (1992)	Heath et al. (1994)	Rhys Jones (1994)	Semple et al. (1994)	Bristow and Vasilopoulous (1995)	Conlin et al (1996)	Sykes (1996)	Kumaraswamy (1997)	Yates (1998)	Al Momani (2000)	Mitropoulos and Howell (2001)	Brooker (2002)	Killian (2003)	Sheridan (2003)	Fryer et al. (2004)	Adriaanse (2005)	Ashworth (2005)	Chan and Suen (2005)	Cheung and Yiu (2006)	Waldron (2006)	Abd El-Razek et al. (2007)	Yiu and Cheung (2007)	Abeynayake (2008)	Love et al. (2010)	Gad et al. (2011)	Jaffar et al. (2011)	Ilter (2012)	Emre Cakmak (2013)	Rizwan (2014)	Nirmal Kumar (2016)	Soekimo et.al. 2007	Poh 2005	Levy 2007)	Illankoon 2019	Conlin et al. (1996)	M.Kumaraswamy 1998			
		Causes of Disputes																																										
36	Contractor related	Performance of suppliers (C16)																				4		2																2				
37		Lack of knowledge of local legal system (C17)																3						4																				
38		Unfamiliarity with local condition (C18)																	3					4								3												
39		Resources availability (C19)																																										
40		Breaches of contract (C20)																											1	2					8				9	4				
41		Issue of security of the construction site (C21)																																	43									
42		Poorly drafted or incomplete and unsubstantiated claims (C22)																																										
43		Accident/ safety issue (C23)																																		27								
44		Labour/equipment / materials shortage (C24)																					1												16									
45		Materials testing technique (C25)																																	36									
46		Exaggerated claims (C26)																																3									1	
47		Inability to adhere to industry standards (C27)																																					4					
48		Lack of experience in construction (C28)																																						9				
49		Language of contract document (C29)																							3					4					9	24								
50	Design related (D)	Design errors (D1)	1										3					1		2		4						3							4			1						
51		Inadequate / incomplete specifications (D2)						4															4			3							3	4		6	4	2		3		7		
52		Quality of design (D3)														2			2		2					2	2							5				2	1		5			
53		Availability of information (D4)																																18									3	
54		Delay of design (D5)												9	4						2														26			4			2			
55		Excessive extra work (D6)																																	12									
56		Professional negligence (D7)																4																			4				4			
57		Inadequate site investigations (D8)																																									2	
58		Excessive quality variations (D9)																					3		2																5			
59	Contract related (E)	Ambiguities in contract documents (E1)		2		1	1	9		2			5	2									1		3						2	3	8	1						2				
60		Different interpretations of the contract provisions (E2)																				5	1	3		2			1	2		2	3	12	6					2				
61		Unbalance risk allocation (E3)																					1	3								2	3	10	3	10					13			
62		Other contractual problems (E4)															2	2																1										
63		Value engineering (E5)	6																																									
64		Termination (E6)																																										
65		Conflict of law (E7)																																										
66		Failure to understand and/ or comply with its contractual obligations by the employer/contractor/subcontractor																																										
67		Poor scope definition (E9)																						4										3							12			
68	Contract related (F)	Adversarial / controversial culture (F1)						2																										21			1							
69		Lack of communication (F2)						3		3		1											2	4	2						1	3	16	10				2				4		
70		Lack of team spirit (F3)									4													4										19										

Table 08 : The summary of the casue of dispute with rank give in literature

SE NO	Category of Dispute	Reference	Diekmann and Nelson (1985)	Hewit (1991)	Watts and Scrivener	Spittler and Jentzen (1992)	Heath et al. (1994)	Rhys Jones (1994)	Semple et al. (1994)	Bristow and Vasilopoulous (1995)	Conlin et al (1996)	Sykes (1996)	Kumaraswamy (1997)	Yates (1998)	Al Momani (2000)	Mitropoulos and Howell (2001)	Brooker (2002)	Killian (2003)	Sheridan (2003)	Fryer et al. (2004)	Adriaanse (2005)	Ashworth (2005)	Chan and Suen (2005)	Cheung and Yiu (2006)	Waldron (2006)	Abd El-Razek et al. (2007)	Yiu and Cheung (2007)	Abeynayake (2008)	Love et al. (2010)	Gad et al. (2011)	Jaffar et al. (2011)	Ilter (2012)	Emre Cakmak (2013)	Rizwan (2014)	Nirmal Kumar (2016)	Soekimo et.al. 2007	Poh 2005	Levy 2007)	Illankoon 2019	Conlin et al. (1996)	M.Kumaraswamy 1998					
		Causes of Disputes																																												
71	Human behavior rele	Strikes/ interruption/protests (F4)	5																																											
72		Poor management (F5)						1												3			4												41			3	2	5						
73		Poor workmanship (F6)																				1																								
74		Administration (F7)										7																	2					4					3	1	6					
75		Previous working relationship (F8)																															9													
76		Conflicting party interests (F9)																						2																						
77		Personality traits (F10)																						2								2								7						
78		Inter parties problems (F11)																						2															7							
79	Project related (G)	Site conditions (G1)	3							5			1		5										2			4							13	1	3		5							
80		Unforeseen changes (G2)										2																					14					6								
81		Quality/ defects (G3)																3																	20						5					
82		Lack of space in construction site (G4)																																	33											
83		Environmental hazards by project (G5)																																	19											
84	External Factor (H)	Project uncertainty (G6)														1	1																													
85		Weather (H1)	4						3				8	3	6																				23	29	1			15						
86		Legal and economic factors (H2)																											3					9												
87		Fragmented structure of the sector (H3)																					2													20										
88		Disruption (H4)		4																																				10						
89		Economical environment (H5)																												6																
90		Influence of lawyers (H6)							7																																					
91		Interferences with utility line (H7)												7																																
92		Jurisdixtional problem (H8)																																												
93		Cultural background (H9)																												2																
94		Market inflation (H10)																																								11		14		
95		Public disorder (H11)																																				2								
96		Third party delays or force majeure events(H12)												6																								9					2			
97		Necessity of enviroment improvement (H13)																																												
98		Competitive envirement (H14)					2																																							
99	Suden tax and cost increase (H15)																											4																		

Table 9: The Summary of the cause of dispute accoding to the Globle Construction Disputes Report 2015 to 2020

	Cause of Dispute	Middle East						Asia						North America						UK						Continetal Europe						Glouble average						
		2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	2015	2016	2017	2018	2019	2020	
1	Failure to properly administer the contract	1	1	1	2	2	2	1	1	1				4	2	3	2			1	1	1	1	1		2	3	1	2	3	3	1	1	1	1	3		
2	Poorly drafted or incomplete and unsubstantiated claims	2	2	2		1	1	3	3	2				5		2		3	3	3		2			3				3			2	2	2	2		1	
3	Errors and/ or omissions in the contract document													1	1	1	1	1	2						1					1	3	3	4		2			
4	comply with its contractual obligations by the employer/contractor/ subcontractor			3		3								3			3	2	1	2	3	3	3	2	2	2		3	1			4	5	3	3	1	3	
5	Failure to make interim awards on extensions of time and compensation	4			1		3	2	2															1		3				2	5					2		
6	Differing site conditions													2	3													1										
7	A biased PM or Engineer	3						4																														
8	An unrealistic contract completion date being defined at tender stage	5																	3																			
10	Conflicting party interests (subcontractor/ main contractor/ employer or JV partner)																			4							1	2										
11	Incomplete design information or employer requirements (for Design & Build)		3																	5	2					5	2					4	5					
12	Third party or force majeure events																								4			2										
13	Failure to serve the appropriate notice under the contract									3													3	3														
14	Owner directed changes			3															3																			

CHAPTER 3:

Research Methodology

3.1 Introduction

The research methodology defines the research methods and techniques used in the research. According to Kothari (2008), the research design is the theoretical arrangement within which research is conducted. The data for the study needs to be clear-cut and accurate to fulfil the objectives of the research. This chapter will elaborate on the processes of data collection for the research, This chapter will also justify the reasons behind the selection of the data collection method. This survey attempts to explore the opinions of construction professionals engaged in construction projects in Sri Lanka. The survey was focused on the behaviour of the construction disputes in Sri Lanka. Identification of common causes to the disputes, severity of theses causes and frequency of occurrence of the cause in construction contracts in Sri Lanka. The information required for this study was composed through a detailed literature review from reputed journals, published books, and websites. The methods of the collecting the primary and secondary data required for the research and the steps of the research are illustrated in figure 06 and figure 07.

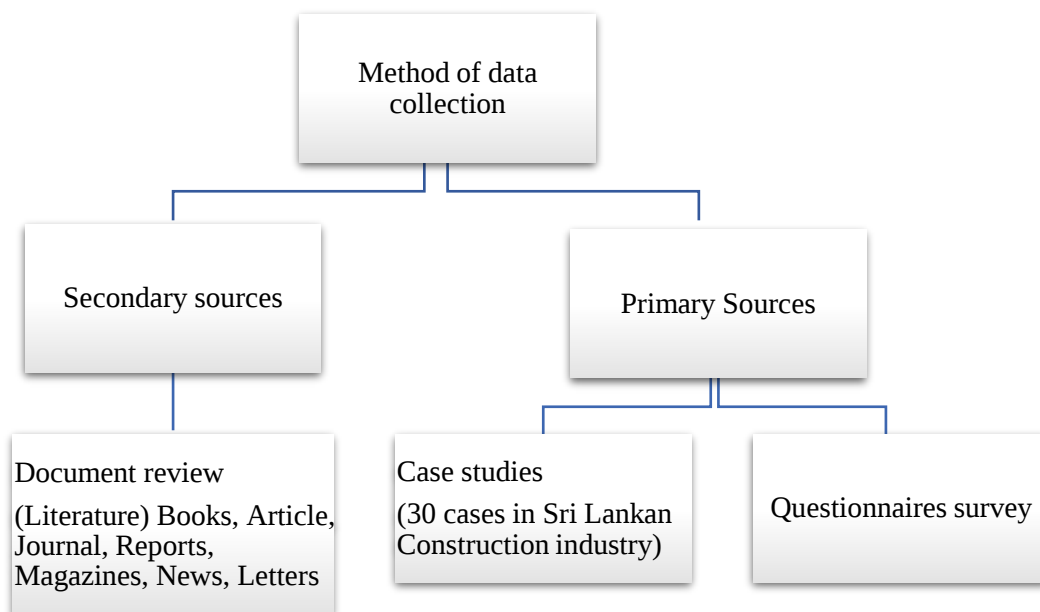


Figure 06 Methods and Source of the data collection

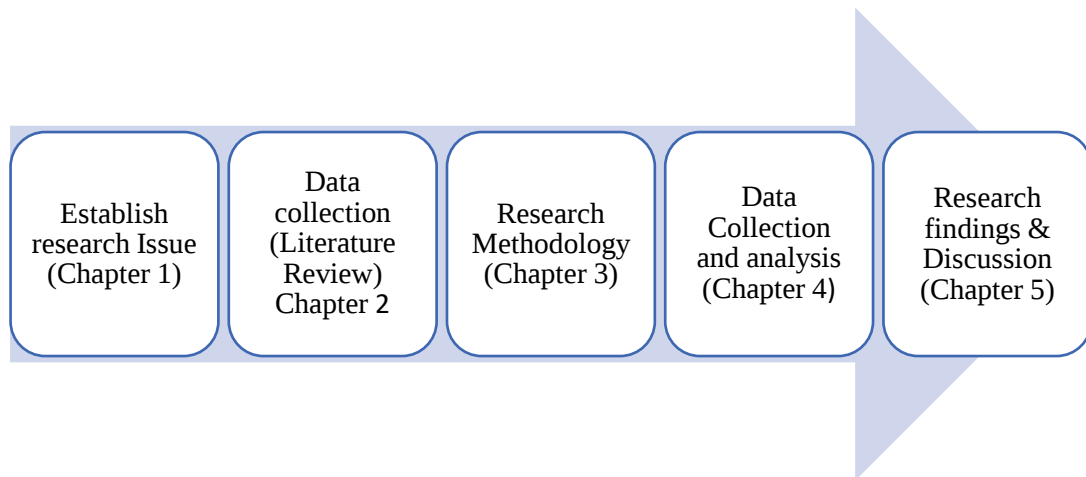


Figure 07: Steps of the Research

3.2 Method of Data Collection

The data for the research is based on the literature review related to construction industry. The thesis, books, Reports and website have been selected for this study including Global dispute reports 2015 to 2020. It was found wide range of the cause of the dispute and selected 100 cause of disputes from literature surveying. The factors were further studied and concluded to 76 factors and ranked them considering the frequency of occurrence of the cause of disputes in each literature.

The data required for the study based on case studies have been collected by analyzing the disputes cases occurred in Sri Lankan construction industry within the last ten years. In this study, it was checked the availability of the cause of dispute identified through the literature surveying in selected disputes cases. In this study, thirty disputes cases have been selected with the availability of the sources. The data required for the study based on the experience of the professionals in the construction industry has been collected through the questionnaires surveying.

3.2.1 Design of questionnaire

The questionnaire is based on the literature to determine the cause of conflicts in the construction industry. The chosen cause of widespread anger is very broad and the use of all the causes of conflict in examining the list of questions does not work. With a selection of 37 highly repetitive causes it is constructed as a variation of input. To the best of our knowledge, it is thought that these 37 elements of conflict will cover the entire construction site. However, respondents were also asked to add other causes that were not in the questionnaire, but no such important items were found. When selecting features, consideration was given to the availability of local construction industries, case studies and the global construction industry.

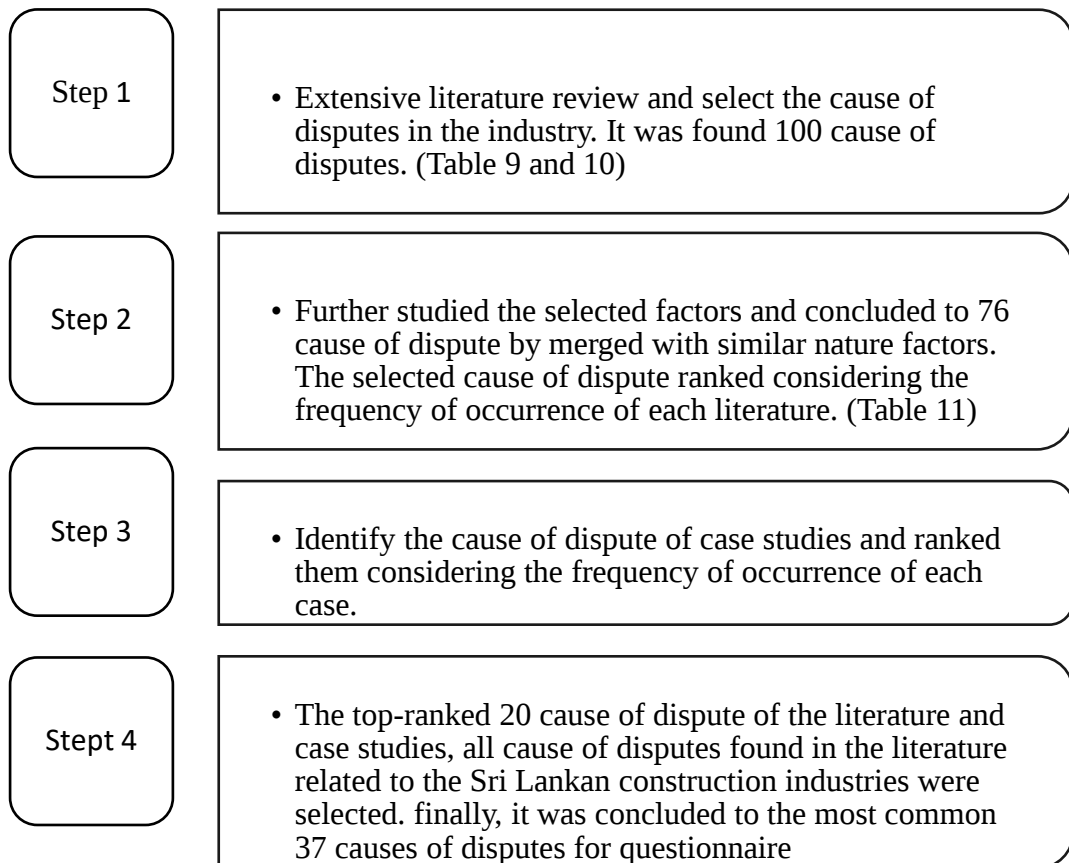


Figure 08: Steps of Selecting the Variable for the Questioners.

The questionnaire survey was done for validating the finding from the previous literatures of the construction industry and case studies. Questionnaires are distributed though the google form and emailed to 150 participates selected professional in Sri

Lankan construction industries, specially involved in contract management. Out of 150 questionnaires sent, 77 numbers of usable responses were received, which represents a 51 percent response rate.

The questionnaire has been prepared with two main sections and seven sub-sections. different parts as follows:

Part 1:

Background information of the respondents such as the name of the organization, position/designation, qualification, working experience, and type of construction projects involved and type of the organization.

Part 2:

The second part is included the selected dispute factors and grouped them as A- Owner related, B -Project Related, C – Contractor related, D- Designer related, E-Contract Related, F- Human Behavior related and G-External factor related.

The participants were requested to rate the most common dispute factors in the Sri Lankan construction industries as per their experience using 1-5 Likert-scale as follows:

The Relative Importance Index (RII) was computed as:

$$RII = \sum_{i=1}^n \frac{Wi}{A * N} \dots\dots\dots (A)$$

3.2.2 Subjects of the Survey and Responses

Three project participants (e.g. client, coordinator, and contractor team) were the subject of the study. Respondents are identified by their contacts. Many methods have been used to submit a list of questions and get answers. Email, considered safe, fast and reliable, was the preferred way to get answers to the lessons. Also, a list of questions was sent directly (face to face) and answers were immediately received. Email addresses are collected from various sources, e.g. contact, organization membership list, membership list of professional organizations and institutions.

150 complete questions were distributed on topics in the construction industry. Of the 150 questionnaires submitted, 77 answer numbers were obtained, representing a response rate of 51 percent. Distribution of organizational respondents, details, management position, project involvement, and conflict experience reflected in the results.

3.3 Analysis of Data

In this study, data analysis was based on descriptive statistics and MS Excel was used to analyze data. The designed questionnaire let the respondents provide their opinion based on their experiences. Likert scales are accurate and are widely used for ideas management. Descriptive statistics provide simple summaries about the sample and the observations made. In the business world, descriptive statistics provide a useful summary of many types of data.

Relative Importance Index Technique: Use it to find the significance of the significance of the various causes and effects of the causes.

The same approach will be adopted in this study by different groups (contractor, Coordinator and Employer / Developer).

The Relative Importance Index (RII) was computed as:

$$\text{RII} = \sum_{i=1}^n \frac{W_i}{A * N} \dots\dots\dots (A)$$

Where W = weights given to each Cause of Dispute by the respondents from 1 to 5, ('1' is Very low use and '5' is Very high use), A = highest weight (i.e. 5 in this case), and N = total number of respondents.

CHAPTER 04

Data Analysis and Results

4.1 Introduction

The purpose of this research was to identify the common cause of disputes in Sri Lankan construction industry. The secondary data were collected from the past thesis and book. The case studies and the questionnaire surveys were conducted to collect the primary data required for the research

4.2 Literature review

The purpose of the literature review was identified as the common cause of dispute in the construction industry. Mainly this review was covered with three different sections.

- 1) The thesis, reports and books related to the disputes in the construction industry published globally.
- 2) The thesis published related to disputes in Sri Lankan construction industry
- 3) The Global construction dispute report (Arcadis) year 2015 to year 2020

4.2.1 Literature Related to Disputes in International Construction Industry

Extensive range of literature was studied and identified 100 individual cause of disputes related to the construction industry (Table 08 and 09). These causes of disputes were further studied and concluded to 79 common factors (Table 10). These causes of disputes were ranked considering the frequency of occurrence of each literature. It was found the most common cause of the dispute was “Ambiguities of contract document (C15)” and the most common conflict group is Owner Related dispute factors. The frequency of the occurrence of the dispute factor literature was 18 times. The top twenty-six disputes factors tabulated in Table 11 for further studies.

Table 10: Selected cause of Dispute

		Reference		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39			
	Category of Dispute		ID	Diekmann and Nelson (1985)	Hewit (1991)	Watts and Scrivener	Spittler and Jentzen (1992)	Heath et al. (1994)	Rhys Jones (1994)	Semple et al. (1994)	Bristow and Vasilopoulous (1995)	Conlin et al (1996)	Sykes (1996)	Kumaraswamy (1997)	Yates (1998)	Al Momani (2000)	Mitropoulos and Howell (2001)	Brooker (2002)	Killian (2003)	Sheridan (2003)	Fryer et al. (2004)	Adriaanse (2005)	Ashworth (2005)	Chan and Suen (2005)	Cheung and Yiu (2006)	Waldron (2006)	Abd El-Razek et al. (2007)	Yiu and Cheung (2007)	Abeynayake (2008)	Love et al. (2010)	Gad et al. (2011)	Jaffar et al. (2011)	Ilter (2012)	Emre Cakmak (2013)	Rizwan (2014)	Nirmal Kumar (2006)	Soekimo et.al. 2007	Poh 2005	Levy 2007)	Illankoon 2019	Conlin et al. (1996)	M.Kumaraswamy 1998			
		Causes of Disputes	ID																																										
1	Owner related (A)	Variations initiated by the owner	A1			1		1						1	1	1			1			1	1	1		1	1	1						1								1			
2		Change of scope	A2	1	1					1					1	1										1	1			1				1		1	1								
3		Late giving of possession	A3												1	1											1							1		1									
4		Restricted and limited access	A4								1																1																		
5		Acceleration	A5			1					1																									1				1					
6		Unrealistic expectations	A6									1													1										1	1									
7		Delays of payment	A7						1	1			1				1		1		1			1	1	1						1		1	1	1					1				
8		Unrealistic tendering	A8							1												1		1											1										
9		Budget limitation	A9										1										1																1	1					
10		Supremacy of owner and Unfair stakeholders involvement	A10					1	1									1																		1					1				
11		Owner furnished material and equipment	A12																																	1									
12		Delay of decision by Owner	A13																																	1					1				
13		Method of quality control (B1)	A14																	1																									
14		Delay of Instruction and Approvals	A15																																1								1		
15		Delay of shop and drawings and other details approvals	A16																																										
16	Project related (G)	Lack of coordination	B1					1															1	1			1																		
17		Lack of communication	B2							1	1	1		1										1	1	1						1	1	1										1	
18		Adversarial approach in handling conflicts	B3															1							1																				
19		Extention of time	B4					1																	1	1	1								1										
20		Suspension or Termination of project or part of the project	B6			1										1																													
21		Failure to understand and/ or comply with its contractual obligations	B7																																										
22		Breaches of contract	B8																											1	1					1					1	1			
23		Unforeseen Site conditions	B9	1								1				1		1										1								1		1							
24		Unforeseen changes	B10											1																						1									
25		Lack of space in construction site	B11																																										
26		Environmental hazards by project	B12																																										
27		Necessity of enviroment improvement	B13																																										
28		Project uncertainty	B14															1	1																										
29	on	Delays in work progress	C1		1	1						1							1				1						1						1		1						1		

Table 10: Selected cause of Dispute

[illegible]

Table 10: Selected cause of Dispute

					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39		
	Category of Dispute	Reference		Diekmann and Nelson (1985)	Hewit (1991)	Watts and Scrivener	Spittler and Jentzen (1992)	Heath et al. (1994)	Rhys Jones (1994)	Semple et al. (1994)	Bristow and Vasilopoulous (1995)	Conlin et al (1996)	Sykes (1996)	Kumaraswamy (1997)	Yates (1998)	Al Momani (2000)	Mitropoulos and Howell (2001)	Brooker (2002)	Killian (2003)	Sheridan (2003)	Fryer et al. (2004)	Adriaanse (2005)	Ashworth (2005)	Chan and Suen (2005)	Cheung and Yiu (2006)	Waldron (2006)	Abd El-Razek et al. (2007)	Yiu and Cheung (2007)	Abeynayake (2008)	Love et al. (2010)	Gad et al. (2011)	Jaffar et al. (2011)	Ilter (2012)	Emre Cakmak (2013)	Rizwan (2014)	Nirmal Kumar (2006)	Soekimo et.al. 2007	Poh 2005	Levy 2007)	Illankoon 2019	Conlin et al. (1996)	M.Kumaraswamy 1998			
		Causes of Disputes	ID																																										
59	Contract related (E)	Ambiguities in contract documents	E1		1		1	1	1		1			1	1							1	1	1	1	1						1	1	1	1	1				1					
60		Conflict of law	E3																					1																					
61		Unbalance risk allocation	E4																					1	1							1	1	1	1	1				1					
62		Other contractual problems	E5															1	1																1										
63		Value engineering	E6	1																																									
64		Poor scope definition	E7																						1									1							1				
65	Human behavior related (F)	Adversarial / controversial culture	F1						1								1																		1			1							
66		Cultural background	F2																												1														
67		Lack of team spirit	F3									1													1											1									
68		Strikes/ interruption/protests	F4	1																																		1							
69		Previous working relationship	F5																																		1								
70		Conflicting party interests	F6																							1																			
71		Personality traits	F7																							1						1									1				
72		Inter parties problems	F8																											1												1			
73	External Factor (H)	Weather	G1	1						1				1	1	1																			1		1	1		1					
74		Legal and economic factors	G2			1	1		1			1																			1		1		1		1	1			1	1			
75		Fragmented structure of the sector	G10																					1											1										
76		Disruption	G11		1																																			1					
77		Interferences with utility line	G12												1																														
78		Public disorder	G13																																							1			
79		Third party delays or force majeure events	G14												1																												1		

Table 11: The most common cause of dispute according to the literatures

	Causes of Disputes	ID	Frequency of Occurance	Rank
1	Ambiguities in contract documents	E1	18	1
2	Variations initiated by the owner	A1	15	2
3	Delays of payment	A7	14	3
4	Lack of communication	B2	13	4
5	Change of scope	A2	12	5
6	Legal and economic factors	G2	11	6
7	Inadequate / incomplete specifications	D3	10	7
8	Delays in work progress	C1	10	8
9	Unforeseen Site conditions	B9	9	9
10	Quality of the work	C6	9	10
11	Quality of design	D2	9	11
12	Weather	G1	9	12
13	Design errors	D1	8	13
14	Contractor site management	C12	8	14
15	Unbalance risk allocation	E4	8	15
16	Contractor's valuation Error	C4	7	16
17	Resources availability	C20	6	17
18	Failure to properly administrator the contract	C15	6	18
19	Delay of design	D6	6	19
20	Financial failure of the contractor	C2	6	20
21	Unrealistic expectations	A6	5	21
22	Supremacy of owner and Unfair stakeholders involvement	A10	5	22
23	Extention of time	B4	5	23
24	Delay of shop and drawings and other details approvals	A16	5	24
25	Contractor performance	C11	5	25
26	Breaches of contract	B8	5	26

Table 12: The distribution of cause of dispute according to the literature.

	Conflict Group	Frequency	%
A	Owner related (A)	80	24%
B	Project related (B)	48	14%
C	Contractor related (C)	85	25%
D	Design related (D)	43	13%
E	Contract related (E)	34	10%
F	Human behavior related (F)	17	5%
G	External Factor (G)	29	9%
	Total	336	100%

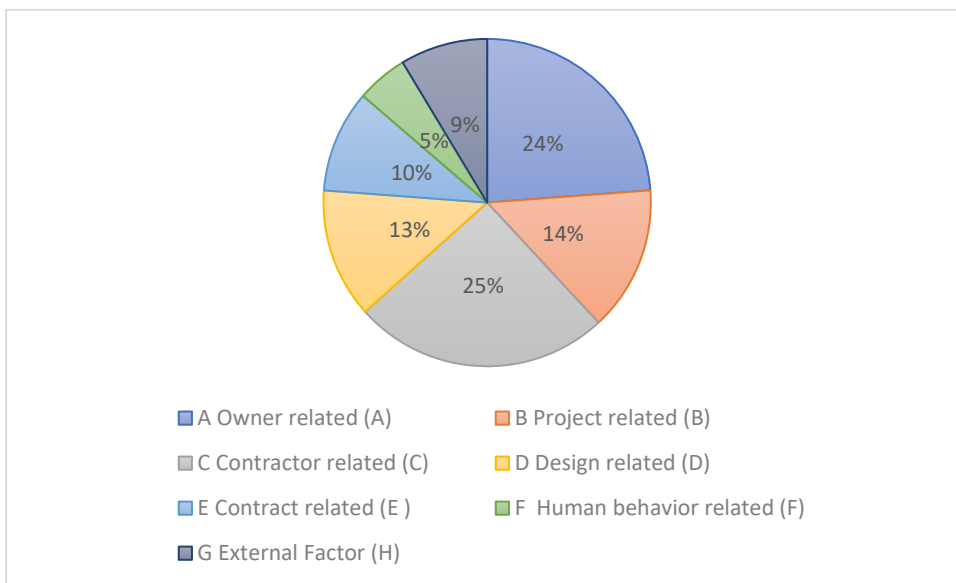


Figure 09: The distribution of cause of dispute according to the literature

4.2.2. Literature Related to Local Construction Industry

The cause of the dispute has differed from country-wise and region-wise (Arcadis 2019). Since the study of the past studies related to Sri Lankan construction industry is very important. In this study special consideration has been paid for literature related to the Sri Lankan construction industry. Sixteen (16) conflict factors had been identified from this literature review, and three of them are common for both studies. 14 most common conflict factors were selected and ranked according to the data available in the studies (Table 13) for further analysis.

Table 13: The cause of dispute related to the Sri Lankan Construction Industry

	Causes of Disputes	ID	Abeynayake (2008)	Illankoon 2019
1	Supremacy of owner and unfair stakeholders involvement	A10		8
2	Breaches of contract	B8	1	4
3	Contractor site management	C12		5
4	Failure to properly administrator the contract	C15	1	1
5	Lack of experience in construction	C30		9
6	Design errors	D1	1	
7	Inadequate / incomplete specifications	D3		3
8	Ambiguities in contract documents	E1		6
9	Unbalance risk allocation	E4		13
10	Poor scope definition	E7		2
11	Personality traits	F7		10
12	Inter parties' problems	F8		7
13	Weather	G1		15
14	Legal and economic factors	G2	1	14

Table 14: The distribution of cause of dispute according to the literature related to the Sri Lankan Construction industry.

Group ID	Dispute Group	No	% of Dispute
A	Owner related (A)	1	6%
B	Project related (B)	2	12%
C	Contractor related (C)	4	24%
D	Design related (D)	2	12%
E	Contract related (E)	3	18%
F	Human behavior related (F)	2	12%
G	External Factor (G)	3	18%
	Total	17	100%

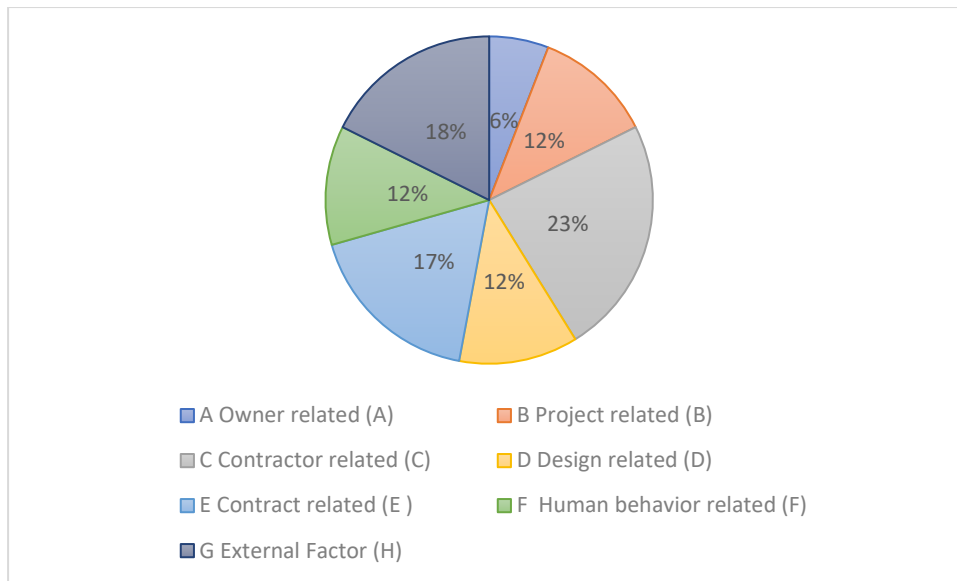


Figure 10: The distribution of cause of dispute according to the literature related to the Sri Lankan Construction industry.

It was found the most common dispute factor is C15- Failure to properly administrator the contract and the group is Contract Related Disputes.

4.2.3 The Global Construction Dispute Report.

The Global construction dispute report (Arcadis) is a major dispute analysis report for the global construction industry. It was analyzed annually, globally, and region-wise. The causes of dispute were illustrated in Table 09 for the years 2015 to 2020. However, the data were not available for the Asian region in 2017,2018 and 2019. The cause of disputes in global construction industries according to the Global disputes report illustrated in table 15, 16 and Figure 11. It was found the most common cause of dispute was “Failure to properly administrator the contract”. In addition to the cause of disputes, it has been analyzed values of dispute and length of the dispute. Due to lake of information and data the length and the value of the disputes were not considered in this research.

Table 15: The Cause of disputes According to the Global Dispute Report.

Dispute Cause	ID	Frequency of Occurrence	Rank
Variations initiated by the owner	A1	2	8
Unrealistic expectations	A6	2	9
Extension of time	B4	10	4
Failure to understand and/ or comply with its contractual obligations	B7	20	2
Unforeseen Site conditions	B9	5	6
Failure to properly administrator the contract	C15	29	1
Inadequate / incomplete specifications	D3	7	5
Ambiguities in contract documents	E1	12	3
Conflicting party interests	F6	3	7
Inter parties' problems	F8	2	10
Third party delays or force majeure events	G14	2	11

Table 16: The distribution of cause of dispute according to the Arcadis

ID	Dispute Factor	Frequency of Occurrence	%
A	Owner related (A)	4	4%
B	Project related (B)	35	38%
C	Contractor related (C)	29	32%
D	Design related (D)	7	8%
E	Contract related (E)	12	13%
F	Human behavior related (F)	2	2%
G	External Factor (G)	2	2%
	Total	91	100%

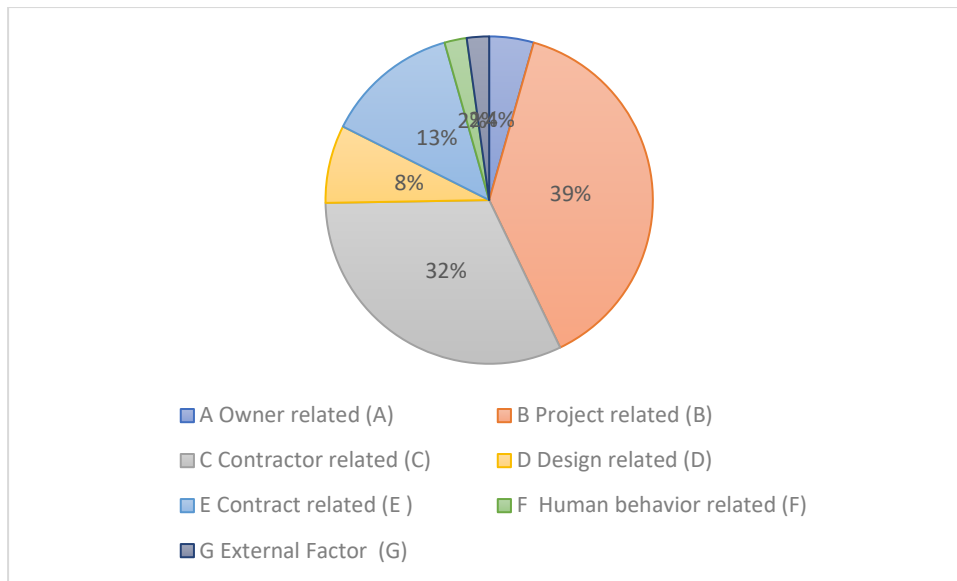


Figure 11: The distribution of cause of dispute according to the Arcadis (2015-2020)

4.3 Case Studies

The purpose of this case studies was validating the cause of dispute, root cause for the disputes identified from literature survey. 30 dispute cases have been selected in Sri Lankan construction industry established within the last ten years. All cases related to Sri Lankan construction industry and most of the project are GOSL funded projects. The project cost is varied from 50 million to 5, 000 million. Most of the disputes were resolved by alternative dispute resolution methods, some of them solved by arbitration and litigation process and some of them are hearing the cases. The summary of the disputes enclosed in Appendix B.

In this study, it was checked the availability of each cause of dispute identified from the literatures survey. It was found twenty-seven (27) conflict factors which are directly affected to these disputes. The identified cause of disputes were tabulated in Table 9 and ranked them considering the frequency occurrence of the factors in each case (Table 17). In this study, the only frequency occurrence of a factor's was considered. The data are not available to study the severity of each factor, cost, and duration of the conflict. The most common conflict factor was "D3 - Inadequate/incomplete specifications".

Table 17: The Cause of Dispute identified from case studies.

No	Dispute Cause	ID	Frequency of Occurrence
1	Inadequate / incomplete specifications	D3	12
2	Extension of Time	B4	10
3	Exaggerated claims	C28	6
4	Unforeseeable site condition	B9	6
5	Unrealistic tendering	A8	6
6	Ambiguities in contract documents	E1	5
7	Lack of communication and coordination	B2	5
8	Defects and delay of Design	D1	3
9	Poorly drafted unsubstantial claim	C25	2
10	Third party delays or force majeure events	G14	2
11	Technical inadequacy of the contractor	C3	2
12	Unbalance risk allocation	E4	2
13	Shortage of Materials, and Equipment's	C21	2
14	Competitive environment	G7	2
15	Delay of decision by client	A13	2
16	Late position of site	A3	1
17	Method of Quality control	A14	1
18	Delay of Payment	A7	1
19	Defects in construction	C9	1
20	Error in tendering	C4	1
21	Professional negligence	D9	1
22	Budget limitation	A9	1
23	Supremacy of owner/ consultant	A10	1
24	Owner furnished material and equipment	A12	1
25	Suspension or Termination of project	B6	1
26	Change of scope	A2	1
27	Poor management	C14	1

Table 18: The distribution of cause of dispute according to the case studies.

Dispute Group	Nos of Occurrence	% Of Occurrence
Owner Related A	9	33%
Project Related B	4	15%
Contractor Related C	7	26%
Design Related D	3	11%
Contract Related E	2	7%
Externa Factor Related F)	2	7%

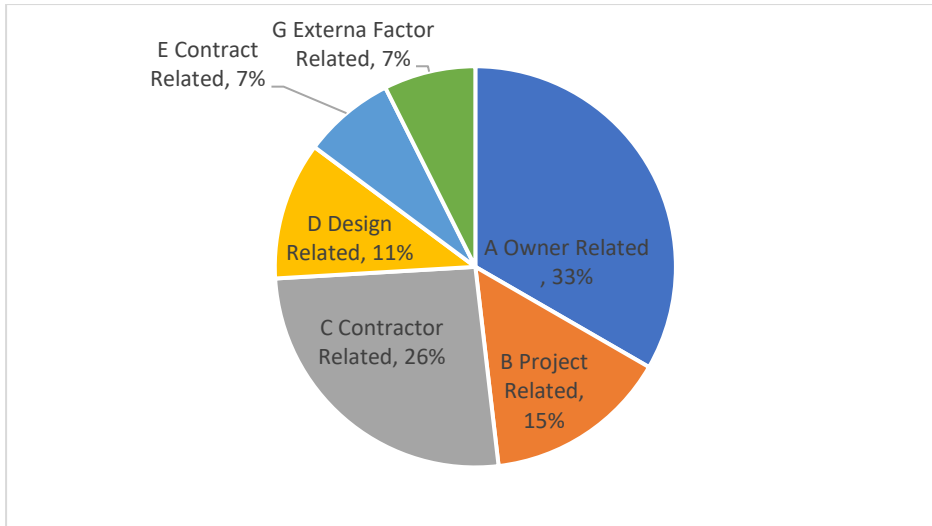


Figure 12: The distribution of cause of dispute according to the Literature Review.

4.4 Questionnaire Survey

The purpose of the questionnaire survey was to identify the most common cause of dispute based on the experience of the professionals in Sri Lankan Construction Industry and identify any other influencing factor for the disputes in the Sri Lankan construction projects.

4.4.1 Selection of Conflict Factor for Questionnaire Survey

When selecting the cause of dispute for questionnaire survey, it was considered the top-ranked cause of dispute from case studies, literature related to Sri Lankan construction industry and literature related to globule construction industries. Initially, the top 20 rank conflict factors of the group were reviewed tabulated in Table 19. The top-ranked 37 cause of disputes were selected for the questionnaire survey.

Table 19: The cause of dispute selected for questionnaires survey.

Cause of Disputes	Cause of Dispute ID	Rank			
		Case Study	SL Literature	Literature	ARCADIS
Owner related conflict factors					
Variations initiated by the owner	A1			2	8
Change of scope	A2	26		5	
Late position of site	A3	16			

Unrealistic expectations	A6				8
Delay of Payment	A7	18		3	
Unrealistic tendering	A8	5			
Supremacy of owner/ consultant	A10	23	2		
Delay of decision by client	A13	15			
Method of Quality control	A14	17			
Project related					
Lack of communication and coordination	B2	7		4	
Extension of Time	B4	2			4
Failure to understand and/ or comply with its contractual obligations	B7				2
Unforeseeable site condition	B9	4		9	6
Contractor related					
Delays in work progress	C1			7	7
Technical inadequacy of the contractor	C3	11			
Error in tendering	C4	20		16	
Quality of the work	C6			10	
Defects in construction	C9	19			
Contractor site management	C12		2	13	
Failure to properly administrate the contract	C15		1	18	1
Resources availability	C20			19	
Shortage of Materials, and Equipment's	C21	13			
Poorly drafted unsubstantial claim	C25	9			
Exaggerated claims	C28	3			
Lack of experience in construction	C30		2		
Design Related	D				
Defects and delay of Design	D1	8	2	14	
Quality of design	D2			11	
Inadequate / incomplete specifications	D3	1	2	8	5
Contract related					
Ambiguities in contract documents	E1	6	2	1	3
Unbalance risk allocation	E4	12	2	15	
Poor scope definition	E7		2	20	
Human behaviors related					
Personality traits	F7		2		
Inter parties' problems	F8		2		8

External factors related					
Weather	G1		2	12	
Legal and economic factors	G2		1	6	
Competitive environment	G7	14			
Third party delays or force majeure events	G14	10			8

The questionnaire was designed in two main sections and six sub-sections. The first section included the preliminary details of the response and secondary section divided into six subsections as Owner related, Project related, Contract Related, Contractor related, Design related, Contract related, Human behaviour related and External factor-related (Appendix A).

In this survey, 150 professionals were selected to circulate the questionnaires through googleform and email. The questionnaire survey was conducted within the selected expert in the construction industry who are involved in construction management sector including Engineers, Architect, Quantity surveyors working as consultant, Contractor or Client organization.

In total, seventy-seven (77) members have successfully responded to the survey. And the response rate is 51 percent. The panel members were identified based on their working experience in Sri Lankan construction industry and contract management sector. All professionals have got a bachelor's degree in Engineering, Quantity Survey, or Architect and all are practising professionals such as Senior project managers, Project managers, Senior engineers, Planning engineers, Contract managers. Out of responded 39 Nos (51.3%) are Consultant, 36 Nos (46%) are Contractor, and 12 Nos (15.8%) are Client/ Developer, and 2 Nos are Government organization and funding agency.

4.5 Characteristics of Respond Organization

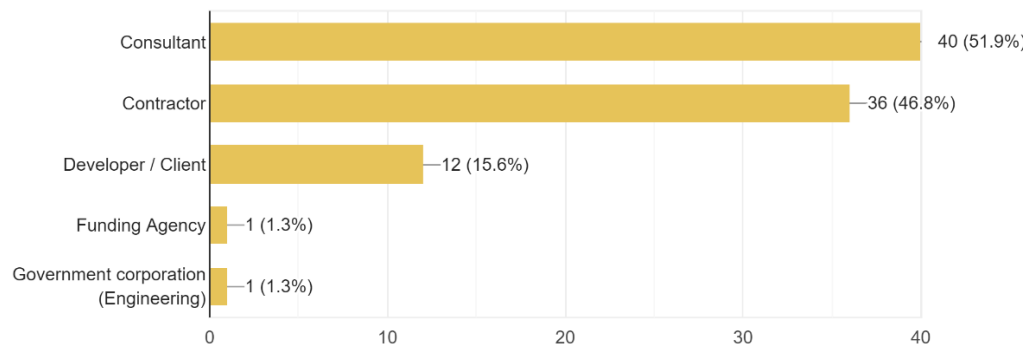


Figure 13: Nature of the Organization of the Respond

The working experience of the respond illustrated in figure 14. Out of the response, 92% of the response has more than 5-year working experience and 64% have more than 10 years working experience. The group of the response can be considered as reliable for this study.

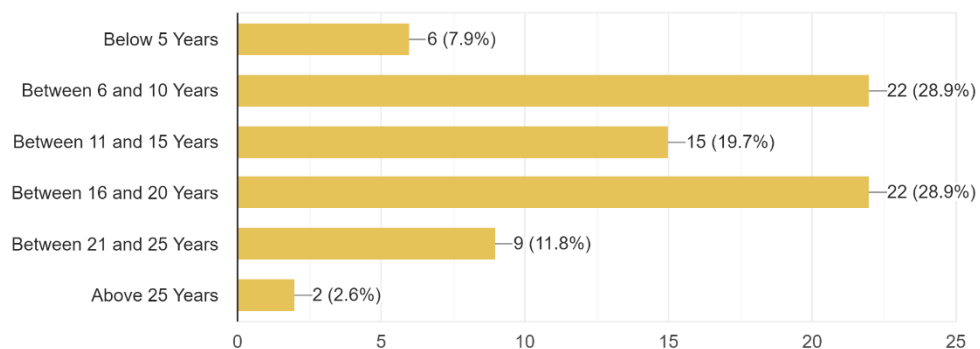


Figure 14: Working experience of the respond

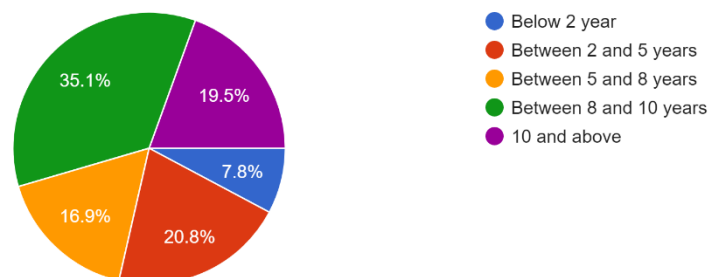


Figure 15: Experience of the field of Construction management of the respond

According to Figure 15, 72% of the responded have experience in construction management for more than 5 years. Since the reliability of the data is at an acceptable level.

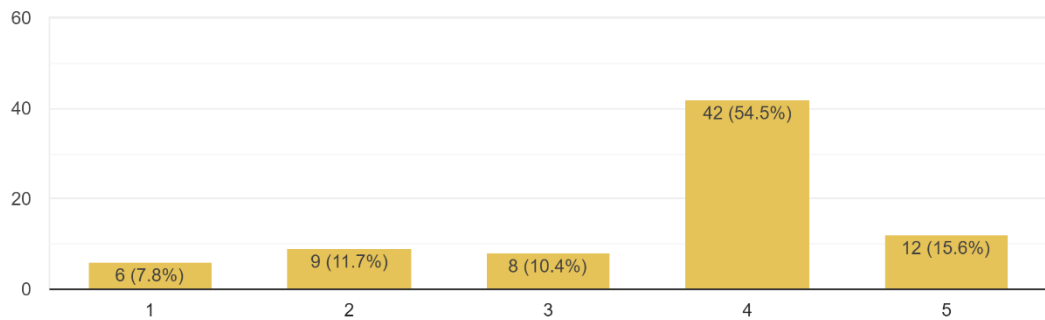


Figure 16: Responds for A1 Variation Initiated by Owner

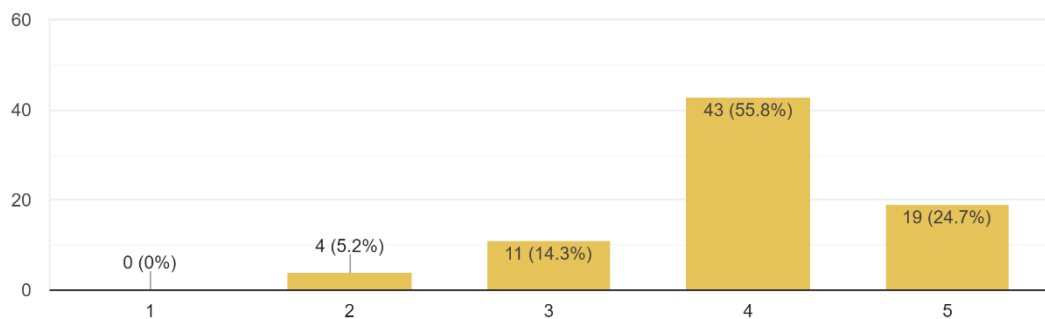


Figure 17: Responds for A2 Change of Scope

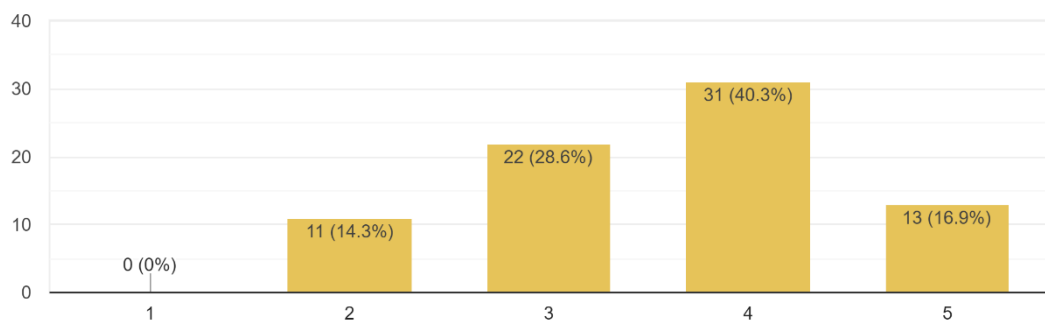


Figure 18: Responds for A3 Late giving possession of site

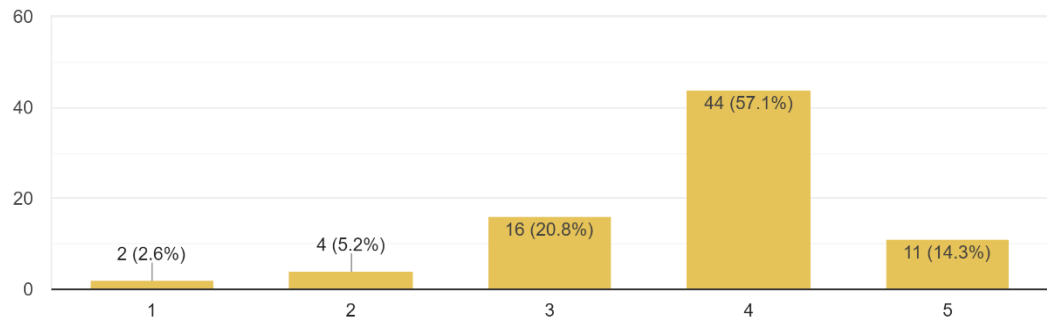


Figure 19: Responds for Unrealistic Expectation

The respond for the “delay of payment” 45.5 % of the respondent has given 5th rank. It shows this factor is most affected to the developing country construction industry.

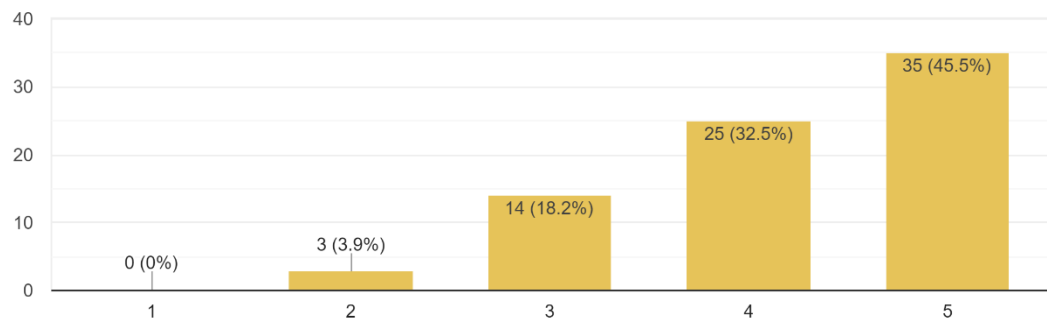


Figure 20 Responds for Delays of Payments

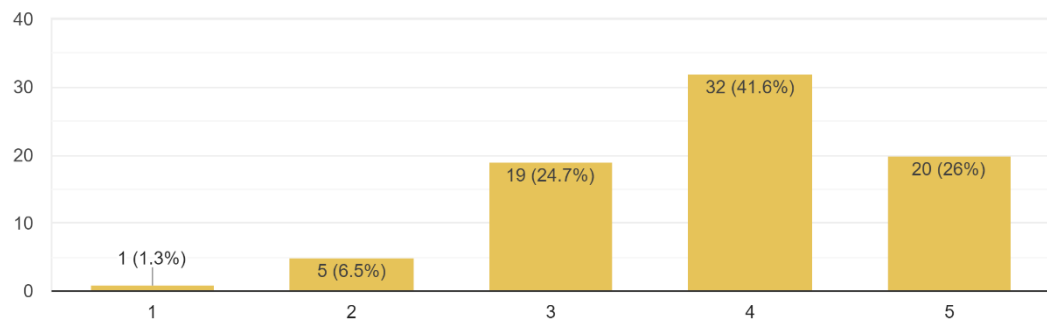


Figure 21 Responds for Unrealistic Tendering

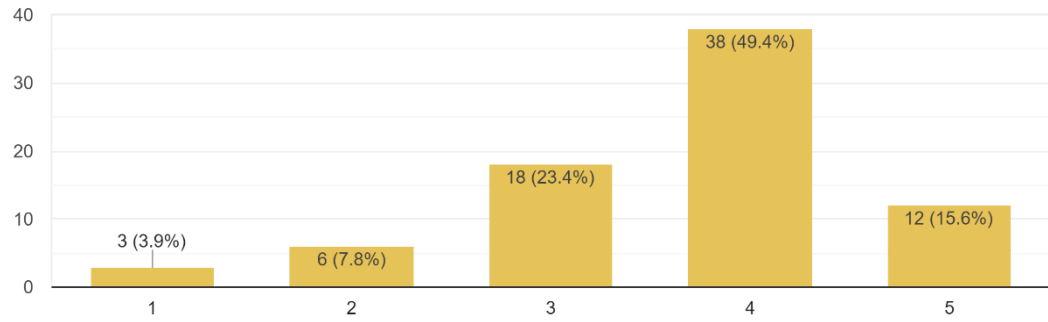


Figure 22 Responds Supremacy of Owner and Unfair Stakeholders involvement

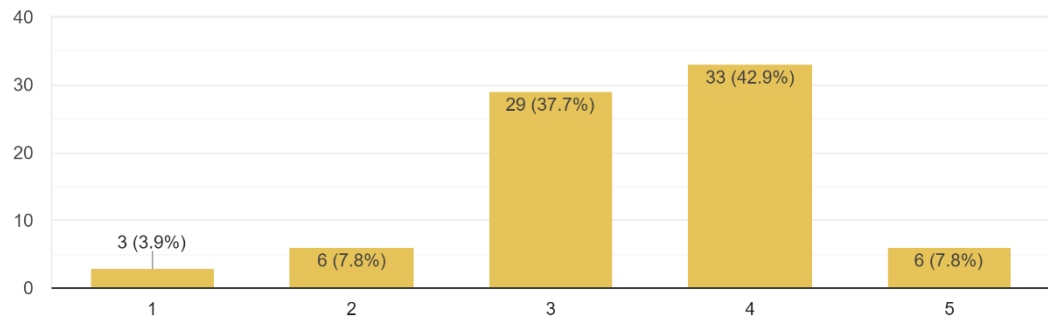


Figure 23 Responds for Methods of Quality Control

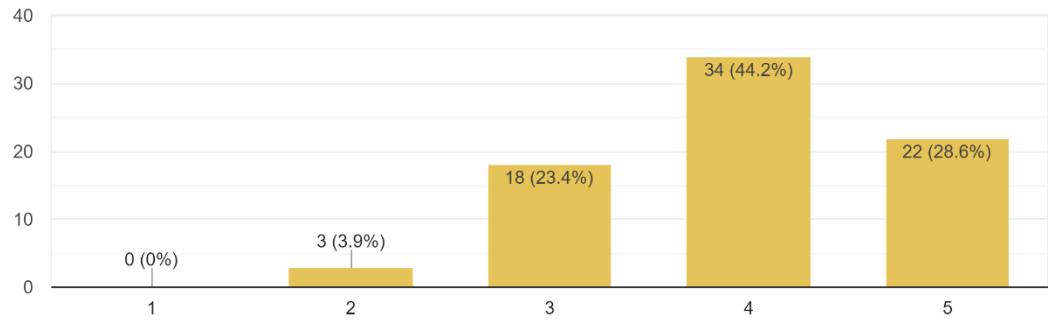


Figure 24 Responds for Lack of Communication

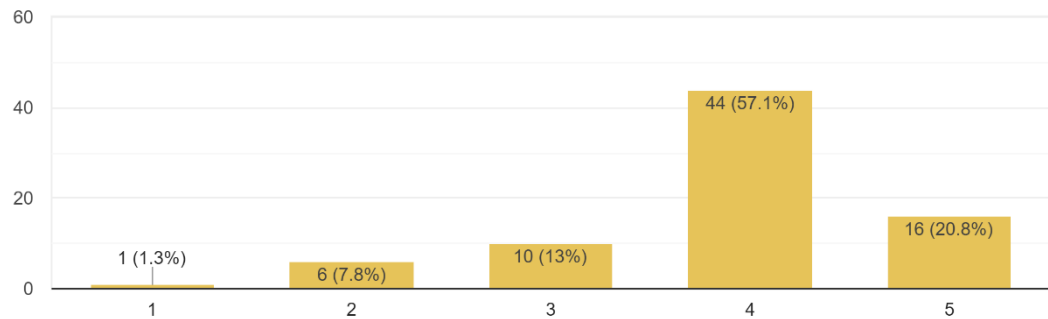


Figure 25 Responds for Extension of time

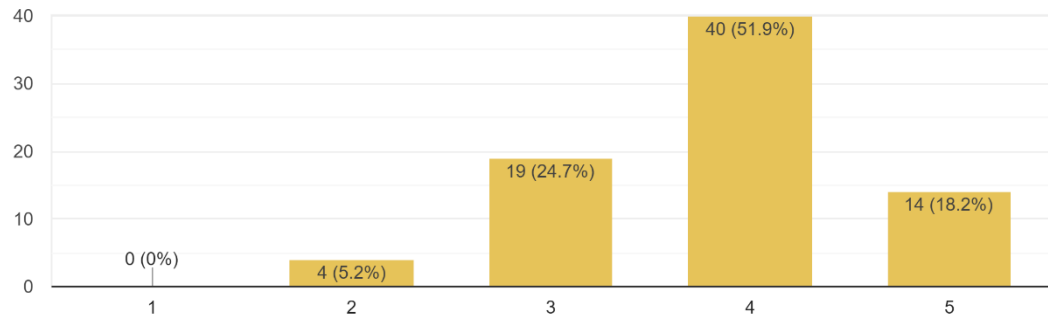


Figure 26 Responds for Failure to Understand and comply with its contractual obligations.

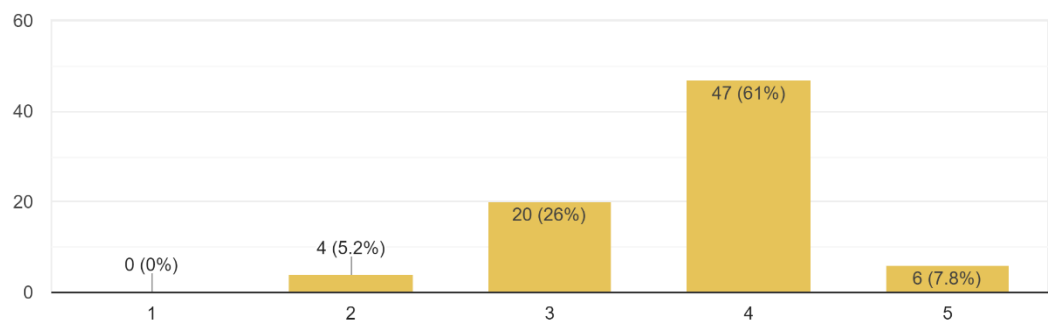


Figure 27: Responds for Unforeseen Site condition

The second-ranked conflict factor was “[C1] Dealy of payment”. Out of this respond, 24.7% has used scale 5 (highest scale) for this factor (Figure 28).

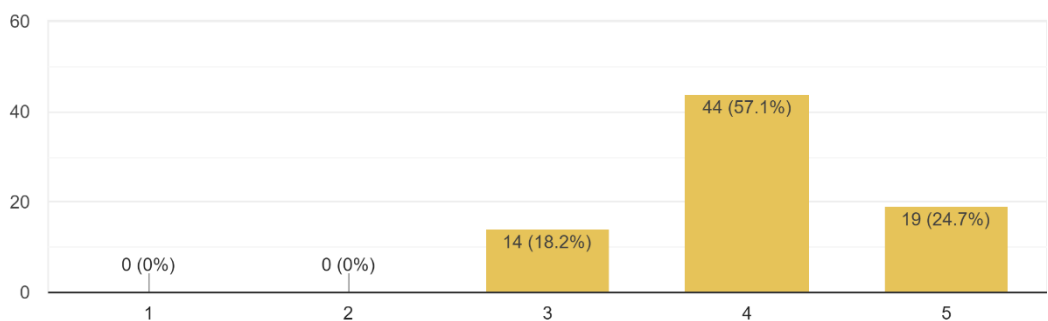


Figure 28; Response for Delays in work Progress

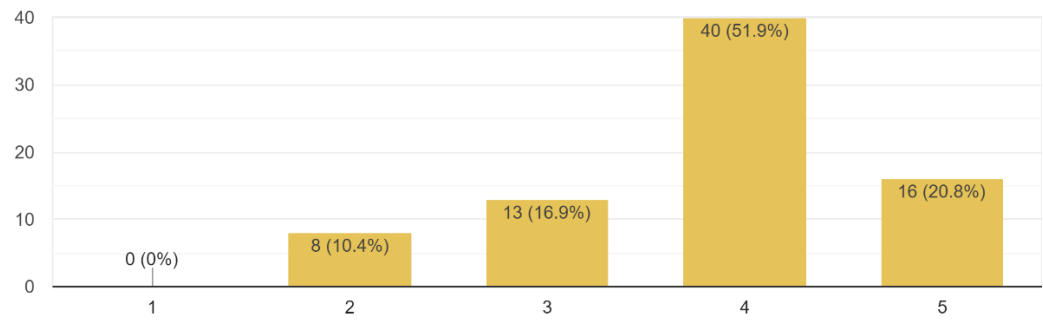


Figure 29: Response for Technical inadequacy of the contractor

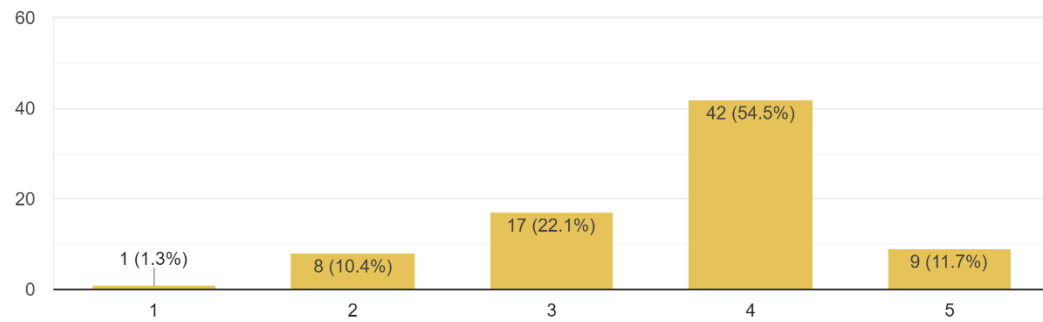


Figure 30; Response for Contractors Valuation error

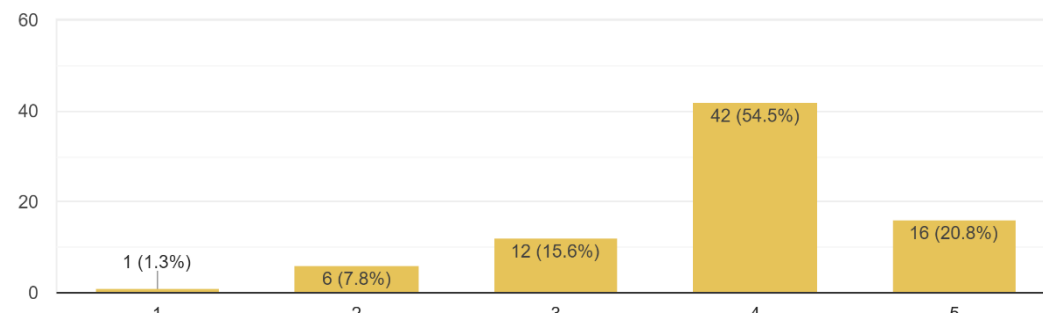


Figure 31 Responds for Quality of Works

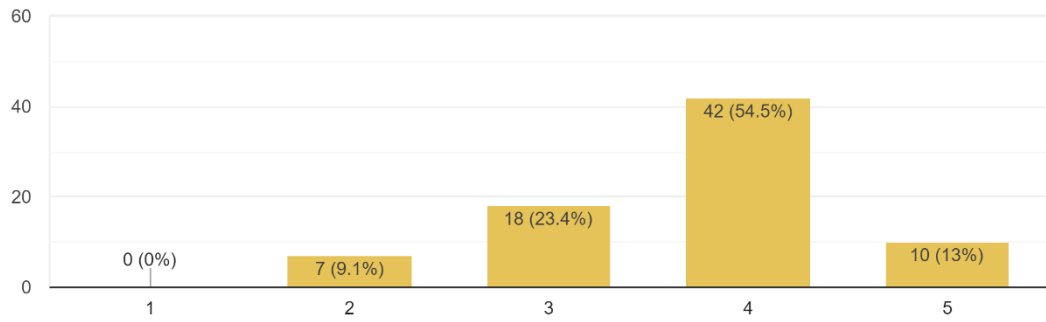


Figure 32: Response for Defects in Construction

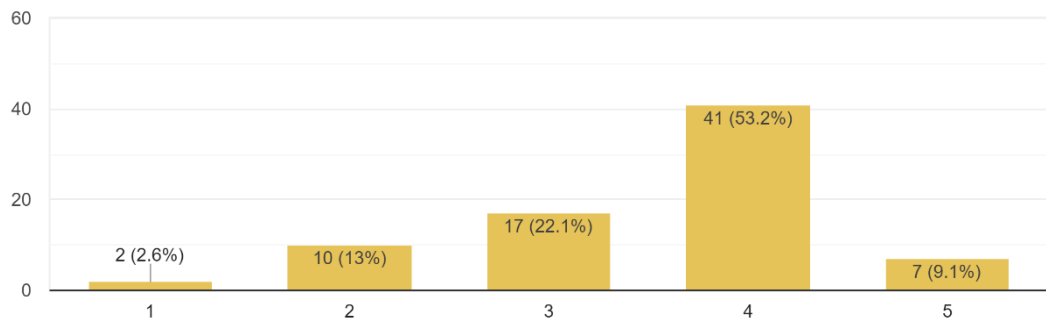


Figure 33: Response for contractor Site Management

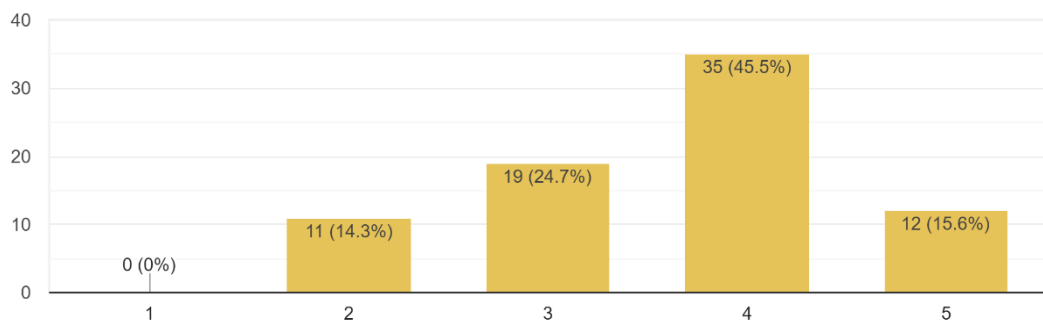


Figure 34: Responds for Failure to properly administrator the contract

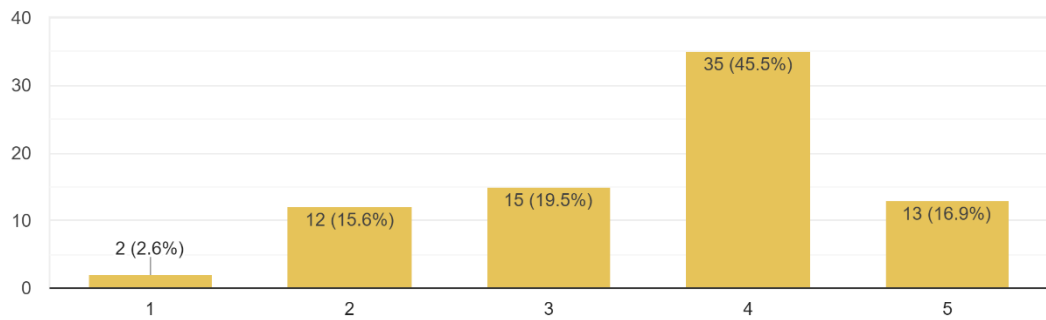


Figure 35: Shortage of materials and equipment

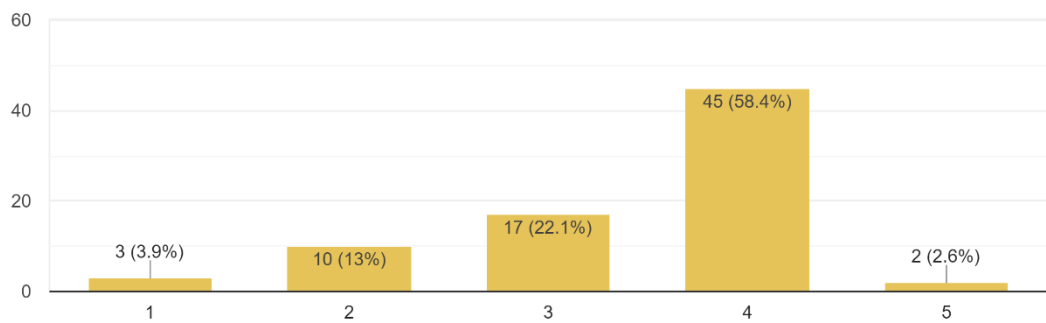


Figure 36: Response for Poorly drafted Unsubstantial Claims

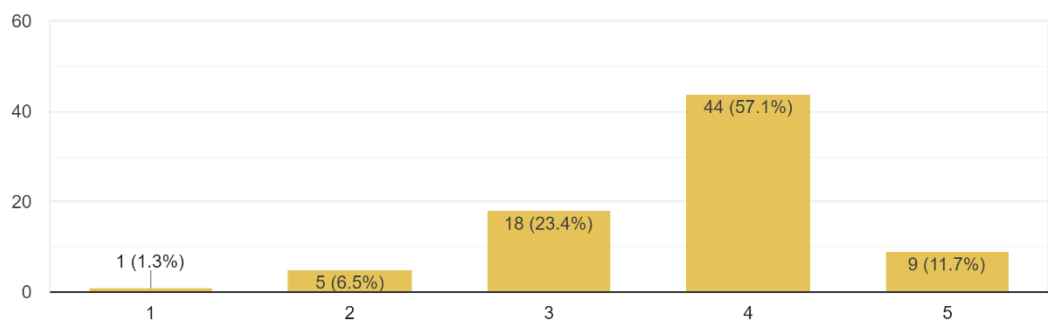


Figure 37: Response for Exaggerated Claims

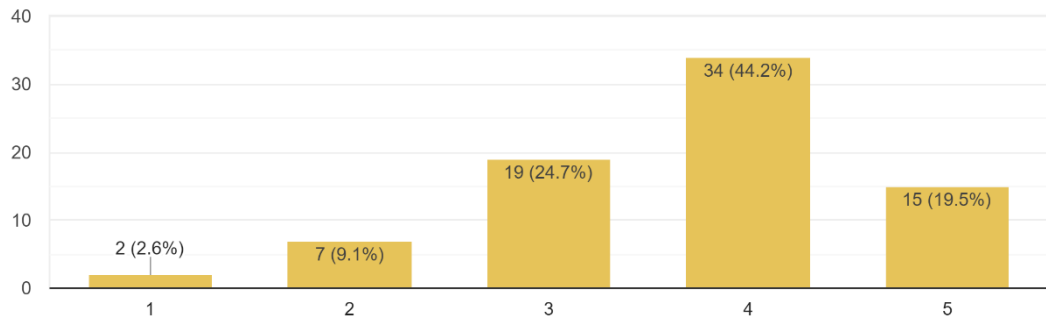


Figure 38: Response for Lack of Experience in Construction

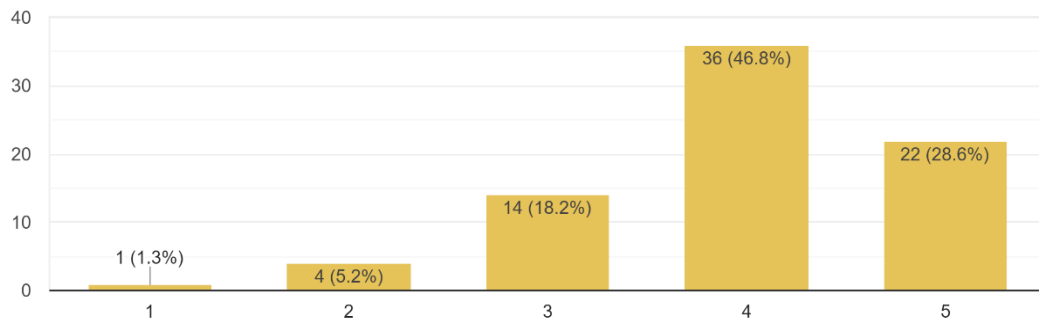


Figure 39: Response for Design Errors

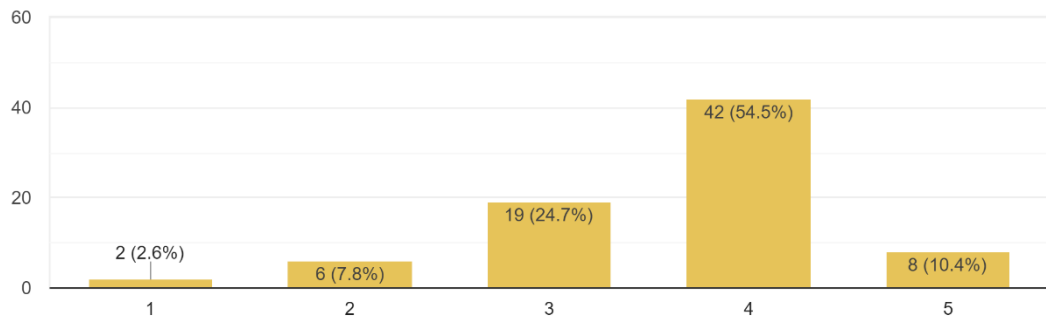


Figure 40: Response for Quality of Design

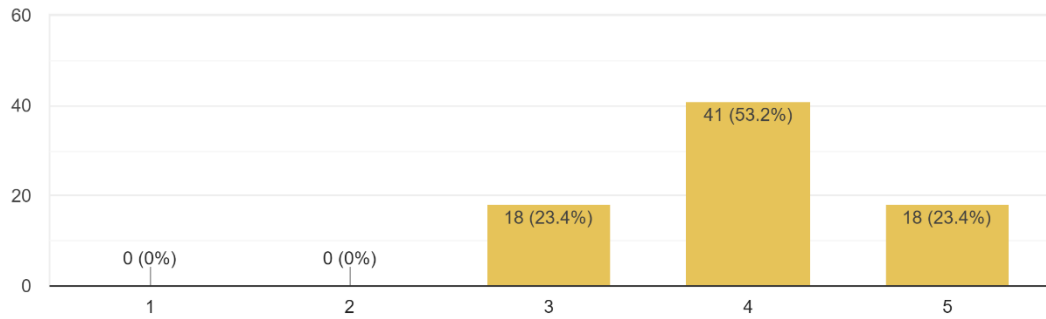


Figure 41: Responds for Inadequate / incomplete specifications

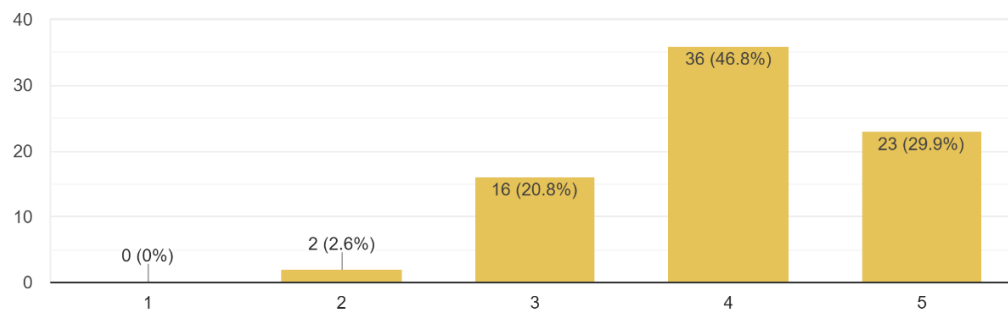


Figure 42: Response for Ambiguities in contract Documents

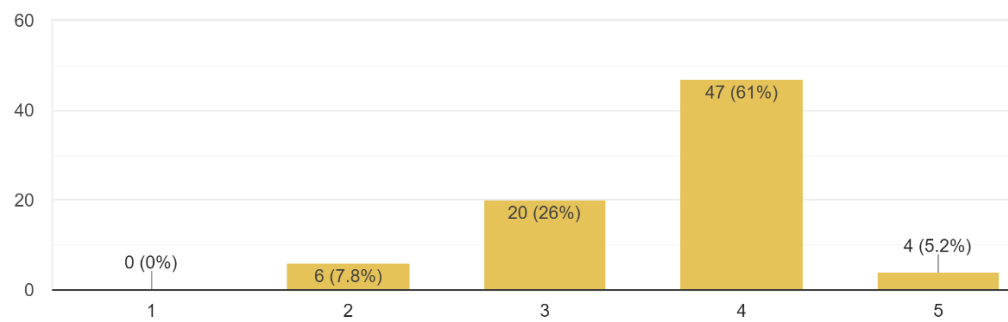


Figure 43: Response for Unbalance risk allocation

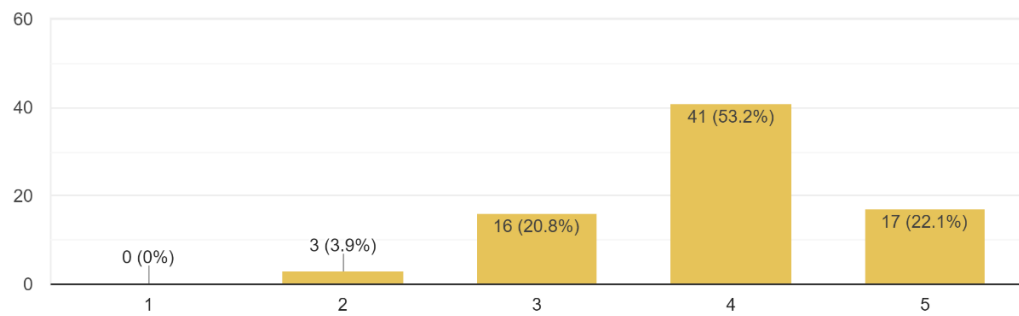


Figure 44 Responds for Poor scope definition

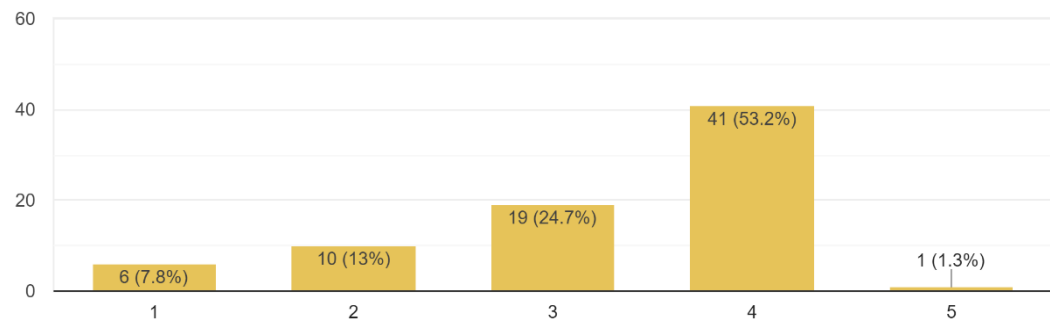


Figure 45: Response for Interparty and Personnel Problems

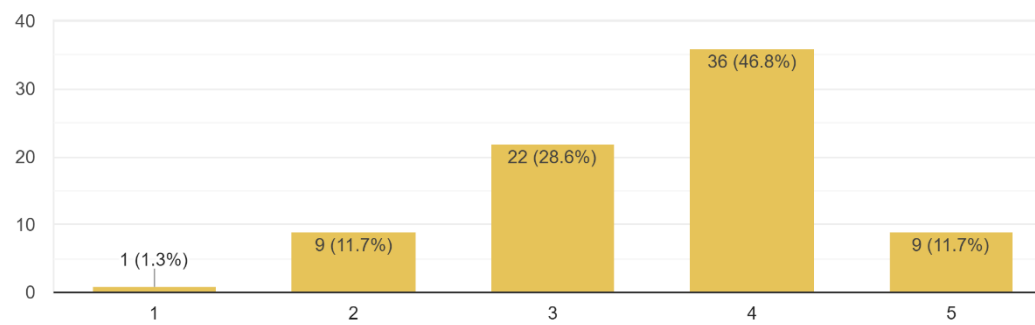


Figure 46 : Response for Personality Traits

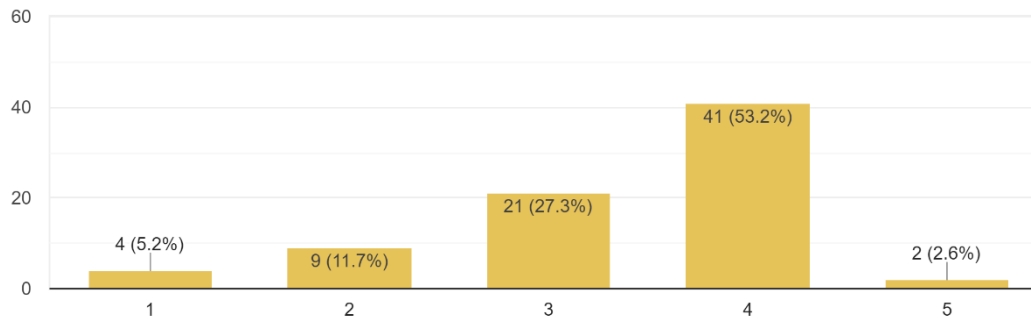


Figure 47: Responds for Weather

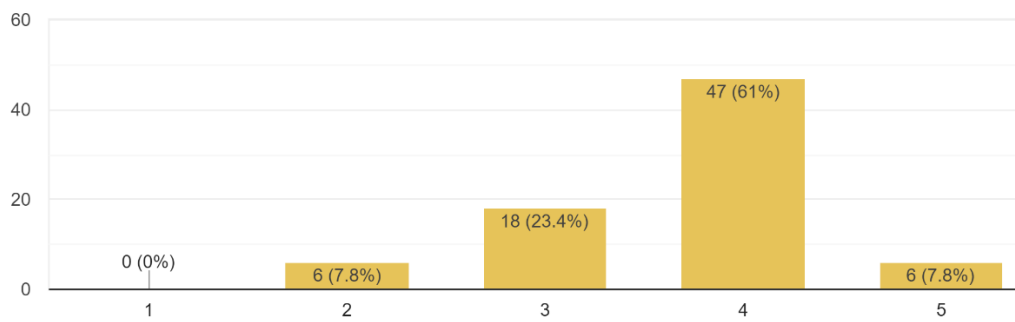


Figure 48: Responds for Legal and Economic factors

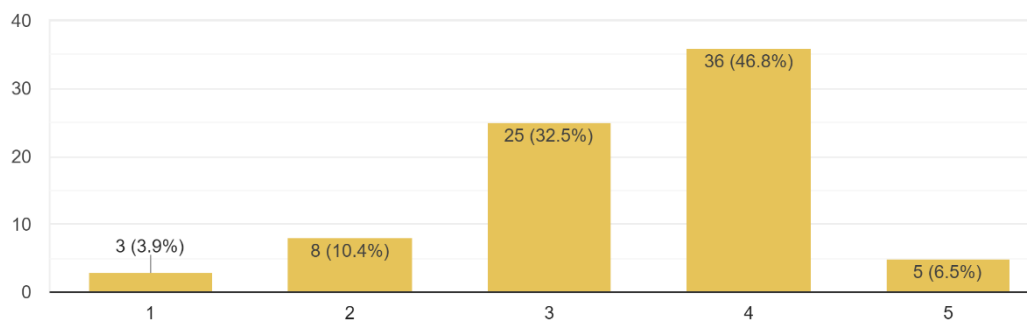


Figure 49: Responds for Competitive Environment

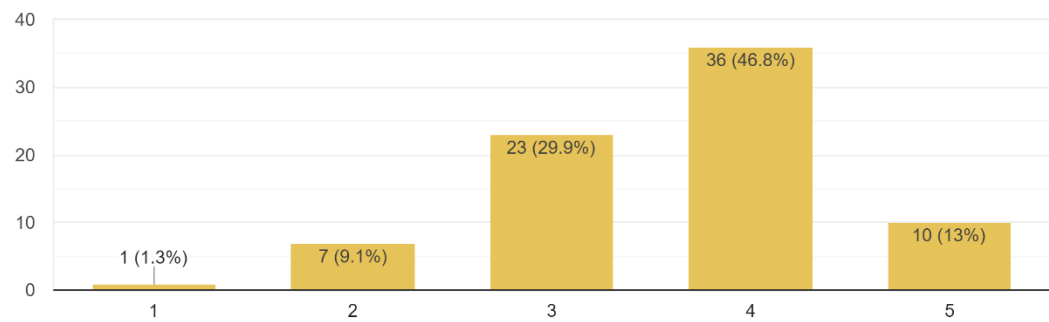


Figure 50: Responds for Third-party delays or force majeure events

Table 20, Result, R II and rank of the causes of Disputes.

	Conflic Factor	Significant Level Rating					Relative Importance Index (RII)				Rank			
ID		1	2	3	4	5	All mean	Consultant	Contractor	Developer	Overall	Consultant	Contractor	Client/ Developer
A1	Owner Related Conflict Factors													
	Variations initiated by the owner	6	9	8	41	12	0.716	0.697	0.684	0.764	29	30	26	19
A2	Change of scope	0	4	11	43	18	0.797	0.821	0.789	0.745	5	2	4	22
A3	Late position of site	0	11	22	31	12	0.716	0.733	0.700	0.655	28	23	22	35
A6	Unrealistic expectations	2	4	16	43	11	0.750	0.759	0.758	0.673	15	16	12	34
A7	Delays of payment	0	3	14	24	35	0.839	0.826	0.858	0.800	1	1	1	7
A8	Unrealistic tendering	1	5	19	31	20	0.768	0.779	0.768	0.709	12	11	10	30
A10	Supremacy of owner and Unfair stakeholders' involvement	3	6	18	37	12	0.729	0.764	0.721	0.727	22	14	15	26
A13	Delay of decision by client	0	5	14	37	20	0.789	0.779	0.832	0.727	8	12	2	25
A14	Method of Quality control	3	6	29	32	6	0.684	0.697	0.658	0.655	33	31	33	36
Specify any other factors														
ID	Project Related													
B2	Lack of communication	0	3	18	33	22	0.795	0.815	0.784	0.800	6	4	7	9
B4	Extention of time	1	6	10	43	16	0.776	0.759	0.784	0.673	10	17	8	33
B7	Failure to understand and/ or comply with its contractual obligations	0	4	19	39	14	0.766	0.764	0.753	0.782	13	15	13	14
B9	Unforeseen Site conditions	0	4	20	46	6	0.742	0.733	0.721	0.800	17	24	16	10
Specify any other factors														
ID	Contractor Related													

Table 20, Result, R II and rank of the causes of Disputes.

	Conflic Factor	Significant Level Rating					Relative Importance Index (RII)				Rank			
ID		1	2	3	4	5	All mean	Consultant	Contractor	Developer	Overall	Consultant	Contractor	Client/ Developer
C1	Delays in work progress	0	0	14	44	18	0.811	0.810	0.795	0.855	2	5	3	1
C3	Technical inadequacy of the contractor	0	8	13	40	15	0.763	0.800	0.716	0.818	14	7	18	5
C4	Contractor's valuation Error	1	8	17	41	9	0.729	0.754	0.684	0.745	21	18	24	24
C6	Quality of the work	1	6	12	42	15	0.768	0.785	0.742	0.818	11	10	14	4
C9	Defects in construction	0	7	18	42	9	0.739	0.754	0.700	0.800	18	19	21	12
C12	Contractor site management	2	10	17	40	7	0.705	0.682	0.679	0.782	30	33	28	16
C15	Contract Administration	0	11	19	34	12	0.724	0.744	0.668	0.818	25	21	32	6
C21	Shortage of Materials, and Equipment's	2	12	15	34	13	0.716	0.723	0.689	0.745	27	25	23	23
C25	Poorly drafted unsubstantial claim	3	10	17	44	2	0.684	0.713	0.621	0.727	32	26	36	29
C28	Exaggerated claims	1	5	18	43	9	0.742	0.754	0.705	0.800	16	20	19	11
C30	Lack of experience in construction	2	7	19	33	15	0.737	0.790	0.668	0.764	19	9	31	21
ID	Design Related													
D1	Design errors	1	4	14	35	22	0.792	0.779	0.768	0.855	7	13	11	2
D2	Quality of design	2	6	19	41	8	0.724	0.687	0.705	0.782	24	32	20	15
D3	Inadequate / incomplete specifications	0	0	18	41	17	0.797	0.800	0.789	0.800	4	8	5	8
	Specify any other factors													
ID	Contract Related													

Table 20, Result, R II and rank of the causes of Disputes.

	Conflic Factor	Significant Level Rating					Relative Importance Index (RII)				Rank			
ID		1	2	3	4	5	All mean	Consultant	Contractor	Developer	Overall	Consultant	Contractor	Client/ Developer
E1	Ambiguities in contract documents	0	2	16	35	23	0.808	0.821	0.784	0.818	3	3	6	3
E4	Unbalance risk allocation	0	6	20	47	3	0.724	0.744	0.674	0.764	23	22	29	20
E7	Poor scope definition	0	3	16	40	17	0.787	0.805	0.768	0.764	9	6	9	17
	Specify any other factors													
ID	Human Behaviors related													
F7	Personality traits	6	10	19	40	1	0.653	0.631	0.647	0.691	36	36	35	32
F8	Inter parties and personal problems	4	9	21	40	2	0.671	0.641	0.674	0.727	35	35	30	28
	Specify any other factors													
ID	External Factors related													
G1	Weather	1	9	22	35	9	0.711	0.713	0.684	0.727	30	27	25	27
G2	Legal and economic factors	0	6	18	47	5	0.734	0.713	0.721	0.764	20	28	17	18
G7	Competitive environment	3	8	25	35	5	0.682	0.667	0.658	0.691	34	34	34	31
G14	Third party delays or force majeure events	1	7	23	35	10	0.721	0.713	0.679	0.800	26	29	27	13
	Specify any other factors													

4.6 Discussion on Analysis

The magnitude of the cause of the dispute differs from case to case and the personal experience gain from the contract management. The experts in the field noted that the severity of a conflict factor is depending on many factors. Since this investigation is limited to study the causes of the dispute.

Table:21 The most common cause of disputes.

Source	Rank 1	Rank 2
Literature related to the global construction industry.	[E1] Ambiguities in contract documents	[A1] Variations initiated by the owner
Literature related to Sri Lankan Construction industry	[C15] Failure to properly administrator the contract	[C12] Contractor site management
The Global dispute reports	[C15] Failure to properly administrator the contract	[B7] Failure to understand and/ or comply with its contractual obligations
Case studies	[D3] Inadequate / incomplete specifications	[B4] Extension of Time

It is observed that the effect of the cause of dispute depends on many factors and according to the globule dispute report, the conflict factors were varied with yearly and regionally.

Table 22: The most common cause of dispute According to the questionnaire survey the results

	Rank 1	Rank 2
Overall	[A7]Delays of payment	[C1] Delays in work progress
Consultant	[A7] Delays of payment	[E1] Ambiguities in contract documents

Contractor	[A7] Delays of payment	[A13] Delay of decision by client
Client/ Developer	[C9] Defects in construction	[D1] Design errors

According to the experience in professionals in Sri Lankan construction industry, the most common cause of dispute is “[A7] Delay of the payment”. It was top-ranked in consultant and contractor group and overall. The delay of the payment is not in top rank in global dispute report or literature. The client group top rank dispute factors were [C9] Defects in construction and [D1] Design errors.

Table 23: Comparison of Cause of disputes

Cause of Disputes	Cause of Dispute ID	Rank				
		Questioners Surveying	Case Study	SL Literature	Literature	ARCADIS
Owner related conflict factors						
Variations initiated by the owner	A1	27	-	-	2	8
Change of scope	A2	4	26	-	5	-
Late position of site	A3	28	16	-	-	-
Unrealistic expectations	A6	15	-	-	-	8
Delay of Payment	A7	1	18	-	3	-
Unrealistic tendering	A8	11	5	-	-	-
Supremacy of owner/ consultant	A10	21	23	2	-	-
Delay of decision by client	A13	8	15	-	-	-
Method of Quality control	A14	32	17	-	-	-
Project related						
Lack of communication and coordination	B2	6	7	-	4	-
Extension of Time	B4	10	2	-	-	4
Failure to understand and/ or comply with its contractual obligations	B7	13	-	-	-	2
Unforeseeable site condition	B9	16	4	-	9	6
Contractor related						
Delays in work progress	C1	2	-	-	7	7
Technical inadequacy of the contractor	C3	14	11	-	-	-
Error in tendering	C4	22	20	-	16	-
Quality of the work	C6	12	-	-	10	-
Defects in construction	C9	18	19	-	-	-
Contractor site management	C12	31	-	2	13	-
Failure to properly administrator the contract	C15	23	-	1	18	1
Shortage of Materials, and Equipment's	C21	29	13	-	-	-
Poorly drafted unsubstantial claim	C25	33	9	-	-	-
Exaggerated claims	C28	17	3	-	-	-
Lack of experience in construction	C30	19	-	2	-	-
Design Related	D			-		-
Defects and delay of Design	D1	7	8	2	14	-
Quality of design	D2	24	-	-	11	-
Inadequate / incomplete specifications	D3	5	1	2	8	5
Contract related						
Ambiguities in contract documents	E1	3	6	2	1	3
Unbalance risk allocation	E4	25	12	2	15	-
Poor scope definition	E7	9	-	2	20	-
Human behaviors related						
Personality traits	F7	36	-	2	-	-
Inter parties' problems	F8	35	-	2	-	8
External factors related						
Weather	G1	30	-	2	12	-
Legal and economic factors	G2	20	-	1	6	-
Competitive environment	G7	34	14	-	-	-
Third party delays or force majeure events	G14	26	10	-	-	8

According to the finding of Table 23, the experience of the professionals in the Sri Lankan Construction industry the most common cause of dispute is “[A7] Delay of payment.” But the delay of payment is not in top-ranked in case studies and literature survey. According to the central bank Sri Lanka annual reports (2015 to 2019), the construction industry of Sri Lanka has become maximum in 2017 and it was observed some depreciation in 2018 and 2019. The contribution to construction from GDP is 7.6% in 2016, 7.2% in 2017 and 6.8% in 2018. The dispute related to the payment would be created due to the depreciation of the construction industry. This root cause will create many more conflict such as delay of progress, the extension of time, additional claim etc... The finding from the literature the delay of payment ranked in third and it is a common dispute factor in Sri Lankan construction industry and global industry also.

The next most common cause of the dispute is [C1] delay of progress. The first root cause will badly affect the progress of the works and this might be the reasons for the delay of the overall progress. It was found rank seventh in literature survey. It also a common dispute factor in the Construction industry.

The third-ranked conflict factor is [E1] Ambiguities in the contract document. This conflict factor is top-ranked in all the literature and case studies. This factor was ranked sixth in case studies, ranked second in Sri Lankan literature, ranked first in the literature related global construction industry, and ranked 3 in global dispute report. Since this factor is a most affecting cause of dispute in the construction industry. This is an avoidable factor if identified at the initial stage. The awareness of this ambiguities in the contract document will help to successfully completion of the project.

The fourth-ranked cause of dispute is [D3] Inadequate / incomplete specifications. This also a major top-ranked cause of dispute in literature and case studies. This dispute factor has ranked fourth in case studies, ranked seventh in Sri Lankan related literature, ranked fifth in globule literature and ranked 12th in global dispute report. Since awareness and educating this type of conflicts can be minimized.

The fifth-ranked conflict factor is [A2] Change of scope. This is an Owner related factor, and the change of scope is the main factor creating many more conflict in the construction industry. It is ranked 5 in the literature review related to the international construction industry. Since the definition of the scope at the initial stage is very important to complete the project without conflicts.

The sixth-ranked conflict factor is [B2] Lack of Communication. The lack of communication is a major root cause of creating many more conflict in not only the construction sector other sectors also. By proper communication, planning will prevent this type of conflict in the construction industry. This is common to the owner, consultant, contractor, and other related parties.

The seventh dispute cause is [D1] Design errors. This is also a top-ranked in case studies, and literature review. The Design error of the project also a root cause of many more conflict to the project such as Delay of progress, Extension of time, cost overruns etc. The identification of the error in design in the preliminary stage will be to prevent this type of dispute at the project implementing stage. Proposing an independent design review team this type of conflict can be managed.

The eighth conflict factor is [A13] Delay of the decision by the client. This factor is not top ranked in Literature or Global dispute report. In this case studies, it was ranked in fiftieth. This might be happened in government sector employment due to the long procedure of communication. By proper communication and properly distributing the authority, this type of conflict can be minimized.

The ninth conflict factor is [E7] Poor scope definition. The scope of the works has not properly defined, having errors and uncompleted due to lack of knowledge, lack of information and lack of experience. This was found in Sri Lankan literature rank second and global literature ranked in twentieth. Obtaining proper expert knowledge for the project and active participation at the design stage can be minimized this type of conflicts.

The tenth conflict factor is [B4] Extension of time to the contract. This is ranked second in case studies and ranked fourth in the Global dispute report. Most of the time EOT is a secondary factor for conflict. As a result of any conflict, EOT will be created. Due to the extension of time to the contract the contractor would claim prolongation cost claim and claims are the basis of a dispute. Since avoidance of the EOT will be benefited to the project to the successful completion of the project.

“[C15] Failure to properly administrator the contract” in this research it is ranked in 25th. However, the Literate related to Sri Lankan construction industry and Global dispute report has ranked 1. The contract administration is a key tool for the successful completion of the project. By the skill of the contact manager can be managed most of the conflict without fail the project. Since the proper contract administration can be managed much more dispute created in the construction industry.

CHAPTER 5

Conclusion and Recommendations

Conflicts in the construction industry are inevitable. Most disputes in the first stage are small in nature and if not handled properly, this can lead to litigation, opposition, pain, and poor relationship between project participants. Therefore, the purpose of this study is to identify the causes of conflicts in the Sri Lankan construction industry based on expert knowledge, case studies and past studies.

Within this investigation, extensive literature survey was carried out and found 100 cause of disputes existing in the construction industry, and thirty (30) dispute cases related to Sri Lankan construction industry were analysis and identified twenty-nine (29) cause of disputes. The ranking of the cause of disputes has been done considering the frequency of occurrence of each literature and cases. The top-ranked 37 cause of disputes are shortlisted to use as a variable for the questionnaires survey. The questionnaires survey has been carried out through google form and email. One hundred fifty (150) group professionals selected for this survey and 77 are responded.

The most common cause of dispute identified in this investigation based on the experience of the professionals is Delay of payment, Delays in work progress, Ambiguities in contract documents, Inadequate/incomplete specifications, Change of scope, Lack of communication, Design errors, Delay of the decision by the client, Poor scope definition, Extension of time and Failure to properly administrator the contract.

To be able to reduce the impact of this most affected cause of dispute (delay of payment), it is of extreme importance that cost estimations involved in the project be done on a sound basis. The budget allocation, financial stability of the organization should be aware and should be pay more attention at the planning stage.

However, the most common cause of disputes in the construction industry based on literature was Failure to properly administrator the contract, Ambiguities in contract documents, Failure to understand and/ or comply with its contractual obligations, Variations initiated by the owner, Inadequate/incomplete specifications, Extension of time and Unforeseen Site conditions.

The most common cause of disputes based on case studies were Inadequate/incomplete specifications, Extension of Time, Exaggerated claims Unforeseeable site condition, Unrealistic tendering,

This study was limited to the study on the cause of dispute related to the construction industry. However, it is found the length of the dispute and the value of the dispute also the important factors for decision-makers to avoid and withdraw the disputes. The effect of the dispute to a project depends on the length and the value of the dispute. Since it is encouraged to collect data to develop the value and the length of a dispute related to the Sri Lankan construction industry.

The findings of this study (books, case studies and questionnaires) make it clear to project planners and developers that Ambiguities in contract documents, insufficient / incomplete details, and failure to manage contract properly, and payment delays are major battles in Sri Lankan construction industry. It is recommended that you pay extra for the above concert items during the planning and construction phase, thereby reducing the time and cost required to fix the problem if it explodes during the construction phase. In other words, spending more money on planning compared to final savings is minimal.

The study clearly identified a group of six major conflicts in the construction industry based on literature and experience in the industry. This effect can be applied to any construction field in the world. However, the selection of 37 conflicting items will be largely determined by the status of the Sri Lankan construction industry. It is hoped that this result will certainly give insight to project planners and starters to do their projects without problems or at least at least.

In order to be able to reach an area that allows for the reduction of the effects of the most affected causes of conflict, it is important that the construction industry adheres to best procurement practices, proper contract management and management, excellent communication. The setting of documents and procedures can be accepted as a step forward.

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APPENDIX

Appendix A

Dear Sir / Madam,

I am a Post Graduate student at Department of Civil Engineering, Faculty of Engineering, University of Moratuwa. As a partial fulfillment to the M.Sc. degree programme, I need to carry out a research project in the study area. The title of the research is as follows:

Title of the Research: Investigate the Common cause of Conflicts in Sri Lankan construction industry

I am pleased to inform you that you have been selected to take part of this survey and kindly request your fullest participation and cooperation throughout the same.

It would be grateful if you could spend your valuable time to answer all the questions in this questionnaire, as it is directed. This questionnaire will be used for academic purpose only. It is designed as a tool for collecting primary data for the research.

I assure that this information will be kept confidential and only the summarized results will be provided in the report and therefore no specific reference will be made to experts who take part of this survey.

Thank you.

Yours faithfully,

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QUESTIONNAIRE – PART 1

1 General Information

1.1 Name of Respondent:

1.2 Designation:

1.3 Name of the organization :

1.4 Nature of Organization:

Consultant

☐

Contractor

☐

Developer / Client

☐

Other (Please specify)

1.5 Working experience :

Below 5 Years

☐

Between 6 and 10 Years

☐

Between 11 and 15 Years

☐

Between 16 and 20 Years

☐

Between 21 and 25 Years

☐

Above 25 Years

☐

1.6 Exposure to the Construction Management activities within the working experience

Below 2 year

☐

Between 2 and 5 years

☐

Between 5 and 8 years

☐

Between 8 and 10 years

☐

10 and above

☐

1.7 Email :

1.8 Telephone / Mobile :

QUESTIONNAIRE – PART 2

The purpose of this questionnaire is to identify the Common Dispute Factors in Sri Lankan construction industry. It was identified wide range of conflict factors in construction industry by analyzing dispute cases and literature surveying. The most common thirty-two conflict factors and seven main groups were identified by ranking on frequency basis. The scope of this questioners surveying is rank the most common dispute factors and identified any other conflict factors in construction industry.

The identified conflict factors in construction industry are listed below and the respondents are requested to put their view on **To What Extent** these factors are effect to make conflict/dispute in Sri Lankan construction projects.

Please use 1-5 Likert-scale for indicating your opinion on the extent of use.

1= Very low effect

2= low effect

3= Neutral effect

4= High effect

5= Very high effect

Questionnaire 2

Part 2(A): The conflicts factors related to the Owner (Employer)

ID	Owner related conflict factors	1	2	3	4	5
A1	Variations initiated by the owner					
A2	Change of scope					
A3	Late position of site					
A6	Unrealistic expectations					
A7	Delays of payment					
A8	Unrealistic tendering					
A10	Supremacy of owner and Unfair stakeholders' involvement					
A13	Delay of decision by client					
A14	Method of Quality control					
Specify any other factors						

Part 2(B): The conflicts factors related Project

ID	Project related	1	2	3	4	5
B2	Lack of communication					
B4	Extension of time					
B7	Failure to understand and/ or comply with its contractual obligations					
B9	Unforeseen Site conditions					
Specify any other factors						

Part 2(C): The conflicts factors related to the Contractor

ID	Contractor related	1	2	3	4	5
C1	Delays in work progress					
C3	Technical inadequacy of the contractor					
C4	Contractor's valuation error					
C6	Quality of the work					
C9	Defects in construction					
C12	Contractor site management					
C15	Failure to properly administrator the contract					
C21	Shortage of materials, and equipment's					
C25	Poorly drafted unsubstantial claim					
C28	Exaggerated claims					
C30	Lack of experience in construction					
Specify any other factors						

Part 2(D): The conflicts factors related Design

ID	Design related	1	2	3	4	5
D1	Design errors					
D2	Quality of design					
D3	Inadequate / incomplete specifications					
	Specify any other factors					

Part 2(E): The conflicts factors related to Contract

ID	Contract related	1	2	3	4	5
E1	Ambiguities in contract documents					
E4	Unbalance risk allocation					
E7	Poor scope definition					
	Specify any other factors					

Part 2(F): The conflicts factors related Human behaviors

ID	Human behaviors related	1	2	3	4	5
F8	Inter parties and personal problems					
F7	Personality traits					
	Specify any other factors					

Part 2(G): The conflicts factors related External factors

ID	External factors related	1	2	3	4	5
G1	Weather					
G2	Legal and economic factors					
G7	Competitive environment					
G14	Third party delays or force majeure events					
	Specify any other factors					

APPENDIX

Appendix B

Disputes 1

Project Nature: Building

Methods of Payment: Unit rate

Employer of the contract: Public

Contract Value Rs. 4,507,730,959.60

Bidding Document CIDA SBD 02

Related Clauses and contract: *2.1 Right of Access to the Contractor.*

The Employer shall give the contractor right of access to, and possession of all parts of the site within 14 Days from letter of Acceptance unless otherwise specified in contract data.

Dispute Crystallized

The dispute arisen between parties for the extension of Time for Completion of 23 days against the detail Particulars of Extension of time for completion and Associated Cost claim, failed to resolve between parties due to rejection of the same by the Engineer.

Background

The employer has partially handover the site on 03 January 2018 (within 14 days). The possession of all part of the site given on 26 January 2018. The contractor claims 23 days Extension of time to the contract and associated cost.

The Engineer has rejected the same due to site was partially handover to the contractor. No effect on the contractor to carried out the works according to the works program.

Action: The contractor was not agreed with rejection and write for Alternative Adjudication Board.

Decision:

This delay of handing over has not affected to the contractor accept the Engineers decision.

Cause of Dispute:

- 1) Late giving of possession
- 2) Extension of time
- 3) Exaggerated claims

Disputes 2

Project Nature: Building

Methods of Payment: Unit rate

Employer of the contract: Public

Contract Value Rs. 4,507,730,959.60

Bidding Document CIDA SBD 02

Related Clauses: 7.3 *If the contractor suffers delay and or incur a cost from complying with theses instruction or as a result of a delay for which the Engineer is responsible, The contractor shall give notice to the Engineer and shall be entitled subject to Sub-clause 19.1*

- a) *An extension of time for any such delay, if completion is or will delayed, under sub-clause 8.4*
- b) *Payment of any such cost plus a reasonable profit, which shall be included in the contract price.*

Dispute Crystallized: Dispute arisen between parties for extension of time for completion of 3 days against the detail particulars of Extension of Time for completion and Associated cost claim.

Background

The engineer has issued an instruction regarding the reinforcement stock (T0 bars) at site-based his visual observations on 22 August 2019 and instructed

- a) Arrange further testing for the sample collected from stock at the site
- b) Temporarily suspend the use of T10 bars which were purchased from the related supplier
- c) Use another supplier for Reinforcement steel

As a result of the above matter, most of the main works has been delayed by 3 days till finalized the matter. The contractor has to claim Extension of time and associated cost for the delay. The Engineer has rejected the same due to “defects shall be identified by the contractor before use of steel”. Since it is the responsibility of the Contractor.

Cause of Dispute:

- 1) Methods of Quality control
- 2) Extension of Time
- 3) Exaggerated claims

Disputes 3

Project Nature: Building

Methods of Payment: Unit rate

Employer of the contract: Public

Contract Value Rs. 4,507,730,959.60

Bidding Document CIDA SBD 02

Related Clause: 12.3 Contract data maximum profit and overhead 16%

Contract data 13.4 (b) maximum attendance fee 6%

Dispute Crystalized

The dispute arisen between parties for the agreement upon the Contractor's price proposal for the variation [1000kg material hoist (4 nos – 2 block A, 2 for Block B), (BOQ Item No 2.10)] which was instructed by the engineer, but failed to resolve parties due to disagreement of the Methods of calculations.

Background

The supply and installation of materials hoist was included in the initial scope of the works and variation order issued on Change of Quality and characteristic of the works item. Pursuant to the sub-clause 12.3 (ii) contract data 16% profit and overhead entitled only for “works directly carried out by the main contractor. As per sub-clause 13.3 contract data the attending fee shall be 6% including any profit and overhead. Since the Engineer has rejected the method of calculation.

Cause of Dispute:

- 1) Exaggerated claims
- 2) Inadequate / incomplete specifications (D2)
- 3) Delay and defects in design

Disputes 4

Project Nature: Building

Methods of Payment: Unit rate

Employer of the contract: Public

Contract Value Rs. 4,507,730,959.60

Bidding Document CIDA SBD 02

Related clauses

Condition of contract 13.0 Variation and Adjustments.

Variation may be initiated by the Engineer at any time prior to issuing the Taking -over the certificate for the Works, either by instruction or by a request for the contractor to submit a proposal.

Dispute Crystalized

Dispute arisen between parties for the agreement upon the Contractor price proposal for the variation [supply tested at manufactures workshop, delivery to site installation of 400 kVA prime-rated generator] which was instructed by the Engineer, but failed to resolve the between parties due to disagreement on the price proposal, there for the contractor sought relief from Alternative dispute resolution Procedure.

Background

The length of the exhaust pipe of the Generator has been changed and the variation order has been issued by the Engineer. The contractor submits the cost proposal for the “supply and installation of a generator with a control panel, exhaust pipe”. The Engineer has rejected the cost proposal and accepted only cost for an additional length of the exhaust pipe.

Cause of Dispute:

- 1) Exaggerated claims
- 2) Delay and defects in design
- 3) Inadequate / incomplete specifications (D2)

Dispute 5

Project Nature: Building

Method of Payment: Lump Sum

Employer of the contract: Public

Project cost 318,000,000.00

Bidding Document CIDA SBD 04

Related clauses

Condition of Contract 14.2 Advance payment

The Employer shall make an advanced payment, as an interest -free loan for mobilization ad design, when the contractor submits a guarantee to the value of the advance payment in accordance with this sub-clause. The total advance payment shall not exceed 20% of the initial contract price and will be paid in two equal instalments. The first instalment shall be paid within 14 days of furnishing the guarantee ad submission of the performance security.

Condition of Contract Clause 14.5 Delay of payment

If the contractor does not receive payments in accordance with Sub -Clause 14.5 (payment) the Contractor shall be entitled to receive an interest of amount calculated at 1% above the published lending rate of the central bank of Sri lank to commercial bank.....

Condition of Contract 16.1 Contractors Entitlement to suspend works

If the Engineer fails to certify in accordance with Sub-Clause 14.4 or the Employer fails to comply with Sub-Clause 14.5 (payment) the Contractor may, after giving not less than 42 days' notice to the Employer, suspend work 9or reduce the rate of work)

Dispute Crystalized:

Dispute arisen between parties for the agreement upon the Interest claim for delay of payments and the Extension of time and related cost for the contract.

Background

The advance payment application was submitted by the contractor with a relevant document on 15th August 2015 and the contractor has been mobilized to the site accordingly. However, the contractor was slowdown the works until receiving the advanced payment. The advance payment has been delayed by 72 days and the contractor claim interest for delay of payment and Extension of time and related cost for the delay. The Engineer accepted the interest claim and rejected the Extension of Time for the completion and related cost.

Cause of Dispute:

- 1) Extension of Time
- 2) Delay of Payment
- 3) Budget limitation

Dispute 6

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 120,000,000.00

Bidding Document CIDA SBD 02

Related clauses

Condition of Contract 20.2 Notice of Force Majeure

If a party is or will be prevented from performing any of its obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party become aware or should have become aware of the relevant event or circumstance constituting Force Majeure.

Clause 19.1 Contractors claim (para 4)

Within 84 days after the Contactor become aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the

Dispute Crystalized:

The dispute arisen between parties for the extension of Time for Completion of 35 days against the detail Particulars of Extension of time for completion and Associated Cost claim, failed to resolve between parties due to rejection of the same by the Engineer.

Background

The contractor has sent the intention to claim Extension of Time for completion and associated cost for a force Majeure condition on 30th April 2019. the contractor has summited the on 20th December 2019 for this claim and the Engineer has rejected due to Not submit the claim within 84days pursuant to the sub-clause 19.1 Contractors Claim.

Cause of Dispute:

- 1) Extension of Time
- 2) Poorly drafted unsubstantial claim
- 3) Delay of the decision by Client

Dispute 7

Project Nature: Cost Reimbursement Design and Build

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 540,000,000.00

Bidding Document CIDA SBD 04

Related clauses

Condition of Contract Sub Clause 14.8 Statement at Completion

Dispute Crystalized:

The dispute arisen between parties for the certification of the Interim payments. The part of the prim cost has been rejected by the Engineer and failed to resolve between parties due to complication of the contract document.

Background

The method of the payment was cost reimbursement. Design cost included in fixed cost and installation of Air-condition system, building management system, and network system has been done by the specialized subcontractor as design and build contract. Since the Engineer rejected the design fee of the specialized works from prime cost.

Cause of Dispute

- 1) Ambiguities in contract documents
- 2) Exaggerated claim

Dispute 8:

Project Nature: Design and Build

Type of construction: Building

Oner of the contract: Public

Project cost 152,000,000.00

Bidding Document CIDA SBD 04

Related clauses

Sub Clause 13.2 Value Engineering

The contractor may, at any time, submit to the Engineer a written proposal which (in the Contractor's opinion) will, if adopted, (i) accelerate completion; (ii) reduce the cost to the Employer excluding, maintaining or operating the works; (iii) improve the efficiency or values to the Employer of the completed works

Dispute Crystalized:

The dispute arisen between parties for approval of the cost proposal for additional works of a lump sum project. The parties failed to resolve the cost proposal submitted by the contractor for additional basement.

Background

As per the condition of contract “ No Variation due to change of Ground Condition. Since the contractor proposed an additional sub-basement on Value Engineering. The Engineer has accepted the proposal. However, the engineer accepted the technical proposal and continue the works. The dispute has raised the approvals of cost proposal for additional sub-basement.

Cause of Dispute

- 1) Unforeseeable site condition
- 2) Ambiguities in contract documents
- 3) Error in tendering

Dispute 9-

Project Nature: Design and Build

Type of construction: Building

Employer: Government of Sri Lanka

Project cost 120,000,000.00

Contract Duration: 11 months

Bidding Document CIDA SBD 04

Related clauses***2.1 Right of Access to the Contractor.***

The Employer shall give the contractor right of access to, and possession of all parts of the site within 14 Days from letter of Acceptance unless otherwise specified in contract data.

Dispute Crystalized:

The dispute arisen between parties for the extension of Time for Completion of 120 days against the detail Particulars of Extension of time for completion and Associated Cost claim, failed to resolve between parties due to rejection of the same by the Engineer.

Background:

The letter of award issued on 12th February 2016 for the works and the Employer informed to the contract, the date of commencement will be postponed till further notice on 19th February 2016. The contractor submits the advance and performance security, insurance and Advance payment application accordingly. The employer handover the site on 25th June 2016. The contractor claim Extension of time for the delay with the associated cost. The Engineer accepted the Extension of time for delay and rejected associated cost.

Cause of Dispute

- 1) Extension of time
- 2) Authority approvals
- 3) Lack of communication

Dispute 10

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 175,000,000.00

Contract Duration: 15 months

Bidding Document CIDA SBD 04

Related clauses

Employer Requirement

B.2.1 Soil Investigation:

Soil investigation has not been done for this site. For the purpose of submission, the bidder can consider soil bearing capacity is 125 kN/m².

B.2.2 Excavation for foundation

*During excavation for the foundation in the proposed building, **all necessary precaution to be taken by the successful bidder not to damaged or disturb existing foundations of the nearby building and any service line.** If any damaged done to the foundation and/or any other part of the existing building or any service line, the responsibility lies with the successful bidder and corrective measure to be taken for the entire satisfaction of the employer.....*

B-4.1 -4.10 Unforeseeable Physical Condition

In this sub-clause “Physical Condition” means natural physical condition made and other physical obstruction and pollutants, which the contractor encounters at the site when executing the works, including subsurface and hydrological conditions but excluding climatic conditions.

This notice shall describe the physical condition, so that they can be inspected by the Engineer, and shall set out the reasons why the contractor considers them to be unforeseeable. The contractor shall continue the executing the works, using such proper and reasonable measures as are appropriate for the physical conditions and shall comply with any instructions which the engineer may give, if an instruction constitutes a Variation, Clause 13 shall apply.

Dispute Crystalized:

The dispute arisen between parties for the rejection of the claim for earth protection works for the foundation under physical unforeseen condition.

Background

The ground investigation has not done for the foundation at the bidding stage and design would be done assuming the bearing capacity 125kN/m² given in contact data. The soil investigation is done and found the bearing capacity of 125kN/m². However, the groundwater table is within the foundation level and find sandy soil within the foundation arear. Since a proper earth protection work is required for whole area for excavation. The specification says, “the contractor should get necessary precaution

earth protection at the excavation”. The contractor claims under unforeseen ground condition has rejected by the engineer.

Cause of Dispute

- 1) Unforeseeable site condition
- 2) Inadequate / incomplete specifications
- 3) Lack of communication

Dispute 11

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 540,000,000.00

Contract Duration: 15 months

Bidding Document CIDA SBD 04

Related clauses

Sub-clause 7.4 Rejection

If, as a result of an examination, inspection, measurement or testing, any plant, materials, design or workmanship is found to be defective or otherwise not in accordance with the contract, the Engineer may reject the Plant, Materials, design or workmanship by giving notice to the Contractor,

Employer Requirement

Dispute Crystalized:

The dispute arisen between parties for the failure to satisfy the expected quality of the works as per the given specification.

Background

The expected stench of the concrete was G30 for columns, beams and sab. The strength of the concrete of the second-floor slab and beam was not satisfied. The contractor proved the structure is satisfied for design criteria and no more improvement.

In the employer's requirement, the concrete specifications Not define only details given regarding structural capability accordance with relevant code of practice. The rejected concrete structure is capable with a designed code of practice even though, concrete is not in accordance with Contractor initial proposed specification.

Cause of Dispute

- 1) Defects of the construction
- 2) Ambiguities in the contract document

Dispute 12

Project Nature: Measure and pay and lump sum

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 540,000,000.00

Contract Duration: 30 months

Bidding Document CIDA SBD 04

Related clauses

Sub Clause 4.10 Unforeseeable Condition

In this sub-clause "Physical Condition" means natural physical condition made and other physical obstruction and pollutants, which the contractor encounters at the site when executing the works, including subsurface and hydrological conditions but excluding climatic conditions.

This notice shall describe the physical condition, so that they can be inspected by the Engineer, and shall set out the reasons why the contractor considers them to be unforeseeable. The contractor shall continue the executing the works, using such proper and reasonable measures as are appropriate for the physical conditions, and shall comply with any instructions which the engineer may give, if an instruction constitutes a Variation, Clause 13 shall apply.

Dispute Crystalized:

The dispute arisen between parties for rejection of the claim under the unforeseen physical condition for change of pile foundation of the building.

Background

The project is to design and build and methods of payment were lumpsum. The detail soil investigation report has been submitted by the employer at the bidding stage. However, it was found some changes in ground profile and claim under unforeseen physical condition. The dispute was arisen due to rejection of the claim.

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Cause of dispute

- 1) Unforeseeable site condition
- 2) Ambiguities in the contract document
- 3) Inadequate / incomplete specifications

Dispute 13

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 440,000,000.00

Contract Duration: 15 months

Bidding Document CIDA SBD 02

Related clauses

13.0 Variation and Adjustments.

Variation may be initiated by the Engineer at any time prior to issuing the Taking -over certificate for the Works, either by an instruction or by a request for the contractor to submit a proposal.

Sub Clause 12.3 (ii) of Contract data, the applicable Engineer's approved maximum overhead and profite (Mark up) percentage shall be 16% of the Basic rate over rate/prices of such work item in relation to variation directly carries out by the Contractor himself.

Sub-clause 1.1.4.3 (a) condition of contract

Define the phases 'basic rate' as all expenses necessary to complete the work item to the satisfaction of the Engineer including material, labour, tool and similar other expenses but excluding profit and overhead.

Dispute Crystalized:

The dispute arisen between parties for the agreement upon the Contractor's price proposal for the variation [supply, installation, testing and commissioning of Air Conditioning system].

Background

Some of the BOQ items was not finalized at the tendering stage and kept as a provisional sum item. The attending fee 6% and maximum profit and overhead 16%. The contractor claims 6% attending fee and 16% Profit and overhead for this item and the Engineer rejected.

- 1) Ambiguities in contract documents
- 2) Error in tendering

Dispute 14

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 740,000,000.00

Contract Duration: 15 months

Bidding Document CIDA SBD 04

Related Causes

Dispute Crystalized

The dispute arisen between parties for settlement of damage to a client property due to deep excavation activities.

Background

The project is office complex with two basements. A building adjacent to the project was cracked and seen some settlement due to excavation and dewatering work. The Insurance company rejected the claim due to improper construction activity.

Cause of Dispute

- 1) Improper construction activities
- 2) Site conditions
- 3) Professional negligence
- 4) Unforeseeable site condition

Dispute 15

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 340,000,000.00

Contract Duration: 15 months

Bidding Document CIDA SBD 02

Related Causes

Dispute Crystalized

The dispute arisen between parties for claim of Extension of Time and associated cost for rectification and adjustment of previous works.

Background

The project was a balanced work of a previous contractor. It was required some rectification for finishing works of wall and floor. According to the contract, the rate shall be included any rectification or adjustment of previous works. The contractor claim Extension of time and Associated cost for this additional activity. The dispute arisen between parties due to rejection of Extension of Time for completion and associated cost.

Cause of Dispute

- 1) Extension of time
- 2) Inadequate / incomplete specifications
- 3) Competitive environment

Dispute 16

Project Nature: Measure and pay

Type of construction: Building

Oner of the contract: Government of Sri Lanka

Project cost 240,000,000.00

Contract Duration: 15 months

Bidding Document CIDA SBD 02

Related Clause

Dispute Crystalized

The dispute arisen between parties for a claim of Extension of Time and associated cost for delay of materials approvals and Not availability in the market.

Background

The roof structure steel was 305 x 175 x 56kg as per the UK stranded. This material was not available in Sri Lankan market and proposed alternative steel section which are readily available in Sri Lanka. The engineer spent 65 days to select an alternative section. Due to this delay, the item delayed 20 days and claim an extension of Time for completion and associated cost for this delay. The Engineer rejected it due to the experienced contractor should be aware of this condition and he should prepare for this material.

- 1) Inadequate / incomplete specifications
- 2) Extension of time
- 3) Materials shortage

Disputes 17

Project Nature: Building

Method of Payment: Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. 3,487,019,145.02 (Excl VAT)

Bidding Document CIDA SBD 02

Related Clauses and contract: *Clause 4.1 (Contractor's General Obligations) of Condition of Contract*

Clause 4.2 (d) - 'Essential Equipment' of the Bidding Data

Dispute Crystalized

This issue based on the tower crane which is the contractor become prequalified by saying that they have 16 Ton tower crane and can be installed in the project. Failed to resolve between parties due to the deduction of payment for the relevant preliminary item by the Engineer.

Background

This 16ton is considered due to uplift the cooling towers to the 19th-floor level. But the contractor installed 12ton tower crane at the site and in the beginning, they have informed that the 16ton tower crane will be installed when it is required and until then they agreed for the cost deduction for that preliminary item that contains lump sum of Rs. 150,000,000.00 and consultant evaluated it as a cost-saving of Rs. 73,473,000.00

Action: The contractor was not agreed with the deduction made by the engineer and write for Dispute Adjudication Board.

Decision:

DAB made inquiries from the reputed contractors in the industry and were informed that 16T tower cranes are not readily available in the market. Thus the current applicable market rates for 8T and 12T tower cranes found and extrapolate the figure for 16T and adjusted the payment for BOQ item as Rs.140,640,000.00 and no entitlements for finance charges on the amount of underpayment made.

Cause of Dispute

- 1) Unrealistic tendering

- 2) Inadequate / incomplete specifications
- 3) Shortage of machineries

Disputes 18

Project Nature: Building

Method of Payment: Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. 3,487,019,145.02 (Excl VAT)

Bidding Document CIDA SBD 02

Related Clauses and contract: *Clause 13.4 (Provisional Sums) of Condition of Contract*

Dispute Crystalized

This issue-based on awarded contracts of Air Conditioning and Ventilation System, Fire Protection and Detection System, Building Management System under Provisional Sum items of the Bills of Quantities. The Main Contractor mentioned 5% separately as the Attendance fee for each Provisional Sum item at the tender stage.

Background

At the construction stage of the awarded AC, Fire, BMS Contracts, the Main Contractor claimed 5% mentioned in the BOQ as attendance fee for civil and coordination fees, attendance fees and overhead profits etc. Due to the Contracts awarded to the Main Contractor and as per the Pricing Preambles, all overhead and profit for carrying out works shall be deemed to be included in the prices or sums stated by the Contractor

The Engineer has rejected the additional 5% amounts claimed by the main contractor and asked to carry out the works as per the offer.

Action: The contractor was not agreed with rejection by the engineer and write for Dispute Adjudication Board.

Decision:

The Contractor is not entitled to an allocation of 5% for Civil Works and Coordination Fees for the Specialized Building Works.

Cause of Dispute

- 1) Exaggerated claims
- 2) Inadequate / incomplete specifications

Disputes 19

Project Nature: Building

Method of Payment: Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. 3,487,019,145.02 (Excl VAT)

Bidding Document CIDA SBD 02

Related Clauses and contract: *Clause 12.2 (Method of Measurement) of Condition of Contract*

Dispute Crystalized

This issue based on area covered by the composite aluminium cladding.

Background

The Contractor contends that “supply and installation of composite aluminium cladding system on suitable framework to cover the external façade as specified” should be measured on the tangible area of cladding which is visible to the outer surface

The Engineer has measured the cladding system confined to the area on elevation

Action: The contractor was not agreed with area measured by the engineer and write for Dispute Adjudication Board.

Decision:

The DAB decides that the Engineer is correct in measuring the aluminium cladding system confined to the total area on the elevation of the external facades in Sq.m.

Cause of Dispute

- 3) Exaggerated claims
- 4) Inadequate / incomplete specifications

Disputes 20

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Related Clauses and contract: *Clause 31.1 Defects, specification (Contractor's General Obligations) of Condition of Contract*

Clause 4.2 (d) - 'Essential Equipment' of the Bidding Data

Dispute Crystalized

The dispute was arisen between parties due “do the equipment delved comply with the agreement?”.

Background

According to the specification the Country of Origin of the shall be UK. The assembling country can be considered as the Country of Origin if substantial or major assembling of the components, a commercially recognized product result that differs substantially in its basic characteristics or in purpose or utility its components.

At Xylem Factory in China assembling does not differs substantially in its basic characteristic or in purpose or utility from its components. They are assembled as per Design & using major components produced in UK without changing basic characteristic.

However the employer has rejected the pumps and instructed the contractor to remove them and replace by Equipment that are originated from UK.

The replacement of the pumps were instructed considering above case as a 'Defect' in the contractor's work as per clause 31.1 of the Condition of the Contract.

Action

The Employer and Contractor agreed to refer the Adjudication procedure.

Cause of Dispute

- 1) Inadequate / incomplete specifications
- 2) Unrealistic tendering

Disputes 21

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Dispute

The dispute was arisen between parties due to Not settlement of BOQ items of Utility connection.

Background

According to the description where it states that "allow for connecting to sewer drainage line from the hotel to CMC sewer network with necessary approvals and for proper coordination of the same. "It appears that only providing connection of the new sewer network line is identified in the BOQ item. Therefore, any tenderer would quote nothing, but the connection charge.

The respondent anticipates the tenderers to price for this item, the tenderers might have to require carrying out a thorough investigation and obtaining quotations from the CMC. The drawing shows end of the sewer line within the building premises and the words

“ to Municipal connection” appears at the end. No specific location of the end sewer line is shown.

Dab is of the view that within the tender period where it has been limited to 30 days the Employer cannot expect that an investigation can be done, or he can obtain quotations from the local authority within this period.

Although this type of work shall not be vested with the contractor due to the nature of the event, still the DAB can accept that the responsibility could be passed to the contractor if this item is identified as a provision item. As the work involved at the time of tender is not properly identified, when preparing the tender document, the employer must carry out casting in order to reserve its funds and to get necessary approvals. This is an item where one cannot pass the entire responsibility of costing to a tenderer and anticipate that the tenderer has sufficient time to carry out a thorough investigation before pricing this item.

Action

The Employer and Contractor agreed to refer the Adjudication procedure.

Cause of Dispute

- 1) Unrealistic tendering
- 2) Unbalanced risk allocation

Disputes 22

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Dispute

The dispute was arisen between parties due to Not settlement of BOQ items of Utility connection.

Background

The contractor stated that there is an item for the claimant to obtain power supply connection from the Ceylon Electricity Board (CEB). The description of the item stated that “ allow for obtaining main power supply connection from the CEB (400 KVA) including all correspondences and coordination work, builder’s work etc, excluding the cost of transformer’.

The claimant claims that the work envisaged in this item is quite different from the work that has to be performed and he pleads that he should be paid the actual expenditure incurred and cost of overhead.

Cause of Dispute

- 3) Unrealistic tendering
- 4) Unbalance risk allocation

Disputes 23

Project Nature:Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Dispute

The dispute was arisen between parties due to Not settlement of BOQ items fuel tank.

Background

The claimant has priced the BOQ item S01 and S-02 for a sum of Rs. 7,571,520.00 and Rs 551,600.00 respectively in respect of this item. The claimant’s positions is that the item no S-01 and S-02 do not provide any provision to the requirement of supplying a storage tank.

It is also stated that in specification that capacity of the storage tank shall be sufficient to operate generator for a period of 8 hours full load for 5 days. The specification also stated that the fuel tanks have been manufactured and installed complying with BS

799/5. Therefor, by using recommended fuel consumption of the generator, the capacity of the storage tank shall be computed and the claimant shall install fuel tanks having these capacities.

Cause of Dispute

- 1) Unrealistic tendering
- 2) Inadequate / incomplete specifications

Disputes 24

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Background

The claimant states that he has quoted this as a BOQ item R-183 and quoted price is Rs. 3,182,975.00. the make of lift quoted to supply is OTIS brand lift and in order to function this lift is should have a clear height of 4000mm from the last landing level.

The drawings provided only a clear height of 3600 mm and therefor , the claimant requested to change the structural drawing to that effect. However , this has not been done and therefor , the claimant decided to substitute another lift with a rand name schindler, but this was rejected by the Engineer. The Engineer had requested to use KONE brand lift which was costlier than the claimant's proposal and the claimant is now claiming the price difference between the claimant's original proposal and the lift which was installed in the project.

The claimant has informed the Engineer regarding the insufficiency of the headroom due the selection of the type of the lifts and due to unavailability. The claimant is also

the civil Contractor for this work. Therefor, he should have brought this matter to notice of the Engineer at least before completion of civil works.

Cause of Dispute

- 1) Design errors
- 2) Technical inadequacy of the contractor

Disputes 25

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Dispute

A dispute has risen between the parties concerning non- payment of Rs 17,686,318.72 excluding the taxes and non-approval of extension of time of 94 days by the Employer.

Background

The employer has not paid the amounts certified by the Engineer in Interim payment certified No 3, certified at Termination and the Final Certificate;

The Employer has introduced 17 nos variations to a total value of Rs. 11,832,135.63 which is about 70% of the value of the works completed. These variations affected the progress adversely;

There were delays by the Employer in completing the work undertaking by the Employer, in suppling the martials to be supplied by him and in issuing the drawings. Those events can be categorized as compensation Events under Sub clause 44.1 (c) of the General Condition of contract.

The contractor and the Employer agreed to terminate the contract and the parties jointly established the procedure for payment after termination.

Cause of Dispute

- 1) Budget limitation

- 2) Supremacy of owner/ consultant

Disputes 26

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Dispute

A dispute has arisen between the parties due to not approved of contractors claim of Rs 54,608,857.22 as additional cost associated with extension of time.

Background

The engineer approved 217 days of extension of time in view of the employer's delay of opening of LC

The contractor submitted their cost claim 01 for the cost associated with the extension of time, with relevant particulars, by their submission dated 14 June 2016.

The engineer provided their evaluation of the cost claim 01 as Rs. 20,384,971.68. An overhead and profit of 32.5% was used by the Engineer instead of the 38.29% used by the contractor.

As the engineer did not honour the promise made, the contractor has now revised to their cost claim 01 submitted on 14 June 2016 to the amount of Rs. 54,608,857.22

Cause of Dispute

- 1) Owner furnished material and equipment
- 2) Extension of time

Disputes 27

Project Nature: Building

Method of Payment : Measure & Pay

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 02

Dispute :

The dispute has been risen between the parties due to not approve the claim of 25,234,543.92 as a additional cost for demolishing and other related cost.

Background

The basement concrete has been done without approvals of the Engineer. Since the engineer has instructed to demolish the basement and reconstruct the same with proper approvals. The contractor has accepted this instruction and demolished the basement and reconstructed accordingly.

However, the contractor submitted claim for cost for initial concrete and related material, cost of demolishing and extension of time and related cost. The engineer pointed that this is solely happen mistake of the contractor and rejected the same.

Action

The Employer and Contractor agreed to refer the Adjudication procedure.

Cause of Dispute

- 1) Lack of communication
- 2) Poor management

Disputes 28

Project Nature: Building

Method of Payment : Lump sum

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 04

Dispute

The dispute has been risen between the parties due to not approve the claim of 12,327,245.00 as a additional cost for foundation improvement and excavation works.

Background

The project design and build (structural and services only, the architectural drawings issued by employer). It was specified in bidding document the bearing capacity of the soil is 100 kN/m² for initial design. If the ground is more varied the actual cost will be paid. However, the surfaced rock I visualized at the pre-bid meeting.

Cause of Dispute

- 1) Inadequate / incomplete specifications
- 2) Lack of communication
- 3) Unrealistic tendering

Disputes 29

Project Nature: Building

Method of Payment : Lump sum

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 04

Dispute

The dispute has been risen between the parties due to not approve the claim of 9,387,545.00 as a additional cost inured by contractor as a result of suspended of the contract.

Background

The management of the employer has been changed and they decided to change the scope of the project and suspended until finalized the scope. and the project has been suspended due to change of

Dispute

- 1) Force major
- 2) Suspension of project
- 3) Change of scope

Disputes 30

Project Nature: Building

Method of Payment : Lump sum

Employer of the contract: Government of Sri Lanka

Contract Value Rs. -

Bidding Document CIDA SBD 04

Dispute

The dispute has been risen between the parties due to not approve the claim of 59,435,865.00 for price fluctuation for extended time period.

Background

Price fluctuation is not applicable for this contract. 236 days time extension has been granted for this project due to many delays mainly by client. The contractor has been claimed price fluctuation for extended time period and the engineer has rejected the same.

Cause of Dispute

- 1) Extension of time
- 2) Ambiguities in the contract document