

**RISK MANAGEMENT IN THE CONSTRUCTION ENVIRONMENT: THE EFFECTS OF
DECISION MAKING AND COMMUNICATION**

by

Wesley David Cerff

2008020365

Submitted to partially comply (in module KOB 700) with the
conditions for the degree MSc (Construction Management)

Department of Quantity Surveying and Construction Management

Faculty of Natural and Agricultural Sciences

University of the Free State

Bloemfontein

Dr MS Ramabodu

Study leader

2015

TABLE OF CONTENTS

TABLE OF CONTENTS	i
LIST OF FIGURES.....	v
LIST OF TABLES.....	vi
DECLARATION.....	vii
SYNOPSIS.....	viii
OPSOMMING	x
ACRONYMS	xii
ACKNOWLEDGEMENTS.....	xiii
CHAPTER 1 THE PROBLEM AND ITS SETTING	1
1.1 INTRODUCTION.....	1
1.2 PROBLEM STATEMENT	3
1.3 MAIN PROBLEM.....	4
1.4 SUB-PROBLEMS.....	4
1.5 HYPOTHESES	4
1.5.1 Primary hypothesis.....	4
1.5.2 Secondary hypothesis	4
1.6 OBJECTIVE OF THE STUDY	5
1.7 LIMITATIONS	5
1.8 DEFINITIONS	5
1.8.1 Descriptive and analytical.....	5
1.8.2 Insurance	7
1.8.3 Risk management	7
1.8.4 Likelihood.....	7
1.8.5 Impact	7
1.8.6 Risk mitigation	7
1.9 LITERATURE STUDY.....	7
1.10 EMPIRICAL STUDY.....	8
1.10.1 Methodology.....	8
1.10.2 Data gathering.....	8
1.10.3 Selection of participants	9
1.11 IMPORTANT CONCEPTS	10
1.12 CHAPTER LAYOUT.....	10
CHAPTER 2 OVERVIEW OF RISK MANAGEMENT	13
2.1 INTRODUCTION.....	13

2.2	RISK MANAGEMENT	14
2.3	COMMUNICATION	15
2.4	DECISION MAKING.....	17
2.5	CONCLUSION.....	18
CHAPTER 3 RISK MANAGEMENT		20
3.1	INTRODUCTION.....	20
3.2	DEFINITION OF RISK MANAGEMENT	22
3.3	MANAGING OF PROJECT RISK.....	24
3.3.1	Planning	27
3.3.2	Tendering.....	28
3.3.3	Contract awarding	28
3.3.4	Construction.....	29
3.3.5	Take-over and maintenance period.....	30
3.3.6	Construction risks commonly found in several construction projects.....	30
3.3.7	Financial risks	31
3.3.8	Supply risks.....	31
3.3.9	Organisational risks.....	32
3.4	IDENTIFICATION OF RISK.....	32
3.5	RISK MANAGEMENT STEPS.....	35
3.6	ENTERPRISE RISK MANAGEMENT.....	36
3.7	CONTRACTUAL RISK COMPONENT	39
3.7.1	Risk of loss or damage to the works	39
3.7.2	Contractual limitations of risk element	40
3.7.3	Construction insurance.....	40
3.7.4	Terms of insurance.....	44
3.8	CORPORATE GOVERNANCE AND ETHICS.....	45
3.8.1	Imperatives for corporate, risk and ethics governance.....	45
3.8.2	Bribery, corruption and fraud	48
3.9	RISKS OF A CONSTRUCTION PROJECT	51
3.10	MAJOR RISKS ASSOCIATED WITH BUILDING CONSTRUCTION	51
3.10.1	Main work.....	51
3.10.2	Common risks types.....	52
3.11	CONCLUSION	52
CHAPTER 4 COMMUNICATION		54
4.1	INTRODUCTION.....	54

4.2	EFFECTIVE COMMUNICATION.....	58
4.3	GENERAL COMMUNICATION INFORMATION.....	62
4.3.1	Internal communication	62
4.3.2	External communication	64
4.3.3	Principles of effective communication.....	65
4.4	COMMUNICATION RISKS	66
4.4.1	Communication issues during construction.....	68
4.4.2	Challenge of communicating in the construction project environment.....	71
4.5	COMMUNICATION METHODS	72
4.6	APPLICABLE ADVICE	76
4.6.1	Take care and time with communication.....	77
4.6.2	New communication technology	77
4.6.3	Communication tools and methods.....	78
4.7	CONSTRUCTION SITE INFORMATION MANAGEMENT	80
4.8	CONCLUSION	81
	CHAPTER 5 DECISION MAKING.....	83
5.1	INTRODUCTION.....	83
5.2	CERTAINTY VERSUS UNCERTAINTY	83
5.3	METHODS FOR DECISION MAKING.....	86
5.4	CONTRACTS.....	89
5.4.1	Administration	90
5.4.2	Contract provisions for risk allocation	91
5.5	METHODS AND STAGES OF RISK MANAGEMENT	92
5.5.1	Identification	93
5.5.2	Review, evaluation and assessment.....	93
5.5.3	Strategic planning.....	94
5.5.4	Monitoring	94
5.6	PROJECT RISK MANAGEMENT	94
5.7	CRISIS MANAGEMENT IN THE OFFICE	95
5.7.1	Potential threat or disaster to the building.....	96
5.7.2	Potential threat or disaster that does not require relocation	97
5.7.3	Information transfer to employees at the time of a disaster.....	97
5.7.4	Investigative team	98
5.8	MANAGEMENT	98
5.8.1	Responsibility and authority.....	98
5.9	CONCLUSION	99

CHAPTER 6	EMPIRICAL RESEARCH AND DATA ANALYSIS.....	101
6.1	INTRODUCTION.....	101
6.2	TESTING OF QUESTIONNAIRES.....	101
6.3	PURPOSE	102
6.4	RESEARCH METHODOLOGY	102
6.5	INTERVIEWS.....	102
6.6	EMPIRICAL FINDINGS.....	105
6.6.1	Important knowledge	105
6.7	QUESTIONNAIRES	109
6.8	TESTING OF HYPOTHESES	127
6.8.1	Results from empirical study	127
6.8.2	Research parameter.....	128
6.9	CONCLUSION	133
CHAPTER 7	SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	136
7.1	INTRODUCTION.....	136
7.2	CONCLUSION	137
7.3	RECOMMENDATIONS	138
7.3.1	Decision-making, risk and the success of a project	138
7.3.2	Communication, risk and the success of a project.....	138
7.3.3	Other recommendations.....	139
7.3.4	Further research.....	139
	REFERENCES.....	140
	Appendix A: Questionnaire.....	148

LIST OF FIGURES

Figure 3.1: Construction project stages.....	27
Figure 3.2: Types of Fraud.....	46
Figure 3.3: Actions taken against internal perpetrators	47
Figure 4.1: Phases of the project life cycle.....	59
Figure 4.2: Examples of communication issues during a typical construction project	67
Figure 4.3: Formal and Informal Communication	75
Figure 5.1: Composite Building Confidence Index.....	85
Figure 5.2: Main contractors: growth in building activity	86
Figure 6.1: Is the construction industry profitable	111
Figure 6.2: Construction project risk.....	114
Figure 6.3: Site management risk	119
Figure 6.4: Difficulties of communication.....	122
Figure 6.5: Minimise risks	124
Figure 6.6: Geographical challenges.....	126

LIST OF TABLES

Table 3.1: Different levels of risk management	25
Table 3.2: Components of enterprise risk management	37
Table 4.1: Communication methods.....	69
Table 6.1: Profile of professionals interviewed	104
Table 6.2: Summary of interviews	108
Table 6.3: Response rate on questionnaires	110
Table 6.4: Profile of respondents	110
Table 6.5: Factors in effective communication	121
Table 6.6: Effectively minimising human error in risk.....	123
Table 6.7: Geographical challenges.....	125

DECLARATION

I, the undersigned, Wesley David Cerff (ID: 8911025076084), hereby declare that the work contained in this dissertation is my own original work and that I have not previously submitted it in its entirety or partially at any other university for the attainment of a degree or other qualification.

_____ (SIGNATURE)

NAME

DATE

SYNOPSIS

A number of factors contribute to cost overruns, time complications, specification details, and weak communication. Some are within the control of the project team, but most of them are not. These complications lead to additional costs and loss of productivity on construction sites due to time loss. Optimism bias, inability to produce on certain levels, lack of experience and knowledge, inability to understand the seriousness of executing risk management duties as well as strategic misrepresentation are identified as the main causes.

In the ideal world every project will make its estimated profit, the client will be satisfied with the product and the professional teams on the client's side and the contractor's side will have made all the correct decisions as originally planned at the pre-contract meetings.

Every single decision made by a member of the project team (including contractors and consultants), from the principal agent to the labourer on site, has an effect on the results of a project.

The concepts of decision making, teamwork and communication play a significant role in the construction industry and are dominant in this study. The construction industry is in a more challenging environment than before. Client expectations have increased and clients want quality products and services that use new advanced resources and equipment at lower cost and that need to be done in less time – which eventually leads to risk.

Risk management is a relatively new addition to the wider concept of commercial and trade authority. Risk management may be seen as an ignored part in the planning and completion of building projects, but its significance and effect in the construction industry cannot be stressed enough.

This study aims to create awareness of risk by all parties involved and to show that better planning will limit or mitigate the source of risk on a project. Furthermore, effective risk management will only be possible with efficient communication. With communication and awareness, there will be better quality

and control of the project. Lastly, the study aims to educate future generations regarding the importance of risk.

Key words: Risk, communications, experience, decision making, knowledge

OPSOMMING

'n Groot aantal faktore dra by tot addisionele koste met betrekking tot die begroting, tydsprobleme, spesifikasie-besonderhede en swak kommunikasie. Sommige kan deur die projekspan beheer word, maar die meeste nie. Hierdie komplikasies lei tot addisionele kostes en verlies aan produktiwiteit op die konstruksierrein as gevolg van verlore tyd. Optimistiese vooroordeel, die onvermoë om op sekere vlakke te produseer, 'n gebrek aan ervaring en kennis, onvermoë om die erns van die uitvoering van risikobestuurspligte, sowel as strategiese wanvoorstelling te verstaan word as die belangrikste oorsake geïdentifiseer.

In die perfekte en ideale wêreld sal elke projek die geraamde wins lewer, sal die kliënt tevrede wees met die produk en die professionele spanne sal, aan beide die kliënt en die kontrakteur se kant, al die regte besluite geneem het, soos oorspronklik beplan is by die vergaderings wat gehou is voordat die kontrak gesluit is.

Elke besluit wat deur 'n lid van die projekspan (insluitende kontrakteurs en konsultante) gemaak is, van die hoofagent tot die werkers op die perseel het 'n uitwerking op die resultate van 'n projek.

Die konsepte van besluitneming, spanwerk en kommunikasie speel 'n belangrike rol in die konstruksiebedryf en is die fokus van hierdie studie. Die konstruksiebedryf staan voor 'n groter uitdaging as voorheen. Die kliënt het hoër verwagtinge en wil kwaliteit produkte en dienste hê wat nuwer en meer gevorderde voorraad en masjinerie teen 'n laer koste gebruik en wat vinniger voltooi moet word – wat tot risiko lei.

Risikobestuur is 'n relatiewe nuwe bydrae tot die wyer konsep van kommersiële en handelsgesag. Risikobestuur kan beskou word as die deel wat in die beplanning en voltooiing van bouprojekte geïgnoreer word, maar die betekenis en uitwerking in die konstruksiebedryf kan nie genoeg beklemtoon word nie.

Die studie het ten doel om bewustheid van risiko by alle betrokke partye te skep en om aan te toon dat beter beplanning die oorsaak van risiko op 'n projek kan

beperk of verwyder. Verder sal doeltreffende risikobestuur slegs moontlik wees indien daar effektiewe kommunikasie is, en met kommunikasie en bewustheid sal daar beter kwaliteit en beheer oor die projek wees. Laastens het die studie ten doel om die toekomstige geslagte op te voed oor die belangrikheid van risiko.

Sleutelwoorde: Risiko, kommunikasie, ondervinding, besluitneming, kennis

ACRONYMS

AIRMIC:	The Association of Insurance and Risk Managers
ALARM:	The National Forum for Risk Management in the Public Sector
ALOP:	Advanced Loss of Profits
BRE:	Building Research Establishment
CAR:	Contractor's All Risk
CIRIA:	Construction Industry Research and Information Association
COSO:	Committee of Sponsoring Organizations
EAR:	Erection All Risk
HAPM:	Housing Association Property Mutual
HAZOP:	Hazard and Operability Studies
IRM:	The Institute of Risk Management
JBCC:	Joint Building Contracts Committee
MD:	Managing Director
NCR:	Non-Conformance Report
NHBC:	National and House Building Council
PLC:	Project Life Cycle
PMBOK:	Project Management Body of Knowledge
RFI:	Request for Information / Interpretation
SHE/Q:	Safety Health Environment/ Quality

ACKNOWLEDGEMENTS

Pagel Cloete, Selemela Khoele, Alex Grobler, Edgar Gwena, and Jan Venter for all your patience and answering my questions when you probably had much better things to do.

Pagel Cloete, for helping me brainstorm when I was stuck and for encouraging me throughout this time as well as your assistance with the structural layout of the document.

Dr MS Ramabodu, for being my study leader and assisting so much with this study.

Leandri Cerff for loving me, for taking care of me, and for supporting my dreams. You are the very best.

CHAPTER 1

THE PROBLEM AND ITS SETTING

1.1 INTRODUCTION

Since 2000 there has been an increased demand for information concerning the topic of risk in the construction industry, as well as the effect of risk on various elements in the construction industry. The main focus has been project execution. It may be argued that focussing on project execution includes, among others, quality, communication, team trust and conflict.

Risks may be present or looming in all ventures and projects. The specific projects considered in this dissertation were contracting projects in the construction industry. This study sets out to identify contracting specific risks, resulting from decisions made during the construction phase of a project. According to Klemetti (2006: 77), a lack of risk management and decision-making skills is one of the most visible shortages in risk management. All these decisions have an impact on the construction project, contracting company, the construction industry and eventually, the economy of the country. This investigation identifies risks associated with decision making from construction site level to project design level and evaluates methods employed in the industry to manage these risks. Risk can be calculated if the right information and criteria are available (Wood & Ellis cited in Smith, 2003: 31).

Risk is difficult to define, therefore, this study relies mainly on information obtained from construction sites as well as completed construction projects. Information was also gathered from experienced construction management employees from different companies as well as stakeholders in the industry. The information gathered for this dissertation includes a literature review and an in-depth empirical study that includes questionnaires, interviews and role clarification. Practical examples have been applied to identify risks to illustrate how projects can be affected, and explain the broader impact of those risks on the sector, industry and economy.

According to Bennett and Jayes (1995: 30) every single decision made by a member of the project team (including contractors and consultants), from the principal agent to the labourer on site may have an effect on the operational, commercial, financial, and health and safety results of a project. No matter how unimportant a specific employer/employee feels, any and every decision may have an effect. The success or failure of decisions may subsequently have an influence on the construction project, which may have an effect on the contracting company, and it may even eventually have an effect on the contracting sector, the construction industry and the economy of the country. However, if the incorrect channels of communication are being used, the fundamental elements of communication will be lacking. Thus, the task at hand may not be executed as originally planned, which may lead to the objective of the task not being met (Aldous, 2003: 219-223).

It is advised that risks associated with decision making should be identified quickly, in order to successfully decrease and eliminate the negative impact of subsequent decisions regarding a unique situation that may have an impact on the future.

In a hypothetical world, main contractors should reach their profit margins on every project, the client would be satisfied with the product and the professional teams on the client's side and the contractor's side would have made all the correct decisions as originally planned during the pre-contract meetings. Historical projects advocate that reality seldom corresponds to with the hypothetical world. Professionals in the construction industry should aspire to equal the expectations of the hypothetical world as far as humanly possible (Fawcett & Palmer, 2004: 23).

The unknown risks and factors beyond the control of the professional teams, which may restrain expectations, may be a relevant problem to be addressed. There may be several constraints to attend to in order to minimise losses and maximise profits (Kerzner, 2001: 135). Furthermore, each unique project has unique circumstances with unique risks. By minimizing the impact of negative events and exploiting opportunities, managers can assure their sponsors and stakeholders of delivering project deliverables

on time, within the budget and according to the required quality (Novinson & Duggan, 2014: online).

Cohen and Palmer (2004) point out that risks need to be identified, measured, evaluated and managed effectively. There may be different ways of responding to an identified risk, namely eliminate, litigate, deflect, accept, or create an opportunity after the risk has been identified, quantified and prioritised. Anyone who manages projects should know that each project carries its own risks, either to the employees or to the company (Cohen & Palmer, 2004).

Wiig (2004:144) states that management groups should work together to achieve the original goals that were set. Effective and proficient communication may be identified as one of the elements that affects the success of a management team. Communication may play an important role to ensure that all the parties in the management team are updated and on track concerning movement on a project. According to Wiig (2004), if the above does not occur, the probability of various types of risks may inevitably be a major concern. If this situation presents itself, it could most probably lead to a series of failures.

1.2 PROBLEM STATEMENT

It can be argued that decision making, teamwork and communication play a significant role in the construction industry. It is important to keep in mind that a decision made today will have an effect on future outcomes.

Client expectations increase and they require better quality products and services, thus making the construction industry a more challenging environment. The availability of advanced resources and equipment create an opportunity to reduce cost, time and decision making. A relatively new addition to the wider concept of commercial and trade authority, is risk management. Furthermore, it is seen as an ignored part in the planning and completion of building projects, but its significance and effect in the construction industry cannot be emphasised.

1.3 MAIN PROBLEM

The influence that risk will have in terms of decision making and communication on the results of a project's success and the extent that identified risks will be manageable to ensure the best possible outcome for all entities and parties involved.

1.4 SUB-PROBLEMS

In order to explore the primary research question, the following secondary questions needed to be addressed:

- What should be done if a risk arises?
- How can risk management's importance and impact in the construction industry be emphasised enough?
- How will effective communication (or the lack thereof) have an effect on the success (or failure) of a management team on a project?

1.5 HYPOTHESES

1.5.1 Primary hypothesis

The primary hypothesis states that operational, commercial, financial, health and safety risks may have a negative or positive influence on decision making from managerial to executional level and communication between parties pending on how these risks are dealt with, for example, creating an opportunity or ignoring the risk at hand. The operational, commercial, financial, health and safety success of a construction project depend on industry specific knowledge, negotiation skills, how management deals with problem solving and crisis management, as well as knowledge of the organisational structure and operational systems.

1.5.2 Secondary hypothesis

Communicating risk awareness within a reasonable time (one to three days) via email, telecommunication or written letters to all parties involved and advocating comprehensive planning will reduce the magnitude of risk for a project. Effective and

efficient risk management will only be possible with effective and efficient communication. Better communication and awareness will contribute to higher quality and greater control of the project.

1.6 OBJECTIVE OF THE STUDY

The objective of this study is to identify the various factors of decision making in a contracting company that affect the construction industry, and the economy of the country. These effects may have associated risks that may influence all of the above and in order to minimise the effect of the risk, this study focuses on possible associated risks resulting from various members of the management team's decisions. This may provide the knowledge to enable future generations to eliminate risks and may also improve risk acceptance and risk management.

1.7 LIMITATIONS

- Limited project information (due to sensitivity);
- The target population was limited to the Gauteng and Mpumalanga area in South Africa;
- Limited to construction projects, ranging from R75 000 000 to R650 000 000; and
- Limited to the contractor's project management team.

1.8 DEFINITIONS

1.8.1 Descriptive and analytical

The definitions used to describe risks may be descriptive or analytical in nature. The differences between the two types of definitions are as follows:

Descriptive definitions are related to sources and elements of the risk and are used for the classification of projects based on the risk associated with them and for the determination of the risk premium to be used in determining a discount rate (Walker, 2008: 120).

Analytical definitions provide definitions of risk in terms of probability or variability, for instance:

- The probability of loss is determined;
- The probability that the developer-investor will not receive the expected or required rate of return is determined;
- The deviation of realised return for the expected return is used as determining factor; and
- The variance or volatility of returns is investigated to determine the probability or variability of risks having a negative effect on the construction process (Walker, 2008: 120).

Risk is an abstract concept and has two dimensions, namely

- The probability that a specific risk event will occur or that a specific condition will exist; and
- The consequence or impact on the project outcomes that the event or condition will have if it does occur (Steyn, Carruthers, Du Plessis, Kruger, Kuschke, Sparrius, Van Eck & Visser, 2012: 355).

Risk may also be defined as the combination of the probability of an event and its consequences. In all types of undertaking, there is the potential for events and consequences that constitute opportunities for benefit (upside) or threats (downside) to success (AIRMIC/ALARM/IRM, 2002).

Vaughan and Vaughan (2008: 2) define risk as a condition in which there is a possibility of an adverse deviation from the desired outcome that is expected or hoped for.

In this dissertation, the definition for risk that is used, is:

Risk is an event that may happen that may have an influence, big or small, on the project at hand (Steyn et al., 2012: 355).

1.8.2 Insurance

Insurance involves a promise of compensation for specific potential future losses in exchange for periodic payments. Insurance is designed to protect the financial well-being of an individual, company or other entities in case of unexpected loss (Sekhesa, 2007: 2).

1.8.3 Risk management

Risk management is increasingly recognised as being concerned with both positive and negative aspects of risk. Therefore, this standard considers risk from both perspectives (AIRMIC/ALARM/IRM, 2002).

1.8.4 Likelihood

Likelihood is the probability that an adverse event, which may result in the materialisation of the risk, may occur (Elyse, 2006b: online).

1.8.5 Impact

Impact refers to the potential effect on the profitability of the project should the risk materialise (Kerzner, 2001: 135).

1.8.6 Risk mitigation

Risk mitigation means using various instruments to mitigate the impact of risk, e.g. using derivatives, insurance, risk transfer or qualification and internal control procedures (Nickson & Siddons, 2006: 78).

1.9 LITERATURE STUDY

The literary review on this study included mainly books, articles, internet websites, records, observations, as well as verbal interviews.

These sources inform the literature study, highlight and discuss main themes supporting the research.

1.10 EMPIRICAL STUDY

An exploratory study was conducted using qualitative methods to analyse data gained from knowledgeable and experienced professionals. These methods are used to ensure that the theory supports the practical product delivery element of construction. The researcher conducted interviews with the intention to gain a general perspective of the arguments of the selected professionals and their thoughts on risk identification and risk management. After the interviews had been conducted, the questionnaire, which focused on the topic of interest, were distributed to the selected professionals, which included architects, quantity surveyors, contract managers and project managers.

1.10.1 Methodology

The literature study is supported by empirical research. The research was conducted and completed within a specific period. The interviews were conducted in a one-month period and the questionnaires returned within two months after being sent out. The target population was professionals in the construction industry limited to the Gauteng and Mpumalanga areas in South Africa. The research study consists of a literature review, data gathering, and the empirical study. This research study insured that a wide range of documented theories and opinions were covered. This was done to avoid erroneous deductions from a single set of data.

1.10.2 Data gathering

The data gathering strategy included the use of a self-administered questionnaire that consisted of various categories that may have an effect on the objective of the study (the descriptive method). Verbal meetings also took place with associated professionals in the field of construction in attempting to develop the most accurate assessment possible. For the purpose of this study, the researcher focused on relatively large-scale construction projects (ranging from R75 000 000 to R650 000 000).

1.10.2.1 Qualitative techniques

Questionnaire – The questionnaire comprised yes/no/choose one of the following and fill in questions. The questionnaire was used to gather the necessary data for the study. Due to location differences, the questionnaire was also an effective tool to send and receive via email.

Face-to-face Interviews – the interviews were conducted to gather more in-depth information about specific problems, such as:

- Create awareness of risk by all parties involved;
- Show that better planning will limit or mitigate the source of risk on a project;
- Effective risk management will only be possible with efficient communication;
- Identify the financial advantages;
- Show that there will be better quality and control of the project; and
- Prove that forecast can be more accurate if some risk is anticipated.

The interviewees were selected based on the following:

The interviewees are qualified and experienced in the field, because of their construction industry knowledge, negotiation skills, how management deals with problem solving and crisis management, as well as knowledge of the organisational structure and operational systems' involvement and experience. All the interviewees are currently working on active projects, and their views and opinions are thus of the utmost importance.

1.10.3 Selection of participants

Participants should work (or have worked) or be involved in the construction industry in all possible aspects thereof.

Participants should be part of the contractor's project management team.

Judging from the profile of respondents it is clear that the opinions on construction risk, communication and decision making were sound.

1.11 IMPORTANT CONCEPTS

The following concepts were perceived to be of importance for consideration during this research study.

- Risk management;
- Risk control;
- Risk avoidance;
- Risk reduction;
- Risk financing;
- Financial risk management;
- Operational risk management;
- Risk transfer;
- Security function;
- Enterprise risk management;
- Risk management process;
- Critical risk;
- Important and unimportant risk;
- Post-loss and pre-loss objectives;
- Survival;
- Cost of risk;
- Effective communication;
- Internal and external communication;
- Communication channels;
- Bottom-up communication; and
- Decision-making.

1.12 CHAPTER LAYOUT

Chapter 1: Introduction and background

This chapter entails a brief introduction of the effects of decision making and communication of risk management in the construction industry.

Chapter 2: Overview of risk management

This chapter contains a comprehensive overview regarding the roles and functions of risk management in the construction industry. The effects and possible solutions for certain risks are also addressed.

Chapter 3: Risk management

A detailed literature review of risk management in the construction industry, discussing various definitions, contractual issues, ethics and governance, risk problems, as well as models and solutions, are presented.

Chapter 4: Communication

A detailed literature review of communication in risk management is presented and effective communication, internal and external communication, tools and methods are discussed.

Chapter 5: Decision making

A detailed literature review of decision making in risk management, discussing different methods, project planning, crisis management, details of contracts as well as management thereof form part of this chapter.

Chapter 6: Empirical research and data analysis

This chapter covers the empirical data and how the data was analysed to determine findings on various elements of risk management and how problems were dealt with. It also covers how to determine an appropriate management methodology, management structure and propose suitable contingencies.

Chapter 7: Summary of the study, conclusion and recommendations

This final chapter highlights the problem statements related to the aim of the study, examines the hypotheses for, and limitations to, the scope of the study. The literature review and the empirical data are compared to construct deductions, leading to findings

and conclusions. A number of reasons why risks occur were identified and while not universal, a number of them share definite similarities.

CHAPTER 2

OVERVIEW OF RISK MANAGEMENT

2.1 INTRODUCTION

The key factor in influencing anyone to do anything, as stated by Turner (2003: 122), including resolving conflict, is to ensure that the reward for doing it is greater than the risks involved. The assumption is that if people understand and value the rewards for being involved in a specific project, and if they have taken the necessary steps to minimise the risks involved in gaining the reward, they may see construction management as being in their best interest.. In this way, giving the employees an incentive to work for will encourage them to work harder to achieve the set goals.

Goudar (2010) states that “Communication is the glue that holds a project team together”. Goudar (2010) further mentions that communication does not only refer to talking, it also involves listening. Without clear, timely, unambiguous communication, even a small team working together may have major problems. In the case of a virtual team, poor communication may render an already challenging situation nearly impossible to control. The project’s status needs to be tracked and monitored effectively using various tracking tools. The project manager should ensure timely and appropriate generation and collection of information. One should follow email ethics during formal written communication and be precise and clear while communicating to help to achieve better understanding. Project managers should know that there are potentially hundreds of communication channels. The larger the project, the greater the chances are that communication may break down. This can be because of various reasons such as communication channelling, lack of effective communication within the hierarchy of management, and human resources and professional inefficiency.

Methods for deciding on the most imperative risks contained in a project may probably differ from project to project. While there are doubts regarding the need to restrict the number of risks to be actively managed, it may be beneficial to give attention to those risks that are considered to be of high impact or high probability, as stated by Ashworth and Hogg (2002: 167).

Natural disasters are unpredictable and structurally impossible to avoid. Buildings in hazardous and non-hazardous areas have to be prepared in such a way in order to face possible future structural damage/load (the extent will depend on the geographical position). Hugo (2005: 3) states that it may be impossible to foresee what could happen in the future and members of the construction industry are interested in the here and now of construction cost. Researchers and scientists developed and produced structural restricting methods and materials, but they can only protect if they are used in the correct manner.

2.2 RISK MANAGEMENT

According to Knipe, Van der Walt, Van Niekerk, Burger and Nell (2002: 331), risk management is a systematic process followed in the view of analysing, identifying and responding to project risks by trying to maximise the probability and consequences of positive events and by minimizing the probability and consequences of adverse events to project objectives. There are many risk management functions to be considered. In this dissertation, the researcher only focuses on risk management in the construction environment and the effects of decision making, acts of nature and communication.

Having defined a project's objectives, the next step is to identify risks and uncertainties that may prevent the project from achieving the stated goals, deliverables and prevent the project of making the most of the opportunity that will enable the project to exceed the stated objectives (Burke, 2010: 263). The identification of risks may be a very important factor in risk management and how it can be applied effectively. Risk identification has to be analysed, in order to conduct a risk analysis (Van Well-Stam, Lindenaar, Van Kinderin & Van den Bunt, 2004: 29).

Enterprise Risk Management is currently a vibrant process in the built environment. It should be affected by an entity's board of directors, management and other personnel, applied in a strategy-setting and across the entity, designed to identify potential events that will affect the entity. Furthermore, it should provide a tool to measure and to manage these events, in order to provide reasonable assurance that the entity will achieve its objectives (Chapman, 2011: 4).

Bribery, corruption, fraud, favouritism, nepotism, extortion, embezzlement and irregularities can have an effect on the bottom line of any organisation. It has the most significant impact on the employees' morale, which relates to a firm's performance and stock market returns. Senior management is responsible for a firm's culture, motivation of people and expressing what the firm stands for. It is crucial to invest in control systems; it protects the firm's reputation and morale. It is also good practice to punish the offending party by means of a disciplinary procedure. It is fundamental that each party has the authority to deal with some of these cases and each party has to be aware of the facts as well as the consequences if they are not handled in the correct manner in any organisation (Nobel, 2013: online).

The common-law position is that the contractor's responsibility for the works will commence at the time that he takes possession of the site and will end when he surrendered it to the employer. This will normally coincide with the practical date of completion as per clause 8.1 of the Joint Building Contracts Committee Principle Building Agreement (JBCC, 2007: 6). Thereafter, responsibility is passed on to the employer. However, the contractor is responsible for making good of physical loss or damage due to his team's performance. Anything else will be for the employer's account (Finsen, 2005: 84-85).

2.3 COMMUNICATION

The skill to communicate well, both verbally and in writing, is the basis of an effective team. Burke (2010: 280-281) states that through communication, team members share information, exchange ideas and influence attitudes, behaviours and understanding. Communication helps members to develop interpersonal relationships, inspire team members, handle conflict, negotiate, chair meetings and make presentations.

During the construction phase, interaction between various parties (client, project manager, architect, quantity surveyor, main contractor, sub-contractors and suppliers) takes place. Communication between them is vital, but in a crisis, the damage in terms of the effectiveness of the different team members, and latent tension throughout the

phase, may be immense; or it may have a positive outcome, depending on the dynamics of the team (Emmitt & Gorse, 2007: 25-26).

One of the key values that policies need to emphasise is open communication. Unless something is commercially or individually confidential, it may be communicated in a complete, explicit, and timely manner. Credibility and trust of managers will only come with consistently truthful and open communication. Communication about significant happenings needs to be thoroughly planned. Being too busy should not be an acceptable excuse for inadequate or ineffective communication (Dainty, Moore & Murray, 2006: 220).

Competing needs and objectives naturally lead to feelings of discord and tension, which in turn raise the possibility of conflict within a construction project team. Thus, the maintenance of effective communication is an effective way of ensuring that project teams are working together effectively and ultimately, ensure successful deliverables. Before techniques of effective communication are explored, it is important to understand the difficult context in which managers operate. Within project-based industries, such as construction, barriers of effective communication are complex and multifarious, because of the number of actors that govern the success of construction practices (Dainty, et al., 2006: 19-20).

Knipe et al. (2002: 111) state that the significance of communication is to cause action or agreement to take place, and to make a record that may be needed for future information or future reference. The larger the project, the more complex communication becomes and the importance of effective communication and the execution thereof should be emphasised.

Due to its very nature, the construction industry requires the personnel to be mobile in order to complete the realisation of the project. To carry out the job function, communication with others is essential and quality, quantity and timing of information may either hinder or facilitate successful results (ARUP, 2014: online).

The construction industry has not found a suitable resolution to the problem of information communication and interchange on construction sites. Construction sites are information demanding environments. A number of construction personnel in the field need large amounts of information, ranging from drawings to contractual data and discussions. However, the main type of information personnel has to receive and transfer are paper based files, which include drawings, data collection, correspondence, progress information and specifications (Bowden, Dorr, Thorpe & Anumba, 2004: 17-32).

2.4 DECISION MAKING

Everybody is exposed to risks in his or her daily life, as stated by Steyn et al. (2012: 353). One may, therefore, expect that projects will also be exposed to risk. Risk in projects may not be eliminated; it may only be reduced to an acceptable level. A risk-free project will not be worth pursuing. Certain risks in projects have to be accepted, reduced or transferred.

Certainty is achieved in cases where alternative outcomes are identified, together with a definite statement of the probabilities of such outcomes. Partial uncertainty is found where alternative outcomes may be identified, but without the participant's knowledge of the probabilities of such outcomes (Kirkman, 2008: 3).

In many organisations, according to Nickson and Siddons (2006: 76), this process may have changeable levels of formality and administration associated with it. Some of the companies see risk management as the main tool of project management. The central aspect is that risk management may help identify possible causes of project disasters, from the start of the project until the end. In terms of disaster prevention and control, the flaw is that the evaluation of risks comes down to subjective evaluation.

The purpose of a business continuity management plan is to ensure that there is continuity and/or timely recovery of business operations following an unplanned interruption to business operations. This ensures that one remains competitive and do

not lose customer confidence. This will influence the decisions one makes on a daily basis (Nell, 2013: 3).

Contract administration is the process of ensuring that the seller's performance meets contractual requirements, liaising between the client and the contractor(s). On larger projects with multiple product and service providers, a key aspect of contract administration is managing the interfaces among the various providers and ensuring there is a communication channel to confirm that the best possible decision will be made for all parties involved. The legal nature of the contractual relationship makes it imperative that the project team be acutely aware of the legal implications of actions taken when administering the contract. Crucial, educated decisions have to be made in order to complete the process (Project Management Institute, 2000: 131).

Legislature has acknowledged that the managing director will require assistance to ensure the implementation and management of safety, health and environment (SHE) legislation and has, therefore, provided this person with the authority to assign the responsibility to other personnel to assist them with these functions (SHEQ Management Systems, 2014: online). All site personnel are responsible for safety and in every decision made, safety will be a factor to be taken into account. Even though there is a person assigned to manage the overall safety of the site, it is still everyone's responsibility to ensure safety.

2.5 CONCLUSION

When looking at an overview of risk management, decision making and communication are key aspects in order to manage risk successfully. While risk management focuses on analysing, identifying and responding to the risks in the project, decisions need to be made in order for the risks to be minimised. Communication is used to channel information to the relevant parties involved. It is advisable to record communication, in order to refer back to decisions made, if proof is needed.

All employees need to have the skill to communicate well, in order to have a good flow of information. Interaction between parties is also necessary. Communication should be

seen as an integral part of any team or project. Decision making and communication goes hand-in-hand. Furthermore, decision making is linked to certain outcomes. One should be aware of all these knowledgeable theories, risks, opportunities and to be skilled enough to execute them in any situation that could arise.

CHAPTER 3

RISK MANAGEMENT

3.1 INTRODUCTION

According to Vaughan and Vaughan (2008: 2), there will firstly be a specific situation or problem which someone will state, and which others will understand and use their knowledge to limit, dissolve or mitigate. Given the situation, there might be an uncertainty about the outcome, and there is also the possibility that the outcome will not be as favourable as predicted.

Success may be achieved by pursuing business opportunities to gain a competitive advantage. Burke (2010: 258) states that projects and new ventures, whether big or small, will typically be set up to take advantage of these opportunities, or to make something new or enhance existing facilities. Consequently, risk may be seen as an intrinsic part of any management team. With increasing competition, increasing technology, and an increasing rate of change, risk management may gain greater significance and importance.

The Aqua Group (1990:10) define risk as a possible financial loss, which has to be carried by someone, resulting from the difference between what was initially anticipated and what finally happened. Investment and development may often be considered as risky since the actual return, which will be realized from the investment, may be uncertain to the investor-developer. The project team may not have control over uncertain circumstances to some extent. The above-mentioned control will be distinguished by the team's experience and knowledge of projects. In other words, risk is relative to the uncertainty of future returns from an investment.

Risk management can be a systematic process followed from the view of analysing, identifying and responding to project risks by attempting to maximise the probability and consequences of positive events and by minimizing the probability and consequences of adverse events to project objectives (Knipe et al., 2002: 331). Many management risk functions can be considered. In this dissertation, the researcher only focuses on

financial risk management in the construction environment and the effects of decision making, “acts of God” and communication.

Risk can inadvertently relate to the ability to predict future financial loss. Abilities are gained by experience (Cloete, 2001: 2-3). Hypothetically, should there be no risk, the project manager knows exactly what to expect and he/she can execute the project risk free. Risk is, therefore, not the same concept as the probability (or chance) of loss.

Risk management always reminds us of the popular phrase widely attributed to Alan Lakein: “*Failing to plan, is planning to fail*” (The Phrase Finder, 2015: online). Preparing for the worst possible outcome may really benefit the project in the end. Insurance companies remind their clients that no one knows what may go wrong, hence encouraging their clients to invest in insurance policies as precautions to risk.

Risk management skills may be essential in a complex and demanding construction industry. Walker (2008: 14-15) states that the way techniques are employed and the way they are put together by means of a project risk management process may be fundamental to achieve successful results. The following actions are included:

- Appraisal;
- Analysis of risk;
- Control methods, for example, risk avoidance and risk reduction;
- Risk financing, for example, risk transfer, risk retention and security;
- Insurances;
- Evaluation; and
- Identification.

The functional professional may be considered to have a better background and knowledge to manage risk in terms of the above-mentioned techniques (Walker, 2008: 14-15).

According to Vaughan and Vaughan (2008: 24) the risk management process can be listed as follows:

- Determination of objections;
- Identification of risks;
- Evaluation of risks;
- Consideration of alternatives and selection of the risk treatment device;
- Implementation of decision; and
- Evaluation and review.

These six steps can be used to achieve optimum results in terms of effective risk management (Vaughan & Vaughan, 2008: 24).

The success of risk identification, according to Willis (2002: 156), depends on more than a few factors, such as the level of experience and abilities of the workforce concerned, the accessible data, the skills and experience of the analyst and the available time.

The key factor in influencing anyone to do anything, including resolving a conflict, can be to ensure that the reward for doing it is greater than the risks involved. The assumption is that if people understand and value the rewards for being involved in a specific project, and if they have taken the necessary steps to minimise the risks involved in gaining the reward, they will regard project work as being in their best interest. In this way, they may be influenced to work on or otherwise support the project and it will help to minimise any potential conflict as it will be in the interest of all employees to do so (Turner, 2003: 122).

Effective risk management can be the difference between a successful project and a failed project (Vaughan & Vaughan, 2008: 24). It is, therefore, very important that the project manager knows the possible risks and if they occur, how to minimise the negative influence as much as possible.

3.2 DEFINITION OF RISK MANAGEMENT

According to Vaughan and Vaughan (2008: 2), economists, statisticians, decision theorists and other knowledgeable professionals have long discussed the concepts *risk* and *uncertainty* in an attempt to construct a definition of risk that can be useful in all the various fields of investigation. To this point there is no such definition, as different fields

are exposed to different risks. That is what makes the term risk such a strong and globally debated term. The definition of risk that is practical for this dissertation is the following:

“Risk is a condition in which there is a possibility of an adverse deviation from the desired outcome that is expected or hoped for (Vaughan & Vaughan, 2008: 2).”

It will be impossible to enumerate all the risks that may arise during the development of construction projects. Therefore, the researcher focused on risks subject to insurance coverage. These are divided into three different categories, namely conventional (ordinary) risks, catastrophic (extraordinary) risks and risks inherent to the works (MAPFRE, 2012: 22). These three categories are seen as indemnifiable losses.

Conventional risks include fire, lightning, explosion and theft. Catastrophic risks can also be seen as *force majeure* or acts of nature, such as floods, windstorms, earthquakes and landslides. Risk inherent to the works includes defects in workmanship, unskillfulness, negligence and malicious acts (fraud). Another risk inherent to the works is errors in calculation or design and employment of defective or inadequate materials (MAPFRE, 2012: 22-29).

The term “uncertainty” has often been used with the term “risk”. Therefore, as stated by Vaughan and Vaughan (2008: 3), it seems appropriate to explain the relationship between these variables:

- Uncertainty is the state of mind that is characterised by doubt, based on a lack of knowledge and experience of what will or will not happen in the distant or near future.
- Certainty is a conviction or certitude about a particular situation.
- The existence of risk is a condition or combination of circumstances of which there is a possibility of loss that creates uncertainty when that risk is recognised. This can happen on various levels of authority.

3.3 MANAGING OF PROJECT RISK

In order to understand the principles of risk management, one first needs to understand the different stages of construction. In this dissertation, the researcher primarily focuses on the construction phase.

Risk can be difficult to define but may be taken as a connotation of variation in probable results. Ashworth and Hogg (2002: 156) state that risks most certainly have a negative effect on a project. Professionals in the construction industry need to be knowledgeable about the effect of any risk that might occur and have the background of historical data to identify and eliminate risks as soon as possible.

Project risk management involves conducting risk management planning, engaging in risk identification, completing risk analyses, creating a risk response action plan, and monitoring and controlling risk on a project. Project risk management will be a continuous process to be engaged in throughout the entire project. A key point to remember is that risk is not always bad. The purpose of project risk management is to increase the likelihood and impact of positive events and to decrease the probability and impact of negative events (Elyse, 2006b: online).

According to Steyn et al. (2012: 354), the ultimate goal of project risk management is to improve project performance, i.e., to supply the correct deliverables on time and within budget. Risk management should be practised until the project has run to completion and closure has taken place. Murphy's law states "If anything can go wrong, it will go wrong" (The Phrase Finder, 2015: online). Good risk management is about anticipating what might go wrong during the execution of a project and applying preventative actions or providing some contingency.

Risk management is a daily activity and an integral part of project management. With pro-active risk management, one can evaluate projects in a comprehensive manner, and assess and document risks and uncertainty (Project Risk Management, 2010: xvii).

Hillson (1997: 37-38) developed a model for individuals and companies to compare the maturity level of their risk management. There are four levels, ranging from naïve to an

advanced level. Table 3.1 presents the definitions of the different levels of risk management and their capability.

Table 3.1: Different levels of risk management

Different levels of risk management
<u>Level 1: Naïve/Unaware</u>
<ul style="list-style-type: none"> - Unaware of need for management of risk - No structured approach to dealing with uncertainty - Inconsistent and reactive risk management processes - Little or no attempt to use lessons learned
<u>Level 2: Novice/Basic</u>
<ul style="list-style-type: none"> - Experiments with risk through a small number of individuals - No generic structured approach to risk management - Aware of potential benefits of managing risk, but inconsistent application, not gaining full benefits
<u>Level 3: Normalised/Mature</u>
<ul style="list-style-type: none"> - Management of risk built into routine business processes formalised generic risk processes - Benefit understood at all levels of the organisation, although not always consistently achieved
<u>Level 4: Natural/Advanced</u>
<ul style="list-style-type: none"> - Risk awareness culture with proactive approach to risk management in all aspects of the business - Active use of risk information to improve business processes and gain competitive advantage - Emphasis on opportunity management (“positive risk”)

(Source: Hillson, 1997: 37-38).

According to Hillson (1997), there are four different levels of risk management. Level 1 is identified as naïve, which is risks that a team would normally not be aware of, with no structured approach. Level 2 is identified as novice. There are risks with no generic structures that have been tried and tested on individuals who could manage the risks because they were aware of them. Level 3 involves a routine business process and action plans to get the most out of the risk management. This is called normalised or mature risk management. Level 4 is identified as natural risk, which is the most advanced form of risk management. Much emphasis is placed on opportunity management to create a positive risk.

The following steps are required for successful risk management (Burke, 2004: 253):

- Focus on the most significant risks;
- Consider various risk management options;
- Understand of effective risk allocation;
- Appreciate the factors which may impact on a party's willingness to accept risks;
- Appreciate the response of a party if and when risk happens; and
- Define the context of the work and plan for success.

This will define what one has to achieve to be successful and establish a basis for dealing with risk and future decisions. It will further help to identify areas of risk, uncertainty and constraint and limit or prevent one from achieving the objective. Evaluating the risks, prioritising the level of risk and uncertainty, and quantifying their frequency of occurrence and impact will define how one will respond to the indefinite risk (which may be a combination of various types of risks). To eliminate, mitigate, defect or accept risk in order to apply the risk control function, a risk management plan should be implemented (Burke, 2004: 253).

A risk management plan may involve training team members, and communicating with all stakeholders. As the risk and the work environment is constantly changing, it is essential to continually monitor and review the level of risk and one's ability to effectively respond to the risk (Burke, 2004: 253).

There may be many benefits of risk management, as mentioned by Cloete (2005: 322). It will make decision making more systematic and less subjective, which will allow the robustness of projects to specify uncertainties to be compared. It gives improved understanding of the project by identifying the risks and considering response scenarios. However, it has a powerful impact on management by forcing a realisation that there is a range of possible outcomes for a project.

Further benefits of risk management are that the risks will be clearly defined well in advance of the venture, and management decisions can be supported by analysing data (which will be made available), allowing estimations to be made with greater confidence (Jobling, Merna & Smith, 2006: 74-75).

Figure 3.1 illustrates the different stages of a typical construction project.

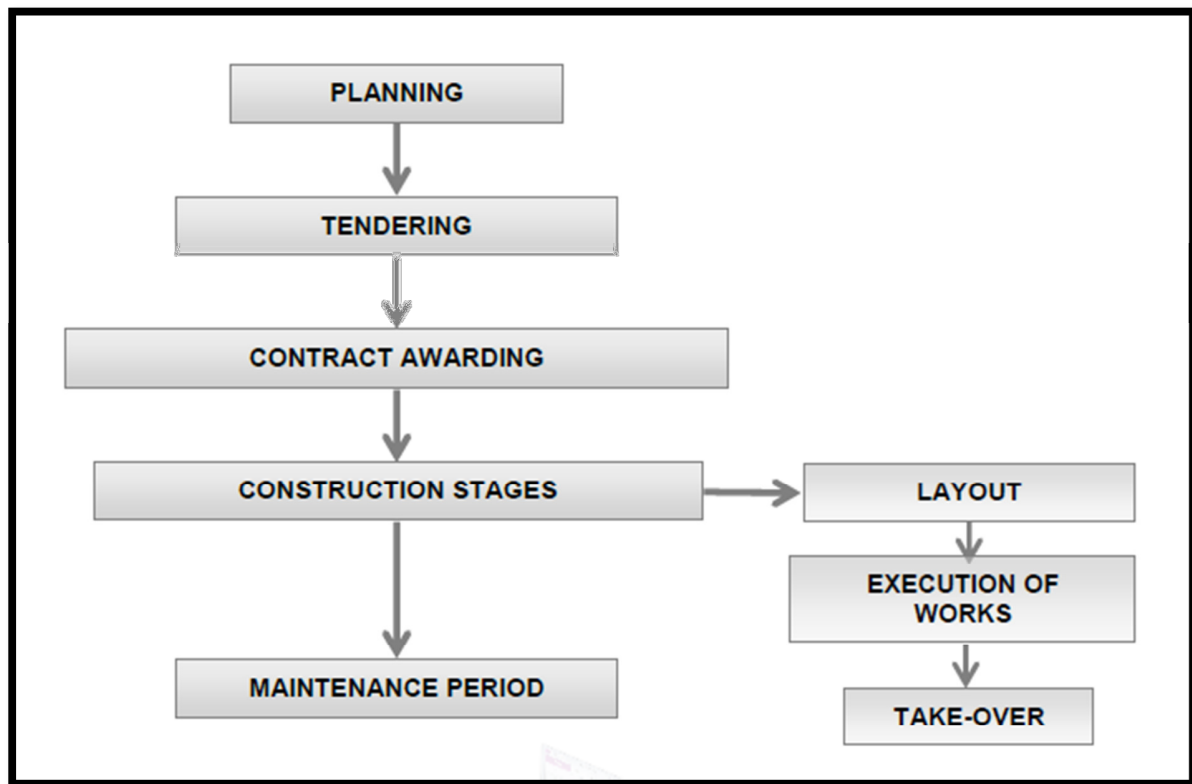


Figure 3.1: Construction project stages (Source: MAPFRE, 2012: 4)

MAPFRE (2012: 4-7) describes the five different stages of a construction project (planning, tendering, contract awarding, construction and take-over and maintenance period) as follows:

3.3.1 Planning

The necessities of all planning components to be completed and the goals to be achieved are defined in this stage. A feasibility study needs to be conducted to help solve all the economic, environmental, physical and political questions. The study requires relevant gathering of all the information for the design, which can be topographical, hydrological or statistical (MAPFRE, 2012: 4-5).

3.3.2 Tendering

After detailing and specification, the tender will be publicly announced. Tendering is compulsory if the client is from the public sector. However, in case of a private client, offers can be demanded directly from numerous contending contractors (MAPFRE, 2012: 5).

3.3.3 Contract awarding

The client evaluates the different bids with regard to the budget, environmental studies, experience, financial guarantees, historical data, reputation, technical and quality certificates. The contract is awarded to the successful contractor, who will be informed. In general, tendering documents contain the following:

- Sets of administrative clauses, which include:
 - Applicable legal system;
 - Purpose;
 - Funding;
 - Budget, cost and review;
 - Acceptance of tender procedure;
 - Acceptance of tender criteria;
 - Capacity to contract;
 - Documents;
 - Construction;
 - Agreement awarding committee;
 - Qualification committee;
 - Valuation criteria;
 - Documents provided by the successful tenderer;
 - Obligations before the signature of the agreement;
 - Agreement award and return of the provisional guarantee;
 - Execution of the agreement;
 - Agreement performance;
 - Agreement assignment;

- Agreement resolution;
- Contractual responsibility, and
- Nature of this agreement and prerogatives of the administration and competent jurisdiction (martinez, 2006: 1-20).
- Sets of particular clauses, which include:
 - Contracting;
 - Prices;
 - Project execution time frames;
 - Method of payment, and
 - Conditions to be fulfilled by the contractor.
- Sets of technical specifications, which include:
 - Technical features of the project;
 - Scope documents included;
 - Previous studies;
 - Tests;
 - Basic documentation to be used;
 - Scales;
 - Number of copies;
 - Degree of completion of layouts;
 - Progress charts, and
 - Project units including prices (MAPFRE, 2012: 5).

3.3.4 Construction

Once a building contract is awarded, the site will be established and building will commence – from foundation to structure to finishing. The construction period may vary depending on the size and complexity of the project. During construction, the client pays the agreed amount to the contractor on a monthly basis. The amount paid will depend on work done during the valuation period, contractually agreed upon by both parties (MAPFRE, 2012: 6).

3.3.5 Take-over and maintenance period

As soon as the contractor receives practical completion, the contract will be handed over to the client. Ninety days thereafter, if all the snags are completed, the final account will be signed in order for the payment to be completed. The contractor's contractual liability ends when the final account is agreed upon, although it can be extended during the maintenance period, lasting between six and twelve months as well as the latent defect period (5 years). Within this period, the contractor will be obliged to carry out any correction or repair considered necessary, besides rectifying all defects, faults or flaws in the construction works, all at his own expense. The contractor will be exempted from all contractual liability after the signing of the final acceptance certificate (MAPFRE, 2012: 7).

3.3.6 Construction risks commonly found in several construction projects

The following construction risks are commonly found in several construction projects:

- Inaccurate contract time estimates;
- Change requests due to differing site conditions;
- Temporary excavation and shoring system design is not adequate;
- False work design is not adequate;
- Unidentified utilities;
- Buried man-made objects/unidentified hazardous waste;
- Dewatering is required due to change in water table;
- Temporary construction easements expire;
- Electrical power lines not seen and in conflict with construction;
- Street or ramp closures not coordinated with local community;
- Insufficient or limited construction or staging areas;
- Changes during construction require additional coordination with resource agencies;
- Late discovery of aerially deposited lead;
- Experimental or research features incorporated;

- Unexpected palaeontology findings;
- Delay in demolition due to sensitive habitat requirements or other reasons; and
- Long lead time for utilities caused by design and manufacture of special components (steel towers or special pipe) (Project Risk Management Handbook, 2007: 33-34).

If these construction risks occur, it should be sufficiently dealt with. The manner in which these risks are dealt with will have an impact on the success or failure of the project. Most construction risks, as mentioned above, are risks that the project team are not aware of beforehand. These risks need to be identified as soon as possible, analysed and communicated to the parties that will deal with the risks and manage the crisis (Project Risk Management Handbook, 2007: 33-34).

3.3.7 Financial risks

It is important to know that risk can be related to the return on an investment, but one should furthermore distinguish between risk and uncertainty. Whereas risk can be assessed in terms of its probability and therefore insured against, or allowed for, this is not possible with uncertainty. Risk also needs to be distinguished in its application to an individual asset or to a portfolio of assets. Risk is more related to an investment strategy and portfolio analysis. Risk allowance can thus be seen as the sum of money allowed in the estimate to cover an item about where some uncertainty exists (Nobel, 2013: online).

3.3.8 Supply risks

The supply risks of building materials, plant and personnel could be insufficient. Without these items, the project cannot continue, which means that the completion of the project will be delayed or never be finished, which could have time and cost implications (Bowen & Edwards, 2005: 138-139).

3.3.9 Organisational risks

Risks in the organisation will occur if inexperienced personnel are assigned due to a lack of specialised personnel. In addition, losing critical personnel at crucial points of the project can greatly influence the project. This will lead to insufficient time to plan and will increase the workload of the managers, which was not planned for. Internal bureaucracy causes delays in getting approvals and for decisions to be made.

Concerning project finance, a lack of understanding of complex internal funding procedures will be a risk. If there are many revisions on the financial forecast, especially if money is moved from one financial year to the next, it will pose a problem that will affect the stakeholders' confidence. The critical path can change on an existing construction programme, which could lead to inconsistent cost, time, scope and quality objectives, depending on the needs of the client (Project Risk Management Handbook, 2007: 32).

3.4 IDENTIFICATION OF RISK

Regardless of the manner in which risk is defined, the greatest burden in connection with the risk is that some losses will actually occur. It is thus fundamentally important to identify these risks as soon as possible to minimise the impact of each unique situation (Vaughan & Vaughan, 2008: 8).

Having defined a project's objectives, the next step is to identify risks and uncertainties that can prevent the project from achieving the stated goals, deliverables and prevent the project of making the most of the opportunity that can enable the project to exceed the stated objectives (Burke, 2010: 263). The identification of risks is a very important factor in risk management and how it can be applied effectively. Risk identification should be analysed, in order to conduct a risk analysis (Van Well-Stam et al., 2004: 29).

The greater the awareness and appreciation of risk in construction, the greater the knowledge and judgement of this element. It is essential that risks are identified early to minimise the effect and to maximise the opportunity. The process of risk identification should not be a one-time event, but rather a continuous process (Burke, 2010: 263).

Risk identification should be a systematic process to ensure nothing significant is overlooked. Techniques to identify risks, as rendered by Burke (2010: 264), include:

- Analysing historical records
- Brainstorming
- Flow charts
- Judgement based on knowledge and experience
- Scenario analysis
- Structured interviews
- Structured checklist, and
- Structured questionnaires.

The main reasons for a high rate of project failures are usually relating to the budget, poor quality of tradesmanship and late delivery of a project, under performance, a strained relationship with the client and unrealistic contract deliverables (Burke, 2010: 265).

Identification of risks involves determining which risks are expected to have an effect on the project. Risk assessment is identifying, quantifying and analysing the possibility that risks may occur. It also assesses the impact that it will have on a project. A superior or good historical database can also be helpful in risk assessment and the identification and planning of contingencies. Early contingency planning in a project may prevent delays and causes for panic should interruption occur (Vermaak, 2006: 9).

Risk identification is an iterative process due to new risks that may arise as the project progresses through its life cycle and previously identified risks may drop out. The frequency of iteration and who participates in each cycle will vary from case to case. The project team should be involved in the process so that they can develop and maintain a sense of ownership of, and responsibility for, the risks and associated risk response actions (Project Risk Management Handbook, 2007: 11).

The risk identification stage, according to Raftery (1999), has received the smallest amount of attention in the literature on risk. Experienced individuals in the project

management, who have accumulated some kind of knowledge of carrying out risk analyses on capital projects, found that the identification stage is the most time consuming. Identification of risks internal and external to the project will require the analyst to be creative, inspiring, experienced, resourceful and systematic. The best way to gain access to this collection of delicate qualities, is by assembling a suitable team. Construction professionals are required by act of law to exercise sensible care and ability in carrying out their work. Identification of risk is about making the best use of experience, knowledge and information available at the time of making a decision. In practical circumstances, Raferty (1999: 18-19) further states that it is helpful to work closely with the project team and to consider the following separate areas when risk assessment is done:

- Risks-external to the project and emanating from the business and physical environment.
- Risks-internal to a project which are determined by breaking the project down into major work packages.
- Consideration of the client, the project team and the quality of the documentation from the perspectives of the various contractors in anticipation of sources of claims.

The success of risk identification depends on more than a few factors and the ability of the workforce concerned. The availability of accessible data, skills and experience of the analyst, as well as the availability of time will also assist in identifying risk (Willis, 2002: 156).

During the process of identification, the most important risks need to be identified. It is unproductive and most certainly not necessary to focus attention on all of the risks that have been identified for an average project; many risks may quickly emerge and quickly disappear (Van Well-Stam et al., 2004, 43-45).

3.5 RISK MANAGEMENT STEPS

The six risk management steps, according to Project Risk Management (2010: xvii), are as follows:

Step 1: Risk management planning: Risk management planning is the systematic process of deciding how to approach, plan and execute risk management activities throughout the life cycle of a project. Although there will always be complexities, it will be better to rather keep to a structured plan than to manage each crisis as it emerges. It is intended to maximise the beneficial outcome of the opportunities and minimise or eliminate the consequences of adverse risk events.

Step 2: Identify risk events: Risk identification involves determining which risks may affect the project – depending on the severity of the impact of different risks – and documenting their characteristics. It may be a simple risk assessment organised by the construction team on site.

Step 3: Qualitative risk analysis: Qualitative risk analysis assesses the impact and likelihood of the identified risks and develops prioritised lists of these risks for further analysis or direct mitigation, depending on the severity of the impact of different risks. The team assesses each identified risk for its probability of occurrence and its impact on project objectives. Teams may elicit assistance from subject matter experts or functional units to assess the risks in their respective fields.

Step 4: Quantitative risk analysis: Quantitative risk analysis is a way of numerically estimating the probability that a project will meet its cost and time objectives. Quantitative analysis is based on a simultaneous evaluation of the impacts of all identified and quantified risks.

Step 5: Risk response planning: Risk response strategy is the process of developing options and determining actions to enhance opportunities and reduce threats to the project's objectives. It identifies and assigns parties to take responsibility for each risk response. This process ensures that each risk requiring a response has an 'owner'. The

project manager and the project team identify which strategy is best for each risk, and then selects specifications to implement that strategy.

Step 6: Risk monitoring and control: Risk monitoring and control tracks identified risks, monitors residual risks, and identifies new risks ensuring the execution of risk plans, and evaluating their effectiveness in reducing risk. Risk monitoring and control is an on-going process for the life of the project.

3.6 ENTERPRISE RISK MANAGEMENT

“Enterprise Risk Management is a process, effected by an entity’s Board of Directors, management, and other personnel, applied in strategy-setting and across the entity, designed to identify potential events that will affect the entity, and provide a tool to measure and manage these events, in order to provide reasonable assurance that the entity will achieve its objectives”, as defined by the Committee of Sponsoring Organizations (COSO) of the Treadway Commission (2004: online). This definition reflects the following fundamental concepts:

- A process, on-going and flowing through an entity;
- Effected by people at every level of an organization;
- Applied in strategy setting;
- Applied across the enterprise, at every level and unit;
- Designed to identify potential events that, if they occur, will affect the entity and enable it to measure and manage risk within its chosen risk appetite;
- Able to provide reasonable assurance to an entity’s management and board of directors; and
- Geared to achievement of objectives in one or more separate but overlapping categories (Committee of Sponsoring Organizations (COSO) of the Treadway Commission, 2004: online).

The above definition focuses directly on the achievement of an entity’s objectives.

Table 3.2: Components of enterprise risk management

<i>Internal Environment Culture</i>	The internal environment includes the character of an organisation, and sets the basis for how risk is viewed and addressed by an entity’s people, including risk management philosophy and risk appetite, integrity and ethical values, and the environment in which they work.
<i>Strategy Objective Setting</i>	Purposes should exist before management can identify likely events affecting their success. Enterprise Risk Management ensures that management has in place a process to set objectives and that the chosen objectives support the entity’s mission and are reliable with its risk appetite.
<i>Event Identification</i>	Internal and external events affecting success of an entity’s objectives should be identified, distinguishing between risks and opportunities.
<i>Risk Assessment</i>	Risks are investigated, considering impact and probability, as a basis for determining how they should be managed. Risks are assessed on an inherent and a residual basis.
<i>Risk Response</i>	Management chooses risk responses – avoiding, accepting, reducing, or sharing risk – developing a set of actions to align risks with the entity’s risk tolerances and risk appetite.
<i>Control Activities</i>	Policies and procedures are established and implemented to help ensure the risk responses are effectively carried out.
<i>Information and Communication</i>	Relevant information is identified, captured, and communicated in a form and timeframe that enable people to carry out their responsibilities. Effective communication also occurs in a larger sense, flowing down, across, and up the entity.
<i>Monitoring</i>	The entirety of Enterprise Risk Management is monitored and changes made as needed. Monitoring is accomplished through ongoing management activities, separate evaluations, or both.

(Source: Committee of Sponsoring Organizations (COSO) of the Treadway Commission, 2004: online)

By being exposed to enterprise risk management, various components should be taken into account, which can be dangerous if being unaware of it. The project choice will depend on the risk appetite, ethical values and integrity. By joining into agreement with an enterprise entity, a clearly identified strategy should be in place. Once the events are identified, risk assessment needs to take place, and thereafter a response must be developed. Information needs to be constantly communicated to all parties, and there also needs to be on-going monitoring for all activities (Committee of Sponsoring Organizations (COSO) of the Treadway Commission, 2004: online).

Enterprise risk management is a multi-directional, interactive process in which nearly any component can, and does, influence another (Committee of Sponsoring Organizations (COSO) of the Treadway Commission, 2004: online).

Enterprise risk management includes the following:

- **Aligning risk appetite and strategy:** Management considers the entity's risk appetite in estimating strategic changes, setting associated objectives, and developing tools to manage related risks.
- **Enhancing risk response decisions:** Enterprise risk management provides the consistency to identify and select among other risk responses – risk evasion, reduction, sharing, and acceptance.
- **Reducing operational surprises and losses:** Entities gain improved skill to identify potential events and establish responses, reducing surprise and associated costs or losses.
- **Identifying and managing multiple and cross-enterprise risk:** Every enterprise faces many risks affecting different parts of the organisation, and enterprise risk management facilitates effective response to the inter-related impacts, and integrated responses to multiple risks.
- **Seizing opportunities:** By considering a full range of potential events, management is positioned to identify and proactively realise opportunities.
- **Improving deployment of capital:** Obtaining robust risk information allows management to effectively assess overall capital needs and enhance capital allocation (Committee of Sponsoring Organizations (COSO) of the Treadway Commission, 2004: online).

Enterprise risk management helps organisations achieve group performance and profitability targets and prevents unnecessary loss of resources (Vaughan & Vaughan, 2008: 15-16).

Enterprise risk management is a strategy implemented to give opportunities to others to gain the same experience. This will affect people on every level in the organisation. By giving others opportunities, they will gain the necessary knowledge, expertise and

experience to be able to function independently later on in life. It does not only affect the business' finances, but can influence the image, marketability, strategy and deployment of capital. In addition, in order for the entity to achieve its objectives, these events need to be measured and managed.

Enterprise risk management can firstly be implemented within an organisational structure. Secondly, it can be joint ventures with a previously, disadvantaged company, for example creating a joint venture partnership with a smaller, previously disadvantaged firm to develop it in order for that firm to be able to take on bigger projects in future and to grow as a company. Thirdly, on sub-contractor level, involves the main contractor guiding the sub-contractor through his works and assisting him by supplying necessary and relevant knowledge. The sub-contractor will gain experience and will be able to complete projects independently in future. Lastly, the labour force on a construction site will also be similarly developed (Vaughan & Vaughan, 2008: 15-16).

3.7 CONTRACTUAL RISK COMPONENT

Insurance is a promise of compensation for specific potential future losses in exchange for periodic payments. Insurance is designed to protect the financial well-being of an individual, company or other entities in the case of unexpected loss (Sekhesa, 2007: 2).

3.7.1 Risk of loss or damage to the works

3.7.1.1 Obligation to maintain the works in good repair

The contractor is obliged to maintain the works in good repair until completion. This obligation is based on two legal principles. The first principle is that the contractor, who is in possession of a site, has a common-law obligation to take proper care of the site. He should also return it in due course to the employer in substantially the same condition as when he took possession of it. Secondly, the contractor has a contractual obligation to carry out and complete the works in accordance to his contract, and this contract requires that his work should be free of form defects (Finsen, 2005: 83-84).

The obligation of the contractor to make good of any loss or damage on the site and the works that may occur during the construction period is thus an obligation that exists by operation of law and it is not necessary for the contract to contain expressed provisions in this regard (Finsen, 2005: 83-84).

3.7.2 Contractual limitations of risk element

The contractor's liability is limited to the amount of insurance that is required to be affected in terms of the agreement and it is excluded in respect of the following:

- Uninsurable risks such as riots, confiscation, nationalisation, sonic shockwaves caused by aircraft, wars, acts of terrorism, etc.
- Risk due to some action of the employer and his agents. The contractor is not liable for the cost of making good physical loss or damages that may arise from the use or occupation of any portion of works by the employer, the employer's servants or agents, for example designs, latent defects and material or goods specified by trade name.
- Physical loss or damage to existing structure.
- The position in state contracts. As per Clause 8.4 of the Joint Building Contracts Committee Principle Building Agreement (5th ed.) (JBCC, 2007:6), the state does not insure its buildings and the extent of contractor's liability for the cost of making good damage is not limited (Finsen, 2012: 86-87).

3.7.3 Construction insurance

A large number of events takes place during the development stage of the project. These events will result in economic loss to persons or entities involved. These losses are normally incurred in the design and execution of the work, damage to third parties, circumstances which determine the necessity of insurance and, in consequence, the obligation derived from the contract for the insurance providers to face claims. These claims normally represent large amounts of money (MAPFRE, 2012: 71).

3.7.3.1 The insurance contract

It is a document or policy agreed with an Insurance Company, including a set of norms that will regulate the insurance contractual relationship between both parties (insured and insurer), with specification of their respective rights and duties (Vaughan & Vaughan, 2008: 42-50).

Through the policy, the insurance company should be liable for payment of indemnity under the covers expressly stated in those particular conditions, within the limits established and in compliance with the general conditions common to all the covers and the general conditions specific to those guaranteed covers in each case. The general conditions are a group of basic principles established by the insurer. The particular conditions comprise aspects regarding an individual risk to be insured, name and address of the contracting parties and designation of the insured and payee, if any, insured concept, nature of the risk to be covered, designation and location of insured properties, sum insured or scope of cover, amount of insurance premium, surcharges and taxes, premium due date, as well as the place and terms of payment and the contract duration, indicating the dates when the insurance cover is due to commence and expire (MAPFRE, 2012: 98).

Special conditions, on the other hand, include specific distinctions about the contents of some regulations set out in the general or particular conditions (establishment of deductibles paid for by the insured, elimination of some exceptions and inclusion of others, etc.) (MAPFRE, 2012: 98).

3.7.3.2 Erection All Risk (EAR) insurance

This insurance will cover against damage to insured properties during the erection works regarding machinery, apparatus and metal structures at the construction site, provided that the occurrence of such damage is accidental and unforeseen (MAPFRE, 2012: 69).

3.7.3.3 Machinery insurance

This insurance policy provides cover against losses and material damage to the insured machinery, under operation or otherwise, consequently to internal or external damage, provided that they be caused by accidental and unforeseen events (Sekhesa, 2007: 2).

3.7.3.4 Civil liability insurance

The activity developed by the construction company implies risks involved with the work itself and with its environment, which can bring about damage to third parties (either persons or properties). Hence, the object of the insurance is, in a wide sense, to protect the insured against liabilities due to an accidental event, that is to say, the compensation for economic injury to a patrimony because of an accident, resulting from the obligation to indemnify damage to third parties (MAPFRE, 2012: 70).

3.7.3.5 Decennial insurance

This insurance modality is aimed at protecting owners, promoters and purchasers of buildings or part of these from the date of works acceptance and for a 10-year period, against property damage due to determined construction vices or flaws directly affecting the building stability (Sekhesa, 2007: 2).

3.7.3.6 Contractor's All Risk (CAR) Insurance

Contractor's All Risk (CAR) insurance is an insurance modality that will cover all types of Engineering Civil Works, with the fundamental aim of protecting against accidental loss or damage to the works, including the contractor's construction plant and equipment, as well as third parties' claims due to personal damage, provided that these directly result from such construction works. It provides cover to any party with an interest in the construction project to be carried out: contractor or subcontractors, if any, frequently including all the suppliers of materials and equipment, and rarely, the engineer, consultant or architect. The insurance taker can happen to be the main contractor, all the intervening parties being the insured. It is even possible to find

policies including a “main payee” clause in favour of an entity that finances the construction and demands insurance for the works (MAPFRE, 2012: 72).

Insurance companies usually do not include the engineer among the insured parties, mainly because, if they did, all the losses resulting from defective design will be indemnified with no possible appeal, excepting special cases of proven negligence, which is extremely difficult to prove. Moreover, civil liability of engineers and architects can be covered through a specific professionals’ policy. This insurance provides comprehensive coverage against possible accidental or foreseen loss or material damage to the insured works. This cover is extended to:

- **Works:** Understanding either as such, the permanent and temporary works completed or under construction. These concepts include the necessary materials, supplies, and spare parts for the construction of the insured project. The concept “Works under construction” includes from ground preparation works (ground moving, etc.), auxiliary constructions (access roads, cofferdams, etc.) to air conditioning installation or finishes in general. All the materials stored at the worksite and intended for the construction works are also included here. Besides, other properties and liabilities can be optionally insured.
- **Auxiliary equipment:** This concept includes the elements which are not part of the works, but are necessary for the project construction, among others: scaffolding, formwork, auxiliary bridges, carpentry and timber framing, tools, provisional constructions, power facilities and supplies, dewatering/drainage pipelines, fuels and the rest of similar own properties.
- **Construction machinery:** This concept comprises the group of all types of machinery taking part in the construction works: cranes – fixed or mobile – excavators, piling machinery, ground treatment machinery, loaders, concrete mixers, and drillers.
- **Employees’ and workers’ personal belongings:** Due to the problems that may arise in the event of damage, this cover should only be offered in exceptional cases, and with a limit of indemnity per worker.

- **Debris removal expenses:** In the event where complications may arise that could inflict damage to structure, the environment, people, etc., this cover should only be offered in exceptional cases, where the damages are noticeable and the accountability is clear.
- **Civil liability:** It deals with third parties' compensation claims resulting from an accidental damage to their persons or properties due to accidents occurring at the insured worksite directly connected with the construction works (MAPFRE, 2012: 72-74).

3.7.4 Terms of insurance

Should the works be completed or totally or partially started up before the deadline set out in the policy, the insurance should automatically be cancelled with no premium refund. This fact may represent a problem if the Provisional Acceptance Certificate has not been signed (the signature can be much delayed due to the change in ownership: the developer owns the plot of land, whereas the construction work is property of the contractor) or the subject portion of work has not been effectively started up (Project Management Institute, 2000: 149-150).

On the contrary, should the delay in works result in completion after the date stated in the particular conditions of the policy, an extension should be agreed with the insurance company in order to keep in force the insurance, with the payment of an additional premium established depending on the particular circumstances in each case. The company will reserve the right to accept or reject this extension. On occasion, in order to avoid extensions, the period of time agreed can be longer than the expected time span so as to cover possible delays which are usually more economical (MAPFRE, 2012: 75).

The policy can be underwritten once the construction works have commenced, adjusting the insurance premium according to the non-covered construction period. Should the construction work be interrupted, the insured should notify this circumstance to the company as soon as possible. In this case, both parties may agree a total or partial suspension of the covers under this policy (MAPFRE, 2012: 75).

The developer or any essential contractor, due to whatsoever reason, cannot cancel the term of insurance in a Contractor's All Risk Policy, with the following exceptions: In the event of an important material change in the insured risk, under determined circumstances; or project abandonment, which means the termination of the construction contract. Should the projected works be resumed, it should be possible to reinstate the insurance cover (Project Management Institute, 2000: 149-150).

3.8 CORPORATE GOVERNANCE AND ETHICS

3.8.1 Imperatives for corporate, risk and ethics governance

Research by Price Waterhouse Coopers and the Association of Certified Fraud Examiners showed that companies lose 6% of their turnover as a result of crime and only a third of the crimes in South Africa are reported (PwC, 2011: online).

According to KPMG's 'Profile of a Fraudster' survey that was done in 2007, it was found that:

- 91% of fraud cases committed by employees were repeat crimes;
- Every third fraudster acted more than 50 times;
- Greed and opportunity together accounted for 73% of the frauds;
- More than 50% of the cases, there was no prior suspicion; and
- In 21% of the crimes, however, the company neglected to act even when there was suspicion of wrongdoing (PwC, 2011: online).

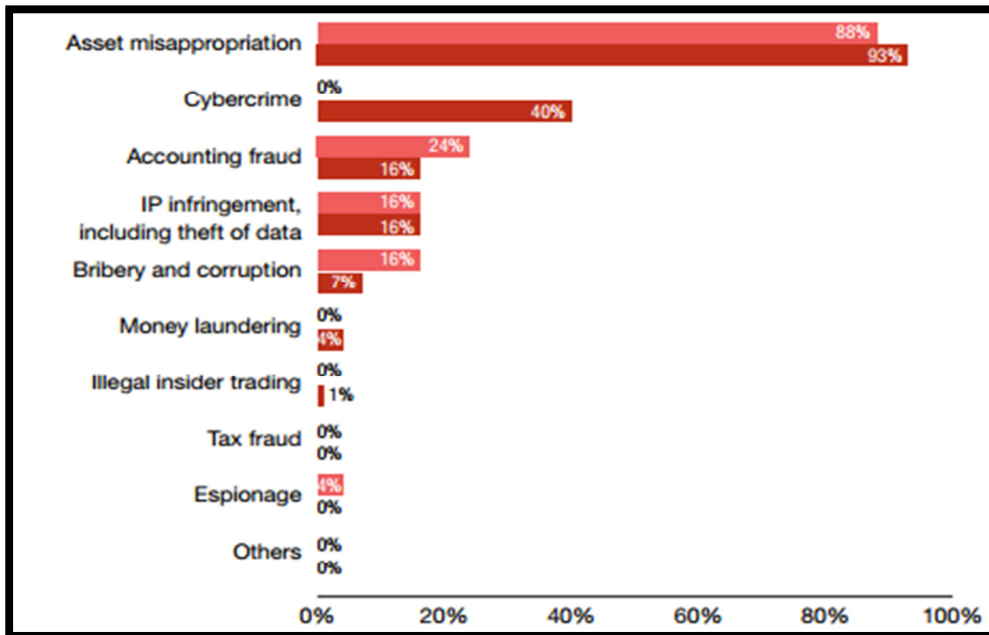


Figure 3.2: Types of Fraud (Source: PwC, 2011: online)

In Figure 3.2, the top bar at every category refers to data in 2009, and the bottom bar refers to data in 2011. In 2009, 88% of fraud was linked to asset misappropriation, but in 2011, that number raised to 93%. Asset misappropriation happens when assets of high value (for example cameras, digitisers. etc.) are added to the asset register but not used for the assigned purpose, and thus misused by staff. These numbers give rise to concern, but the reality is, if one does not face it, one will be aware of the homogenous acts surrounding us in this world.

The perpetrator profile in South Africa shifted to senior management, from 17% in 2009 to 36% in 2011. Consequently, crimes requiring access to sensitive information and more sophisticated know how, for example:

- Tax fraud;
- Market fraud;
- Price fixing; and
- Insider trading (PwC, 2011: online)

The above mentioned are all examples of what could happen in the construction industry on a construction project: from a subcontractor not complying with the tax regulations to main contractors influencing clients. It would be foolish for a company to ignore the possibility of these types of fraud happening. Rather have a system in place to minimise the probability and take action when it occurs than just hoping and believing that it would not happen in the company (PwC, 2011: online).

Business relations, organisations' reputation and brand and relations with regulators of economic crime have a significant impact on South Africa. South African organisations use more stringent measures, such as civil and criminal action and notification of regulators to deal with perpetrators (PwC, 2011: online).

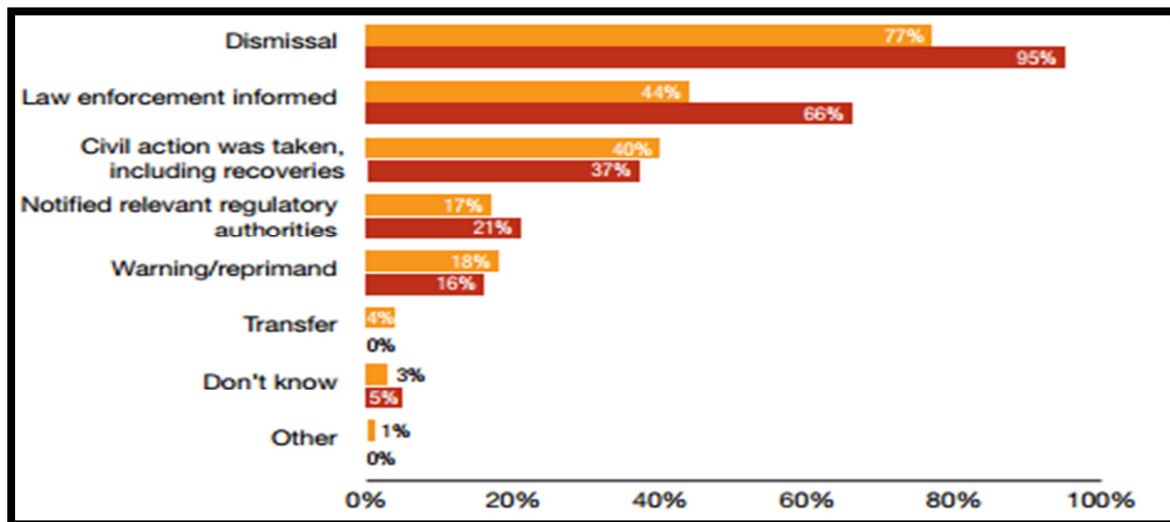


Figure 3.3: Actions taken against internal perpetrators (Source: PwC, 2011: online)

In Figure 3.3, the top bar at every category refers to global while the bottom bar refers to USA data. It is interesting to note that the USA has a 20% higher dismissal rate than the global rate. This shows that stronger action is taken against internal perpetrators. Since the construction industry is a global sector, it would be advised to follow in the USA's footsteps to take stronger action against perpetrators in a company. However, what is concerning is that none of these perpetrators are supposed to get away with it. It is each individual's responsibility to ensure that if anything is known, seen or distributed, action must be taken (PwC, 2011: online).

3.8.2 Bribery, corruption and fraud

Bribery can have an effect on the bottom-line of any organisation and it has the most significant impact on the employees' morale, which relates to a firm's performance and stock market returns. Senior management is responsible for a firm's culture, motivation of people and expressing what the firm stands for. It is crucial to invest in control systems; it protects the firm's reputation and morale. It is also good to punish the offending party by manner of the disciplinary procedure (Nobel, 2013: online).

In a media release of 20 November 2013, Professor Deon Rossouw (2013), Chief Executive of the Ethics Institute of South Africa, noted that the Institute of Business Ethics had found that strongly ethical companies had performed better than average from 2005-2010. This was due partly to ethical companies being able to use their employees' full potential and not just buying their time. Employees were more loyal, more creative and more willing to go the extra mile when working (Ethics Institute of South Africa, 2013: online).

Snyman (2008) defines corruption as anybody who accepts any gratification (benefit) from anybody else, or offers or gives any gratification to anybody else (Snyman, 2008: 411).

Extortion involves placing illegitimate pressure on another in the form of a threat of harm to provide a benefit, material or immaterial, to a public servant, another person or an entity in exchange for acting (or failing to act) in a particular manner. Extortion is thus the process of forcing someone to do something by threatening the person (or some third party) with negative consequences if the person does not comply (Nobel, 2013: online).

Nepotism is a form of corruption; it occurs when a person showed unfair favour towards relatives, instead of applying an objective evaluation of the ability or suitability of the person or company and also implies the decision-maker has a conflict of interest (Nobel, 2013: online).

Favouritism involves the provision of services or resources according to personal affiliations for example:

- Ethnic;
- Religious; and
- Party-political affiliation (Nobel, 2013: online).

Embezzlement involves the theft of resources by persons entrusted with authority over, and control of, such resources (Nobel, 2013: online).

Fraud is defined as the unlawful, intentional making of a misrepresentation that causes actual or potential damage or harm to another. Fraud involves deliberately telling a lie or withholding important facts that causes harm to another (Nobel, 2013: online).

Irregularities refer to non-adherence to organisational policies, guidelines or rules. If irregularities or misconduct occurs against company policy, corrective steps (disciplinary action) against the employee may be taken. This is not a criminal prosecution and the guidelines set by the Labour Relations Act, no 66 of 1995, should be followed (Nobel, 2013: online).

Unethical behaviour is improper, not right, not good and not fair. One will be unethical when one's behaviour does not conform to known standards of professionalism in a particular workplace or profession such as the public service, a bank, the medical, legal or teaching professions (Nobel, 2013: online).

To ensure that there will be control over fraud, bribery, corruption, extortion, nepotism, favouritism, embezzlement, irregularities and unethical behaviour, the word 'leader' will play a fundamental role.

The characteristics of a successful leader are:

- Serve others and put them first;
- Give credit where it is due;
- Take responsibility,

- Even when things go wrong;
- Know their version and trust the plan and processes;
- Take one step at a time;
- Should be transparent and effective;
- Walk the talk and inspire others to do the same;
- Have the courage to challenge wrongs;
- Empower staff to gain knowledge and skills; and
- Know when to step down (Blanchard, 2014: online).

The characteristics of an unsuccessful leader are:

- Not swayed by the opinion of other;
- Focus all the attention on themselves;
- Do all the talking;
- Are arrogant and boastful;
- Finds excuses and hide behind others back;
- Hoard and waste resources;
- Blame others when things go wrong;
- Interfere in operational matters;
- Seek instant gratification and are greedy;
- Abuse their power and position; and
- Treat other in a disrespectful manner (Blanchard, 2014: online).

The King III report and Code on Corporate Governance published in South Africa, in 2009, requires organisations to build an ethical culture with a trusted reputation in order to prevent, reduce, or eliminate misconduct. Chapter 1 of the King III report states that companies should:

- Involve ethics in all company aspects and activities;
- The board should show strategic ethical leadership; and
- Ethics should be actively managed in the company (Institute of Directors in Southern Africa, 2009: online).

3.9 RISKS OF A CONSTRUCTION PROJECT

Risks are evident in the activities carried out throughout the construction stage. Amidst the infinity of risks that may be present, the most frequent are defects, negligence, unskillfulness, workmanship and malicious acts (MAPFRE, 2012: 28). One of the characteristics already mentioned is the lack of specialised and qualified workforce. Some of the most frequent ones are listed below:

- Abrupt concrete pouring, with collapse of plants under construction;
- Defective arrangement of formwork;
- Defective crane anchoring which may cause people to fall;
- Inadequate storages, which on producing unexpected overloads, result in partial collapse of the structure incorrect formwork underpinning, with partial collapsing;
- Lack of skill or carelessness in handling equipment, cause of innumerable damages to the own construction work as well as to third parties; and
- Negligence in the implementation of preventive measures: forgetting to connect the water evacuation pumps, lack of foresight in load lifting, and the like (MAPFRE, 2012: 28).

3.10 MAJOR RISKS ASSOCIATED WITH BUILDING CONSTRUCTION

3.10.1 Main work

Major risks are present in every construction element designed and built in order to guarantee the stability of the building:

Foundation: This is the part of a structure in direct contact with the ground that transmits the load of the structure to the underlying ground. Buildings transmit important loads to the ground. In order to prevent non-uniform building settlements, these loads should be absorbed by the ground through the foundation, which should be supported on highly resistant ground (Elyse, 2006b: online).

Structure: The group of resistant elements providing stability to the building, i.e.: piers, girders, floorings, load bearing walls, roof structure, etc. (Walker, 2008: 14-15).

In the event of failure, there would be a huge financial and administrative issue and implication. Public relations will be destroyed. It can lead to health and safety risks and have an effect on time (Walker, 2008: 14-15).

3.10.2 Common risks types

Common risks are recurring events on a construction site. The minimisation of these risks will depend on the importance placed on these risks in the management values. If the errors are not controlled, it will have a detrimental effect.

Theft acquires importance, since theft results in ever-growing economic losses (such as the high demand on copper items). Design errors or defective materials are essentially due to a bad project planning, improper use of calculations and errors in the choice of materials or in the construction. To prevent defects in foundation, it is important to conduct a respectable geotechnical survey, where the characteristics and behaviour (load bearing capacities, possibility of settlements, etc.) of the ground are studied. Errors during structure construction in terms of concrete structures can include incorrect frame arrangement, defects in formwork and inadequate concrete placement. Furthermore, in terms of steel structures, there needs to be appropriate welding execution and range tolerances otherwise the structure can collapse, buckle or dent. Demolition is an action that requires skilful knowledge. As it is a complex process, it requires top-notch technology and a good planning, as well as a survey on the adjoining buildings (MAPFRE, 2012: 50-58).

3.11 CONCLUSION

The key factor in influencing anyone to do anything, including resolving conflict, is to ensure that the reward for doing it is greater than the risks involved. Every single decision made by a member of the project team (including contractors and consultants), from the principal agent to the labourer on site, has an effect on the results of a project. No matter how unimportant a specific employer/employee feels, every decision has an effect. The success or failure subsequently has an influence on the construction project, which then has an effect on the contracting company, and it will eventually have an

effect on the contracting sector, the construction industry, and the economy of the country (Turner, 2003: 122).

Discussing risk awareness was very important but was also one of the most neglected factors, as discussed in the literature review. The most common reasons are lack of time, poor time management, and insufficient or incapable human resources.

It is essential to identify risk before it happens or to eliminate or limit the risk as soon as it occurs. By not identifying some risk may have a huge impact on project revenue, allowable cost, original planning, earned value and financial forecasting, front and back end loading of a projects cash flow as well as labour strikes and unhappy contractors. Most of the interviewees also stated that it is important to make provision for effective risk management programmes or risk management resources within a company.

Effective risk management will most likely make a difference between a successful project and a failed project, therefore it is very important that the project manager, as well as all the relevant parties, know the possible risks and if they occur, how to minimise the negative influence as much as possible.

CHAPTER 4

COMMUNICATION

4.1 INTRODUCTION

For a project to be successful, it constantly needs effective communication to issue instructions, solve problems, make decisions, resolve conflict and provide all stakeholders involved in the project with the latest information.

The skill to communicate well, both verbally and in writing, is the basis of an effective team. Through communication, team members share information, exchange ideas and influence attitudes, behaviours and understanding. Communication helps members to develop interpersonal relationships, inspire team members, handle conflict, negotiate, chair meetings and make presentations (Burke, 2010: 280-281).

The aim of communication is to guarantee the necessary information, for example, contract documents; drawings; non-conformance reports; pre-contract planning; tender documents; site instructions; and SHE policies and procedures (Knipe et al., 2002: 107).

According to Knipe et al. (2002: 107), the above-mentioned information will be needed by management on site or senior management at the headquarters, who will collect, exchange, timely distribute and, when required, adequately store the information for traceability.

Project and site communication, as an academic field, embraces a large body of knowledge. Communication can be regarded as a learned management skill, thus, not as easy to execute without suitable and adequate experience and knowledge in relevant fields of construction (Knipe et al., 2002: 108-109).

There are two types of communication, namely verbal and nonverbal. Verbal communication involves the use of words, both written and spoken, to relay a message. On the other hand, nonverbal communication uses methods that do not involve words, such as signals, drawings, and symbols. Contract drawings use both methods:

specifications, notes (verbal), and drawings (nonverbal). Even when talking with others, both types of communication are used: speech (verbal) and body language (nonverbal). However, this study does not focus on drawings as it focuses only on the types of verbal communication. As previously mentioned, verbal communication includes written and spoken (i.e. oral) methods (Geren, 2012: 3).

Telephone conversations (and other ways of communicating where one uses one's voice to communicate with others) are called oral communication. A meeting is also a type of oral communication, but then it is a face-to-face conversation. One of the many advantages of oral communication is the fact that one's feelings and body language can help to enhance the message through one's tone of voice or how one uses one's body to communicate. This will help the parties to save time, since they have immediate feedback.

Purves (2005: 13-15) agrees with the above mentioned and states that unlike written communication, which requires a somewhat rigid back-and-forth process, oral communication allows a more fluid dialogue. It is typically less formal. With the exception of prepared speeches and scripted dialogue, oral communication is relatively informal and is not restricted by rigid formats other than common civil courtesy; it can also be confidential. Unless the conversation is being recorded, oral communication is limited to those present.

Conversely, Geren (2012: 3) states that oral communication has its disadvantages, as it can be misunderstood or misinterpreted. Oral communication is contingent upon the speaking skill of the speaker and the listening skill of the recipient. Generally, there is no permanent record and messages are not easily retained. Unless the conversation is recorded, there is no exact account of what was said, and people tend to forget conversation details over time. It is not the best method for lengthy communications. Except for speeches or other presentations, most oral communications are dialogues consisting of short messages.

The hierarchical arrangement of communication may be applied in construction projects. Communication breakdown may occur, because of poor expression, or unclear

messages, because of difficulty in self-expression, poor vocabulary and lack of sensitivity of the receiver. Overloading can be caused by too much information given at once (Mahloka, 2006: 10-11).

This essentially means that the communicators should make sure that they have an adequate vocabulary and the necessary self-confidence to deliver a message in a professional way. They should also know which method to apply in which situation.

Methods of communication include spoken, written and illustrative communication. In order to communicate successfully, the right method should be chosen for the relevant situation. Incoherence and distortion may result if the sender and receiver have not had the same experiences. They will then not understand each other's actions in trying to communicate their respective messages. Distance is another important factor, because separation between the various role players will influence the method of communication. Face-to-face communication and non-verbal communication cannot be used, and these may have been methods that would otherwise have clarified the message. Status differences may impede the communication process between people in various hierarchical positions. Feelings may also distort the message if the sender or receiver has personal sentiments about the message (Mahloka, 2006: 10-11).

Written communication uses a multitude of media to present messages. According to Geren (2012: 3), in general applications not specific to construction, written communication includes, but is not limited to, the following: correspondence; emails; transmittals; faxes; meeting minutes; text messages; and social media.

More specific to the construction process, Geren (2012: 3) explains that written communication includes specific documents or media, such as requests for information/interpretation (RFIs); proposal requests; change order requests; change orders; field observation and daily reports; submittals; and web-based project management systems.

Written communication has advantages and disadvantages. Written communication can be kept as evidence and is permanent. The message will always stay the same, and it

need not be remembered, as it can be read again as many times as needed. The fact that it can be kept will eliminate misunderstanding or misinterpreting.

Unlike oral communication, written communication can be reread until the message is understood and it can be disseminated quickly and widely. In this technology-based society, written communication can be sent to all parties in a timely manner (Geren, 2012: 3).

In a contractual environment, the disadvantages are few, but important. Written communication provides a permanent record and can be used as evidence. The advantage can be a disadvantage, too. In preparing documents, a person should be judicious about what is placed in the permanent record; it will require some level of skill. Not everyone is a good writer (Geren, 2012: 3-4).

It is difficult to assign risk responsibilities to only one party; this means that all parties involved should work together to calculate the risk responsibility in order to ensure that they form the best possible communication channel (Purves, 2005: 13-15).

The calculation of risk responsibility and accountability is a laboured procedure linking many considerations and aspects. It is difficult to transfer your risk responsibility and accountability to protection brokers in order to get away from them.

Contractors are not solely responsible for all the risks in a project. Communication between the different parties involved is important. All parties need to co-operate and work together as a team in order to maximise potential and mitigate risks and losses. These aspects should be kept in mind when working on a project.

Effective communication processes should be in the background of every company that wants to be successful in the long term, especially companies with different environmental settings (Purves, 2005: 13-15).

Usually the term communication is understood as signifying interaction with others on a daily basis with the aim of exchanging information (Welch & Jackson, 2007: 35-40). On an organisational level, communication is divided more narrowly into external and

internal communication. Internal communication involves communication among the organisation's management and internal stakeholders. External communication, on the other hand, focuses on the audiences outside the organisation, which, if effectively managed, can have a huge effect on any company. Both internal and external communications are known as corporate communication (Saunders, 1999: 177).

4.2 EFFECTIVE COMMUNICATION

Communication is the glue that holds a project team together, because communication does not only involve talking, but also listening. Without clear communication, even a small team working together may have problems.

Goudar (2010: online) supports the above mentioned and explains further that the project status needs to be tracked and monitored effectively using various tracking tools. The project manager should ensure timely and appropriate generation and collection of information; should follow email ethics during formal written communication; be precise and clear while communicating to achieve better understanding; and should know that there are potentially hundreds of communication channels. The larger the project, the greater the chances are that communication may break down.

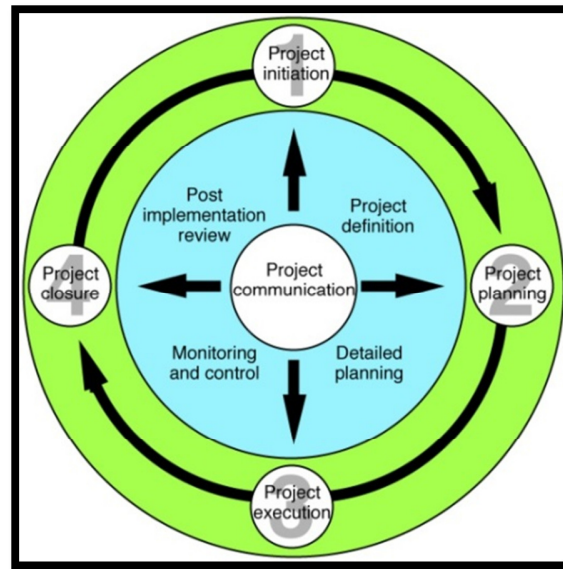


Figure 4.1: Phases of the project life cycle (Source: Westland, 2006: online).

The project manager and project team have one shared goal: to carry out the work of the project for the purpose of meeting the project's objectives. A standard project typically has the following four major phases: *initiation*, *planning*, *execution*, and *closure*. Together, these phases represent the path a project takes from the beginning to its end and are generally referred to as the project *life cycle* (Westland, 2006: online).

As seen in Figure 4.1, the project life cycle starts with initiation, where the project objective or need is identified. It needs to be a clear definition of the risk or opportunity of the project. An appropriate response to the need is documented with recommended solution options. It is critical for any company to ensure that effective communication takes place from the start. If the team's communication is not effective or lacking, the next three phases will be difficult to execute effectively. That is why the phases are linked, using arrows to show the flow of direction.

Phase two involves planning. The project solution is further developed in as much detail as possible and the steps necessary to meet the project's objective are planned. In this phase, the team identifies all the work that has to be done. The team now knows what is wrong and needs to have an action plan in place to mitigate the risk. It is crucial to refer back to the elements of the initiation plan, to ensure that all the important information is

correctly communicated. This can also be referred to as scope management (Westland, 2006: online).

Execution represents phase three, that puts the project plan into motion. It is important to maintain control and communicate as needed during execution. Progress is continuously monitored and appropriate adjustments are made and recorded as variances from the original plan (Westland, 2006: online).

Finally, phase four, which entails closure. The emphasis is on releasing the final deliverables to the customer and handing over project documentation, The last remaining step is to examine what went well and what did not (Westland, 2006: online).

To ensure the possibility of good execution of effective communication for one's section, site, business unit, cluster and sector, one needs to compile a communication plan. The key aspects that should be included in the communication plan are:

- The project objective (how big or small);
- A cost/benefit analysis;
- A schedule and time scale;
- The necessary resources to complete the objectives;
- Assessment of the situation as each situation will differ;
- Supplying the correct and relevant information to the chief executive officers, managing directors, managers or seniors;
- Leadership and managerial consideration; and
- Roles and contribution of any other party that may be necessary (Knipe et al., 2002: 117-118).

During the pre-contract phase, the professional team, consisting of the architect, client, consulting engineer and quantity surveyor, needs to work together from the start of the project, communicating effectively. Each consultant has an equal responsibility function. The more the pre-contract phase develops, the more conflict there will be between the different specialists involved (Emmitt & Gorse, 2007: 22-23).

During the construction phase, interaction between various parties (client, project manager, architect, quantity surveyor, main contractor, sub-contractor and suppliers) takes place. Communication between them is vital, but if a crisis occurs that damages the effectiveness of the different team members, latent tension throughout the phase could be immense; or it could have a positive outcome, depending on the dynamics of the team (Emmitt & Gorse, 2007: 25-26).

Emmit & Gorse (2007: 15-16) identify different levels of communication. The first level involves only one person. It is the thought process of one person, either alone or communicating with others. It can also involve only observation of communication. Interpersonal communication involves two people whereas group communication takes place when three or more people are involved. Multi-group communication will target a number of groups or sub-groups, whereas mass communication includes media, newspaper and television.

Effective communication is complex. The following are suggested by Makuta (2012: 6) as starting points for a communication strategy:

- No single method of communication on its own will necessarily be effective. A blended approach, using multiple channels where relevant, is therefore encouraged (e.g. written correspondence, face-to-face, web-based, meetings, etc.).
- Communication should be targeted and pitched accordingly to address the needs of specific audience(s) e.g. shop floor employees may require a different approach than senior managers.
- Cultural diversity should be respected. Communication tools and approaches should be adjusted accordingly to reflect this aspect.
- Messages, although adjusted to suit various audiences, should be consistent over time and between audiences.
- Messages should be clear and kept as simple as possible.
- Managers should be trained in communication skills to ensure that they understand the importance of communication in the company.

- Steps should, as far as possible, be taken to develop and sustain two-way communication, dialogue and feedback.
- Communication processes should be built into the planning stages of all key programmes and initiatives.

One element that will always arise in any form of communication is conflict. It often occurs due to the opposing needs of misinterpretation; client institution; project objective; team objective; different objectives and opinions from different individuals; subcontractors; suppliers; tertiary knowledge; competitiveness of individuals; levels of remuneration; and personal problems that affect productivity (Knipe et al., 2002: 132).

A review of communication initiatives should be undertaken periodically to check what has worked, what has not, and why.

4.3 GENERAL COMMUNICATION INFORMATION

Internal, as well as external communication is part of any project or business. It is thus important to keep in mind what has to happen and how it will happen. Internal and external communication need to work hand-in-hand in order for the correct information to be relayed to the affected parties.

4.3.1 Internal communication

Communication with all personnel within clusters or business units is of great significance to the organisation. All employees should be informed about company news and events and should be motivated to take part in making this effective. This is done via bulletin boards; communication briefs; email; management meetings; presentations/training; personnel meetings; etc. (Volujevica, 2012: online).

4.3.1.1 Internal communication policy

4.3.1.1.1 Purpose

The purpose of a policy promotes a common framework that should be applied throughout the company, whereby any information on matters that may affect the

business, employees of the company, or its key stakeholders, is communicated timeously and consistently, ensuring that synergy is created between all the employees in their effort to realise the group's strategic intent and supporting goals. All employees need to understand their roles and responsibilities and a climate of openness, transparency, and participation should be created and maintained. Lastly, mutual trust should be established between management and employees (Makuta, 2012: 3).

Communication is an important aspect of employee engagement and an integral part of how a business operates. Effective two-way communication is expected throughout a company. Direct and open communication is, therefore, fundamental to the culture at the company. Good communication means a healthy environment of mutual trust and respect where employees and managers can comfortably discuss work issues or employment concerns (Makuta, 2012: 3).

4.3.1.1.2 Feedback

Obtaining feedback and listening effectively are important elements for good communication. Effective communication is achieved when communicators at all organisational levels seek out feedback and take appropriate action to ensure that the intended meaning is passed on to the relevant audience. Employees should always be able to express themselves without retribution. Managers, on the other hand, should always be committed to acting on employees' feedback, either with clarifying communication or responding with appropriate action (Makuta, 2012: 5).

According to Bennett (2000: 110), there are two types of feedback, namely negative and positive. A remedy should, therefore, be administered for a way forward. There must be a balance between the two, from a managerial perspective. A worker will be motivated if he/she hears that their contribution is appreciated and that they are an asset to the team. Managers should ensure that personnel works for recognition and remember that they deserve praise. However, if all they hear are degrading messages about their work, employees will be demotivated and more likely to quit (Bennett, 2000: 110).

Two types of feedback allow for control loops that speed up identifying problems and improving performance. Accurate feedback is also used to facilitate continuous improvement of efficiency within the project setup. The presence of sufficient and efficient communication channels will reach the rightful destination without distortions. Transmitted information should make sense to the receiver. Feedback establishes automatic control of mainstream projects and flexible control of new projects (Mahloka, 2006: 42).

One of the most prominent distinctions between different types of communication is the level of communication. Construction management literature differentiates between levels in terms of operations and actions; from micro to meso and finally to the macro-level (Emmitt & Gorse, 2007: 15).

4.3.1.1.3 Importance of managers/team leaders

Important information should be made available to team leaders in a timely manner to enable them to relay it to their teams. Information should be cascaded down the organisation and communicated directly to team leaders as appropriate. It is better to over-communicate than to under-communicate. Team leaders should make clear what information is available and communicate as requested. Effective team leaders regularly communicate with their team members on a formal and informal basis, and actively seek feedback from their teams on the effectiveness of their communication with them (Makuta, 2012: 5).

4.3.2 External communication

Management's obligation to request information from external parties, as well as any significant activities and incidents, may affect or have affected the public at large. External communication will be undertaken by the chief executive officer (CEO), contract managers, directors, or the management representative, and communicated to the relevant employees (Volujevica, 2012: online).

When there is an important event, activity, or occasion that is believed to be important enough to be communicated, the proposed message is drafted and forwarded to the

relevant management/community liaison officer. Once the report is approved, the personnel in charge will give this information to the intended party (Volujevica, 2012: online).

4.3.3 Principles of effective communication

The problematic context of communicating in construction raises questions as to how the industry can go about overcoming the structural and cultural conditions and constraints which define its operation, in order that it can develop an infrastructure that facilitates more effective communication in future. In a theoretical sense, applying methods of effective communication should be straightforward, but how theoretical perspectives actually translate in practice will depend on how the people who work in the sector interpret it (Dainty et al., 2006: 11).

Those with experience of working in construction have developed skills to cope with such a challenging communication environment, which enables them to overcome the inherent difficulties of short-term interaction. The belief that communication panaceas do not really exist, may appear incongruent with a concurrent overarching aim of this text eluded to earlier, which is to suggest practicable methods for improving communication within construction projects and organisations.

However, there remain fundamental guiding principles and underlying improved performance that need to be applied in a way that accords with the particular project or situation in hand. In other words, the techniques used should be contingent upon the particular circumstances to which they are being applied (Dainty et al., 2006: 11).

Taking an 'open systems' view of organisations and recognising the impact that environmental variables have on the decision of how to communicate most effectively is an underlying philosophy that should be adhered to throughout communication (Dainty et al., 2006: 11).

4.4 COMMUNICATION RISKS

Communication and cooperation between the various parties involved in the construction procedure are of fundamental importance to the smooth functioning thereof. Communication should continue on a regular and accepted basis and the team members should be informed concerning the risks involved in the procedure. By giving employees rights in the project, the project manager ensures everyone's cooperation and effectiveness, which may lead to a decrease of risks caused by employees' unwillingness and refusal to work or to practice secure procedures, etc. If communication is used often, it will have a positive effect on a project (Elyse, 2006a: online).

Turner (2003: 77) emphasises that it is important to apply decision making in order to engage the entire construction team. Individuals see consequences developing, thus they must know their given position, so that they know how to react. The resulting decisions should reflect a position everyone can live with.

The crisis management team should appoint a spokesperson to communicate with the external and internal stakeholders of the group. The communication should be conducted in a clear and efficient manner. Handling the crisis will emphasise a company's commitment to transparency, accessibility and honesty. This plan should limit, as far as possible, the physical and financial damage caused by an event, and should protect the corporate image of the group (Makuta, 2012: 6).

According to Burke (2010: 281), it will often be stated that information costs money, but lack of information can be even more expensive, for example, the cost of information failure may be due to the following:

- Poor problem solving;
- Poor decision making;
- Lack of interest;
- Working on old drawings of instructions;
- Lack of top-down communication channels; and

- Lack of administration and filing management.

Projects are particularly prone to communication difficulties due to their unique nature. There can be overlapping responsibilities, decentralised decision making and complex interfaces, all placing strain on the communication system.

For the purpose of this dissertation, the researcher focused on the construction phase depicted in Figure 4.2 below. Phase 1 consists of design and Phase 3, completion.

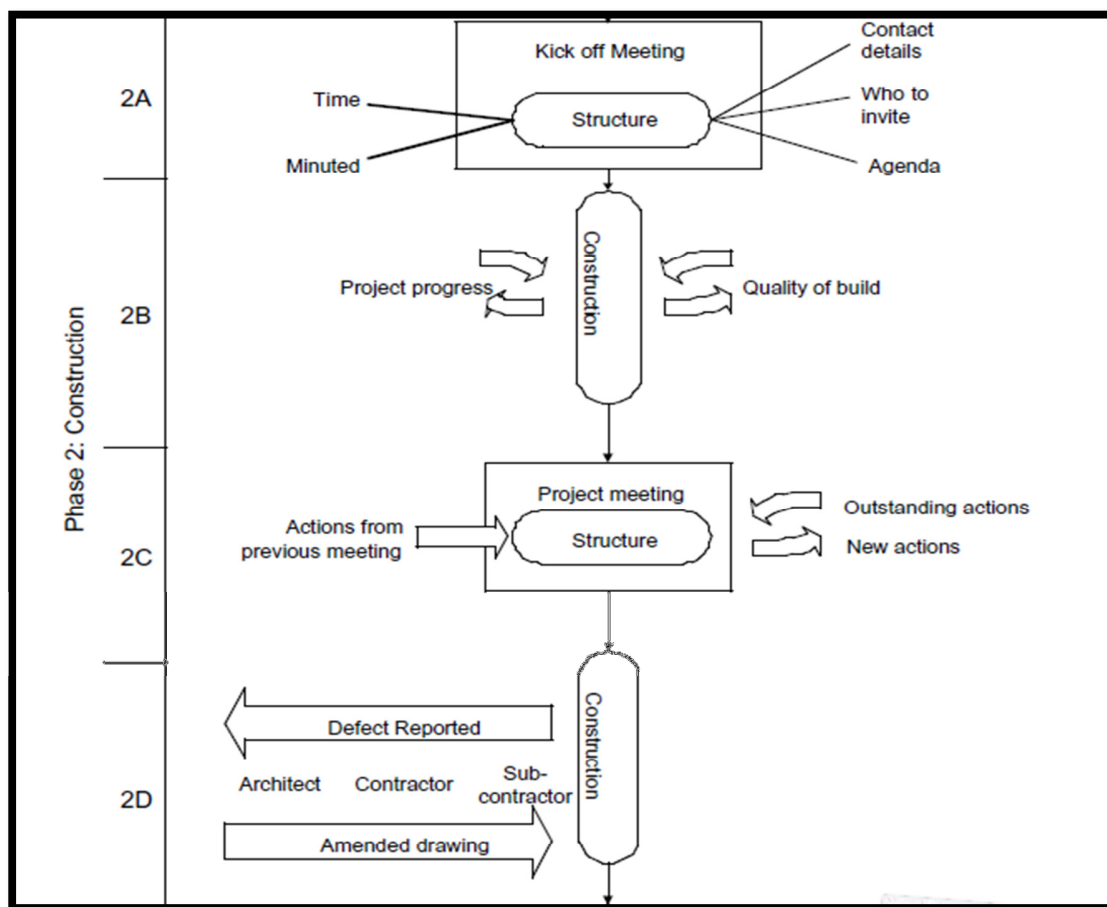


Figure 4.2: Communication issues during a typical construction project (Source: BRE, 2014: online)

4.4.1 Communication issues during construction

4.4.1.1 Pre-start gathering

The project manager should ensure that a pre-start or 'kick-off' meeting is held, because numerous benefits may arise from site communication, including the following:

- It allows individuals to get to know each other; this is likely to lead to improved communication and less provocative attitudes as the work progresses.
- It offers the opportunity to agree on how communication will take place on specific sites.
- It provides the opportunity to define points of interaction for all organisations directly affected.
- It can be used to ensure that all individuals have the contact details for others working on the project.
- It ensures that all relevant people attend the kick off meeting (pre-contract planning meeting). This may include supervisors, suppliers, subcontractors, the principle agent, design team, construction team, etc. (BRE, 2014: online).

4.4.1.2 Technical literature and advice

Excessive quantities of best practice information documents on design, material selection and construction are available from a variety of sources, including manufacturers; building regulatory authorities; trade associations; insurance companies (e.g. Housing Association Property Mutual (HAPM); National and House Building Council (NHBC)); and consultants and research organisations (e.g. Building Research Establishment (BRE), Construction Industry Research and Information Association (CIRIA)) (BRE, 2014: online).

The documents' availability will vary widely in their scope, size, and format depending on issues such as the intended audience and place of use for the document. Communication methods are also available in formats other than paper documents, such as technical information, as indicated in the first four examples in Table 4.1. Information can be communicated in seven ways. Each of these methods will have

different target groups in mind, as well as different reasons for their use (e.g. marketing, hand-outs in office or on site, etc.). Some people will prefer to use internet-based advice, since it is easy to access and understand. Others would prefer posters or guides in paper format that can be kept with them at all times. This can also be distributed more easily. Videos, however, is not a common method to use.

Table 4.1: Communication methods

Communication method	Description/use
Telephone help-desks	Manufacturers provide free advice on the selection, properties and use of their products. Mainly used by site management.
Internet-based advice	Product selection, technical and best practice advice accessible from a personal computer.
CD ROMs	Manufacturers provide product selection, technical and best practice advice.
Videos	Not a common method, perhaps best used to actively demonstrate a product being used or built.
Hand-held guides	Readily able to provide best practice guidance at the point of construction.
Posters	A traditional way to communicate best practice methods. Commonly displayed in site canteens.
Instructions printed on packaging	Manufacturers provide information on their products. The information is generally limited.

(Source: BRE, 2014: online).

4.4.1.3 Provision of technical advice

Preparations should be made to provide practical advice to site-based personnel. This may be of the utmost importance in situations where there is complex detailing to be built, the operatives are inexperienced, or new materials/products are in use. Any person reacts better after they have physically seen what needs to be done to ensure the success of any given site (BRE, 2014: online).

Providing the best practice information can be done in several ways, including presenting technical issues into the standard induction procedures, sample panels and mock-ups, best practice posters on display (e.g. in the site canteen) and manufacturers

visiting the site to reveal the best practice or new products; and supply operators with relevant parts of good practice (BRE, 2014: online).

4.4.1.4 Upwards feedback

Information needs to be efficiently reported to the formal management structure. Two key areas where this can be predominantly important are from supervisors to the site office (e.g. recording on an incorrect drawing) and the site office to head office (e.g. where an incorrect detail is discovered. This should be reported back to the design office and the drawings corrected) (BRE, 2014: online).

4.4.1.5 Project meetings

The effectiveness of any meeting will be benchmarked on the initial planning, individual contribution and the structure of the meeting being held. The benefits from such meetings should make the time spent worthwhile, if done efficiently. (BRE, 2014: online).

The success of formal meetings (e.g. the monthly progress meeting, cost report, monthly management meeting, etc.) is reinforced by being structured, includes a chairperson who provides structure to the occasion; an agenda to have a formal record of what is being discussed or to be resolved (and to stick to what is important for the specific meeting); set start and finish times (availability of time is of the utmost importance in this day and age); and minutes to record the results of the meeting (BRE, 2014: online).

Minutes should always be circulated as soon as possible after the meeting and include action points with the responsible person(s) identified and dates to be completed by. Consider inviting all relevant people to meetings, bearing in mind that some people may only need to attend specific parts of a meeting. As time is money in the built environment, individuals may contribute to the meeting (BRE, 2014: online).

4.4.1.6 Relevant information reaches the intended channels

Where instructions, drawings, specifications or documents are passed outside, the correct formal channels ensure that all relevant parties are kept informed. For example, where the architect emails an amended drawing directly to a sub-contractor, the main contractor should be informed and given a copy of the amendment (BRE, 2014: online).

4.4.2 Challenge of communicating in the construction project environment

Along with shipbuilding and aerospace, the construction industry is one of the oldest and most established project-based sectors. While construction has adopted new and innovative initiatives to varying degrees, its evolution is immediately determined by the constraints of site-based production. As the industry has largely continued to construct in situ, the project-based approach has remained one of bringing together a diverse collection of crafts, professionals and managerial personnel to disparate locations. Within the temporary organisation of the project, participants have a range of objectives, not all of which will be complementary of nature. Competing needs and objectives naturally lead to feelings of discord and tension, which in turn raise the possibility of conflict within a construction project team. Thus, the maintenance of effective communication is an effective way of ensuring that project teams are working together effectively and ultimately, to ensure successful deliverables. It is important to understand the difficult context in which managers operate. Within project-based industries, such as construction, barriers of effective communication are complex and multifarious, because of the number of actors that govern the success of construction practices (Dainty et al., 2006: 19-20).

Barriers to effective communication, according to Dainty et al. (2006: 69-70), are as follows:

- **The individual's frame of reference:** Different people interpret the meaning in communication differently. They rely on their own frame of reference and background to understand. Cultural differences, religious differences, etc. will determine how the message is being understood.

- **Stereotyping:** People will stereotype others according to their socially constructed views. This can lead to a course of action that does not apply to the needs of the particular situation. People will hear what others say because of their socio-economic background, profession or perceived disposition, rather than listening to what they are actually saying.
- **Cognitive dissonance:** If information clashes with a person's established beliefs or feelings, they will have difficulty understanding and accepting it. To deal with the discomfort, they will then challenge or disbelieve the information.
- **'Halo or Horns' effect:** If someone trusts another individual, they may be predisposed to agree with what they say. If there is no trust, they will not believe what they say.
- **Semantics/jargon:** This refers to the difficulty in transferring the meaning of information from one person to another. If jargonised words are used, and the receivers are not familiar with them, they will not understand the meaning.
- **Not paying attention:** When someone is distracted by outside noise or something in the surrounding area, then they will forget the information as soon as it is communicated to them. Internal and work stress, burnout, and lack of concentration can also influence the individual.

4.5 COMMUNICATION METHODS

There are some forms of communication, according to Knipe et al. (2002: 110), which will apply to most construction projects as well as management and administration personnel:

- **Oral:** Key form of communication on any level and any kind of project. Several formal agreements will be discussed verbally before being formally stated on record. There will always be many risks attached to verbal communication as different individuals will interpret information differently. It is therefore critically important that the message is clear and easily encrypted by every ear possible.
- **Written:** There will always be the potential for conflict between the desires to limit the quantity of correspondence. The more information documented, the

lesser the chance of vagueness and ambiguity on most of the elements of a construction project.

- **Graphical:** The basis of a construction project is design and construction drawings, and also the upkeep of new revisions of all different drawings and specifications, for example, electrical engineering drawings; mechanical engineering drawings; bulk excavations; structural engineering drawings; architect's drawings; room data sheets; plumbing and drainage; and many more, including sections and layouts of all of the above.
- **Numerical:** Tables and figures of data are used to convey project information. It is important that the data acquired is accurate in terms of human capacity and information needed. After that has been justified, it is very important that the table or figure that represents the data is easily and quickly understood.
- **Electronic:** More the modern way to go; however, there are numerous risks involved, but definitely the way forward in terms of efficiency and to help with time management.

The significance of communication is firstly, to cause action or agreement to take place and secondly, to create a record that may be needed for future information or future reference. The larger the project, the more complex communication becomes, and the importance of effective communication and the execution thereof should be emphasised (Knipe et al., 2002: 111).

Dainty et al. (2006: 6-7) agree and state that if there is no agreement on how to communicate, people find that it is difficult to function in the industry, both at individual and at team level. The management of the organisation also needs effective communication to be able to work efficiently. Communication is important to achieve coordinated results, as the organisation can only function properly if the employees work together. To coordinate that the outcomes are to the advantage of the individual as well as the company, effective communication is necessary. Change is constant in all organisations. This affects the company as well as the employees. The only way that the change will be accepted, is if the change is being communicated to everyone.

Employees need to be motivated. Employees have a responsibility towards the end product that will be delivered, and demotivated employees will not be effective in the organisation. Their motivation will mostly depend on what they will get from the company or management. Top management also needs to communicate clearly with the workers, because the quality of communication will influence and change the degree of motivation of the employee (Noble, 2013: online).

Dainty et al. (2006: 6-7) support this and state that the needs of the workforce should be understood, and an efficient two-way channel of communication must be created so that organisations can respond effectively to the needs of their employees. The channel should encourage and allow for feedback in an honest and open way.

Chen and Kamara (2008: 9) explain that there are some forms of communication sources that will apply to most construction projects:

- **Supervisor:** The person who has the power and authority to give instructions or orders to respondents, to be held responsible for the work or actions of respondents, and to administrate discipline and penalties.
- **Client:** The person who is responsible for paying for the work contracted to designers and to the contractor.
- **Consultant:** The person who has an agreement with and provides design services and portions of the construction documents for the design team.
- **Design team:** Designers who provide the client with the design of the project and the construction documents, based on the owner's needs.
- **Sub-contractor:** Separate business entities that provide labour, material, equipment, and occasionally second-tier subcontracts to complete a specific portion of the construction.
- **Engineer:** The person who is responsible for the coordination of shop drawings, submittals, layouts, subcontractor organisation, payment verification, and whatever duties are assigned by the construction administrator.
- **Supplier:** The person who supplies a particular service or commodity.

- **Project manager:** The person who is the responsible party to the owner for the success of the project and in charge of all of the construction management employees on the project.
- **Quantity surveyor:** The person who attempts to forecast and evaluate the design in economic terms both on an initial and life-cycle cost basis, prepares much of the tendering documentation used by contractors and plays an accounting role during the construction period.

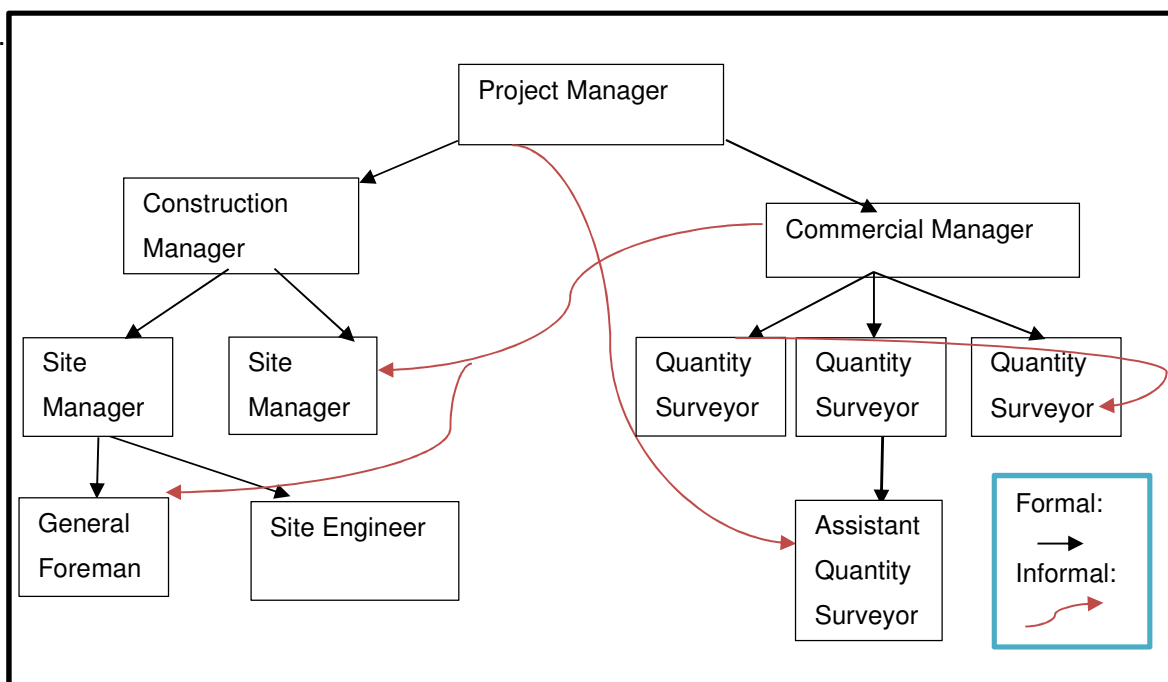


Figure 4.3: Formal and Informal Communication (Source: Dainty et al., 2006: 32).

Figure 4.3 shows the flow of formal and informal communication between the project team professionals. The project manager is at the top of the communication hierarchy of the project team. The communication between the project manager and construction manager, as well as between the project manager and the commercial manager is seen as formal, because it is information that comes from the client. The construction manager and commercial manager will communicate the necessary information to their teams. These processes will continue down the hierarchy, as indicated, as formal

communication. However, informal communication will also take place. This will normally involve guidance, assistance or help. Informal communication can take place between any of the team members (Dainty et al., 2006: 32).

The following are some examples of the basic forms of communication that will apply to most construction projects:

- Cellular (Mobile phone)

There are numerous ways in which you can elect to adopt this technology as your site communications medium. The simplest but the least controllable is to allow field workers to use their personal mobile phones and claim call costs as expenses (ARUP, 2014: online).

- Wireless Local Area Network (WLAN)

The most simple is an ad-hoc network, where a group of PCs and mobile computers fitted with wireless LAN cards can communicate with each other directly. This allows the transfer of information between PCs although it does not allow access to a fixed network. The most popular method of connectivity for wireless LANs is as an extension to a wired network, allowing mobile users or other authorised visitors access to the main servers and other work related information. It is important to realise that, in most applications, wireless LAN is an augmentation technology and not a replacement technology (Arup, 2014: online).

- Low Earth Orbit (Satellite technologies)

By using special handsets information passes directly to and from the nearest low earth orbit (LEO) satellite in view and on to its destination (Arup, 2014: online).

4.6 APPLICABLE ADVICE

Due to its very nature, the construction industry requires its personnel to be mobile in order to complete the project. To carry out their job function, communication with others

is essential and quality, quantity and timing of information can either hinder or facilitate successful results (Arup, 2014: online).

4.6.1 Take care and time with communication

Remember that giving attention to and spending time on communication would probably lead to benefits for the project. Communication should be supported (i.e. ensure that someone given an instruction has the backup, resources and knowledge to complete the task properly and the documentation of the instruction is just as important as executing the task). Make sure the method of communication used is the most appropriate and most effective. Whatever method is used, make sure the message is clear, that all people who need to know are informed, and provide instructions as early as possible. Assumptions are very dangerous, so make sure that actions identified in a memo, fax or email have been carried out. Some sort of follow up or checking might still be necessary. Learn from previous mistakes and experience that you have been involved with where the communication was either good or bad (BRE, 2014: online).

4.6.2 New communication technology

Benefits of items such as mobile phones and two-way radios are well-known; digital cameras and on-site internet and email access might also be beneficial communication tools. This communication technology comes at a price and there are many benefits, and a great deal of risk and administration involved. As long as it is used within the scope of its intended purpose, everything should be in order. For example, drawings could be emailed between the site office and the architect, as could digital photographs of defects and progress. The internet could be used to access information such as building standards and good practice guidance documentation (BRE, 2014: online).

On large-scale construction projects the use of project intranet systems has been shown to be valuable in especially cross-border projects and in areas with limited network access. These systems are based on project-wide access via a network of personal computers to electronic project documents such as drawings, specifications and correspondence (BRE, 2014: online).

4.6.3 Communication tools and methods

Although the contract documents emphasise the actual importance of communication requirements, Purves (2005: 13-15) explains that communication takes place at all times. Communication tools and methods used during the construction process should be suitable to those specific periods and circumstances. For example, you do not want to use a telephone conversation to issue a subcontract order. There are many ways to communicate and construction communication is commonly limited to basic tools and methods; nevertheless, as technology changes, the tools and methods would likely change, and with change comes added responsibility.

A formal meeting is an effective method, if used correctly, according to Geren (2012: 6). The meeting might be routine or a singular event scheduled at a specific time during the construction process. This is a prearranged meeting, usually with an agenda and specific attendees, as only their knowledge could contribute to a successful result. Minutes of formal meetings should be taken and distributed to attendees and other identified individuals shortly after the conclusion of the meeting, generally within a few days. This allows attendees to comment on the accuracy of the minutes while the meeting is fresh in everyone's mind. The person identified to conduct the meeting should not be the person taking the minutes.

As listed by Geren (2012: 6), typical formal meetings during construction include:

- Pre-contract planning meetings;
- Progress/cost report meetings;
- Contractor/subcontractor meetings;
- Safety related meetings; and
- Closeout meetings.

The next method is the informal meeting. These meetings are typically unscheduled and might be called to address a specific issue and probably occur more frequently than formal meetings. Attendees would vary, depending on the subject. Informal meetings occur out of coincidence, such as a conversation during a site visit. Informal meetings

could be very beneficial for a project. They allow for immediate discussion that could result in a quick solution to an issue. However, if not captured, the information is fruitless. Capturing information ensures that there is no misunderstanding or misinterpretation of what was discussed and provides proof that the meeting had taken place (contractually) (Burke, 2010: 280-281).

Another corporate and traditional tool, which Knipe et al. (2002: 110) focus on, is the telephone. Telephonic communications can fill the gap between written media and face-to-face dialogue; it is quick and effective without having to travel. The telephone conversation, like the informal meeting, can be used to discuss issues with possible immediate results, but it should also be documented if important decisions are made or instructions are given, for example, by backing up your statement with a follow-up email.

Reports provide beneficial information for all members of the project team, as mentioned by Geren (2012: 6), although if any party is unfamiliar with a report, they normally struggle to understand all the elements. Reports are used to record and convey information about the status or condition of the project or a portion of it. The most important aspect to remember about a report is that it is factual conjecture; hearsay and judgmental language have no purpose in a report. In cases where a picture explains the situation better than words, a photograph or various elements can be used as a figure, table or appendix in a report with a brief description and mark-ups that focus on specific items (e.g. keynotes, clouds, etc.).

Furthermore, reports, which document details that are typically lost over time, can be used as evidence. However, preparation of these documents is essential to the outcome of the report. Once the quality aspect of the report is questioned, the entire set of reports may be considered as unreliable (Geren, 2012: 6).

Electronic communication is growing at a rapid rate, starting with faxes, email, text messaging, and now, social media, such as Facebook, Twitter and LinkedIn. Electronic communications also include web-based software programs (Quantification software such as QTO, CCS, WinQS, DIMX etc.). Electronic communication may be used in

addition to other communication tools and methods because of its efficiency and effectiveness.

Knipe et al. (2002: 110) also investigated electronic communication, and explain that the main benefit of electronic communications is the capability to store and quickly retrieve documents. As with database systems, information can be searched in a small portion of the time it will take to search for hardcopies. Electronic communications can also be used as evidence.

Another method of construction communication, as stated by Geren (2012: 6), is public communication and perspective. Normally public communication does not happen within the construction team, but with the public. Public communication allows people not associated with a project to be informed of the progress of the work. Since public projects involve public funding, the population would like to know how their tax money is being used to create a better future. Most projects, public or private, could have an important impact on communities. Keeping nearby residents informed helps to soften the impact of dramatic changes; residents will normally be sceptical about change, because of the change in their comfort zones.

From the tender process through all the calls, emails and meetings, to the final application for payment, every member communicates at some time with another. As a team member, it is important to remember that other team members trust the information provided. If information is needed, make sure that it is appropriate and that it is communicated through the correct channels using suitable methods or tools (Geren, 2012: 7).

4.7 CONSTRUCTION SITE INFORMATION MANAGEMENT

In the construction industry, each construction project involves various participants collaborating for a relatively short period in the development of the mandatory requirements.

The traditional methodology to construction procurement, according to De la Garza (1994: 46-55), applies a sequential approach to project development, with the architects

completing most of their designs before the structural engineers, who in turn complete theirs before the construction phase. The involvement of a number of professionals and the traditional procurement procedure has resulted in a clear separation between the design and construction phases of the building process. This administrative and chronological separation has come at a price, frequently resulting in construction schedule delays, cost overruns, increased litigation, and poor building quality, incorrect information, stained relationships with clients, etc.

Bowden et al. (2004: 17-32) state that the construction industry has not found a suitable resolution to the problem of information communication and interchange on construction work sites. Construction sites are information demanding environments. A number of construction personnel in the field need large amounts of information ranging from drawings to contractual data and discussions. However, the main type of information personnel is to receive and transfer includes paper based files, which include drawings, data collection, correspondences, progress information and specifications.

4.8 CONCLUSION

Communication does not only involve talking, but also listening. Without clear, timely, unambiguous communication, even a small team working together might experience problems (Goudar, 2010: online). Communication helps any member of a team to develop interpersonal relationships, inspire team members, handle conflict, negotiate, chair meetings and make presentations (Burke, 2010: 280-281).

Effective communication may be hindered by, amongst other, language and culture differences. There are many different personalities in a team and this may cause communication problems.

Communication and communication channels within a project are essential to minimise risk and to increase project flow. Awareness on site between all members is important. In the ideal world if communication on site is at the correct level, a risk will be communicated immediately or even before it happens.

The correct protocol, as stated by Knipe et al. (2002: 111), is followed on and off site. Skills are developed and transferred from one generation to another. In order for that to happen, the whole team should stand together as a unit to ensure trust and to develop team charisma. The significance of communication is firstly, to create action or agreement and secondly, to make a record that might be needed for future information or reference.

Project and site communication, as an academic field, embraces a large body of knowledge and communication is regarded as a learned management skill, which is not easy to execute without suitable and adequate experience and knowledge of the relevant fields of construction (Knipe et al., 2002: 108-109).

CHAPTER 5

DECISION MAKING

5.1 INTRODUCTION

Steyn et al. (2012: 353) state that everybody is exposed to risks in his or her daily life. Therefore, one will expect that projects will also be exposed to risk. Risk in projects cannot be eliminated; it can only be reduced to an acceptable level. A risk-free project will not be worth pursuing. Certain risks in projects have to be accepted, reduced or transferred.

From the above it can be deduced that all predictions of the future can be described as unsure. It may seem unreasonable to cover up this fact in making a forecast of risks involved. Choices and decisions may have to be made, growth/expansion potentials may have to be exploited, and budgets may have to be allocated.

Yancy (2009: online) argues that risk management must be an integral part of any project.

Project risk management contains the processes for identifying, analysing and responding to project risk. Each process has a set of input and a set of output. Each process also has a set of tools and techniques that are used to turn the input into output (Yancy, 2009: online).

5.2 CERTAINTY VERSUS UNCERTAINTY

A very common risk area, which is currently covered in most risk analyses, concerns fluctuations in the prices of labour and materials. The question arises as to which party bears the risk contractually, should they be involved in such a case. It should always be kept in mind that risk management should be applied in the selection of suitable tenders and contractual agreements for this problem to be manageable. To ensure that the above mentioned is manageable, there must be clear and correct clauses in the contract to justify the necessary actions (Project Management Institute, 2000: 149-150).

Certainty is achieved in cases where alternative outcomes are identified, together with a definite statement of the probabilities of such outcomes. Partial uncertainty is found where alternative outcomes can be identified, but without the participant's knowledge of the probabilities of such outcomes (Kirkman, 2008: 3).

Many variables that may be prone to uncertainty and unpredictability may affect the outcomes of a project, as listed by Steyn et al. (2012: 358), for example:

- Material and labour costs;
- Exchange rate fluctuations;
- Delivery time for purchased items;
- Duration of tasks and activities; and
- Technical performance and reliability of subsystems.

Total uncertainty exists where even the alternative outcomes cannot be identified. This line of reasoning implies that if risk is regarded as the extent to which the actual outcome of an action or decision may diverge from the expected outcome, an action or decision can be risk-free if the consequences or outcome of the situation are known with certainty (Kirkman, 2008: 3).

Uncertainty is a major characteristic of refurbishment work. Generally, there is a high level of uncertainty, not only in the client's objectives but also in the design team (Kirkman, 2008: 3).

According to the Building Confidence Index (BER, 2015: online), as illustrated in Figure 5.1, the building confidence index can ascend or decline. Decision making will be influenced by this index, as construction companies are dependent on shareholders. The overall decline may in part be due to a sharp decline in residential building activity. The Building Confidence Index may ascend when national and international shareholders, as well as government, invest in the building sector of South Africa. The decline in confidence of main contractors changed towards the end of 2014 when it rose noticeably.

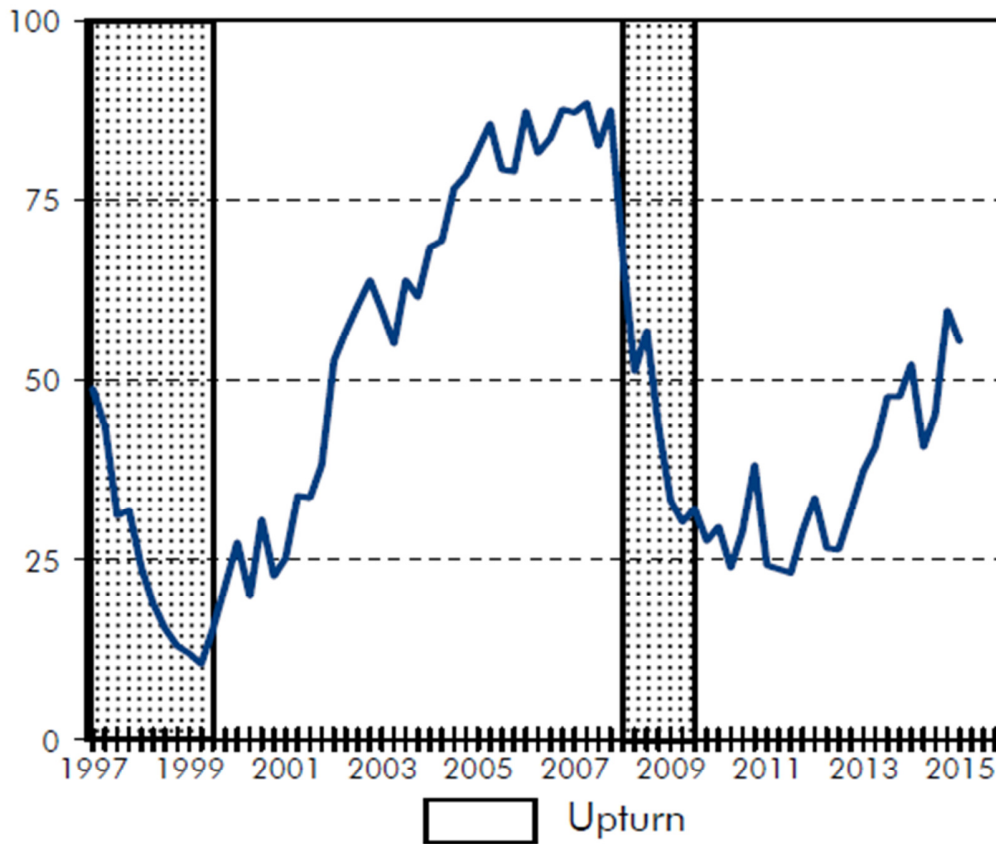


Figure 5.1: Composite Building Confidence Index (Source: BER, 2015: online)

The result in Figure 5.2 was formulated to get data on the professionals experience and it was found that the construction industry has its ups and downs, bad times and good times. Good times will lead to certainty in the industry, whereas uncertainty will be linked to the bad times.

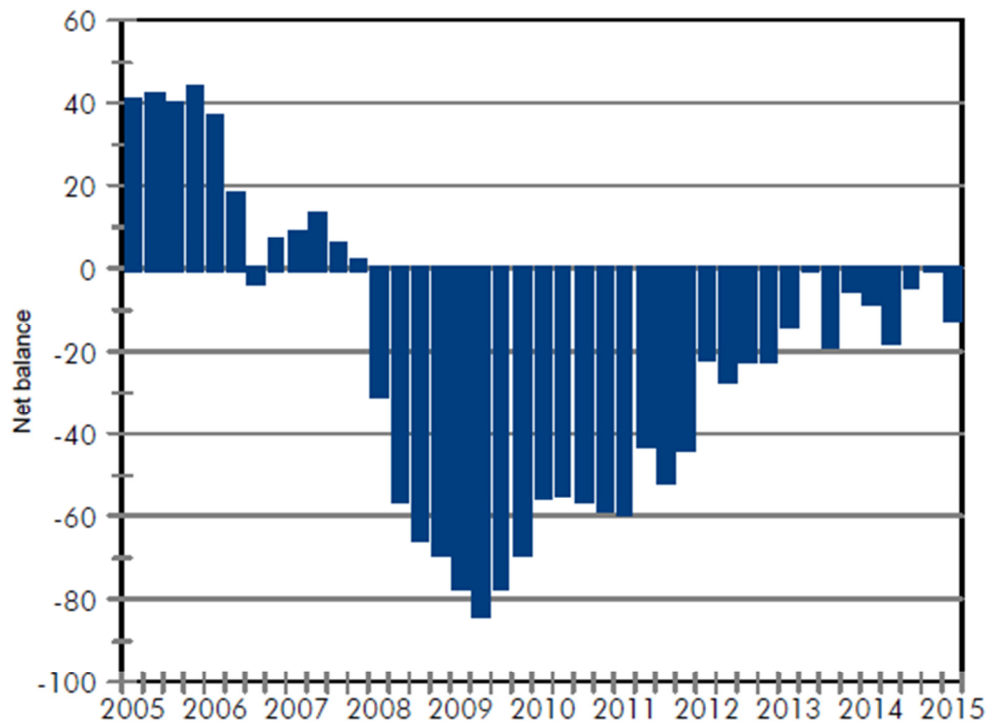


Figure 5.2: Main contractors: growth in building activity (Net balance) (Source: BER, 2015: Online)

5.3 METHODS FOR DECISION MAKING

In order to help people make decisions to construct the anticipated variant from an anticipated result at some time, risk management needs to be seen as an expert discipline that intends to provide a scientific method. Organisations ultimately use risk management in order to make complete, worthy decisions to achieve or exceed their goals (Kallman & Maric, 2004: 57).

Decision making interpreting action as a rational choice, is a way of portraying it. The durability of the idea of decision making not only shows how useful it is, but also its dependability on human goals. Theories of rational choice comprehend and mention choices by using daily language. Language is also an important factor in decision making, since communication is needed to convey a message or to relate ideas (March, 1994: 1).

Methods for deciding on the most imperative risks contained in a project may probably differ from project to project. While there are doubts about the need to restrict the number of risks to be actively managed, it may be clearly beneficial to give attention to those risks that are considered to be of high impact or high probability (Ashworth & Hogg, 2002: 167).

When one makes a decision, on any level, there needs to be an action behind that decision. This also means that for every action a reaction will develop. This means that a decision will have a result. The result achieved is not necessarily the intended result as per decision made at initiation, but it will have to be managed. Moreover, this result can be positive or negative. Any member, team or company that can be held accountable for decision making, should be aware of this. However, only being aware will not be enough; they need to learn from every possible experience they encounter. A positive frame of mind and previous experience can be used to advantage in future problems (March, 1994: 87).

When a person, team or company needs to make a decision, they need to ensure that the decision is ethically accepted by the community in which it will be made. The decision needs to be both legal and morally accepted by the society it will influence. The decision maker also needs to know what the morals are and how to include it when making a decision (Jones, 1991: 367).

Senior leadership support and employee involvement are needed to ensure that a project in the private sector will be successful. Furthermore, in the private sector, the focus will fall more on the finer detail, since it is the client's money and wishes that need to be complied with. In the public sector the support and understanding from top management are also as important, but will be more restricted in the sense of innovation and creativity. However, despite the fact that they are restricted, the success of the project still depends on strong management support (Jurisch, Ikaš, Wolf & Krcmar, 2013: 6).

The quality of the calculated decisions of the top management teams will influence the organisation's performance, since harmony is needed between all team members to

implement these decisions in the best way possible. Further, to sustain their ability to produce and implement strategic decisions, the top management teams must maintain a positive, affective relationship among their members. Thus, the quality of the decision, the consensus and agreement among the members, and affective approval are all required for reasonably high performance (Amason, 1996: 123).

The interactionist model states that the interaction of individual and situational components explains the ethical decision making in organisations. The individual reacts to an ethical problem with perceptions determined by his or her cognitive moral development stage. How an individual thinks about ethical dilemmas and his or her process of deciding what is right or wrong in a situation is determined by the individual's cognitive moral developmental stage. However, cognitions of right and wrong are not enough to explain or predict ethical decision-making behaviour. Additional individual and situational variables interact with the cognitive component to determine how an individual is likely to behave in response to an ethical dilemma. Three individual variables, namely ego strength, field dependence and locus of control, are proposed to influence the likelihood of an individual's acting on cognition of what is right or wrong. Situational variables arising from the immediate job context and the broader organisational culture also moderate the cognition/behaviour relationship. These include the organisation's normative structure, referent others, obedience to authority, responsibility for consequences, reinforcement contingencies and other pressures. Finally, characteristics of the job itself and the moral content of the organisational culture can have an impact on the moral development of the individual (Trevino, 1986: 602).

In order to reform or restyle the methods of the organisation, it is important to manage change effectively. However, it is much more difficult to achieve change in the public sector because of binding laws and regulations, accountability, transparency and strict adherence to the given provisions. In the private sector, the management of the human aspect of change is important, since the employees need to change with the company (Jurisch et al., 2013: 6).

Various decisions need to be made by different management groups, and when these decisions are made, some of the decisions need to be put in writing to ensure that all parties involved know what is needed of them. This can be done in the form of a document, agenda after a meeting, notice or contract.

5.4 CONTRACTS

Consistency in procurement documentation can be achieved if there is a complete separation in the component documents that make up a procurement document (i.e. the conditions of tender, the conditions of contract, the specifications and methods of measurement and payment).

Maritz (2009: 2-8) investigated which standard forms of contract respond best to this approach to uniformity in procurement documents. The following documents, namely the JBCC, GCC, NEC and FIDIC, are known to be used in the construction industry.

Joint Building Contracts Committee (JBCC) Series 2000: From the start, JBCC recognised that employers, contractors and professionals alike could gain a huge advantage if the JBCC documentation could be personalised in such a way that it meets the needs of both the private and public sectors. A joint committee was established to diminish the possible parts that could be accommodated without altering the meaning and making it difficult to read and understand (Maritz, 2009: 3-6).

According to Maritz (2009: 12), the JBCC is the preferred standard form of contract in the South African building industry. The JBCC must continue to support and improve its documentation collection. Furthermore, it is generally recognised that the supplementary documentation and technical support provide constructive assistance to users.

The following aspects are very important in contracts, as it is critical to the implementation of a successful document:

5.4.1 Administration

Contract administration is the process of ensuring that the seller's performance meets contractual requirements. On larger projects with multiple product and service providers, a key aspect of contract administration is managing the interfaces among the various providers. The legal nature of the contractual relationship makes it imperative that the project team be acutely aware of the legal implications of actions taken when administering the contract (Project Management Institute, 2000: 131).

Contract closeout is similar to administrative closeout in that it involves both product verification (Was all work completed correctly and adequately?) and administrative closeout (updating of records to reflect results and archiving of such information for future use). The contract terms and conditions may prescribe specific procedures for contract closeout. Early termination of a contract is a special case of contract closeout (Project Management Institute, 2000: 133).

These procurement processes may overlap and interact. If procurement occurs between different organisations, the contract will be formal. Procurement may also occur between parties within a single organisation, but the contract will then be less formal. If a dispute were to arise, no organisation will be able to go to court against itself (Steyn et al. 2012: 421-422).

A contracting model determines which contracts are to be entered into and what the objectives of each contract will be. The governing principles of the contracting model should be:

- No contract is risk free. Risk should be identified and minimised, and then be transferred to that party best able to manage it.

There should be an allocated single point of integrative responsibility (Steyn et al. 2012: 424).

5.4.2 Contract provisions for risk allocation

Provisions for the allocation of risk among parties to a contract can appear in numerous areas, in addition to the total construction price. Typically, these provisions assign responsibility for covering the costs of possible or unforeseen occurrences. A partial list of responsibilities with related risk that can be assigned to different parties, will include consequential damages (i.e., payments for actual damage costs assessed upon impact of facility defects), delays and extensions of time, differing site conditions (i.e., responsibility for extra costs due to unexpected site conditions) and equal employment opportunity regulations. The list will, furthermore, include force majeure (i.e., this provision absolves an owner or a contractor for payment for costs due to 'acts of God' and other external events such as war or labour strikes). However, indemnification (i.e., this provision absolves the indemnified party from any payment for losses and damages incurred by a third party such as adjacent property owners.), labour laws (i.e., payments for any violation of labour laws and regulations on the job site) and liens (i.e., assurances that third party claims are settled such as 'mechanics liens' for worker wages) should also be included. Liquidated damages (i.e., payments for any facility defects with payment amounts agreed to in advance), occupational safety and health of workers, permits, licenses, laws, and regulations, suspension of work, termination for default by contractor as well as warranties and guarantees should also be included (Hendrickson, 2008: online).

The language used for identifying the risk tasks and duties in these areas must follow the legal requirements and previous interpretations that may differ in altered jurisdictions or over time (Hendrickson, 2008: online).

The client wants a quality-constructed project with equitable and sensible costs, but not all are willing to share risks and/or provide incentives to enhance the quality of construction (Hendrickson, 2008: online).

In recent years, more clients distinguish that the results are normally poor quality of construction by squeezing all the profit from the contractor, and they accept the conception of risk sharing / risk assignment in principle in any known contract.

Nonetheless, the execution of such a notion in the past period has established mixed results (Hendrickson, 2008: online).

5.5 METHODS AND STAGES OF RISK MANAGEMENT

To manage risk, one needs to make important decisions. These decisions will have an influence on the outcome of the project, as the risk will be managed in different ways. If the wrong decision is made, it can have a major impact on the project. It is the responsibility of the team to decide how to deal with risk using certain methods.

There are generally four methods for dealing with risk: ignoring (absorbing), avoiding, reducing (managing) and transferring (insurance).

To ignore, absorb, accept or retain a risk means that one knows that the risk cannot be eliminated or avoided, thus one accepts or assumes that the risk will occur. It can, however, be minimalised by taking the necessary precaution to prevent the risk from becoming too big. It would be the team's responsibility to decide what to do with the risk and to what extent it would influence the project (University of Wisconsin, 2015: online). It is, nevertheless, a dangerous strategy, because the business will run the risk of underestimating potential losses and will be exposed in the event that an incident arises (Elders Insurance, 2013: online).

When avoiding risk, the risk needs to be removed by eliminating the situation that presents the risk. It is not always possible to completely eliminate the risk, but there is the possibility that the risk can be handled (University of Wisconsin, 2015: online). This is one of the easiest ways to mitigate risk, but it is not always a realistic option for projects to take, so the team needs to make an educated decision in deciding if it can be avoided (Elders Insurance, 2013: online).

In the event of managing or reducing a risk, the goal is to be able to minimise the potential that an incident could occur (Elders Insurance, 2013: online). In order to do so, the company needs to decide to set up policies and procedures underlining how the risk will be reduced, and training needs to be provided to enable the employees to handle the risk should it happen. All this will help to reduce the risk. Sometimes it is more

practical to retain the risk, although other ways of handling risk are available (University of Wisconsin, 2015: online).

Transferring risk to an outside party, usually by means of a contract or lease, can be used in some cases. The team would thus decide that the risk will be better dealt with if an outside party managed the risk (University of Wisconsin, 2015: online). This is one of the best methods of risk management as it is a realistic approach, although it can be expensive if not handled effectively. This approach accepts that, although incidents sometimes do occur, the insurance will ensure that the project can cope with the impact of the incident (Elders Insurance, 2013: online).

In many organisations, this process may have changeable levels of formality and administration associated with it. Some of the companies regard risk management as the main tool of project management. The central idea is that risk management can help identify possible causes of project disasters, from the start of the project until the end. In terms of disaster prevention and control, the flaw is that the evaluation of risks comes down to subjective evaluation (Nickson & Siddons, 2006: 76).

5.5.1 Identification

The first step is identification. It involves asking anyone and everyone to identify any risks they believe might apply to the project, and rating them according to harshness and possibility. These decisions are based on low, medium or high for both categories. These are compiled into a risk register (Nickson & Siddons, 2006: 76-77).

5.5.2 Review, evaluation and assessment

Systems vary as to what happens after identification, but in general, the following is typical: it is based on ranking the risks according to joint impact and probability that is decided by the team. The first filter in use is usually to eliminate all the 'low-low' risks, but it only needs to be considered if their status changes in the future. The ranking process can be applied to give increasingly higher profiles to high-impact/probability risks (Nickson & Siddons, 2006: 77-78).

5.5.3 Strategic planning

Following on assessment, once the nature of the risk has been fully reviewed, the next step is to decide on a plan for dealing with each risk. These may include ignoring it, taking mitigation action to decrease the chance of it occurring or minimising the impact, and have an emergency plan in case it does happen (Nickson & Siddons, 2006: 78).

5.5.4 Monitoring

Monitoring is the part of the process that most people often forgets, together with failing to apply identified mitigating actions. The risk identification, assessment and planning stages need to be adjusted when things change. Risk reviews can be implemented whenever there is a demand for a change or by setting criteria that decide the level of the reviews according to the level of the change (Nickson & Siddons, 2006: 79).

In the four stages described above, from identification to monitoring, one constantly needs to make critical decisions based on relevant risks at hand. All decisions made will influence the stages that follow. Thus, all decisions need to be considered and reflected on.

5.6 PROJECT RISK MANAGEMENT

Risk management should be a directed, focused and deliberate effort for a typical project. The following items should be considered in a typical risk management plan:

- Determine the level of risk assessment;
- Schedule the risk management activities for the project;
- Risk management should be an agenda item in regularly scheduled project meetings;
- Risk management should be included as an agenda item in monthly project meetings and should be the main agenda item each quarter;
- Regular communication to the project team regarding risk management efforts and expectations could be essential. During the initiation and alignment stage, risk management should be communicated to the project

team before planning the work and endorsing the plan. It might specifically be necessary to include the team's mission/assignment, roles and responsibilities; and

- Risk should be managed, documented, and reported. An item for reporting on the status of risk response actions should be incorporated into the project schedule and monthly meetings. In addition, a team could make use of a risk management plan spreadsheet for summarising and tracking risk response action efforts for significant risks (Elyse, 2006b: online).

If a risk or multiple risks occur, there should be a plan to manage, reduce and avoid the risk as quickly as possible. Competency of risk planning may increase with experience and a well-structured knowledge of skills. Early planning in a project may prevent delays and reasons for panic should disruptions occur (Elyse, 2006c: online).

Elyse (2006a: online) explains that, if the communication and planning is done successfully, the project deliverables can be taken full advantage of and the project losses can be reduced.

When a project is being planned, it is a very good time to make provision for certain risks or crises that may occur. On the other hand, one does not always have control over these risks and crises that may occur. However, when a risk or crisis does occur, it needs to be solved and the necessary systems have to be in place and implemented correctly to minimise any deficit that may occur.

5.7 CRISIS MANAGEMENT IN THE OFFICE

The purpose of a business continuity management plan is to ensure that there is continuity and/or timely recovery of business operations following a crisis to business operations. This ensures competitiveness and does not lose customer confidence (Nell, 2013: 3).

5.7.1 Potential threat or disaster to the building

On receiving notification of a potential threat or disaster, the building is to be evacuated immediately. Once the building is evacuated, the emergency services such as fire or police are to be contacted, depending on the potential threat or disaster, and then the core crisis management team is to be contacted (Emmitt & Gorse, 2007: 25-26).

The management team assesses the potential threat or disaster and identifies the need to relocate (Nell, 2013: 3).

The following are potential threats or disasters that could require relocation, as listed by Nell (2013: 4):

- Bomb threat/blast;
- Fire;
- Epidemic;
- Extended unavailability of water supply;
- Other natural perils (earthquakes and floods);
- Denial of access to the building;
- Facility structural failure, (burst pipe, wall collapse);
- Terrorism;
- Sabotage; and
- Strikes.

Nell (2013:4) further explains that if relocation is required, the core crisis management team is to contact and update the crisis management team as well as the departmental heads of each section. If no relocation is required and as soon as it is safe to do so, the people will be allowed to return to the building. The core crisis management team will update the crisis management team and any further action required will be decided upon.

5.7.2 Potential threat or disaster that does not require relocation

On receiving notification of a potential threat or disaster, the core crisis management team should be contacted. The initial responsibilities of the core crisis management team are an assessment of the potential threat or disaster. The core crisis management team will update the crisis management team and any further action required will be decided upon (Project Risk Management, 2010: xvii).

The following are potential threats or disasters that do not require relocation:

- Legal liability (non-compliance to legislation, late payments etc.);
- Information system failure (hardware failure, software failure, virus attacks, etc.);
- Loss of key personnel;
- Telecommunication failure;
- Temporary electrical failure;
- Employee error;
- Fraud/theft;
- Financial support systems unavailable (banks);
- Postal strikes;
- Failure or non-performance of critical suppliers, third parties, including outsourced partners;
- Kidnap;
- Major financial loss;
- Death or injury of key personnel;
- Loss or unavailability of key personnel;
- Industrial espionage;
- Sabotage; and
- Loss of entire/part of the management team, due to an accident (Nell, 2013: 5)

5.7.3 Information transfer to employees at the time of a disaster

The following information is to be passed on to employees, as stated by Nell (2013: 6) at the time of a disaster:

- Inform the employees that an incident/disaster has occurred, and where possible elaborate on the extent of the damage;
- Inform the employees that the business continuity management plan has been activated and that the incident/disaster is being dealt with;
- Further inform the employees that under no circumstances must they or their personnel talk to the press; and
- Where possible, employees are to keep time sheets on the time they have spent setting up their new working environment (required for insurance cover purposes).

5.7.4 Investigative team

Depending on the threat or disaster, the crisis management team is to appoint an investigative team to:

- Establish the nature and extent of the threat or disaster;
- Establish, where applicable, the nature and extent of injuries or fatalities and the details of the relevant person/s to be sourced as soon as possible;
- Interview affected and involved staff members;
- Interview witnesses;
- Liaise with the local authorities to establish the cause and impact of the crisis on physical structures and assets. if applicable, establish the duration for which the building will be inaccessible;
- Compare notes with the local authorities, but do not disclose any information; and
- Avoid media contact (refer media to the crisis management team) (Project Risk Management, 2010: xvii).

5.8 MANAGEMENT

5.8.1 Responsibility and authority

To ensure the successful implementation of the management systems and to comply with stated legislation, clear lines of responsibility are defined to ensure that both the

spirit of the relevant legislations and the requirements of associated regulations are met. The managing director or the person with the highest authority and most control over decisions affecting the day-to-day running of the business is the person ultimately responsible to ensure compliance with legislation. As with the financial running of a business unit, responsibility and accountability structures are in place to ensure efficient profitable results. To ensure profitable results for the safety, health and environment (SHE) programme, management will define clear responsibility and accountability structures (SHEQ Management Systems, 2014: online).

Legislature has acknowledged that the managing director will require assistance to ensure the implementation and management of SHE legislation and has, therefore, provided this person with the authority to assign the responsibility to other personnel to assist them with these functions. The managing director will provide for nominated management representatives to be appointed for specific duties to ensure that the management system requirements meet with ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007 and legal requirements. In the event of specific appointments as per legislation requirements, these appointments will be made in conjunction with the management system stipulations (SHEQ Management Systems, 2014: online).

5.9 CONCLUSION

Decision making and communication are two vital factors, as the success of decision making will have an effect on the success of communication, which will have an effect on any project. Methods for deciding on the most imperative risks contained in a project may probably differ from project to project. Obviously, the more senior the team member, the more serious the decision making becomes, as it will most probably affect everyone lower in the hierarchy. This is an indication of the seriousness of decision making as well as the correct execution thereof (Ashworth & Hogg, 2002: 167).

Ethical decision making and behaviour are issues involved in the various decision making models. The degree of morality felt is expected to play a key role in the acknowledgement of moral issues. In a simpler way, it can be said that the details of

decision making and behavioural processes become unrelated if the person does not know that he or she is dealing with moral issues.

The four most commonly used contracts are the JBCC, NEC, GCC and FIDIC. The contract is an agreement between two or more parties, where both parties' requirements need to be included and respected. A contract that is not done the correct way, may lead to wrongful interpretation, which may lead to legal action being taken, such as mitigation, arbitration, adjudication, and mediation. Choosing the contract, and deciding together, are as important as managing the contract on an administrative basis.

Project management is a continuous process from the start to the finish. It is crucial to plan in detail, even though not all the information is always available. Making provision for the unforeseen at the beginning will allow the project and/or construction team to prepare for certain situations. This means that there will be a system in place to eliminate or reduce the problem on various levels of management. Thus, the emphasis will be on thorough project planning to increase the chances of dealing with the project successfully. If the communication and planning are done successfully, full advantage can be taken of the project deliverables.

When risks or crises do occur, they need to be solved and the necessary systems have to be in place and implemented correctly to minimise any deficit that can occur. Even though crisis management is not the first thing that comes to mind when thinking about risk, it can always be turned into a threat or opportunity. It depends on whether companies have structured policies and procedures and tested systems in place. Should any form of crisis occur, it can then be dealt with promptly.

Decision-making is important in all the different aspects, as seen above.

CHAPTER 6

EMPIRICAL RESEARCH AND DATA ANALYSIS

6.1 INTRODUCTION

The empirical study that forms part of this research study includes interviews and the questionnaire results. Interviews were held with twenty individuals such as contract managers, site agents, site engineers, resident engineers, construction quantity surveyors, in management positions, who have five or less years of experience, and members with experience exceeding 10 years of knowledge in their professions.

All of the interviewees have a tertiary qualification in building science. The contents of the interviews concerning the questions asked were the same to ensure consistency. Questionnaires were sent to professionals working in the construction industry who had experienced and dealt with risk and risk management, and who had up to 25 years of experience in risk management.

The format of the questionnaire was regarded as user-friendly, clear, well-structured and easy to answer. The questionnaire was distributed to 43 research participants to get a broad perspective of the opinion of the professionals in the industry, and only 22 questionnaires were returned within a reasonable time.

The empirical study is based on interviews as well as sending out the questionnaire. The interviews, as well as questionnaires, were used to gather information for the empirical study. These research methods were used to test the reliability of each method and the study itself, thus forming a solid research basis that is sufficient, comprehensive and impartial.

6.2 TESTING OF QUESTIONNAIRES

The questionnaire was tested by a group of five individuals who were regarded as qualified experts with adequate experience. After the pilot study had been conducted, the feedback was gathered, processed and changes to the questionnaire were made. Thereafter the questionnaire was distributed to participants and returned within a

reasonable time. In order to study the effects of specific risk factors on the construction industry, various organisations were used in the sample.

6.3 PURPOSE

The purpose of this chapter is to analyse the opinions of respondents regarding the risk management skills of construction project managers and to evaluate the opinion of respondents on the effectiveness of core communication and decision-making skills for construction management. The opinions of respondents are also evaluated in the context of the proposed risk, communication and decision-making skills.

6.4 RESEARCH METHODOLOGY

The research hypothesis states that a construction project requires industry specific knowledge, specifically when managing risks in the construction environment. Furthermore, the study aims:

- To create awareness of risks by all parties involved;
- To show that better planning will limit or mitigate the source of risk on a project;
- That effective risk management will only be possible with efficient communication;
- That the financial advantages should be identified;
- That there should be better quality and control of the project;
- To prove that forecast can be more accurate if some risk is anticipated;
- To prove that teamwork and human resource skills will be developed; and
- To educate future generations on the importance of risk.

6.5 INTERVIEWS

Interviews were conducted with twenty (20) professionals where seven different topics formed the base of the interview (see Table 6.2). The main aim of the interviews was to obtain feedback to determine the opinions of professionals in the construction environment.

The interviews were conducted with junior to more senior professionals that worked on various projects in the construction industry in 2014. All these professionals were selected based on their management level, knowledge and experience in the building and construction industry. From the data collected, it was notable that the interviewees had a wide range of working experience in the construction industry. It was beneficial to conduct interviews with them, since the opinions were from different generations. However, with regard to risk management, the opinions of more experienced employees will be more valuable.

Although different opinions are valuable, the minimum requirement was that the individual should have at least a tertiary qualification. The majority of the interviewees had reasonable number of years' (5 to 15) experience and were in senior management positions.

During the interviews, most of the interviewees confirmed their positions and job titles verbally. Before the interviews, there were already a good relationship between the interviewee and the researcher. All the interviewees are currently working on active projects, and thus are of utmost importance to share their views and opinions.

Table 6.1 shows the profile of the professionals interviewed.

Table 6.1: Profile of professionals interviewed

Nr	Participant position	Qualification	Years' experience
1	Junior Quantity Surveyor	Honours Degree	2
2	Site Quantity Surveyor	Master's Degree	5
3	Site Quantity Surveyor	Honours Degree	7
4	Site Quantity Surveyor	Bachelor's Degree	6
5	Senior Quantity Surveyor	Honours Degree	13
6	General Foreman	National Diploma	17
7	Site Engineer	Honours Degree	6
8	Site Engineer	Bachelor's Degree	4
9	Site Agent	Bachelor's Degree	11
10	Junior Project Manager	Bachelor's Degree	2
11	Project Manager	National Diploma	9
12	Project Manager	Honours Degree	22
13	Project Manager	Master's Degree	13
14	Contracts Manager	National Diploma	14
15	Contracts Manager	Honours Degree	11
16	Contracts Director	National Diploma	27
17	Quantity Surveyor	Honours Degree	9
18	Candidate Quantity Surveyor	Honours Degree	4
19	Candidate Quantity Surveyor	Honours Degree	6
20	Senior Safety Officer	National Diploma	18

The profile of interviewees indicates that they are in positions of authority. Of the interviewees, 55% have an honours or master's level qualification. Regarding experience, 45% of the interviewees have experience of more than 10 years, while 85% of the interviewees occupy positions in construction site management. The interviewees are qualified and experienced in the field and their opinions can therefore be seen as representative and reliable for this study.

6.6 EMPIRICAL FINDINGS

6.6.1 Important knowledge

The interview findings of senior management in the construction industry and the knowledge they gained through experience are essential to resolving and mitigating risk and risk factors. Common areas of knowledge that were identified were crisis management of any given situation, problem solving, decision making and construction industry knowledge.

All the interviewees indicated that teamwork is essential and that one has to have knowledge about one's colleagues' responsibilities, so that one can assist to the benefit of the company.

The feedback from the interviewees indicated that they had different opinions about how to gain experience in the field. Some stated that you need to start on smaller, less complex projects and over time, gain experience to work on larger and more complex projects. Others stated that you will learn more and faster on bigger projects, which are more complex, as one will be, figuratively speaking, thrown into the 'deep-end' and just need to 'swim'.

All interviewees gave sufficient feedback and participated in discussions during the interviews. Seven topics were discussed and results are as follows:

Topic 1: Create awareness of risk by all parties involved

Discussions with most of the senior interviewees indicated that risk awareness was very important but was also indicated as one of the most neglected aspects. The most common reason provided for this was lack of time, poor time management, and insufficient or incapable human resources. The junior interviewees concentrated more on creating awareness among subcontractors and additional junior personnel on a project.

Topic 2: Better planning will limit or mitigate the source of risk on a project

All of the interviewees agreed that better planning will most definitely encourage the project team as well as identify possible risks that may arise by focussing on historical data, knowledge and experience. Most of the interviewees also stated that, in theory, better planning seems like a very good idea, but that it is not as easy in practice. The reasons for this are competitive markets, insufficient preparation for contractual documents, insufficient human resources, tight financial margins, working opportunities, global competitors, etc.

Topic 3: Effective risk management will only be possible with efficient communication

Most of the interviewees agreed that communication and communication channels within a project are essential to minimise risk and to increase project flow. The interviewees also stated that it is very important that communication goes through the right channels; either top-to-bottom or bottom-up, depending on the level of severity of any given matter. Awareness between all members on site is really important. In the ideal world risks should be communicated immediately or even before they happen, if communication on site is at the correct level.

Topic 4: Identify the financial advantages

Most of the site-based professionals do not take financial information too seriously, as they have one aim and one aim only; to get the job done as soon as possible. The feasible information the researcher received came from various levels of quantity surveyors as well as contract managers. The interviewees indicated that it is essential to identify risk before it takes place or to eliminate or limit the risk as soon as it occurs. Not identifying some risks may have a huge impact on project revenue, allowable cost, original planning, earned value and financial forecasting, front and back end loading of a project's cash flow, as well as labour strikes and unhappy contractors. That is why most of the interviewees stated that it is important to make provision for effective risk management programmes or risk management resources within a company.

Topic 5: There will be better quality and control of the project

In most construction projects, the word quality will be stated a number of times as the client want the project to be perfect and the contractor will be battling with the day-to-day constraints and design changes. All of the interviewees agreed that by controlling risk to an accepted level will most definitely increase the quality as time management will be easier, there will not be as many obstacles at practical completion, and there will be enough time to plan all activities and not to have to rush these activities. The quality of a project is indispensable for a construction project as it has a huge cost effect. Either way, the contractor's reputation is on the line, as well as building up future clientele.

Topic 6: Forecast can be more accurate if some risk is anticipated

Estimators, planners and quantity surveyors normally play a fundamental role in the execution of an effective forecast, but for the forecast to be effective all parties must be aware of what the other parties are doing. According to the interviewees this normally does not happen. Therefore, in essence a lack of communication leads to many hours being lost fixing financial forecasting on a monthly basis. If the basis of correct communication is followed, the chances of limiting forecasting risk should decrease. All of the interviewees stated that an efficient communication system in a company, for example Microsoft Lync, etc., will definitely limit these accruals.

Topic 7: Teamwork and human resource skills will be developed

All interviewees agreed that if the correct protocol is followed on and off site, skills will be developed and skills will be transferred from one generation to another. In order for that to happen, the whole team must stand together as a unit to ensure trust and to develop team charisma. If this is not the case, there are endless types of risk that may occur. The most common risks mentioned by the interviewees were financial risk, laboured and demotivated staff, lack of attention to detail which may have structural implications and uninformed personnel due to a lack of trust and/or communication.

The results of the various topics discussed during the interviews, are summarised below:

Table 6.2: Summary of interviews

TOPICS USED IN THE INTERVIEWS	RESPONSES
Topic 1: Create awareness of risk by all parties involved.	<ul style="list-style-type: none"> • Highly important, but mostly neglected • Neglected because of time and human resources • Need more awareness
Topic 2: Show that better planning will limit or mitigate the source of risk on a project.	<ul style="list-style-type: none"> • Better planning to encourage the project team • Better planning to identify possible risks • Practically it is difficult to implement the planning, because of various reasons stated
Topic 3: Effective risk management will only be possible with efficient communication.	<ul style="list-style-type: none"> • Communication is essential to minimise risk and increase project flow • Communicate through correct channels
Topic 4: Identify the financial advantages.	<ul style="list-style-type: none"> • Not too serious according to site-based professionals • Job needs to get done • Quantity surveyors and contract managers gave best responses • Identify risk before it happens or limit as soon as it occurs • If not identified, it can have a huge risk on project revenue • Is important to make provision for effective risk management programmes or risk management resources within a company.
Topic 5: To show that there will be better quality and control of the project.	<ul style="list-style-type: none"> • Controlling risk will increase the quality as time management will be easier • Quality of a project is indispensable for a construction project • Huge cost effect either way • Contractor's reputation is on the line • To build future clientele
Topic 6: To prove that forecast can be more accurate if some risk is anticipated.	<ul style="list-style-type: none"> • Estimators, planners and quantity surveyors play a fundamental role • If effective, all parties must be aware of what the other parties are doing • A lack of communication leads to many man-hours being lost fixing financial forecasting on a monthly basis • If company had an efficient communication system in place, it is possibility to limit accruals
Topic 7: Teamwork and human resource skills will be developed.	<ul style="list-style-type: none"> • Correct protocol should be followed on and off site • Skills will be developed • Skills will be transferred from one generation to another • Whole team as a unit • If not, risks occur like financial risk, laboured and demotivated staff, lack of attention to detail which can lead to structural implications and uninformed staff due to a lack of trust and/or communication

The rationale behind the seven topics was to support the findings of the questionnaire, as both methods were used to find solutions for the main and sub-problems of the study. These topics also gave more results since interviews tend to have more information than only a written source.

6.7 QUESTIONNAIRES

The aim of the questionnaire was to generate feedback to determine the opinions of professionals active within the construction industry. The aim was to determine whether they are aware of certain risks and to determine the importance they assign to having industry specific knowledge, strategies that are in place and the necessary backup plan to mitigate these threats. The questionnaire was sent to various respondents who were directly contacted by either telephone or email to ask whether they would be willing to complete the questionnaire.

The research is an exploratory study conducted by using qualitative methods in order to use a professional's direct observation and all his experience. This method was used to ensure that theory and practical construction are aligned. The researcher conducted interviews to gain a general perspective of the arguments based on the problem statement of the study. These interviews helped to gain a deeper understanding, after which the questionnaires were distributed to focus specifically on the topics of interest, namely the problems and sub-problems of the study.

The data gathering strategy included using self-administered questionnaires that consisted of various categories that have an effect on the objective of the study.

Table 6.3 includes the response rates for the various groups of professionals.

Table 6.3: Response rate on questionnaires

Response groups	Sent	Received	Response %
Quantity Surveyor	11	7	64%
Construction Management	15	6	40%
Project Managers	5	2	40%
Architects	3	0	0%
Financial Managers	3	2	67%
Engineers	6	5	83%
Total	43	22	51%

The questionnaire was distributed to 43 research participants of who 22 returned the completed questionnaire, representing a response rate of 51%. In order to study the effects of specific risk factors on the construction industry, various organisations were used in the sample.

All the respondents who received a questionnaire via email were phoned after two weeks to inform them of the importance of their participation in the study.

The aim of the introduction of the questionnaire determines the profile of the respondents and their qualifications and experience. Experience and qualification provides an indication of knowledge of construction management.

Table 6.4: Profile of respondents

Profession of respondents	Number	Percentage (%)	Years of experience	Number	Percentage (%)
Quantity Surveyor	6	27%	0-2 years	2	9%
Construction Management	6	27%	2-5 years	5	23%
Project Managers	3	14%	5-10 years	4	18%
Architects	0	0%	10-15 years	4	18%
Financial Managers	2	9%	15-20 years	6	27%
Engineers	5	23%	20-25 years	1	5%
Total	22	100%		22	100%

Table 6.4 shows the profile of the respondents. Hundred per cent of the respondents are professionals in the construction management industry. Almost 32% of the respondents have more than 15 years' experience and 50% have more than 10 years' experience. There is a reasonable proportional distribution in the number of years' experience of the respondents, as 32% of the respondents have less than 5 years of experience in the construction industry.

Judging from the profile of respondents it is clear that the opinions on construction risk, communication and decision making were enough to conduct the study.

Question 1 of the questionnaire posed the question: "*Is the construction industry profitable?*" Figure 6.1 reveals:

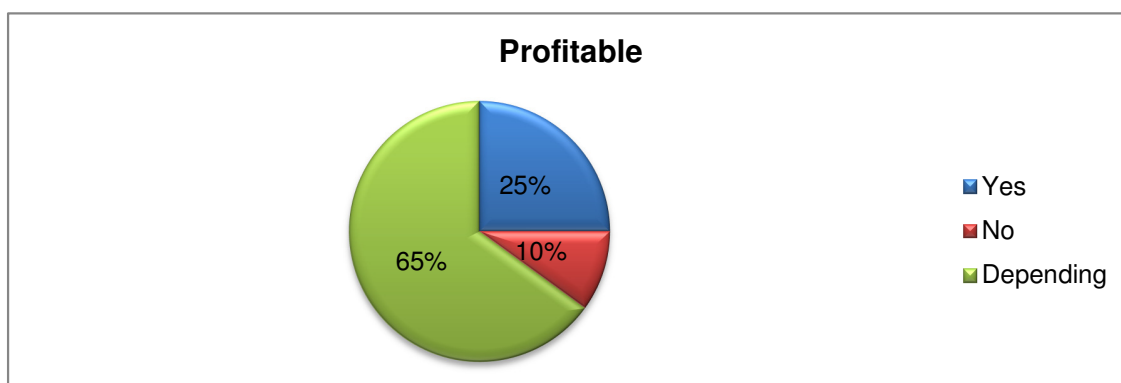


Figure 6.1: Is the construction industry profitable?

Twenty five per cent (25%) of the participants answered 'yes' to the question and their additional comments were mostly long-term driven as well as experience driven.

Ten per cent (10%) of the participants answered 'no' to the question and in the researcher's opinion these individuals did not have much experience. They were part of the 18% of respondents that had between five and ten years' experience (Table 6.3). The experience the participants had was during the 2008 recession. In the participants' experience, it felt like projects were done to pay salaries to continue existing as a company.

Sixty five per cent (65%) of the participants answered 'depending' to the question. The reasons given are market stability, local investors' resources, global investors, investment risk in South Africa, global opportunity in South Africa, global variables and exchange rates, centralised area (globally), crime and safety and the political structure of South Africa.

Most of the above factors can have either a positive or a negative impact. South Africa is a proud nation with a unique history. Many foreign investors in South Africa boost the economy; however it must be sustained and should even grow if South Africa wants to be competitive. For South Africa to become investor friendly, South Africa must be regarded as an attractive investment opportunity with great potential. All these factors have an effect on micro and macro construction-related enterprises in South Africa and all of them carry unique risks to deal with.

A construction project has many risks. In Question 2, the participants who are associated with construction projects, highlighted the most common risks that can arise. Some of the risks that were noted on the questionnaires are discussed below.

Historical data that is not accurately used and collected is a huge problem. For example, the estimator will make allowance for a certain amount of money for preliminaries and general. After the tender is submitted, the allowables are fixed. This can lead to a financial loss or loss of valuable resources if not managed properly. Complications with allowables can lead to additional job remodelling or creative cost engineering by the quantity surveyor to assist with absorbing some of the problems at hand. Smaller contractors can become insolvent if a mistake like this is made.

A scenario, as created by the researcher, is as follows: if there is a lack of experienced site management, risk can occur. The risk of recruiting a junior foreman to run a R100 million project is a recipe for disaster, but nonetheless it still happens, because the construction industry is unpredictable. There are times when there is a huge shortage of personnel and other times a huge surplus of personnel. The above-mentioned factor is a risk a company must take and the company must have plans and policies in place to limit and mitigate the effects of such occurrences. Furthermore, some building contracts

have vague clauses or are unique contracts where the risk falls on one party, for example, a lump sum fixed price design and construct contract that must be compliant with all regulations. In the researcher's opinion the contract is often quite standard with a couple a necessary addendums, additions and omissions, but the party who signs the contract just sees the numbers and not all the detail; the contract participant will study the contract only later.

Nevertheless, information and administrative risk is also a concern that will influence a project's profitability (Figure 6.1). When a company is busy with a project there is always time management issues, programme dates, completion dates, deadlines, valuations, subcontractor payment dates, etc. Information is critical in any of the above and parties should always try to have proof and create a sufficient paper trail of evidence. If all of this is in order, the operations will flow much easier. As most parties know, this is not always the case, and if not, it exposes many risks in various components of the project, for example:

- Extension of time not awarded as the paper trail and evidence was not sufficient;
- Subcontractor/main contractor using superseded drawings;
- Subcontractor/main contractor not aware of certain clauses, for example the security in most construction contracts;
- Subcontractor/main contractor not happy about his claim being cut;
- Internal and external audits being done;
- Minute meetings as it forms verbal agreements between parties; and
- Termination of a contractual agreement, etc.

All the above mentioned are practical examples of what can happen, or go wrong, if information is not in place and the administration is not updated regularly.

The respondents were asked in Question 3: "*Which of the following bears the most risk associated with a construction project?*" and the results were as follows as indicated in Figure 6.2:

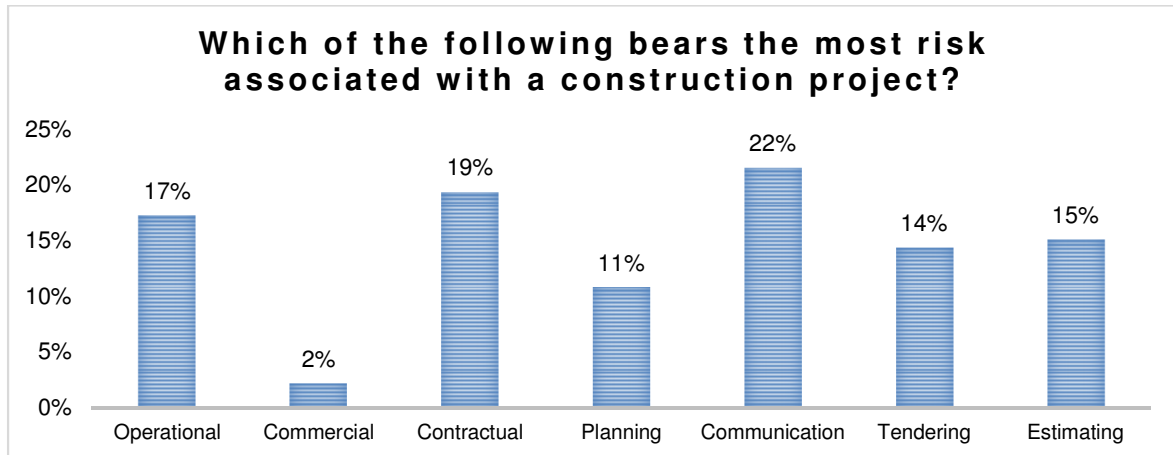


Figure 6.2: Construction project risk

Respondents responded as follow to the above-mentioned question:

Seventeen per cent (17%) of respondents indicated that operational risk bears the most risk in a building construction project.

However, when asked in Question 4 to “*List risk associated with a construction project in terms of operations*”, the following list of answers were given:

- Project communication;
- Planning;
- Material specifications;
- Improper delegation of duties;
- Scope changes;
- Underqualified operational team;
- Long Snag lists; and
- Repairs and re-works.

Two per cent (2%) of respondents indicated that commercial risk bears the most risk in a building construction project (see Figure 6.2). In Question 5 the respondents were asked to “*List risk associated with a construction project in terms of commercial aspect of the project*”, and the responses were as follows:

- Estimation

- Scope creep;
- Inexperienced commercial team;
- Contract breach;
- Lack of communication channels
- Late payment by client;
- Under certification by client's agents;
- Difficulty in maintaining a positive cash position; and
- Incurring losses.

Nineteen per cent (19%) of respondents indicated that contractual risk bears the most risk in a building construction project (see Figure 6.2). The contract of any project defines the project and should play an integral role in the execution of events. For Question 6, when asked to "*List risk associated with a construction project in terms of contractual risk*", the answers were as follows:

- Project completion;
- Payments;
- Insufficient information and relevant specification (communication and decision making);
- Knowledge of project specific contracts;
- Nature and complexities of the contract; and
- Signing contracts where contractual positions are weak.

Eleven per cent (11%) of respondents indicated that effective planning risk bears the most risk in a building construction project (see Figure 6.2). This is quite low, considering that if a project is planned incorrectly, the project will most definitely fail. If time is on the contractor's side, a project can always consolidate and correct pre-planning problems. Question 7 was "*List risk associated with a construction project in terms of planning*". The respondents indicated that the following were risks associated:

- Unclear specifications;
- Site access;

- Material procurement;
- Unrealistic goals;
- No attention to detail;
- Weak planning and preparation;
- Lack of proper mentoring of progress; and
- Lack of transparency and also not recognizing warning signs.

Twenty two per cent (22%) of respondents indicated that communication risk bears the most risk in a building construction project (see Figure 6.2).

Fourteen per cent (14%) of respondents indicated that tendering risk bears the most risk in a building construction project (see Figure 6.2). Regarding question 8, “*List risk associated with a construction project in terms of tendering*” the respondents indicated the following:

- Type of project;
- Distance from key centres;
- Unclear information at tender stage;
- Tendering for a job which is too big for the company;
- Tendering too low;
- Omission of cost; and
- Market is too competitive.

Fifteen per cent (15%) of respondents indicated that estimating risk bears the most risk in a building construction project (see Figure 6.2). Once the tender has been awarded to a company the estimator will hand the bill of quantities over to the quantity surveyor who then has the opportunity to re-engineer the cost of the project, and to make sure that all the cost worksheets make sense and escalation is taken into account. In Question 9 of the questionnaire, the respondents were asked to “*List risk associated with a construction project in terms of estimating*” and the responses were as follows:

- Bill of quantity rates;
- Competition;

- Unclear information at tender stage;
- Under-estimate the total value of a project;
- Method of choosing the correct bid (Cheapest is not always the cheapest); and
- Under allowance for some activities within a project.

With a diverse group of professionals, there will be many different opinions, as different professionals have different risks and threats to take care of. This is just another example that there are various risks in various divisions and subdivision of construction. One department is not more important than another department. All departments must work in unison to ensure that the minimum is affected in a project.

Communication and decision making were evident in most of the risks associated with different aspects of the construction industry. It is critical to have effective communication, and to know that all decisions made will have consequences.

The participants were asked in Question 10 *“Does certain construction risks repeat it? Please identify which are most likely to be repeated? In your professional opinion why does this occurrence repeat itself?”* The responses were as follows:

- Estimation risks are always repeated due to competition;
- Waterproofing risks always repeat because water ingress or outgress is our greatest problem in civil engineering;
- Planning and operations;
- The construction industry is constantly changing along with the specific project and area, which will cause planning and operations risks;
- Subcontractors and suppliers may also have a huge influence on the risk of planning and operations;
- Late delivery of projects and time overrun;
- Repeat due to over ambitious programme, lack of proper management and technical skills; and
- Over expenditure – Over ambitious prices because of competition and lack of cost control.

Question 11 asked the following: *“In your experience how have you planned for risks and how have you dealt with on-going risks?”* In response to question 11, there is a tendency in the contracting sphere of construction to deal with risk as it occurs. Other responses, however, indicated that risks to any project must be assessed so that the mitigating factors can be determined from the greatest threat to the slightest risk. In most of the civil engineering projects the greatest risk is waterproofing. It can be interpreted that specialised contractors, who carry a design and installation risk for the works, must do this specialist trade.

More remarks were that the risk must be mitigated as soon as possible and not ignored, which means that a pro-active approach to possible risks need to be taken. Lastly, respondents indicated that probable risks need to be identified and shared with all relevant team members and they have to compile a mitigation plan that would be unique to all different scenarios.

When asked in Question 12 *“In your opinion, what can be done to limit or mitigate these risks?”* the respondents indicated that identifying the risk as early as possible, will enable one to act fast and minimise the possible impact of the risk. To plan for certain risks was another response. However, this is not always possible, but certain risk scenarios can be calculated before it happens. Lastly, to take decisive action will help the team to act before the risk becomes a reality.

From project to project, new or existing risks occur repeatedly. Figure 6.3 indicates the significance of the most popular elements, and show where risks are predominantly created with site management, as asked in Question 13 *“Where are risk predominantly created with site management?”*

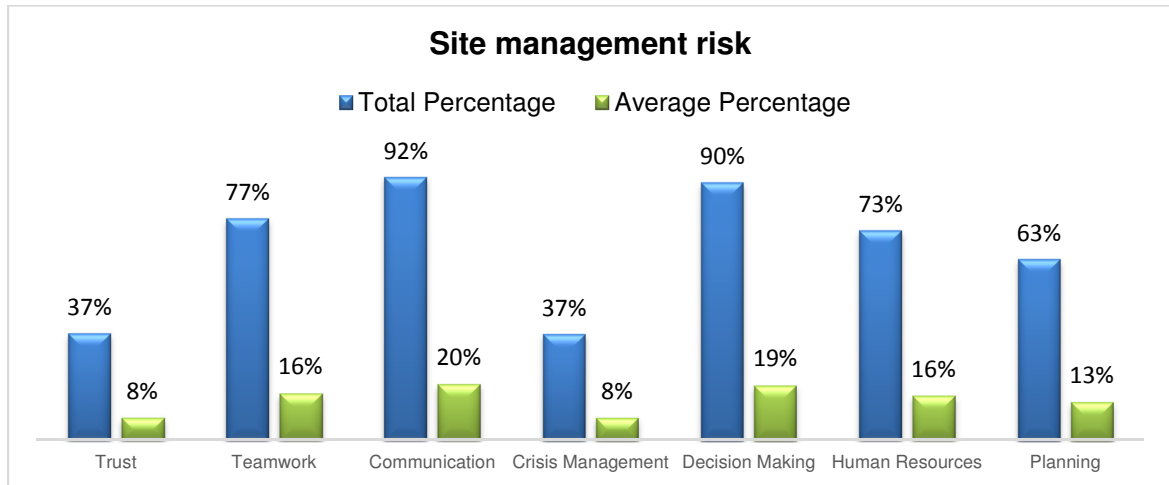


Figure 6.3: Site management risk

The total percentage in Figure 6.3 is based on the amount of time the risk was listed in the responses. The average percentage was determined based on the specific listed risk divided by the grand total of site management risks calculated by the respondents, which equates to 100%.

Trust accounted for 8% overall, which was one of the lowest variables. Thirty seven per cent (37%) of the respondents marked trust as important in situations where possible risks can develop or arise. Crisis management accounted for 8% overall and 37% of the respondents marked crisis management as an area where possible risks could develop or be created. This was another low variable. As the highest variable, communication accounted for 20% overall and 92% of the respondents marked communication as an area where possible risks can develop and be created. Decision making accounted for 19% overall and 90% of the respondents marked decision making as an area where possible risks can develop or be created. This was the second highest variable, following communication.

From Figure 6.3, it is clear that communication and decision making are the two areas where risks are predominantly created. Without communication and decision making, problems will occur and the outcome of the project will be influenced.

Question 14 relates to Question 13, which will give examples of why these risks play a major role in managing a project.

“Why do we have issues with the above if all are such an intricate part of managing a project?” is Question 14, and the respondents explained that it is because teams consisting of different human resources cause complex issues to teamwork. Communication makes projects executed more effectively. Projects are successful with good forward planning and decision making in order to avoid crisis management. However, project teams change constantly, therefore everyone has to learn how to work with each other all over again. Furthermore, the human factor will always play a role. Humans have different ideas, opinions, strengths and weaknesses, etc. and humans make mistakes.

The constant changes in the construction industry, the project itself and the area around it may also have a big influence on these risks. Lastly, lack of focus and planning is an intricate part of managing a project, as the team focuses on what they decide is most essential. The team would mostly plan for the scenarios they are exposed to and aware of, instead of making the effort to understand the challenges in more detail.

Question 15 raised the question *“Would you say a lack of trust between team members could lead to increased project risk? Why would you say such distrust exists? (Competitiveness, achievement based, security, lack of knowledge)”* The respondents indicated that trust delegation amongst team members makes it easier and creates more time for planning by senior management. Thus, they will be more productive. Without trust, the risk is higher.

Lack of trust will definitely lead to increased project risk. Distrust is a very common occurrence in the construction industry. Distrust usually exists amongst new teams who are not fully aware of the strengths and weaknesses within the team. Furthermore, lack of trust between team members will lead to ineffective communication and teamwork. It will also lead to some parties being overworked, because they do not trust their team members to share the work. Distrust exists because of incompetent team members, different opinions, morals, background, etc. If each team member does what is

expected of him or her, trust should not be an issue. However, skill and personality are most definitely contributing factors to distrust in a team.

“On a scale from 1 (least) to 5 (most), indicate in your opinion to what extent the following variables could be possible factors in effective communication skills?” is Question 16, as seen in Table 6.5 and summarized in Figure 6.4.

Table 6.5: Factors in effective communication

Variable	1= Least 5= Most					Mean Score
	1	2	3	4	5	
Organisational Structure	9%	14%	77%	0%	0%	3
Time Management	0%	14%	82%	4%	0%	3
Lack of planning	0%	0%	9%	82%	9%	4
Language and Cultural differences	0%	0%	4%	77%	19%	4
Hierarchy of the team	18%	68%	14%	0%	0%	2

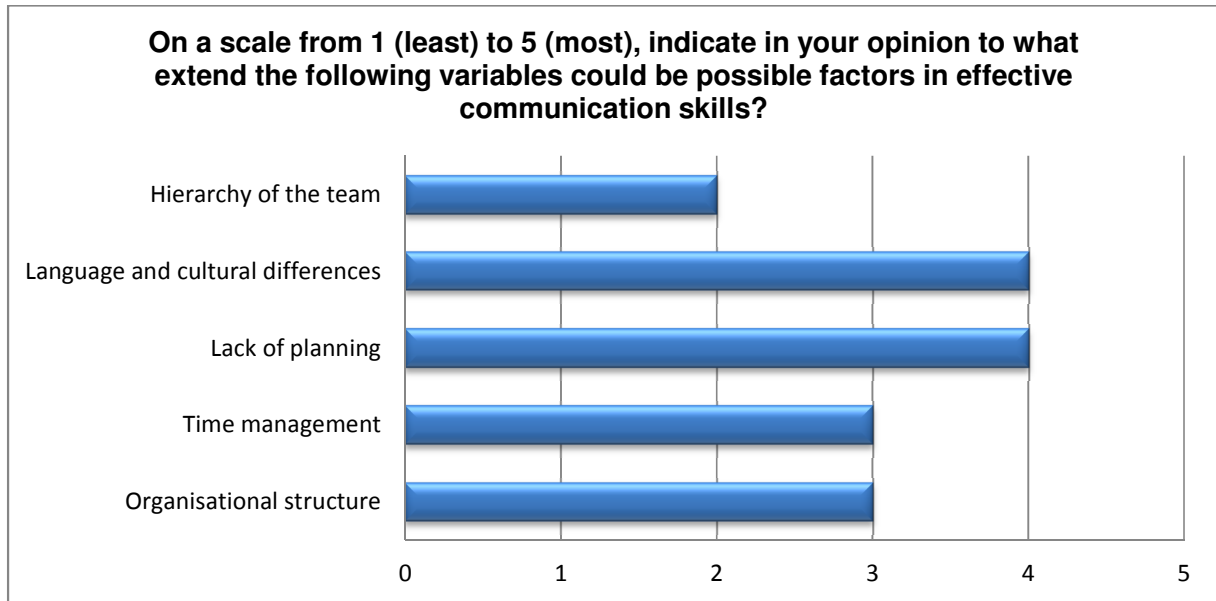


Figure 6.4: Difficulties of communication

Lack of planning was ranked highest, as illustrated in Table 6.5, and summarized in Figure 6.4, followed by language and cultural differences (Mean Score: 4) as areas where difficulty of communication could occur in the construction environment, since there are many different personalities in a team, which could cause communication problems.

The hierarchy of the team was indicated as the factor that will have the least influence on effective communication (Mean Score: 2), because the one party may feel too important for the other party, or the one party may feel ‘scared’ or hesitant to communicate with their superiors. Management often neglects to ensure that employees understand the message that is passed on to them. Team members are often intimidated to say that they do not understand a message and members often do not share simple information as it seems to be obvious.

Regarding Question 17, “*How do you deal with crisis management? In your opinion, is it effective?*”, respondents indicated that crisis management happens after an event. Several of the participants indicated that they deal with crises as they occur. To evaluate the crisis situations and tackle the issues depending on the urgency is another

way the respondents indicated how they deal with crisis management. Lastly, to tackle the crisis head on, and not procrastinate, is also good crisis management.

Question 18 relates to the question: *“We all know human resources are a crucial component to success or failure. In your experience, how does human error contribute to the creation and/or aggravation of risk?”* Respondents indicated the following:

- Individual commitment, willingness and sense of interest are important, but it starts with the individual and the team has little control over someone else’s approach;
- Professionals, who have different opinions and solutions, work together on projects. Human error can therefore not be avoided and thus imposes risks to projects. However, without human errors, people would not learn. It is important therefore to learn from the errors in order to avoid recurrence of the same risks; and
- It is human to make mistakes. Thus there will always be a risk factor.

Table 6.6: Effectively minimising human error in risk

Variable	1= Least 5= Most					Mean Score
	1	2	3	4	5	
Status of Individual	77%	23%	0%	0%	0%	1
Age difference	82%	18%	0%	0%	0%	1
Line Management	86%	14%	0%	0%	0%	1
HR Management	14%	82%	4%	0%	0%	2
IR Procedures	0%	0%	14%	77%	9%	4
Disciplinary Policy	0%	0%	0%	9%	91%	5
Grievance Procedure	0%	23%	68%	9%	0%	3

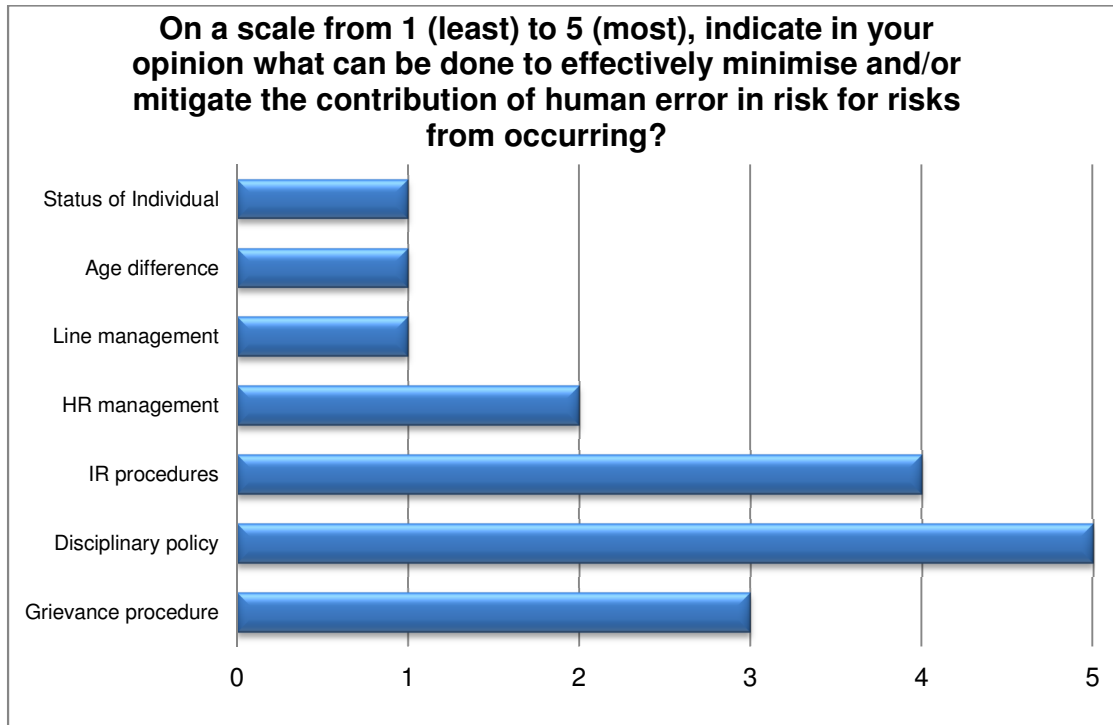


Figure 6.5: Minimise risks

For Question 19, respondents ranked as indicated in Table 6.6, and summarized in Figure 6.5, the disciplinary policy procedure highest (Mean Score: 5) as a possibility for minimisation and mitigation of risks in the construction environment, followed by industrial relations procedures Mean Score: 4) as an area which could help to effectively minimise and/or mitigate the contribution of human error to risks occurring. The status of the individual, the age difference of the individual, as well as line management was ranked the least important (Mean Score: 1).

This shows the documents, policies and regulations that the company have in place are emphasised, with less emphasis on the individual.

Respondents further indicated the following ways to effectively minimise risk:

- Learning from mistakes and ensuring work guidelines, procedures and policies are adhered to;
- Good, effective and open communication channels between team members;
- Effective human resource management;

- Good structured hierarchy;
- Proper training of team members individually and as a team; and
- Effective NCR (Non-conformance report) procedures to identify where individuals have gone wrong in order to identify their weaknesses so that they can understand, as well as a proper, active behaviour system.

Table 6.7: Geographical challenges

Variable	1= Least 5= Most					Mean Score
	1	2	3	4	5	
Decision Making	9%	14%	77%	0%	0%	3
Culture	82%	18%	0%	0%	0%	1
Communication	9%	86%	5%	0%	0%	2
Time	0%	9%	82%	9%	0%	3
Human resources	0%	0%	0%	9%	91%	5
Material	0%	0%	9%	87%	4%	4

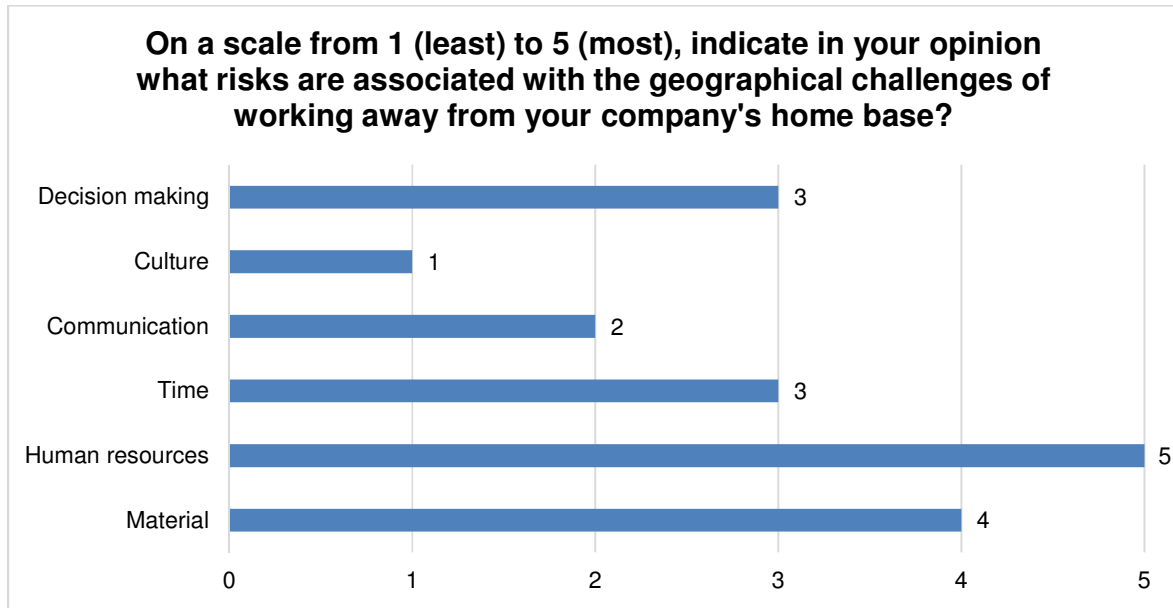


Figure 6.6: Geographical challenges

Table 6.7, and summarized in Figure 6.6, revealed that human resources were rated highest by the respondents (Mean Score: 5), as the geographical challenge of working away from your home base in the construction environment. The respondents indicated material as the second highest challenge (Mean Score: 4). Respondents rated culture as least challenging (Mean Score: 1).

Furthermore, culture and language plays a role away from home and thus poses a risk to communication. One would also need to master the foreign material specifications and procurement methods. This can have an impact on project decision making and time. Type of materials might also affect the construction methods that will be implemented. This will have a huge cost effect on human resources such as travel, accommodation, etc. Working with new subcontractors and suppliers are also a risk. An inadequate subcontractor or supplier may be appointed at first, and it may be expensive and time consuming to travel from the site to the home base.

For the project to be successful away from home, most emphasis is placed on the human resources department being responsible for the site team. Professionals procuring and transporting the materials will also influence the success or failure of the project.

In conclusion, it is important to take the correct decisions on different levels, such as operational, commercial, safety and financial levels. A great deal of experience, education and knowledge is needed to know how to link the different elements to achieve one result. This is essential, because to manage a risk is to manage a crisis. One needs to be able to do all of the above effectively in order to control one risk or problem.

To effectively manage a project in the construction industry, management needs to have the required knowledge in the relevant professional field. This includes industry specific knowledge, construction management knowledge and knowledge gained through experience working in the industry. The probability of the success of any project will be affected by the team's leadership, trust, communication, decision making and teamwork.

6.8 TESTING OF HYPOTHESES

6.8.1 Results from empirical study

6.8.1.1 Interviews

The results from the interviews support the hypothesis and the subproblems, namely

- What should be done if a risk arises?
- How can risk management's importance and impact in the construction industry be emphasized enough?
- How will effective communication (or the lack thereof) have an effect on the success (or failure) of a management team on a project?

The results illustrate that knowledge of the construction sector is important for all professionals in the industry. A key point raised is that one has to learn from one's mistakes as soon as possible because mistakes can have serious consequences.

The research reflects that any leader in a specific field needs to build up knowledge in various levels of the industry, as sectors may vary and specific knowledge on specific projects will be needed, depending on the size and complexity of the project.

6.8.1.2 Questionnaire

The purpose of the questionnaire was to define awareness of certain risks and the importance of communication, time management, decision making, and complications of geographical challenges, and human resources policies and procedures.

The data retrieved indicate that the problems arise in implementing and executing the 'plan-on-paper', because it is sometimes difficult to bring the idea to reality.

It also came to light that much experience, education and knowledge are needed to know how to assimilate all the different elements to achieve one result. This is crucial, because to manage a risk is to manage a crisis.

6.8.2 Research parameter

6.8.2.1 Primary hypothesis

The primary hypothesis states that operational, commercial, financial, health and safety risks may have a negative or positive influence on decision making from managerial to executional level and on communication between parties, depending on how these risks are dealt with, for example, creating an opportunity or ignoring the risk at hand. The operational, commercial, financial, and health and safety success of a construction project depend on industry specific knowledge, negotiation skills, how management deals with problem solving and crisis management, as well as knowledge of the organisational structure and operational systems.

Bennett and Jayes (1995: 30) state that any and every decision may have an effect. The success or failure of decisions subsequently may have an influence on the construction project, contracting company, contracting sector, the construction industry and the economy of the country. Turner (2003: 122) adds that every single decision made by a member of the project team has an effect on the results of a project. From questions 4 to 9, it can be derived that communication and decision making will be evident in most of the risks associated with different aspects of the construction industry.

Communication is an important aspect of employee engagement and an integral part of how a business operates. Effective two-way communication is expected throughout a company. Direct and open communication is therefore fundamental to the culture at the company. Good communication means a healthy environment of mutual trust and respect where employees and managers can comfortably discuss work issues or employment concerns (Makuta, 2012: 3). Question 16 supported the statement that mutual trust is crucial, as the respondents described ways in which lack of trust will influence a project.

Effective risk management will most likely be the difference between a successful project and a failed project, therefore it is very important that the project manager, as well as all relevant parties, know the possible risks and if they occur, how to minimise the negative influence as much as possible. In Question 12, possible ways to mitigate risks were identified that can help to effectively manage the risk. It also directly links with Topic 1 from the interviews, where it was stated that awareness of risk needs to be created by all parties involved.

Risks can be difficult to define but may be taken as a connotation of variation in probable results. Ashworth and Hogg (2002: 156) state that risks most certainly have a negative effect on a project. According to Knipe et al. (2002: 331), risk management is a systematic process followed in the view of analysing, identifying and responding to project risks by trying to maximise the probability and consequences of positive events and by minimising the probability and consequences of adverse events to project objectives. Hillson (1997: 37-38) also emphasises opportunity management (“positive risk”).

Furthermore, all the interviewees indicated that teamwork is essential and that one should have knowledge about a colleague’s job, so that one can contribute in a positive manner. Trust is also an important aspect of teamwork, as indicated in Question 15. Topic 7 of the interviews also supports the literature concerning teamwork.

Communication and decision making goes hand-in-hand. Within any company’s base communication structure decisions have to be made. Some companies regard risk

management as the main tool of project management, while others do not. Factors that will always affect decision making will be brainstorming, communication channelling, crisis management, a lack of effective communication within the hierarchy of management and human resources, professional inefficiency, as well as other contributing factors. As support to the literature, it was evident from Figure 6.3 that communication and decision making were the highest variables. The highest variable, communication, accounted for 20% overall and 92% of the respondents marked communication as an area where possible risks could develop and be created. Decision making accounted for 19% overall and 90% of the respondents marked decision making as an area where possible risks could develop and be created. This was the second highest variable, just below communication.

It is clear that communication and decision making are the two areas where risks are predominantly created. Without communication and decision making, problems will occur and the outcome of the project will be influenced.

From the above, the primary hypothesis is supported.

6.8.2.2 Secondary hypothesis

Communicating risk awareness within a reasonable time (one to three days) via email, telecommunication or written letters to all parties involved and advocating comprehensive planning will reduce the magnitude of risk for a project. Effective and efficient risk management will only be possible with effective and efficient communication. Better communication and awareness will contribute to higher quality and greater control of the project. Topic 2 of the interviews supported the literature by showing that effective risk management will only be possible with efficient communication.

If communication is used a great deal, it will have a positive effect on a project. Communication and communication channels within a project are essential to minimise risk and to increase project flow. If the incorrect channels of communication are being used, the fundamental elements of communication will be lacking. Thus, the task at

hand will not be executed as originally planned, which may lead to the objective of the task not being met (Aldous, 2003: 219-223). Wiig (2004: 144) adds that effective and proficient communication can be identified as one of the elements that has an influential effect on the success of a management team.

Maintaining effective communication is an effective way of ensuring that project teams are working together effectively and ultimately to ensure successful deliverables. Before techniques of effective communication are explored, it is important to understand the difficult context in which managers operate (Dainty et al., 2006: 19-20). To carry out their job function, communication with others is essential and quality, quantity and timing of information can either hinder or facilitate successful results (ARUP, 2014: online).

Obtaining feedback and listening effectively are important elements in good communication. Effective communication is achieved when communicators at all organisational levels seek out feedback and take appropriate action to ensure that the intended meaning is passed on to the relevant audience (Makuta, 2012: 5).

One of the crucial findings is that management often neglects to ensure that employees understand the message passed on to them. Members often feel intimidated to say that they do not understand a message and members often do not share simple information, as they regard it as being obvious (Knipe et al., 2002: 108-109). In Topic 1 from the interviews, it was indicated that awareness of risk needs to be created by all parties involved. Furthermore, in Question 12, mitigation of risk was indicated as a way of effectively managing the risk.

From the above evidence, it is clear that the secondary hypothesis is supported.

6.8.2.3 Research objective

The objective of this study was to identify various effects that decision making has on a contracting company, which may have an effect on the construction industry, and the economy of the country. These effects may have associated risks that may influence all of the above in order to minimise the effect of the risk. This study needs to be aware of

associated risks that may possibly transpire as various members of the management team make decisions. This may provide the knowledge for future generations to eliminate risks and may also improve risk acceptance and risk management.

The research objective was met.

Methods for deciding on the most imperative risks contained in a project may probably differ from project to project. Communication and decision making goes hand-in-hand. Within any company's base communication structure decisions have to be made.

Factors that will always affect decision making are brainstorming, communication channelling, crisis management, lack of effective communication within the hierarchy of management and human resources, professional inefficiency, as well as other contributing factors.

There may be many benefits of risk management, as mentioned by Cloete (2005: 322). It may enable decision making to be more systematic and less subjective, which will allow the robustness of projects to specific uncertainties to be compared.

In addition, losing critical personnel at crucial points of the project may influence the project in a major way. This may lead to insufficient time to plan and may increase the workload of the managers, which was not planned for. Internal red tape causes delays in getting approvals and for decisions to be made and will worsen if functional units are not available and/or overloaded (Project Risk Management Handbook, 2007: 32).

Identification of risk is about making the best use of experience, knowledge and information available at the time of making a decision (Raftery, 1999: 18-19).

Every single decision made by a member of the project team (including contractors and consultants), from the principal agent to the labourer on site has an effect on the results of a project (Turner, 2003: 122).

Taking an 'open systems' view of organisations and recognising the impact that environmental variables have on the decision of how to communicate most effectively is

an underlying philosophy that may be adhered to throughout communication (Dainty et al., 2006: 11).

Turner (2003: 77) emphasises that it is important to apply decision making in order to engage the entire construction team.

When a person, team or company needs to make a decision, they need to ensure that the decision is ethically accepted by the community in which it will be made. The decision needs to be both legal and morally accepted by the society it will influence. The decision maker also needs to know what the morals are and how to use it when making a decision (Jones, 1991: 367).

Further, to sustain their ability to produce and implement strategic decisions, the top management teams must maintain a positive, affective relationship among their members (Amason, 1996: 123).

Risk management always brings the popular phrase: "*failing to plan, is planning to fail*" to mind. Preparing for the worst possible outcomes can really benefit the project in the end.

There can be many benefits of risk management, as mentioned by Cloete (2005: 322). It will enable decision making to be more systematic and less subjective, which will allow the robustness of projects to specific uncertainties to be compared. It gives an improved understanding of the project through identifying the risks and thinking through response scenarios.

6.9 CONCLUSION

The research was conducted using two research methods namely interviews and a questionnaire. The questionnaire was compiled, distributed and analysed using a basic method and the interviews were conducted with various professionals with ample experience, contributing to valuable and reliable data. This research method, making use of the interviews and a questionnaire contributed to a valuable and reliable data set.

The main aim of the interviews was to get feedback to determine the opinions of professionals in the construction environment. The reason for choosing various experienced professionals is that it is good to get opinions from the different generations, but with regard to risk management, opinions from the more experienced would be of more value.

The results from the interviews support the hypothesis and illustrate that knowledge of the construction sector is important for all professionals in the industry. Some of the Interviewees stated that it is essential to learn and gain as much knowledge as possible from every unique situation in the construction industry. Another important point raised is to learn from mistakes as soon as possible because mistakes can be fatal. Others stated that learning will be more and faster on bigger projects, which are more complex.

The researcher deduced from the interviews that, as the industry develops, the complexity of the projects will increase and there will thus be a greater demand for knowledge. The research reflects that any manager in a specific field needs to build up knowledge on various levels of the industry, as sectors may vary where specific knowledge on specific projects will be needed, depending on the size and complexity of the project.

The aim of the questionnaire was to determine the importance of having industry specific knowledge; having strategies and a necessary backup plan to mitigate these threats in place; whether the participants are aware of certain risks; the importance of communication, time management, and decision making; and the complications of geographical challenges, and human resources policies and procedures.

The responses indicate that the participants are mostly aware of the different types of risks, as well as the implementation and mitigation of these risks. Conversely, the difficulty comes in executing and implementing the 'plan-on-paper', because the theory is sometimes difficult to bring to reality.

It also came to light that how to manage risks and manage crises, ensues from knowing how to communicate effectively.

The interviewees also stated that it is very important that communication travels through the right channels, either top-to-bottom or bottom-up, depending on the level of severity of any given matter.

One of the crucial findings was that management often neglects to ensure that someone understands the message passed on to them. This is a prime example of how crucial communication is in the construction industry. Employees often feel intimidated to say that they do not understand a message and managers often do not share simple information, as they regard it as being obvious (Knipe et al., 2002: 108-109).

CHAPTER 7

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 INTRODUCTION

Decision making, teamwork and communication play a significant role in the construction industry, which is much more complex than what it originally seemed to be. It is important to remember that a decision made today will not necessarily have an immediate effect but the effect may be severe in future.

The construction industry is facing a more challenging environment than before. Client expectations have increased and they are in need of better quality products and services that use new and advanced resources and equipment at a lower cost. It also needs to be done in less time, which eventually leads to risk. Risk management is a relatively new addition to the wider concept of commercial and trade authority. Risk management may be seen as an ignored part in the planning and completion of building projects, but its significance and effect on the construction industry cannot be stressed enough.

The researcher's main problem was the following:

The influence that risk will have in terms of decision making and communication on the results of a project's success and the extent that identified risks will be manageable to ensure the best possible outcome for all entities and parties involved.

The researcher did a literature study. The research was conducted and completed within a specific period. The interviews were conducted in a one-month period and the questionnaires sent out and returned in a two-month period. The target population was professionals in the construction industry, from the Gauteng and Mpumalanga area, South Africa. The research consisted of a literature review and data gathering. Using this method ensured that a wide area of theory and opinions were covered and eliminated deductions from a single set of data. All of the above was done to create a broad spectrum and collect as much data and knowledge as possible from others in the

field, which had a phenomenal impact on the results of the study as well as certain individuals that participated in the researchers study.

7.2 CONCLUSION

The literature study showed that in the ideal world every project will make its estimated profit, the client will be satisfied with the product and the professional teams, on the client's side and the contractor's side, will have made all the correct decisions as originally planned at the pre-contract meetings (Steyn et al. 2012: 354).

The objective of this study was to identify the various influences that communication and decision making have on a contracting company, which will have an effect on the construction industry and the economy of the country.

As previously mentioned, Vaughan and Vaughan (2008: 24) stated that risk management is a relatively new addition to the wider concept of commercial and trade authority. Risk management may be seen as an ignored part in the planning and completion of building projects, but its significance and effect in the construction industry cannot be stressed enough. Professionals in the construction industry should do their best to come as close to the ideal world as humanly possible.

The question that probably comes to mind is: what about all the things outside their control that do not make this possible? Kerzner (2001: 135) and Novinson and Duggan (2014) previously stated that in order to minimise losses and to maximise profits there are several constraints to attend to and each unique project has unique circumstances with its unique risks.

Effective risk management will most likely be the difference between a successful project and a failed project, therefore it is very important that the project manager, as well as all relevant parties, know the possible risks and if they occur, to minimise the negative influence as much as possible.

Project and site communication, as an academic field, embraces a large body of knowledge and communication can be regarded as a learned management skill, thus

not as easy to execute without suitable and adequate experience and knowledge in relevant fields of construction (Knipe et al., 2002: 108-109).

Decision making and communication are two vital factors, as the success of decision making will have an effect on the success of communication, which will have an effect on any project. Methods for deciding on the most imperative risks contained in a project may probably differ from project to project (Ashworth & Hogg, 2002: 167).

This will provide the knowledge for future generations to eliminate risks and will also make accepting and dealing with the risks easier.

7.3 RECOMMENDATIONS

7.3.1 Decision-making, risk and the success of a project

To ensure the best possible outcome for all entities and parties involved, it is recommended that the importance of having all relevant information available or the majority of information available before committing to a decision is imperative. Decisions must be made on time and communicated to relevant parties to ensure that all of the parties involved are aware of the significance of any decision and the impact it will have, since all decisions made will have consequences.

It is further recommended that the company have all the necessary documents, policies and regulations in place, as this would be the information that employees use to make decisions and know that they are in line with the company vision and mission. It would be a platform where decisions can be made and backed-up by written proof.

7.3.2 Communication, risk and the success of a project

To ensure the best possible outcome for all entities and parties involved it is recommended that communication is a learned skill and it is of enormous importance that no matter what your age or your position you must always try and develop your communication skills as well as passing on your knowledge to others. It is crucial to have effective communication, as communication and communication channels within a

project is essential to minimise risk and to increase project flow. If a company has an effective communication system in place, it is possible to limit risk.

7.3.3 Other recommendations

Creating risk awareness by all parties involved is important, but mostly neglected. It is crucial to create more awareness, since all parties are not informed about the risks in the construction industry. It is therefore recommended that more time and human resources be set aside in order to have the means necessary to create such awareness.

Estimators, planners and quantity surveyors normally play a fundamental role in the execution of an effective forecast, but for the forecast to be effective all parties must be aware of what the other parties are doing, and according to the interviewees this normally does not happen. Therefore, in essence a lack of communication leads to many hours being lost fixing financial forecasting on a monthly basis. If the basis of correct communication is followed, the chances of limiting forecasting risk should decrease. All of the interviewees stated that an efficient communication system in a company, for example, Microsoft Lync, etc., will definitely limit these accruals.

7.3.4 Further research

The researcher recommends that further research should be conducted in construction insurances, advance payment, manmade and natural disasters, and crisis management, as risk does not always occur as expected, but unexpectedly as well. This indicates that any professional member has to think fast and effectively to control and limit the damage at hand.

Repeated risk was another concern that was highlighted by the participants, and further research into the managing methods thereof would be of benefit to the construction industry.

REFERENCES

- AIRMIC, ALARM & IRM. 2002. *A risk management standard*. London: The Association of Insurance and Risk Managers (AIRMIC), The National Forum for Risk Management in the Public Sector (ALARM) and the Institute of Risk Management (IRM). [online]. Available from: www.theirm.org/publications/documents/Risk_Management_Standard_030820.pdf [Accessed 14 March 2014].
- Aldous, D. 2003. Ultimate instability of exponential back-off protocol for acknowledgment-based transmission control of random access communication channels. *IEEE Transactions on Information Theory*, 33(2), pp. 219-223.
- Amason, A.C. 1996. Distinguishing the effects of functional and dysfunctional conflict on strategic decision making: resolving a paradox for top management teams. *The Academy of Management Journal*, 39(1), pp. 123-148.
- Aqua Group. 1990. *Tenders and contracts for building*. (2nd ed.). Oxford: BSP Professional Books.
- ARUP. 2014. *Mobile technology construction hardware*. [online]. Available from: www.buildingsmart.org.uk/construction_site_coms_needs [Accessed 23 April 2014].
- Ashworth, A. & Hogg, K. 2002. *Willis's practice and procedure for the quantity surveyor*. (11th ed.). Oxford: Blackwell Science.
- Bennett, J. 2000. *Construction: the third way*. Oxford: Butterworth-Heinemann.
- Bennett, J. & Jayes, S. 1995. *Trusting the team: the best practice guide to partnering in construction*. Reading, UK: University of Reading, Centre for Strategic Studies in Construction.
- BER. 2015. FNB/BER *Building Confidence Index*. [online]. Available from: www.ber.ac.za/FNBBCICCI/2026.aspx [Accessed 17 May 2014].
- Blanchard, K. 2014. *Lead like Jesus*. [online]. Available from: www.leadlikejesus.com [Accessed 17 May 2014].
- Bowden, S., Dorr, A., Thorpe, A., & Anumba, C. 2004. Mapping site processes for the introduction of mobile IT. In: Dikbas, A. & Scherer, R. (eds.). *Proceedings of the 5th European*

Conference on Product and Process Modelling in the Building and Construction Industry, Istanbul, Turkey 6-10 September 2004. Cape Town: AA Balkema, pp.491-498.

Bowen, P.A. & Edwards, P.J. 2005. *Risk management in project organisations*. Oxford: Butterworth Heinemann.

Building Research Establishment (BRE). 2014. *BRE guidance on construction site communication*. [online]. Available from: projects.bre.co.uk/site_communications/pdf/communication-guidance.pdf [Accessed 25 February 2014].

Burke, R. 2010. *Fundamentals of project management: tools and techniques*. Ringwood: Burke.

Chen, Y. & Kamara, J. 2008. The mechanisms of information communication on construction sites. *Forum Ejournal* [online], 8, pp.1-32, June. Available from: research.ncl.ac.uk/forum/v8i1/information_communication.pdf [Accessed 19 May 2014].

Chapman, R.J. 2011. *Simple tools and techniques for enterprise risk management*. (2nd ed.). Chichester, UK: John Wiley & Sons.

Cloete, C.E. 2001. *Risk management*. Sandton, SA: South African Property Education Trust.

Cloete, C.E. 2005. *Property investment in South Africa*. (2nd ed.). Sandton, SA: South African Property Education Trust.

Cohen, M.W. & Palmer, G.R. 2004. *Project risk identification and management*. [online]. Available from: search.proquest.com/openview/ef1efedc4b3c642ad93f95493100d644/1?pq-origsite=gscholar [Accessed 19 May 2014].

Committee of Sponsoring Organizations of the Treadway Commission. 2004. *Enterprise risk management: integrated framework*. [online]. Available from: ir.nmu.org.ua/bitstream/handle/123456789/118984/6ac2c39a3c557f91f716bff1453966d7.pdf?sequence=1&isAllowed=y [Accessed 15 June 2014].

Dainty, A., Moore, D. & Murray, M. 2006. *Communication in construction: theory and practice*. New York: Taylor & Francis Group.

De la Garza, J.M. 1994. Value of concurrent engineering for A/E/C industry. *Journal of Management in Engineering*, 10(3), pp. 46-55.

Elders Insurance. 2013. *The four techniques of risk management*. [online]. Available from: eldersinsurance.com.au/news/the-four-techniques-of-risk-management [Accessed 15 October 2014].

Elyse. 2006a. *Project communications management*. [online]. Available from: www.anticlue.net/archives/000801.htm [Accessed 4 March 2014].

Elyse. 2006b. *Project risk management*. [online]. Available from: www.anticlue.net/archives/000810.htm [Accessed 5 March 2014].

Elyse. 2006c. *Project time management processes*. [online]. Available from: www.anticlue.net/archives/000763.htm [Accessed 18 February 2014].

Emmitt, S. & Gorse, C. 2007. *Communication in construction teams*. New York: Taylor & Francis Group.

Ethics Institute of South Africa. 2013. *Ethical companies better positioned to win the war for talent*. [online]. Available from: www.isbe.org.uk/EthicsFactandFigures [Accessed 18 May 2014].

Fawcett, W. & Palmer, J. 2004. *Good practice guidance for refurbishing occupied buildings*. London: CIRIA.

Finsen, E. 2005. *The building contract: a commentary on the JBCC agreements*. (2nd ed.). Cape Town: Juta.

Geren, R.L. 2012. Communication during construction. *Keynotes: Information for the improvement of construction documents*, 10 (1), pp. 3-7.

Goudar, J. 2010. *The project perfect white paper collection: effective project communication management*. [online]. Available from: www.docstoc.com/docs/62833284/Case-Study-in-Effective-Project-Communication-Management [Accessed 19 April 2012].

Hendrickson, C. 2008. *Project management for construction: fundamental concepts for owners, engineers, architects and builders*. [online]. Available from:

www.scribd.com/doc/28202582/Project-Management-for-Construction-Book-2008 [Accessed 19 March 2014].

Hillson, D A. 1997. Towards a risk maturity model. *International Journal of Project & Business Risk Management*, 1(1), pp. 35-45.

Hugo, S.L. 2005. *Recurring natural disasters: structural materials and methods used to restrict structural damage and fatalities*. Bloemfontein: University of the Free State. (Unpublished dissertation (BScQS:Hons)).

Institute of Directors in Southern Africa. 2009. *KING III Report*. [online]. Available from: african.ipapercms.dk/IOD/KINGIII/kingiiiireport/ [Accessed 18 May 2014].

Jobling, P., Merna, T. & Smith, N. 2006. *Managing risk in construction projects*. (2nd ed.). London: Blackwell Science.

Joint Building Contracts Committee. 2007. *Principal building agreement*. (5th ed.) Johannesburg: Joint Building Contracts Committee Inc.

Jones, T.M. 1991. Ethical decision making by individuals in organizations: an issue-contingent model. *The Academy of Management Review*, 16(2), pp. 366-395.

Jurisch, M.C., Ikas, C., Wolf, P. & Krcmar, H. 2013. Key differences of private and public sector business process change. *E-Service Journal*, 9(1), pp. 3-27.

Kallman, J.M. & Maric, R.V. 2004. A refined risk management paradigm. *Risk Management*, 6(3), pp.55-68.

Kerzner, H.R. 2001. *Strategic planning for project management using a project management maturity model*. New York: John Wiley & Sons.

Kirkman, R. 2008. *Ferry and Brandon's Cost planning of buildings*. (8th ed.). London: Blackwell Science.

Klemetti, A. 2006. *Risk management in construction project networks*. Helsinki, Finland: Helsinki University of Technology.

Knipe, A., Van der Walt, G., Van Niekerk, D., Burger, D. & Nell, K. 2002. *Project management for success*. Cape Town: Butterworth-Heinemann.

Lockhart-Barker, E. 2013. *Saint-Gobain Gyproc committed to sustainability critical life cycle assessment process*. [online]. Available from: www.leadingarchitecture.co.za/saint-gobain-gyproc-committed-to-sustainability-critical-life-cycle-assessment-process/ [Accessed 6 October 2014].

Mahloka, P. 2006. *The role of communication in the construction industry*. Bloemfontein: University of the Free State. (Unpublished dissertation (BScQS:Hons)).

Makuta, I. 2012. *Internal communications policy*. Johannesburg: Group Five.

MAPFRE. 2012. *Manual on construction risks, damage to the works and advanced loss of profits (ALOP)*. [online]. Available from: pdfchoice.co.uk/doc-file/manual-on-construction-risks-and-alop-seguros-mapfre [Accessed 29 September 2014].

March, J.G. 1994. *Primer on decision making: how decisions happen*. New York: Simon & Schuster.

Maritz, M.J. 2009. The future: what next for standard forms of contract in the South African construction industry? *Paper delivered at the 2nd Annual Conference of the SACQSP (endorsed by ICEC)*, Durban 16 October 2009. South Africa: University of Pretoria, pp. 1-12.

Martinez, F.S. 2006. Specific administrative clauses for contracting through public tender, the design, manufacture and supply of a Cryogenic reconfigurable slit unit for emir, open procedure (file number: c50/06). Handout

Nell, C. 2013. *Business continuity management procedure*. Johannesburg: Group Five.

Nickson, D. & Siddons, S. 2006. *Project management disasters and how to survive them*. London: Kogan Page.

Nobel, C. 2013. *The real cost of bribery*. [online]. Available from: hbswk.hbs.edu/item/7325.html [Accessed 16 May 2014].

Novinson, E. & Duggan, T. 2014. *Definition of project risk management: what is a risk management project?* [online]. Available from: www.ehow.com/info_7934314_risk-management-project.html [Accessed 15 May 2014].

Project Management Institute. 2000. *A guide to Project Management Body of Knowledge*. Sylva, NC: Project Management Institute Incorporated.

Project Risk Management. 2010. *Project risk management: guidance for WSDOT projects*. Olympia, WA: Washington State Department of Transportation.

Project Risk Management Handbook. 2007. *Threats and opportunities*. (2nd ed.). Sacramento: Office of Statewide Project Management Improvement.

Purves, K. 2005. Meetings and incentive travel. *Corporate communications*, 34(3), pp. 13-15.

PricewaterhouseCoopers (PwC). 2011. *Cybercrime in the spotlight: 6th PwC global economic crime survey*. South African edition. [online]. Available from: www.pwc.co.za/crimesurvey [Accessed 16 May 2014].

Raftery, J. 1999. *Risk analysis in project management*. London: Spon.

Saunders, M. 1999. Linking external communication and organizational effectiveness. *Organizational Development Journal*, 17(4), pp. 35-40.

Sekhesa, B. 2007. *The management of risk and the influence of insurance and guarantees in the construction industry*. Bloemfontein: University of the Free State. (Unpublished dissertation (BScQS Hons)).

SHEQ Management System. 2014. *Integrated SHEQ management systems explained*. [online]. Available from: www.sheqmanagementsystem.co.za/IntegratedSHEQManagementSystemsExplained.html [Accessed 21 March 2014].

Snyman, C.R. 2008. *Criminal law*. (5th ed.). Durban: Lexis Nexis.

Steyn, H., Carruthers, M., Du Plessis, Y., Kruger, D., Kuschke, B., Sparrius, A., Van Eck, S., Visser, K. 2012. *Project management: a multi-disciplinary approach*. (3rd ed.). Pretoria: FPM Publishing.

The Phrase Finder. 2015. *The meaning and origin of the expression: Failing to plan in panning to fail* (online). Available from: www.phrases.org.uk/meanings/failing-to-plan-is-planning-to-fail.html [Accessed on 9 October 2015].

The Phrase Finder. 2015. *The meaning and origin of the expression: Murphy's Law* (online). Available from: www.phrases.org.uk/meanings/murphys-law.html [Accessed on 9 October 2015].

Trevino, L.K. 1986. Ethical decision making in organizations: a person-situation interactionist model. *The Academy of Management Review*, 11(3), pp. 601-617.

Turner, J.R. 2003. *People in project management*. Burlington, VT: Gower.

University of Wisconsin-Madison. Division of Business Services. 2015. *What is risk management?* [online]. Available from: www.bussvc.wisc.edu/risk_mgt/what_is_rm.html [Accessed 18 March 2015].

Van Well-Stam, D., Lindenaar, F., Van Kinderin, S. & Van den Bunt, B. 2004. *Project risk management: an essential tool for managing and controlling projects*. London: Kogan Page.

Vaughan, E.J. & Vaughan, T. 2008. *Fundamentals of risk and insurance*. (10th ed.). Hoboken, NJ: John Wiley & Sons.

Vermaak, S. 2006. *Assessering van risiko by bouprojekte*. Bloemfontein: University of the Free State. (Unpublished dissertation) (BScQS Hons)).

Volujevica, A. 2012. *Role of internal and external communication*. [online]. Available from: pure.au.dk/portal-asb-student/files/48563031/Thesis_Final.pdf [Accessed 27 August 2014].

Walker, A. 2008. *Project management in construction*. (5th ed.). London: Granada.

Welch, M. & Jackson, R.P. 2007. Rethinking internal communication a stakeholder approach. *Corporate Communications: an International Journal*, 12(2), pp. 177-198.

Westland, J. 2006. *The project management lifecycle*. [online]. Available from: cnx.org/content/m31913/latest/ [Accessed 19 June 2014].

Wiig, K.M. 2004. *People-focused knowledge management: how effective decision making leads to corporate success*. Boston: Elsevier Butterworth-Heinemann.

Willis, H.L. 2002. *Power distribution planning reference book*. (2nd ed.). New York: Marcel Dekker.

Wood, G. & Ellis, R. 2003. Existing risk management approaches in civil engineering. In: Smith, N.J. (ed.). *Appraisal, risk and uncertainty*. London: Thomas Telford, pp.22-32.

Yancy, R. 2009. *Scope management*. [online]. Available from:
www.yancy.org/research/project_management/scope.html [Accessed 7 April 2014].

FOR OFFICE USE ONLY:

SEND: Yes/No

RETURNED: Yes/No

Appendix A: Questionnaire

**RISK MANAGEMENT IN THE CONSTRUCTION ENVIRONMENT: THE EFFECTS OF
DECISION-MAKING AND COMMUNICATION**

Profession: _____

Number of years' experience: _____

1. In your experience is the construction industry profitable?

Yes	Depending	No
-----	-----------	----

2. List common risks associated with construction projects?

3. Which of the following bares the most risk associated with a construction project?

Operational	Commercial	Contractual	Planning	Communication	Tendering	Estimating
-------------	------------	-------------	----------	---------------	-----------	------------

4. List risk associated with a construction project in terms of operations?

5. List risk associated with a construction project in terms of commercial aspect of the project?

6. List risk associated with a construction project in terms of contractual risk?

7. List risk associated with a construction project in terms of planning?

8. List risk associated with a construction project in terms of tendering?

9. List risk associated with a construction project in terms of estimating?

10. Does certain risks repeat it? Please identify which are most likely to be repeated? In your professional opinion why does this occurrence repeat itself?

11. In your experience how have you planned for risks and how have you dealt with ongoing risks?

12. In your opinion, what can be done to limit or mitigate these risks?

13. Where are risk predominantly created with site management?

Trust	Teamwork	Communication	Crisis Management	Decision making	Human Resources	Planning
-------	----------	---------------	-------------------	-----------------	-----------------	----------

14. Why do we have issues with the above if all are such an intricate part of managing a project?

15. Would you say a lack of trust between team members could lead to increased project risk? Why would you say such distrust exists? (Competitiveness, achievement based, security, lack of knowledge)

16. On a scale from 1 (least) to 5 (most), indicate in your opinion to what extent the following variables could be possible factors in effective communication skills?

DESCRIPTION	1	2	3	4	5
ORGANISATIONAL STRUCTURE					
TIME MANAGEMENT					
LACK OF PLANNING					
LANGUAGE AND CULTURAL DIFFERENCES					
HIERARCHY OF THE TEAM					

17. How do you deal with crisis management? In your opinion, is it effective?

18. We all know human resources are a crucial component to success or failure. In your experience, how does human error contribute to the creation and/or aggravation of risk?

19. On a scale from 1 (least) to 5 (most), indicate in your opinion what can be done to effectively minimise and/or mitigate the contribution of human error in risk for risks from occurring?

DESCRIPTION	1	2	3	4	5
GRIEVANCE PROCEDURE					
DISCIPLINARY POLICY					
IR PROCEDURES					
HR MANAGEMENT					
LINE MANAGEMENT					
AGE DIFFERENCE					
STATUS OF INDIVIDUAL					

20. On a scale from 1 (least) to 5 (most), indicate in your opinion what risks are associated with the geographical challenges of working away from your company's home base?

DESCRIPTION	1	2	3	4	5
MATERIAL					
HUMAN RESOURCES					
TIME					
COMMUNICATION					
CULTURE					
DECISION MAKING					

21. We all know in South Africa there is not a lot of earthquakes, hurricanes, flooding etc. But does the team prepare themselves for any act of God that could occur?
