CONTRACTOR LIABILITY ON CONSTRUCTION PROJECTS: RISK MANAGEMENT AS STRUCTURED IN FIDIC CONTRACTS FOR PROJECTS IN SOUTH AFRICA WITH SPECIFIC REFERENCE TO INSURANCE

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DECLARATION

I, Comfort Kelebogile Sekano, declare that this research report is my own, unaided work. It is submitted in partial fulfilment of the Master of Science in Engineering at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

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2 October 2018

ABSTRACT

Risk is an intrinsic characteristic of the construction industry. This uncertainty is present in almost all, if not all projects, due to the project profile and contractual arrangements. Seeing that failure proofing is not practical, the effective and efficient management of risks is essential for reducing the probability of failure, promoting successful delivery of projects and enhancing profitability. Accordingly, risk management is integral not only to the successful delivery of projects, but to the overall organisational sustainability.

Due to the dynamic nature of the construction environment, construction companies are also exposed to potential liabilities, some of which arise from the contract conditions. These contracts are relied upon to clearly and equitably allocate risks on projects and provide remedies for addressing the risks should they manifest. Insurance is a contractual requirement to address the adverse effects of some risks which are insurable.

This risk profile has justified the purpose of the study to investigate contractor liability, risk exposure and responsibilities as structured through the internationally recognised FIDIC contracts and the use of insurance as the risk transfer tool of choice for construction projects in South Africa. Four large construction companies were selected for a detailed review of risk management processes in line with best practice to determine whether the implementation was supportive of decisions such as purchasing insurance.

The research findings illustrate that the documented processes of the South African construction are in line with best practice. However, as revealed in the literature review, there is a gap between theory and the application of risk management techniques and although insurance is the preferred risk transfer tool, it is still not well understood and the industry is still lacking in applying proper thought processes regarding their requirements.

In loving memory of

Dr Sean Sicupira, my beloved partner.

Thank you for planting the seed.

and

To my 2 year old son, Onkabetse,

My greatest blessing.

You are the inspiration that finally propelled me, to complete this report.

For that, I am eternally in your debt.

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ABBREVIATIONS AND ACRONYMS

CIDB	Construction Industry Development Board
FIDIC	Fédération Internationale Des Ingénieurs Conseils (The International Federation of Consulting Engineers)
GBP	Great British Pounds (Sterling)
GCC	General Conditions of Contract
IMF	International Monetary Fund
IRM	Institute of Risk Management
JBCC	Joint Building Contracts Committee
NEC	New Engineering Contract
PMBOK	Project Management Body of Knowledge
PMI	Project Management Institute
SAFCEC	South African Federation of Civil Engineering Contractors
USD	United States Dollar
ZAR	South African Rand

1 INTRODUCTION

Risk is an intrinsic characteristic of the construction industry, mainly due to construction projects being 'temporary' endeavours undertaken to create unique products, services or results, as defined by the Project Management Institute (PMI) (2004). These projects are undertaken in dynamic environments and organisations, comprising complex conceptual, design and construction processes characterised by uncertainty (Akintoye & MacLeod, 1997; Ren, 1994). Risks in construction are present in almost all, if not all projects (Hamburger, 1990, PMI, 2004), due to the project profile and contractual arrangements. Therefore, the efficient and effective management of risks involved is essential for reducing the probability of failure, promoting successful delivery of projects and enhancing profitability (Akintoye & Macleod, 1997; PMI, 2004; Ren, 1994).

The risk exposure on construction projects exists throughout the project life cycle. For owners, it starts during the conception phase, whereas for contractors it starts during the pre-tender stage. While risks cannot be entirely eliminated, early identification, assessment, management and control thereof tends to be the answer (Zou, Zhang & Wang, 2007). It therefore follows that risk management is an essential project management input for the successful delivery of projects.

For construction companies, most of their risks come from their operations, comprising the delivery of projects, and conditions of contracts are relied upon to allocate risks, liabilities and responsibilities of each contracting party (Baloi & Price, 2003, Bunni, 2003:8, Rahman & Kumaraswamy, 2002). Due to the level of uncertainty on projects, various types of insurances are called for in construction contracts to handle the adverse effects of risk. This risk profile has justified the purpose of the study to investigate contractor liability, risk exposure and responsibilities as structured through the internationally recognised Fédération Internationale des Ingénieurs Conseils (FIDIC) contracts and the use of insurance as the risk transfer tool of choice for construction projects in South Africa.

1.1 Background

According to Massey (2010), "*when we manage projects we are managing risks*", some of which are managed through formal contracts (Ibid; Bunni, 2003). He further states that "*because we do not rationalise what it is we are doing and why we are doing these things….., we very often do not allocate the priority to these functions that they deserve. For example, most construction projects operate on purchase orders even when entering into agreements with sub-contractors. This can have disastrous consequences. Purchase orders provide little protection and contain insufficient risk management facilities for anything but the most simple purchases."* If this is a true reflection of some of the characteristics within the South African construction environment, it questions the risk management and project management applications and the relevance thereof in relation to the sustainability of these companies.

In South Africa, construction is a multi-billion rand industry, with most of its income generated from the public sector (Pricewaterhouse Coopers (PwC), 2016). According to National Treasury (2017), the public sector spent more than ZAR2,5 trillion on infrastructure between 1998 and 2016 and this expenditure is critical for economic growth and social development (Mahadea, 2005). Therefore, the construction sector's role is not only its capability to deliver these projects, but also its significant contribution to the economy (Ofori, Hindle & Hugo, 1996). Statistics South Africa (Stats SA) Report (2018), indicate that out of a total of 16 171 000 employed, 1 390 000 were in construction, as illustrated in Table 1.1.

Table 1.1 Total Employment (number) by economic industry

Industry	2000	2010	2014	2017
Agriculture	1 694 000	649 000	742 000	849 000
Mining	531 000	321 000	427 000	411 000
Manufacturing	1 576 000	1 889 000	1 749 000	1 791 000
Utilities	82 000	96 000	104 000	149 000
Construction	639 000	1 115 000	1 334 000	1 390 000
Trade	2 426 000	3 126 000	3 247 000	3 248 000
Transport	551 000	805 000	952 000	1 001 000
Finance	928 000	1 700 000	2 039 000	2 373 000
Community and social services	1 994 000	2 985 000	3501 000	3 691 000
Private households	1 205 000	1 213 000	1 22 000	1 270 000
Other	87 000			
TOTAL	**11 712 000**	**13 898 000**	**15 230 000**	**16 171 000**

(Source –Stats SA, 2001, 2015a and 2018 – all figures based on 4th quarter figures)

For more than three decades, employment creation has been a calamity for the South African Government[1]. In the early 1990s, McCutcheon (1991), remarked that "unemployment is becoming an increasingly important problem in South Africa". Albeit, he cautioned that whatever solutions that may be derived would not yield immediate results and to date, unemployment rates remain high in comparison with global trends as illustrated in Table 1.2.

Table 1.2 Total unemployment rate (percentages) – global, regional and country specific

Country/Region	2007	2012	2014	2016
World	5.5	6.0	6.1	5.7
Developed Economies and the European Union	5.8	8.6	8.6	9.3
Central and South-Eastern Europe	8.2	8.0	8.3	8.9
Middle East	10.2	10.9	11	10.7
East Asia	3.8	4.4	4.7	4.5
South-East Asia and the Pacific	5.5	4.1	4.3	3.8
South Asia	4.1	3.9	4.0	4.1
Latin America and the Caribbean	6.9	6.6	6.5	8.1
North Africa	11.1	12.1	12.2	12.1
Sub-Saharan Africa	7.5	7.6	7.6	7.2
South Africa	22.3	25	25.2	25.9

(Source: International Labour Organisation (ILO),2014 – employment rates are based on the official definition)

If the provision of infrastructure is a national priority, as affirmed by the various government initiatives such as the Expanded Public Works Programme (EPWP) and Accelerated and Shared Growth Initiative for South Africa (ASGISA)[2], together with corresponding fiscal budget allocations, then the construction industry is relevant and crucial to the country's objectives in respect of economic growth and employment creation. It is therefore imperative that construction companies recognise that their survival going forward depends on devising mechanisms robust enough to confront the high-risk environment within which they operate (PwC, 2013).

[1] South African Presidents from F W De Klerk and Jacob Zuma, have all acknowledged that employment creation is critical, as noted in various "State of the Nation" addresses between 2 February 1990 and 9 February 2017.

[2] In 2004, the South African Government was mandated to halve poverty and unemployment by 2014.www.daff.gov.za/docs/GenPub/asgisa [Accessed 7 February 2017].

1.2 Problem Statement

Construction companies are exposed to potential liability, some of which arise from the contract conditions (Massey, 2010). According to various authors, risk management is integral to not only project success, but overall organisational sustainability (Akintoye & MacLeod, 1997; Zhao & Duan, 2008; Zou, Zhang & Wang, 2007). However, there is a gap between theory and application of risk management techniques (Baloi & Price, 2003; Flanagan & Norman, 1993).

South Africa is classified as a developing country and yet the scale of the infrastructure projects undertaken, such as The Gautrain Rapid Rail Link (Gautrain), Medupi and Kusile coal powered electricity generation plants, including construction in preparation for the 2010 Soccer World Cup are of such calibre that they invite interest and scrutiny from the international community. In some instances, the projects necessitate importing specialist technical skills and project finance from abroad. For example, a section of the deep underground tunnel for the Gautrain was carried out by a specialist team operating the tunnel boring machine (TBM)[3]. As a result, the internationally used FIDIC suite of contracts is preferred over the commonly used and well understood contracts such as the General Conditions of Contract (GCC), Joint Building Contracts Committee (JBCC) and New Engineering Contract (NEC). These commonly used contracts have been tested in terms of the construction contract law, with legal precedence available on various issues, including indemnity, risk and responsibility related issues. The construction contract is the only is the only enforceable agreement between the contracting parties and when the courts are called upon to give effect, they can only do so thin the "four corners" of the contract.

However, contracting companies often suffer prolonged durations, heavy penalties or lengthy disputes and unnecessary law suits, thereby wasting precious project time[4]. In addition, sudden and unforeseen incidents occur, resulting in fatal or losses of colossal magnitudes[5], including liability exposures from the contractual responsibility (Rahman & Kumaraswamy, 2004).This is partly a result of the mismatch between the theory and practice of risk management

[3] www.bombela.com/design [Accessed 22 May 2017]
[4] *EsorFranki Pipelines (Pty) Ltd and Another v Mopani District Municipality and Others* (40/13)[2014] ZASCA 21 (28 March 2014). The matter involved aggrieved tenderers challenging the tender award. The courts found the contract entered into to have been unlawful and invalid since inception (para 2).
[5] *Masstores (Pty) Ltd v Murray & Roberts Construction (Pty) Ltd* (573/2007) 94 [2008] ZASCA (12 September 2008). The employer sued the contractor for negligently damaging or destroying the existing warehouse and its contents claiming an amount of ZAR169 365 173. The Supreme Court of Appeal upheld that the indemnity clause in the contract precluded any actions by Masstores.

techniques on the part of the contractor, coupled with a lack of understanding of contractual implications by both employers and contractors. Consequently, the industry is now litigious, as evidenced by the number of recent Court and/or Arbitration cases in South Africa.

In practice, contracting parties rely on insurance to transfer their allocated risks, as stipulated in construction contract. The current contentious environment suggests that both employers and contractors need to pay far more attention to understanding the implications of their insurance requirements and responsibilities. This report focuses on the problem faced by the contractor.

1.2.1 Research Question

The research question is:

> **Do contractors understand and prepare for their risk exposure and accompanying liability on projects?**

Sub-questions:

In support of the main question, the following sub-questions have been formulated:

- Do contractors understand their risk environment?
- Do they understand the legal implications of the risks as structured in the FIDIC contracts?
- How is risk apportioned through FIDIC Contracts?
- How do they decide what insurance cover to purchase?

1.3 Objective of the Report

Owing to the research questions listed in the preceding section, the specific objectives of the study are as follows:

- To investigate the various construction risks in order to provide an overview of the risk environment and correlate the information with the risks identified by the contractors investigated.
- To investigate the legal implications and contractual framework as structured through the selected contract.

- To investigate whether the South African construction industry subscribes to best practice in respect of risk management.
- To investigate the risk management approach to determine whether it provides the requisite guidance in respect of apportioning risk, risk appetite, tolerance and control, including decisions and processes prior to the purchase of insurance.

1.4 Significance of the Report

Risk management should be used to address uncertainty (IRM, 2010) and insurance provides the mechanism to transfer this uncertainty to a third party. Insurance is a requirement in terms of the construction contract and cover is purchased upfront, yet this is one area which is not well understood.

Specialist products such as the Contractors All Risks (CAR) insurance policy providing cover for damage to contract works follow the contract, as the project or contracts works is the Insured Property. Synergy between the contract and insurance cover is necessary to yield optimal results. The report provides an overview regarding what should be insured and whether it is insurable.

Firstly, the study is significant because it challenges the *status quo* regarding use of insurance; it is not to bridge the gap for financial losses on a project, but rather to cover reinstatement costs in the event of a loss and aims to improve the understanding of the concept of indemnity.

Secondly, the insurance cover can be tailor-made, but this requires risk appraisal of the anticipated project environment and understanding both the contract conditions and policy provisions. Contract works policies may provide standard cover, but there are various extensions available, which necessitates a thorough thought process, as premiums cost money.

1.5 Delineations

This research focuses on South African based companies, listed on the Johannesburg Stock Exchange, regarded as large enterprises (turnover equal to or greater than ZAR117 million). Although these organisations are multi-disciplinary, the focus is on their CIDB grading and classes of work.

Four companies were selected from a list of top 10 construction companies as presented by Pricewaterhouse Coopers (2013) publication titled "Highlighting trends in the South African Construction Industry". The organisations' documented risk management processes and claim related information were reviewed and supplementary information was sourced from their respective websites. This study only covers contract works insurance.

1.6 Report Structure

Chapter 1 defines risk in the introduction, provides the background on risk management and the role of the construction industry in South Africa. It includes the problem statement, research questions, limitations and significance of the report.

Chapter 2 focuses on the literature review on risk management and construction risks. Failures elsewhere are used to highlight the magnitude of losses emanating from construction activities. Also included is the review of the relationship between risk, contract law and insurance.

Chapter 3 outlines the research methodology. Based on the qualitative approach selected, a detailed account of the research design, data collection and analysis is presented.

Chapter 4 is a presentation and discussion of the selected case studies which provide details of the risk management processes and the insurance approach as implemented by the nominated companies.

Chapter 5 provides an overall analysis of the findings from the evaluated case studies. This is followed by a comparative study of the various results. It correlates the risk clauses to insurable risks.

Chapter 6 draws the conclusions based on whether the risk management protocol adequately addressed the various risks and whether the insurance cover on the projects was necessary, appropriate and adequate. Recommendations are based on the conclusions and a summary of various policies together with their application is provided.

2 LITERATURE REVIEW

2.1 Introduction

The substantial cost of failure, competitive environment and tougher economic conditions have raised risk management to the forefront front of business thinking (Akintoye & MacLeod, 1997; Valsamakis, Vivian & du Toit, 2010). As a result, organisations are cognisant of the importance of controlling and managing their risk exposure (Akintoye & MacLeod, 1997, Ren 1994).

The construction industry with high-risk and uncertainty engrained in its footprint has not been spared from the global volatility (Flanagan & Norman, 1993; Valsamakis, Vivian & du Toit, 2010:7). Accordingly, risk management is integral to strategic management, as it increases the probability of success and minimise the impacts of failure, which translate into organisational prosperity (IRM, 2002; Ren, 1994, Valsamakis, Vivian & du Toit, 2010:7, 12; Zou, Zhang & Wang, 2007).

Although risks cannot be eliminated (Zou, Zhang & Wang, 2007), they are also not all identifiable or controllable and risk management provides mechanisms to mitigate the impact and promotes responsible risk taking (Valsamakis, Vivian & du Toit, 2010). The management of risk is not standardised (IRM, 2002, Kerzner, 2003:654), but requires a subjective approach tailor made for the specific entity and applicable environment, instead of a “one-size-fits-all” (IRM, 2002).

Research shows that the successful delivery of projects depends on achieving the time, scope, quality and cost constraints and effectively managing risks (Ren, 1994; Zou, Zhang & Wang, 2007), application of appropriate project management processes (Kliem & Ludin, 1997; Ren, 1994) and the implementation of appropriate, clear, and equitable conditions of contract (Baloi & Price, 2003; Bunni, 2003:8; Rahman & Kumaraswamy, 2002). According to Zou, Zhang & Wang (2007) “early identification and assessment of risks is essential”, which supports the perception that some aspects within the risk management process are more practised than others. Their study of the construction industry in China, together with the comparative risk profile provided by parallel survey in Australia, they conclude that “further exploration of the recognized risks found that they are mainly related to contractors, followed by clients,

designers, subcontractors/suppliers and governmental agencies, and occurred mainly in the construction phase."

The above raises the following literature review questions:

(i) What are the principles that govern an effective risk management system?

(ii) What is the relationship between construction contract law and risk management?

(iii) Considering that the construction industry tends to transfer risk to third parties such as insurers, what is the relationship between risk management, the construction contracts and insurance?

2.2 Risk Management

Valsamakis, Vivian & du Toit (2010:13), define risk management as "*a managerial function aimed at protecting the organisation and its people, assets and profits against the physical and financial consequences of risk. It involves planning, coordinating and directing the risk-control and the risk-financing activities in the organisation.*"

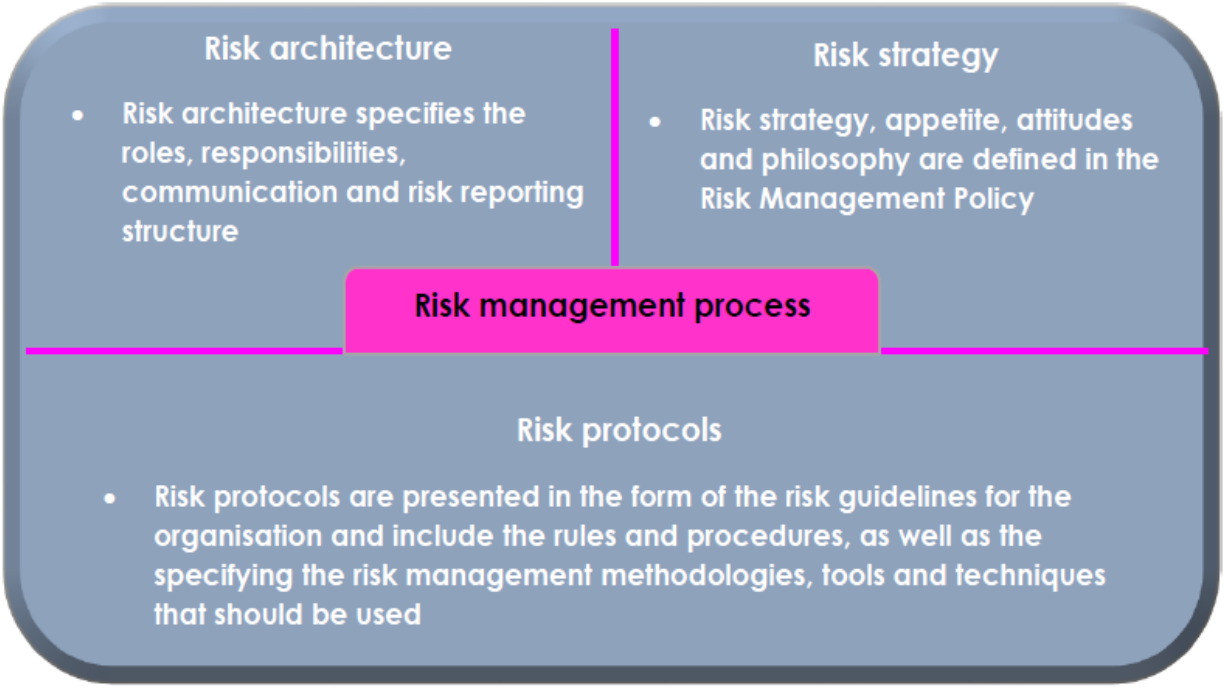
In order to contextualise the importance of risk management, the extensive body of knowledge provides the following convergence (i) it is an integral part of strategic management, which should align with objectives of the organisation, (ii) it is a continuous process of methodically identifying, assessing, analysing, management of risks, (iii) it requires a top down approach, which includes translating strategy into tactical and operational objectives, (iv) it must be integrated into the corporate culture, (v) it requires a comprehensive, inclusive and proactive rather than reactive approach to risk, (vi) supports accountability and (vii) increases the probability of success (IRM, 2002, 2010; Kerzner, 2003:655; PMI, 2004, Valsamakis, et al, 2010:13, 15). This is in line with the statement by the IRM (2010), that "risk management is a process that is underpinned by a set of principles", which are extracted from ISO[6] 31 000 and summarised as follows:

[6] ISO – International Standardisation Organisation is an independent, non-governmental international, standard-setting organisation with a membership of 161 national standard bodies.
ISO 31000 is a generic risk management standard. However, ISO31000 cannot be used for certification purposes, but does provide guidance for internal and external audit programmes. Organisations using it can compare their risk management practices with the internationally recognised benchmark, providing sound principles for effective management and corporate governance.
https://www.iso.org/iso-31000-risk-management. [Accessed 14 June 2013]

- *"To create and protect value, as this assists organisation's in achieving objectives and improve performance.*
- *It should be part of every process at every level.*
- *It should be part of decision-making at all levels, to facilitate making informed choices and prioritise actions.*
- *It should be used to address uncertainty, to identify and define the nature and type of uncertainties.*
- *It should be systematic, structured and timely. This approach contributes to efficiency and generates reliable results.*
- *It should be based on the best data. The inputs used to manage risk should be based on the best available information sources, to ascertain that decision makers understand and consider the limitations and shortcomings of the data made available.*
- *It should be tailored to the organisation's environment. The approach should align with the unique risk profile.*
- *It should consider human factors. The approach should recognise and consider the human and cultural factors that can influence the achievement of the organisation's objectives.*
- *It should be transparent and inclusive.*
- *It should be responsive and iterative by ensuring that the risk management approach is on-going and continually senses change and responds to it.*
- *It should support continual improvement by developing strategies that improve the risk management approach. Risk management should be used to improve all aspects of the organisation."*

2.2.1 The Risk Management Context

The risk management context is the structure designated to successfully implement, support and sustain the risk management process and contextualise the associated activities (ISO 31000, as cited in IRM, 2010). The IRM's review of ISO 31000 highlights that although the standard includes the framework for implementing risk management, it neglects setting out design parameters for the framework that supports the risk management process. However, it provides a suitable structure in terms of risk architecture, strategy and protocols as illustrated in Figure 2.1.

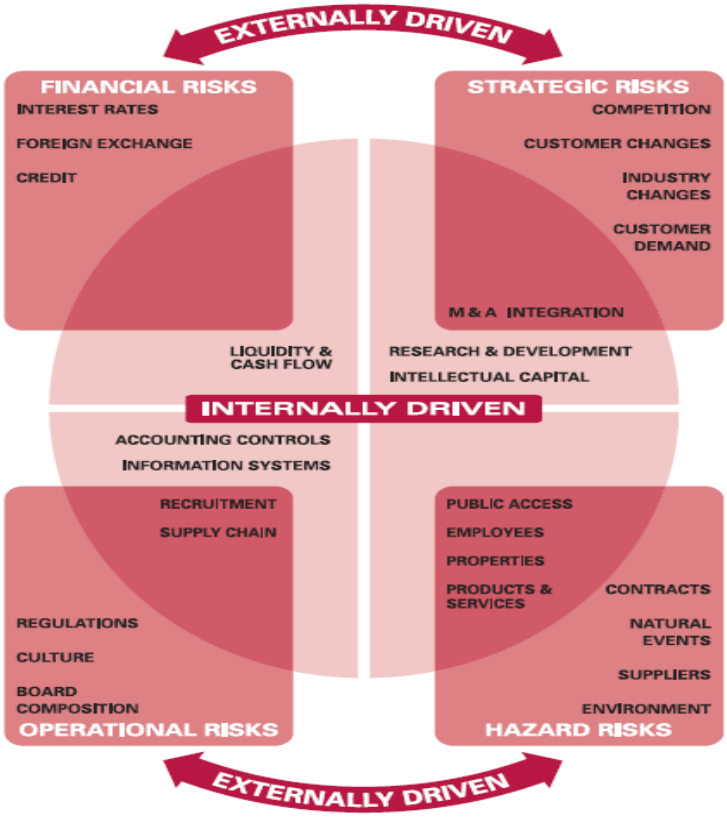


Source: IRM (2010)

Figure 2.1 Risk architecture, strategy and protocols

2.2.2 Risk Drivers

Organisations' risk profiles stem from factors that are both internal and external (IRM, 2002). Risk by nature may result in events with negative impacts, regarded as "risk" or positive outcomes representing opportunity. Global risks such as climate, competition, political, legislation and regulation compliance requirements, priorities and influences, cyclic downturns, labour unrests, rates of exchange, inflation, shortage or abundance of material supply, are external factors. Whereas, risk drivers comprising liquidity and cashflow, integrity, goodwill and work in progress tend to be internal by origin, with some drivers overlapping between the areas (Ibid). The IRM (2002) categorise types of risk into financial, strategic, operational and hazard, as illustrated in Figure 2.2.



Source – IRM (2002)

Figure 2.2 Examples of Key Risk Drivers

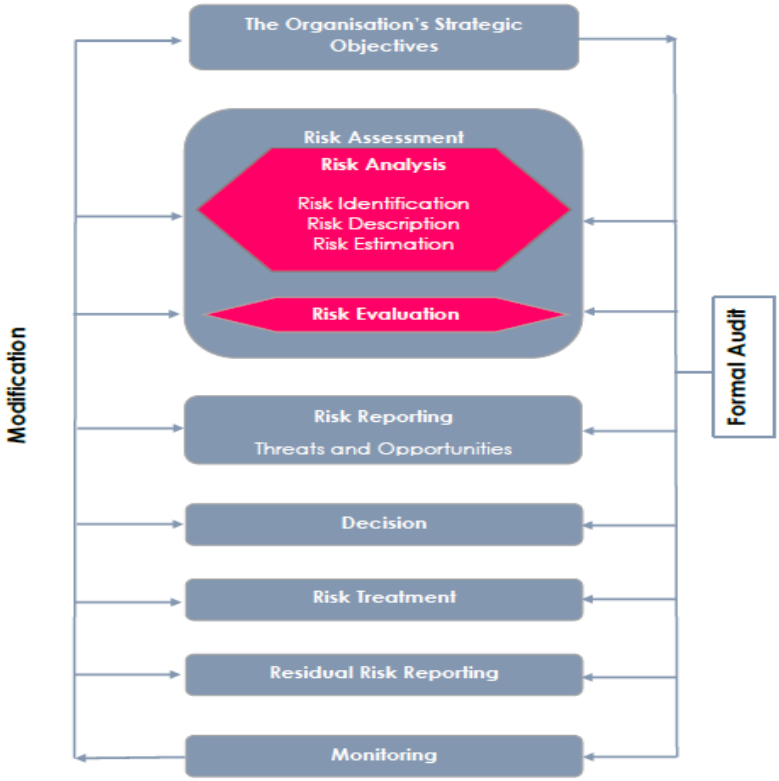
2.2.3 Risk Management Process

Literature shows that the approach to the risk management process is as varied as its definition (IRM, 2002; Valsamakis, Vivian & du Toit, 2010). The Project Management Body of Knowledge (PMBOK) presents a five-stage process comprising (i) risk management planning, (ii) risk identification, (iii) qualitative and quantitative risk analysis, (iv) risk response planning and (iv) risk monitoring and control and this has been adopted by theorists and authors such as Frimpong (2003:222), Kerzner (2003:662), Zou, Zang & Wang (2007) . According to ISO 31000 (as cited in IRM, 2010), firstly the risk management process occurs with the organisation's risk management context and the subsequent stages include: (i) risk assessment, (ii) formulating and implementing risk treatment plans, (iii) monitoring and review of the risk management process and (iv) maintaining a record of the risk management activities. However, there is synergy in that it involves interrelated activities (Kerzner, 2003; IRM, 2002;

Valsamakis, Vivian & du Toit, 2010) comprising the following components ("*7Rs and 4Ts*"), IRM (2002):

- *"Recognition or identification of risks.*
- *Ranking or evaluation of risks.*
- *Responding to significant risks (tolerate, treat, transfer and terminate, which constitute the 4Ts).*
- *Resourcing controls.*
- *Reaction or response planning.*
- *Reporting and monitoring risk performance.*
- *Reviewing the risk management framework."*

The risk management approach presented by the IRM (2002) and supported by Valsamakis, Vivian & du Toit (2010), recognises that the risk management goals and objectives have to align with the organisation's mission. For that reason, this study aligns with the presented approach, which is illustrated in Figure 2.3.



Source: IRM (2002)

Figure 2.3 Risk Management Process

2.3 Enterprise Risk Management and Governance

The collapse of corporate giants in the United States (U.S) and elsewhere such as (i) WorldCom, reporting bankruptcy at US Dollar (USD) 104 billion (Thomas, Schermerhorn & Dienhart, 2004), (ii) Enron, resulting in the loss of approximately 11 000 jobs and the demise of (iii) Arthur Andersen, one of the five largest accounting firms at the time (Michalowski & Kramer, 2003; Thomas, Schermerhorn & Dienhart, 2004); not forgetting that the current financial crisis which the global economy is struggling to recover from is due to (iv) Lehmann Brothers, the fourth largest U.S. investment bank, with 25 000 employees worldwide, bear evidence to the ramifications of "ethical failures" (Thomas, Schermerhorn & Dienhart, 2004) and "the absence of coordinated risk management practices" (Valsamakis, Vivian & du Toit, 2010:80).

Thomas, Schermerhorn & Dienhart, (2004) in their paper on 'Strategic Leadership of Ethical Behaviour in Business' suggest that "*the strategic leadership of ethical behaviour (sic) in business can no longer be ignored*." They further report that "*there is too much at stake for this ethics leadership agenda to be denied. Recent experience with a troubled economy has taught citizens that business is an essential part of the social fabric. They are also recognizing, perhaps belatedly, that when business fails ethically, we all fail. Rebuilding the ethical character of our institutions and regaining public confidence in them are realizable aspirations. Real progress, however, can be made only when the initiatives for ethics change come from within the firm and from its leaders.*"

In support, Valsamakis, Vivian & du Toit (2010:80), state that "the most significant driving force behind the development of enterprise risk management (ERM) was the emergence of corporate governance and its emphasis on boardroom risk management." Arjoon (2005) states that "the current environment of failures of corporate responsibility are not only failures of legal compliance, but more fundamentally failures to do the right thing". Therefore, an enterprise-wide and holistic approach to managing risks is a necessity to drive business success (Hopkin, 2002)[7] , while curbing unethical behaviour (Drennan, 2004).

[7] As cited by Drennan (2004) in "Ethics, Governance and Risk Management: Lessons from Mirror Group Newspapers and Barings Bank".

Corporate Governance

In view of the corporate scandals, Anderson and Orsagh (As cited by Arjoon, 2005) report that, "*while some failures were the result of fraudulent accounting and other illegal practices, many of the same companies exhibited actual corporate governance risks such as conflicts of interest, inexperienced directors, overly lucrative compensation….."*

In South Africa, corporate governance for all companies, including non-profit companies and state-owned entities (Ernst & Young, 2009), is governed by the principles entrenched in the third King Report (King III), which came into effect in March 2010 (Valsamakis, Vivian & du Toit, 2010; Ernst & Young, 2009).

However, it is not regarded as statute. It is only a recommended guideline and a requirement for public companies listed on the Johannesburg Stock Exchange (JSE). Deneys Reitz Attorneys (2006) provide key topics addressed in the King II report, which are still relevant in the King III report. These are:

- The board of directors;
- Risk management;
- Internal audit;
- Integrated sustainability reporting;
- Auditing and accounting;
- Relationship with stakeholders;
- Communication.

The code promotes ethical leadership and corporate governance and citizenship Chapter 1 addresses "principles of corporate governance for board of directors" (Valsamakis, Vivian & du Toit, 2010) and Chapter 4 outlies the governance of risk. According to the application of King III, the information contained in the integrated sustainability report is on an "apply or explain" basis. Organisations have latitude on their approach, they have a choice to apply any of the principles and provide an explanation for those they disregard. This choice will be invalidated by the introduction of the King IV Report, which is on an "apply and explain basis."

Risk plays a role in business decision-making (Flanagan & Norman, 1993), necessitating that the value of the risk management approach is robust enough to guide ethical business behaviour. Corruption, bribery, illegal work practices and collusive tendering are typical traits

of the construction industry, as observed by Gyles (as cited by Smith, Love & Jackson, undated). In order to address this adverse shortfall, the CIDB have published a "Code of Conduct for all parties engaged in construction procurement", which has been drafted in terms of the Construction Industry Development Board Act (Act No.38 of 2000*)* and dictates ethical behaviour amongst the various participants, including a supplementary best practice for Grade 9[8] enterprises (CIDB, undated).

2.4 The Construction Risk Environment

The construction industry is plagued with projects that have a high probability of failure, especially mega projects (Quainoo, 2010; Miller & Lessard, 2001; Nkado, 2010), where prolonged durations and cost overruns are a typical occurrence (Ibid). For example, in South Africa, the Gautrain Rapid Rail, projects costs escalated from ZAR7 billion to an estimated ZAR25,4 billion (Nkado, 2010) and Soccer City stadium renovated for the 2010 Soccer World Cup, at completion there was a 76% increase in costs and 33% increase in the project duration. On the other hand, projects such as the Channel Tunnel, will remain a source of interest for much research due to the complexities brought by (i) the "turbulent" project life cycle spanning from the 1950s until the project was finally completed in 1994 (Anguera, 2006) (ii) a wide range of stakeholders and shareholders (in excess of 1 000 000 (Chang & Ive, 2007), (iii) the project necessitate a labour force of 15 000 (Anbari et al, as cited by Quainoo, 2010), (iv) private lending institutions (external financing in the region of GBP8 million) (Ibid), (v) the involvement of both the British and French Governments (Ibid), (vi) claim disputes in excess of GBP1 billion (Ibid), (vii) the project was completed in a constricted market, yielding lower than expected rate of return.

As indicated above, construction projects are susceptible to hazards and are exposed to a wide spectrum of risks such as:

(i) Climatic conditions, including natural disasters such as wild fires, floods, named storms, hurricanes, smoke clouds, tend to affect the construction programme. For example, persistent storms during the wet season will hamper progress and sometimes result in damage to the works (Bunni, 2003:33).

[8] The grading criteria is as published by the CIDB and is based on contract value. Grade 9 enterprises have the ability and capacity to undertake contracts in excess of ZAR130 000 000

(ii) Economic and financial issues, such as variations in the cost of imports and exports due to the rate of exchange (Winegard & Warhoe, 2003).

(iii) Technology advancement resulting in the introduction of materials with untested performance or strength (Bunni, 2003:33).

(iv) Risks may be associated with the project objectives (cost, time quality, safety and environmental sustainability) or to the various stages of the project life cycle (Zou, Zhang & Wang, 2007).

(v) Complexities may also arise from the contracting parties (Bunni, 2003:33; Chang & Ive, 2007) and associated stakeholders (subcontractors, designers, suppliers) (Zou, Zhang & Wang, 2007).

Bunni (2003:24) argues that there is inadequate understanding of the risk environment, compounded by the poor identification and allocation of risks.

2.4.1 Construction Environment in South Africa

Since completing the projects carried out in preparation for the FIFA World Cup, the industry has been in a slump since 2009 (PwC, 2016; Cremer Media, 2015) and has been unable to recover to similar growth levels (Creamer Media, 2015), due to the global recession and/or stagnant growth (PwC, 2013). This is exacerbated by the government's tardiness, as a major contributor in rolling out infrastructure projects estimated at ZAR847 billion between 2014 and 2017 (Gordhan, 2014). In the 2017, fiscal medium term budget the projected figure was adjusted to an estimated ZAR947,2 billion over a three year period (National Treasury, 2017).

The total income in 2014 was ZAR395 025 million (Statistics South Africa (Stats SA), 2015), of which 57% was for large enterprises (turnover in excess of ZAR117 million) and the remaining 43% was generated by small medium and micro enterprises (SMMEs). The top ten construction companies reported a combined revenue of ZAR145 793 million in 2013 and a net profit of ZAR3 085 million (PwC, 2013). In 2016, the comparative figures were at ZAR130 149 million and ZAR2 927 million, respectively. Aveng, Murray & Roberts and Stefanutti Stocks reported a combined decrease in revenue amounting to ZAR14,8 billion, owing to a weaker economy and reduced expenditure in the commodity markets. The prospects for 2018 are not any better, with Basil Read reporting a net loss of ZAR1 billion for the ending

31 December 2017 (Magubane, 2018) and Group Five is anticipating penalty charges of up to US Dollar (USD)62,4 million on the Kpone project in Ghana (Cokayne, 2018), which will impact their bottom line for the current period. Some of these major companies' financial woes originate from the projects undertaken, which is a significant component of their holistic risk profile.

PwC carry out market related studies, mainly focusing on the top ten construction companies, from which they summarise the risk categories disclosed, as detailed in the table below:

Table 2.1 Top Risk Categories Disclosed by Construction Companies

Construction industry challenges	Impact on and required actions by the industry
Broad-Based Black Economic Empowerment (B-BBEE) and Transformation	
Transformation is seen by the industry as a business imperative. Lack of transformation and low B-BBEE score and non-compliance with employment equity could negatively impact companies on the following: • Reduce ability to win tenders. • Increase likelihood of client sanctions and sanctions from the Department of Labour. • Increase possibilities of penalties being imposed on South African Projects. The limited pool of experienced engineers suitable for management positions remain a significant barrier to transformation.	Skills development and resulting employment equity component seen as one of the biggest challenges Pro-active monitoring of compliance with B-BBEE codes and employment equity targets, including changes to legislation. Implement strategic responses including various empowerment programmes, a focus on management control, skills development, other internal initiatives and headhunting.
Health, Safety and Environmental (SHE) Sustainability	
The industry has less than 50% compliance with the health and safety standards. Any major incidents tend to have implications for reputation and ability to secure work in other sectors.	Although SHE statistics have improved, this still needs to be monitored and reporting of statistics is required throughout the industry. Since August 2015, all projects with a contract value exceeding ZAR13 million have to apply to the Department of Labour for a construction permit that includes baseline risk assessment of the project and health and safety specification.

Table 2.1 Top Risk Categories Disclosed by Construction Companies (continued)

Construction industry challenges	Impact on and required actions by the industry
Industrial Action	
On-going industrial unrests continue to cause project delays and disruptions affecting safety, productivity and profitability.	To mitigate the risk of labour unrests and prevent project disruptions and delays, open communication between unions and the construction companies to monitor and resolve potential labour issues is essential. Strike mitigation plans must be put in place, together with proactive labour relations strategy with allowances in tenders for labour unrests. Pro-active engagement with communities prior to project commencement assists to manage expectations.
Liquidity Risk	
A lack of sufficient working capital increases exposure to liquidity risk. This negatively impact credit, acquisitions and growth opportunities	Cash-flow requirements over the life of a contract should be considered at tender stage, together with robust commercial management. Close monitoring and management of claims and project overheads and tougher debt collection measures are also essential to mitigate liquidity risk.
Talent Management and Staff Retention	
Sourcing and retaining appropriate skilled professionals remains a key challenge. A lack of expertise affects the company's ability to complete contracts and also poses risk to company growth. Staff retention is critical to the sustainability of companies.	A remuneration policy focusing on performance and retention of key talent is essential for business sustainability. Regular succession reviews to identify potential talent risks and career planning strategies should be undertaken, as should in-house training, promotion from within and development initiatives.
Growth, Expansion and Operational Performance	
Growth in the South African construction sector has declined in recent years due to: • The decline in business confidence and volatile labour market. • Government's reduced spending on infrastructure projects. • Competition, which has continued to drive down margins. • Limited expansion into new markets, which has been hampered by volatile commodity prices and exchange rates. Poor performance, a competitive market and shortage of skills places pressure on companies to deliver projects. Poor project execution results in margin erosion and losses.	In order to address the risks posed to growth and expansion, companies need to: • Focus on effective contract negotiation on equitable terms and efficient contract management. • Align capacity with planned SA government spend • Focus on gaining a competitive edge in the market. • Explore growth options in new and emerging markets. The implementation and monitoring of project management procedures and policies over project life cycle and assignment of accountability are imperative in mitigating the risks posed to project execution. Increased focus on closing out loss making projects, improving efficiencies and productivity.

Table 2.1 Top Risk Categories Disclosed by Construction Companies (continued)

Construction industry challenges	Impact on and required actions by the industry
Macro-economic Environment	
Continues poor economic performance has had a negative financial impact on business and their operations. This affects business and investor confidence and limits demand for capital projects and infrastructure.	Maintaining key stakeholder relationships in order to secure work in this depressed cycle.
Tender Risk	
There is an inherent risk in the tendering process as it requires educated and highly judgemental views to be taken on pricing, mark-up, geological conditions, and the quality and availability of materials. There is a risk of bidding and winning contracts on onerous terms or unacceptable commercial conditions.	To mitigate tender risk, extensive tender assessment procedures need to be undertaken at the tendering stage of each project. Experiences estimators should be involved in contract pricing, which is to be subject to review by senior management.
Legislation and Regulatory Compliance	
Non-compliance with applicable legal and regulatory requirements may lead to reputational damage, penalties and fines and impact the entities operations.	Compliance with regulatory and legislative requirements is imperative in preventing loss to a business and maintaining a company's reputation.
Project Execution	
Project execution issues are normally the culmination of all other risks reported. However, the significant public scrutiny of national infrastructure priority projects brings added reputational risk and impact on profitability if projects are not well executed.	The increased complexity of large-scale construction projects requires exceptional project management and discipline at all levels. Failure in these disciplines can result in material effects on project profitability.

Source: PwC, 2013 and 2015

2.5 Construction, Contracts and the Law

The South African Legal System is a hybrid system, with civil law from Roman Dutch law, common law from British law and customary law from indigenous African law. Both common law and legislation are integral parts of the legal framework.

The CIDB (2004), defines a contract as *"an agreement between two or more people that is enforceable in law".*

The construction contract follows the legal concepts regarding the prior allocation of risk and how the risks should be addressed and managed (Adriaanse, 2007:4; Bunni, 2003:12). The purpose of the contract is to succinctly stipulate the responsibilities, obligations and liabilities of the parties, define the scope, project duration, agreed price for executing the works, quality and payment terms (Adriaanse, 2007: 1, 113; Bunni:187). Traditionally, only the employer, who commissions the Works, and the contractor appointed to execute the Works are the parties to a construction contract. In terms of the contract, the contractor warrants to undertake the

work with care and skill, use good quality materials and deliver a product that is 'fit for purpose' (Bunni, 2003:164).

In construction, liability may arise from contract, delict, common law (case law, including strict or "no-fault" liability) or statute. Neethling & Potgieter (2010:211), define delict as "a harmful and culpable act which has a harmful consequence." In order to prove liability in delict, all five elements must be present (i) act or omission; (ii) wrongfulness (duty of care), (iii) fault (negligence or intention), (iv) causation and (v) harm or loss (Ibid: 4). In the event of a claim, the Third Party bears the onus to prove the elements.

In order to promote uniformity, the CIDB recommends the use of four standard contracts. The comparison of the contracts is summarised in Table 2.2.

Table 2.2 Contract Comparison

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
1	**Application**	The obligations by the parties, rather than the nature of the work, determine which contract is to be used. FIDIC recommends that the use of the books as follows: Red : Building and Civil Engineering contracts. Yellow: Mechanical and Electrical process plant contracts. Silver :International major turnkey projects. For projects only and typically designed and managed by independent engineering consultants	• Multi discipline and suitable for any sector or combination of sectors of the engineering and construction industry. • Suitable for projects or general procurement, either: ▪ Designed and managed by independent consulting engineers, or ▪ Designed by engineers and manged by separate project managers both of whom may not be independent of the employer.	Suitable for the building sector of the construction industry where the works are designed and administered by agents of the employer who are co-ordinated by a principal agent.	Suitable for both building and construction works contracts.
2	**Provision for different contracting strategies**	Separate contracts for three main strategies: Red : Construction: Building and Engineering works designed mainly by the employer. Yellow: Plant Design & Build for works designed mainly by the contractor. Silver :Engineer-Procure-Construct Turnkey projects with all work (engineering, procurement and construction) by the contractor.	Six main options to cover the full range of strategies, Option: A Activity schedule (lump sum) B Bill of quantities (re-measurement) C Target contract with activity schedule D Target contract with bill of quantities E Cost reimbursable contract F Management contract	Only suitable for the design by employer contracting strategy.	Although it is focused on the design by the employer contracting strategy, it may be used in design and build contracts.
3	**"Tender" vs "contract"**	"Tender" included as part of the "Contract"	"Tender" and "Contract" separated.	"Tender" included as part of the "Contract"	"Tender" and "Contract" separated.

Table 2.2 Contract Comparison (continued)

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
4	**Structure**	Separate documents with many common clauses repeated in each document. (Documents are structured around 20 similar clauses, which are adapted as required by the contractor).	• One main document (Black book) with common clauses for all contracts. • One set of main option clauses is then selected to create a particular contract. • Further secondary option clauses may then be selected for use in any combination in any of the contracts.	Separate documents with many common clauses repeated in each document.	The series comprises of only one form of contract.
5	**Design by either party**	Red : Intended to be by the employer but the contract provides for the design by the contractor, to the extent specified in the contract. Parts designed by the contractor. to be fit for purpose. Yellow: Design (fit for purpose) by the contractor to the Employer's requirements. Silver : Fit for purpose design by the contractor who shall also be responsible for the accuracy and completeness of the Employer's requirements, with some limited exceptions.	• Design by either party in any proportion to the extent stated in the Works Information. • The contractor "Provides the Works" in accordance with the Works Information; hence the obligation as to the fitness for purpose or otherwise is based on what the Works Information requires.	The contractor is not responsible for the design of the permanent works. However, nominated and selected subcontractors carry design responsibility which is ceded by the contractor to the employer.	Intended to be by the employer but the contract provides for the design by the contractor to the extent specified in the contract.

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
6	**Financial risk allocation**	Each main contract has its own independent (but fixed) risk allocation strategy typical of the sector the contract is designed to target. Red : Employer carries quite a few risks. Yellow: Contractor carries most risk, but the employer still carries some. Silver : Contractor carries virtually all risk. Time and cost effect dealt with differently depending on the risk event. Some events do not allow for contractor's profit. Engineer/ Employer is to determine (extra time & cost) by consultation in an endeavour to reach agreement. Alternatively, engineer can determine.	• Combination of the main and secondary options can provide an almost unlimited range of contract strategy risk allocation in any of the traditional industry sectors. • Through the use of "compensation events" the employer will only pay for the effect of certain risks, if they occur and the contractor does not have to include for these in his prices. • Basis of compensation is the same irrespective of the risk event, with the (separate) time and money effect considered in the same quotation at the same time. • The contractor provides a cost and time forecast of the event, based on his latest Accepted Programme, and on defined items of cost plus tendered overheads and profit. The project Manager accepts, requests for alternative quotations, or does his own assessment.	The risk allocation is fixed based on principle that the risk carried by the party is best suited to deal with it.	The risk allocation is fixed based on principle that the risk carried by the party is best suited to deal with it.

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
7	**Subcontracting**	• The contractor is liable as if he had not subcontracted. Provision for Nominated Subcontracts. • The contractor shall not subcontract the whole of the Works. • No back-to-back conditions of subcontract are provided, however, a FIDIC subcontract agreement was published in 2011.	• The contractor is liable as if he had not subcontracted. No provision for nominated subcontracts. • Back-to-back NEC3 Engineering and Construction Subcontract (ECS) or the NEC3 Engineering and Construction Short Contract are provided. The Engineering and Construction Short Subcontract (ECSS) can also be used as a back-to-back subcontract.	• Provision is made for nominated and selected subcontractors i.e. subcontractors appointed by the principal agent in consultation with the contractor. • The contractor is liable as if he had not subcontracted where the subcontractor is selected. The contractor is not liable in certain respects where the subcontractor is nominated. • Back-to-back forms of subcontract are provided to facilitate the appointment of contractors.	• The contractor is liable as if he had not subcontracted. Provision is made for the appointment of subcontractors in consultation with the employer. ** • The contractor shall not subcontract the whole of the Contract.
8	**"Contractor"**	The person(s) named as contractor in the letter of tender accepted by the employer and the legal successors in title to this person(s)	Person or company as identified in the Contract Data	The party contracting with the employer for the execution of the works as named in the contract data	The natural or juristic person or partnership named in the Contract Data and whose offer has been accepted by or on behalf of the Employer

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
9	**Contractor's Works Risk**	• The contractor is responsible for the care of the works and goods from the commencement date of the works, until issue of take-over certificate (or deemed to be issued), thereafter responsibility of the works passes to the employer. • After the certificate has been issued and the employer has taken over the works, the contractor is responsible for any part of the works that is outstanding until has been completed. • If any loss or damage happens to the works, goods or contractor's documents, the contractor is liable to rectify the loss or damage at his own risk and cost so that the works, goods and documents conform to the contract. • The contractor is liable for any loss or damage caused by any actions performed by the contactor after the take-over certificate has been issued, including loss or damage which occurs after the issue of the said certificate which arose from a previous event for which the contractor was liable.	The risk starts from the project's starting date until the defects certificate has been issued, the risks which are not carried by the carried by the employer are carried by the contractor.	• The contractor takes full responsibility for the works from date upon which possession of the site is granted to the contractor, up until the date of issue of practical completion certificate or deemed achievement of practical completion. • Liability includes: ▪ Making good physical loss and repairing damage except physical loss or damage resulting from certain circumstances, ▪ Replacement value of materials and goods supplied by the employer to the contractor, ▪ Additional professional services of the employer's agents. • The contractor's liability does not exceed the amount of contract works insurance as stated in the Contract Data.	• The Contractor is liable for any damage or physical loss to the Works or Materials. **

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
10	**Indemnities**	Contractor The contractor indemnifies the employer, the employer's personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses) in respect of: • Bodily injury, sickness, disease or death, of any person arising out of or during or by reason of the contractor's design (if any), the execution and completion of the works and the remedying of any defects, unless attributable to any negligence, wilful act or breach of contract by the employer, the employer's personnel, or their respective agents. • Damage to or loss of any property, real or personal (other than the works), to the extent that such damage or loss arises out of, or in the course of, or by reason of the contractor's design (if any), the execution and completion of the works and the remedying of any defects, unless and to the extent that the damage or loss is attributable to any negligence, wilful act or breach of contract by the employer, or their respective agents, or anyone directly or indirectly employed by any of them. Employer The employer indemnifies the contractor, the contractor's	• Each party indemnifies the other against claims, proceedings, compensation and costs due to an event which is at risk. • The liability of each party to indemnify the other is reduced if events at the other party's risk contributed to the claims, proceedings, compensation and costs. • The reduction is in proportion to the extent that events which were at the other party's risk contributed, considering each party's responsibilities under the contract.	Contractor – subject to the indemnities provided by the employer: The contractor indemnifies the employer against any loss in respect of all claims, proceedings, damages, costs and expenses arising from: • Claims from other parties for death, bodily injury or illness of any person, or physical loss or damage to any property, other than the works, arising out of or due to the execution of the works or occupation of the site by the contractor. • Non-compliance by the contractor with any law, regulation or by-law of any local or other authority arising out of or due to the execution of the works or occupation of the site by the contractor. • Physical loss or damage to any plant, equipment or other property belonging to the contractor or his subcontractors. Employer The employer indemnifies the contractor against loss in respect of all claims. Proceedings, damages, costs and expenses arising from: • An act or omission of the employer, the employer's servants or agents and those for whose acts or omissions they are responsible.	Contractor The contractor: • Indemnifies the employer against any liability in respect of damage to, or physical loss of the property of any person, or injury to or death of any person, and ▪ Shall be liable to the employer for damage to or physical loss of all property of the Employer not being portion of the works, nor of the site, arising directly from the execution of the works. Employer The employer indemnifies the contractor against all liability in respect of injury to persons and damage to property.

		personnel, and their respective agents, against and from all claims, damages, losses and expenses (including legal fees and expenses in respect of: • Bodily injury, sickness, disease or death, which is attributable to any negligence, wilful act or breach of contract by the employer, the employer's personnel, or their respective agents. • The matters for which liability may be excluded from an insurance cover as envisaged by the clauses dealing with *Insurance Against Injury to Persons and Damage to Property* – clause 18.3(d) (i), (ii), (iii), which is as follows: ▪ The employer's right to have the permanent works executed on, over, in or through the land, and to occupy this land for the permanent works, ▪ Damage which is the unavoidable result of the contractor's obligations to execute the works and remedy any defects, ▪ Except to the extent that cover may be obtained at commercially acceptable terms: the employer's risks relating to war, hostilities, rebellion, riot, commotion, munitions of war, explosives, pressure waves caused by aircraft, force majeure, etc. as well as design pf the works for which the employer is responsible, and the use or occupation of any part of the permanent works, except as may be specified in the contract.		• An act or omission of a direct contractor appointed. • Design of the works where the contractor is not responsible. • The occupation of any part of the works by the employer or his tenants. • The right of the employer to have the works or any part thereof executed on the site. • Interference with any servitude or other right that is the unavoidable result of the execution of the works including the weakening of or interference with the support of land adjacent to the site unless resulting from any negligent act or omission by the contractor or his subcontractor. • Physical loss or damage to an existing structure and the contents thereof in respect of which the contract is for alteration or addition to the existing structure. • Physical loss or damage to the contents of the works where practical completion has been achieved. • Advance payments where certified and duly made by the contractor to nominated/ selected sub-contractors. • A defect in materials or goods supplied by the employer for incorporation in the works including any consequential damage caused by such defect.	

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
11	**Limitation of Liability**	Contractor • The contractor's liability for the works will not exceed the amount of the contract works insurance as stated in the contract data. • Unlimited for defects to the extent which the contractor is responsible, uncertain for others. • Contractor liable, including for consequential loss, arising from breach or contract, negligence, or other legally actionable wrong. • The contract is silent, hence covered by law of contract in which the site is situated.	Contractor • The contractor's liability to the employer for the employer's indirect or consequential loss is limited to the amount stated in the contract data. • For any event, the liability of the contractor to the employer for loss or to damage to the employer's property is limited to the amount stated in the contract data. • The contractor's liability to the employer for defects due to his design which are not listed on the defects certificates is limited to the amount stated in the contract data. • The contractor's total liability to the employer for all matters arising under or relating to the contract, other than the excluded matters, is limited to the amount stated in the contract data and applies in the contract, tort or delict and otherwise to the extent allowed under the law of the contract. • The excluded matters are amounts payable to the contractor as stated in the contract for; ▪ Loss of damage to the employer's property, ▪ Delay damages if Option X7 applies, ▪ Low performance damages if Option X17 applies and, ▪ Contractor's share if Option C or Option D applies. • The contractor is not liable to the employer for a matter unless it is notified to the contractor before the end of liability date.	Inter-parties Neither party will be liable to the other for loss of use of any works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other in connection with the contract, other than as specifically provided in the Delay Damages, Cost of Remedying Defects, Payment After Termination, Payment on Termination, Indemnities, Consequences of Employer's Risk and, Intellectual and Industrial Property Rights clauses. Contractor • The total liability of the contractor to the employer under or relating to the contract will not exceed the sum resulting from the application of the multiplier (less or greater than 1) to the accepted contract amount, as stated in the contract data, or if the multiplier is not stated, then the accepted contract amount. • Liability is not limited in the case of fraud, deliberate default or reckless misconduct by the defaulting party.	• To be addressed as an additional condition. • Unlimited for defects to the extent which the contractor is responsible, uncertain for others. • Contractor liable for making good physical loss and to repair damage from whatever cause save for "excerpted risks." • Liable for latent defects for a period of ten years after the completion of the contract.

Item		FIDIC	NEC3 Engineering & Construction Contract	JBCC Series 2000	GCC 2010
12	**Insurance**	As per the Particular Conditions if not insured by Employer, includes Contract works, Damage to persons or property and equipment: ▪ Contract works insurance ▪ Plant insurance ▪ Amount stated in Contract data for professional fees ▪ Special risks insurance ▪ Public liability for the value stated in the contract data	Contractor: Loss of damage to works, plant and materials ▪ Loss of damage to equipment ▪ Liability for loss of or damage to property and liability for bodily injury to or death of a person caused by an activity in connection with this contract ▪ Liability for death of or bodily injury to employees of the Contractor arising out of and in the course of their employment in connection with this contract ▪ Employer As stated in the contract data	Contractor Contract works insurance for 100% of contract amount. In case of increase in insured value, it is the responsibility of the Employer	Contractor ▪ Contract works insurance ▪ Plant insurance ▪ Amount stated in Contract data for professional fees ▪ Special risks insurance ▪ Public liability for the value stated in the contract data

Source: CIDB (2005); NEC, JBCC, GCC & FIDIC contract documents

2.5.1 The FIDIC Contract

The FIDIC suit comprises eight contracts:

- The 1999 Short Form (Green Book);
- The 1999 Construction Contract for Works Designed by the Employer (Red Book);
- The 1999 Plant Design – Build Contract (Yellow Book);
- The 2005 Multilateral Development Banks Construction Contract;
- The 2006 Model Services Agreement (White Book);
- The 2006 Dredgers Contract for dredging and reclamation work (Blue Book);
- The 2007 Design Build Operate Contract (Gold).

All FIDIC contracts are similar in the following regard (adapted from Binnington, Copeland & Associates (BCA))[9]:

- They are divided into General Conditions and Particular Conditions.
- The Particular Conditions are divided into two parts, Part A – Contract Data and Part B – Special Provisions.
- They follow a twenty (20) clause layout, as detailed in Table 2.3.

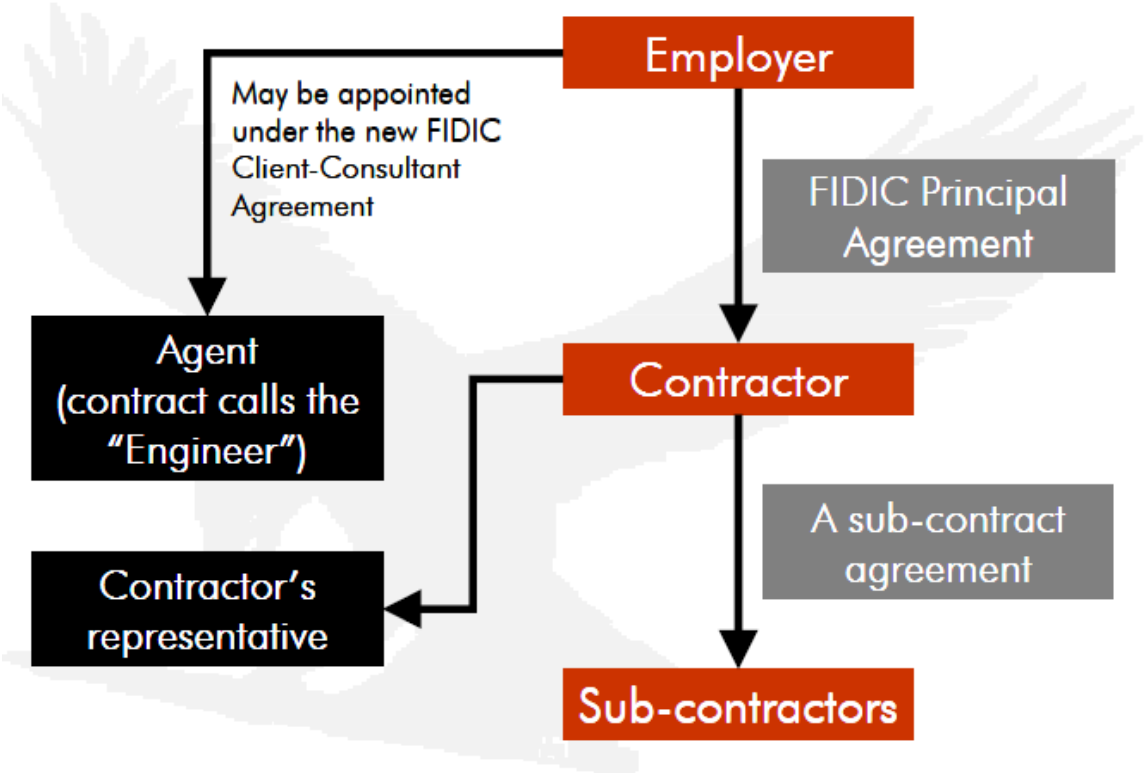
Table 2.3 List of FIDIC Clauses

Clause	Red Book	Silver Book	Clause	Red Book	Silver
1	General Provisions	General Provisions	11	Defects Liability	Defects Liability
2	The Employer	The Employer	12	Measurement and Evaluation	Tests After Completion
3	The Engineer	The Employer's administration	13	Variations and Adjustments	Variations and Adjustments
4	The Contractor	The Contractor	14	Contract Price and Payment	Contract Price and Payment
5	Nominated Subcontractors	Design	15	Termination by Employer	Termination by Employer
6	Staff and Labour	Staff and Labour	16	Suspension and Termination by Contractor	Suspension and Termination by Contractor
7	Plant, Material, Workmanship	Plant, Material, Workmanship	17	Risk and responsibility	Risk and responsibility
8	Commencement, Delays and Suspension	Commencement, Delays and Suspension	18	Insurance	Insurance
9	Tests on Completion	Tests on Completion	19	Force Majeure	Force Majeure
10	Employer's Taking Over	Employer's Taking Over	20	Claims, Disputes and Arbitration	Claims, Disputes and Arbitration

[9] BCA Workshop Notes on FIDIC Contracts

This section takes a closer look into the risk clauses, specifically as structured through the "Works Designed by the Employer" contract (Red Book) as per the standard form.

Firstly, the contract agreement is between the Employer and Contractor (Clause 1.1.2.3). The Engineer is appointed by the Employer (Clause 3.1), with no contractual relationship between the Engineer and Contractor, other than communication, as illustrated in Figure 2.3 below.



Source: Bennington, Copeland & Associates (2011)

Figure 2.4 Contracting Parties as Per FIDIC

The Contractor's main obligations in terms of the contract is to design (to the extent specified in the Contract), execute and complete the Works (Clause 4.1).

The Contractor's risk profile as per the Red Book is summarised in Table 2.4 below.

Table 2.4 Contractor Risk Profile ("Red Book Only)

Clause	Heading	Express Provisions for Additional Costs
1.9	Delayed drawings or instructions	Cost + profit
2.1	Right of access to site	Cost + profit
4.1.2	Unforeseeable physical conditions	Cost
4.7	Setting out (error in specified reference points). However, the Contractor is responsible for the correct positioning	Cost + profit
8.4 (c)	Adverse weather	No additional costs claimable in terms of the contract. However, this is insurable.
8.9	Delays caused by Authorities	No additional costs claimable
11.2	Cost of remedying defects (defects not contractor's responsibility	Variation order
15.3	Employer's termination	Claim for value of work completed
17.4	Employer's risks	Provision for additional costs
19.4	Force Majeure	Provision for additional costs

Source: Morris & Warwick (2014)

In terms of the contract, the party best suitable to bear the risk, especially unforeseen risks, is allocated the responsibility. Special considerations are required when amending standard forms of contract. Morris & Warwick (2014) provide the following recommendations:

- *"FIDIC contracts are internationally recognised and the standard form is a starting point.*
- *Clauses are general in nature. Therefore, project requirements will dictate whether the clause is applicable or not.*
- *Contracts are agreed quickly, but are all issues considered including local law issues?*
- *If the contract is not tailor made, then there is a greater potential for disputes.*
- *Investment in the drafting stages can avoid dispute costs during and after the project.*
- *Issues regarding employer bias versus contractor bias."*

2.5.2 Construction Insurance

Due to the level of uncertainty on construction projects, insurance is a contractual requirement and used as a mechanism through which risk is transferred, but not all risks are insurable. To determine whether a loss is insurable, it should be quantifiable, fortuitous (sudden and unforeseen) versus inevitable, not against public policy, must comprise tangible property, attract a reasonable premium and the insuring party must have an insurable interest

(Valsamakis, Vivian & du Toit, 2010: 318-319) the person insuring. Indemnity is one of the basic concepts of insurance, which is governed by the principle that an Insured may not benefit from a loss at the expense of the Insurer[10]. Therefore, the Insured is not allowed to make a profit.

The insurance industry offers various products which are applicable to construction projects or contracting parties and these include:

- Plant all risks for plant and equipment.
- Contractors all risks (CAR) physical damage or loss to the contract works.
- Professional indemnity, for breach a professional duty (design); it provides cover for error, omission or negligence.
- Surrounding property; this is property not forming part of the contract works, but in close proximity on or around the contract site and under the contractor's care custody and control.
- Public liability; third party liability in respect of damage.
- Lateral support; damage emanating from the lateral support failure attracts strict liability (no-fault liability).
- Piling guarantee; provides cover in respect of liability arising from the failure of the installed piles.

2.5.3 Contract Works Insurance

The policy provides cover for minor and major construction work. The scope includes permanent and temporary works carried out in the execution of the works and fulfilment of the construction contract (Beeby, 1989). The sum insured is based on the contract value, inclusive of the value of any free issue materials.

The findings of a study carried out by Beeby (1989) revealed at the time, contractors had competing views regarding the necessity of CAR cover, with others regarding it as onerous. Albeit, there was consensus regarding the high premiums involved. In present day, CAR insurance is a contractual requirement which can either be arranged by the contractor or the client (principal controlled insurance (PCI)). However, the perception regarding the high costs

[10] The Institute of Loss Adjusters of Southern Africa (2017). *The Principles of Loss Adjusting*. Revised Edition.

involved remains. Moreover, the premium is paid up front, with an option for revaluation at stages in the project, depending on claim status or at the end of the project.

The cover can be tailor-made to suit the project requirements, with considerations regarding transit cover, surrounding property, public liability and contract price adjustment. Due to the level of uncertainty of extent of the potential financial loss, insurance, in particular CAR cover is likely to remain the preferred tool for transferring risk and self-insurance is not an option. However, policies tend to exclude damage emanating from defective workmanship, defective design and defective materials, including consequential losses such as standing time.

In other sectors of the economy, companies are now steering towards limiting expenditure on insurance and implementing self-funding to pre-determined limits. (Valsamakis, Vivian & du Toit, 2010:6).

2.6 Major Findings from Literature Review

The major findings from literature review can be summarised as follows:

- Risk is inherent in the construction industry, but certain aspects are still poorly identified (Bunni, 2003). The risk environment is heightened by the poor identification of various aspects throughout the project life cycle (Bunni, 2003; Kendrick 2003).
- Risk and the management thereof drives good decision making (Flanagan & Norman, 1993, IRM, 2010; Miller & Lessard, 2001).
- There are multiple definitions for risk and there is no standard approach to managing risks. The IRM provides guidelines, which align with ISO 31000. In addition, the view is that risk management does not need to be onerous and complicated in order to add value.
- Risk management is a strategic input that requires a top down approach. It is necessary for achieving strategic for promoting to promote business success, sustainability and overall organisational profitability (IRM, 2002; Zhao, Zhang & Wang, 2007).
- Corporate governance is regarded as being “good for business”, as it enhances the risk management input and ethical behaviour.

- Risk management enhances dissemination of contract requirements and insurance used to hedge potential damage to works and accompanying liabilities (Rahman & Kumaraswamy, 2002; Ren, 1994)
- Categorising risk simplifies the risk identification process. It ensures that the risk is assesses, managed and controlled by the relevant tier and assigned the accompanying responsibility and accountability.
- Construction contracts apportion risk and define obligations, responsibilities and liabilities accordingly.
- Due to the inherent uncertainty and potential risks on construction projects, insurance is a requirement in terms of the various construction contracts, to transfer the risk to insurers.

3 RESEARCH METHODOLOGY

This chapter outlines the research methodology, design and approach, including ethics considerations, data collected and analysed. The last section includes commentary on the ethics considerations.

3.1 Research Methodology

A qualitative approach has been used to achieve the objectives of the research. This methodology was deemed appropriate as it provided scope based on the distinguishing characteristics summarised in Table 3.1.

Table 3.1 Distinguishing characteristics of qualitative approach

Description	Output of qualitative approach
Purpose of the study	• To describe and explain • To explore and interpret • To build theory
Nature of the research process	• Holistic • Unknown variables • Flexible guidelines • Emergent methods • Context-bound
Data collection	• Textual or image-based data • Informative, small sample • Loosely structured or non-standardised observations
Data analysis	• Search for themes and categories • Acknowledgement that analysis is subjective and potentially biased
Communication of findings	• Narratives • Literary style

(Source: Leedy & Ormrod, 2010:96)

The qualitative approach has been criticised for being cumbersome, as there are multiple possibilities (Leedy & Ormrod, 2010:107), time consuming, as it generally lacks structure (Ibid), lacking scientific rigour and providing little basis for generalisation (Crowe et al, 2011). It also does not allow the identification of cause and effect relationships (Leedy & Ormrod, 2010:137).

3.2 Research Design

The research design followed the logical sequence indicated below:

(i) In regard to the literature review, firstly it was used to contextualise the study. Secondly, it provided the necessary background and in-depth comprehension of the subject matter, including the correlation between risk, risk management, construction contracts and insurance. Most importantly, it assisted with refining the research questions and understanding the circumstances emanating from the phenomenon itself. For example, at the commencement of the study, the main objective was establishing whether risk management was tactical or strategic and during the initial review of literature, it became apparent that risk management is part of strategic management.

The review of literature together with the theories embedded within provided the framework for the required data.

(ii) A desktop investigation of four case studies, with a detailed review of the risk management protocol of four JSE listed South African based construction companies. The companies were selected from a list of top 10 performing companies between 2013 and 2014, as detailed in the PwC (2013) publication entitled "SA Construction Highlighting trends in the South African construction industry". Only four companies provided the relevant confidential data required for the study, which was supplemented by the information available on company websites.

The case study approach allows for in-depth interrogation and appreciation of unique and complex issues surrounding the phenomenon of interest in its real-life context (Crowe et all, 2011) for a defined period (Leedy & Ormrod, 2011). When multiple case studies are used, often they are different in key areas, which allows for comparative analysis, build theory or propose generalisations (Ibid).

According to Zhao & Duan (2008), most experienced contractors regard risk management as part of strategic management and project management to achieve competitive advantage. The case studies were used to provide an in-depth analysis regarding the approach, perception and implementation of risk management in the selected companies. The risk management protocol is mapped against the principles, processes and framework detailed in Chapter 2.

In order to address the perceived bias of the case study approach, a supplementary investigation involving the remaining 5 companies was carried out. However, this

exploration was limited to risk management information available on company websites and insurance claim related information available[11]. This exercise was for information only and not an extension to the scope of the research.

(iii) Data analysis commenced once the company specific information was made available. The data collected included risk management policies, charters, models, risk registers, risk procedures and manuals. Additional information such as annual reports, King III compliance registers and press releases were sourced from the companies' websites.

According to Cresswell (1998) and Stake (1995), as cited by Leedy & Ormrod, (2010), the data analysis in a case study typically involves the following steps:

- Logical organisation of data.
- Categorisation of data.
- Interpretation of single instances
- Identification of patterns
- Synthesis and generalisations

The subjective nature and logical presentation listed above is in line with inductive reasoning. Saunders, Lewis & Thornhill (2009) define induction as a "building theory" that focuses on the collection of qualitative data, provides an in-depth understanding of the research context and its flexible structure permits changes of research emphasis as the research progresses (Saunders, Lewis & Thornhill, 2009:61, 127).

The analysis of the data collected and interpretation of the results was used to compare the various cases and map them against the risk management best practice in respect of risk management principles, framework and processes, as noted in Chapter 2.

3.3 Limitations

In order to limit the scope of the research, only the case studies and associated information were considered. Surveys were excluded due to ethics considerations, however, this may be deemed as a limitation, as it does not include the views of stakeholders.

[11] Claims related information from the database of insurance claims investigated by the writer on behalf of various insurers both locally and abroad.

3.4 Ethics Considerations

As detailed in the preceding sections, the research methodology did not involve human subjects. The only interaction was when information relating to the case studies was requested. Having reviewed the guidelines for the Application to the Human Research Ethics Committee (non-medical) for Clearance of Research Involving Human, the research was found not to fall within the category requiring ethics clearance.

Due to the confidentiality considerations, the name of the participating organisations, including any information which is distinctive in nature, has not been included in the report.

4 CASE STUDIES

4.1 Introduction

This chapter provides an overview of the case studies, which entails the presentation of each company's approach to risk management, as extrapolated from the official documentation reviewed. Each case study includes an insurance claim and its outcome on one project, to assess whether the risk management protocol was supportive in that regard. This is particularly relevant, as already indicated in the preceding chapters as the main focus of this study is to investigate the correlation between the risk management approach and insurance as the risk management tool of choice.

The preparation for the Soccer World Cup between 2006 and 2010, although it coincided with the global meltdown, created buoyancy in the construction industry, but this period was short-lived. Since then, the industry has been in a slump due to nominal spending by the public sector and state-owned enterprises, the global recession, and stagnant economic growth. The South African industry was also tainted by the finalisation of the Competition Commission enquiry into anti-competitive behaviour. This revealed collusive behaviour relating to approximately 300 projects, amounting to ZAR47 billion, completed between 2006 and 2011 and affecting 21 construction companies (Moneyweb, 2013; PwC), 2013), resulting in a combined fine of ZAR1,46 billion. The reputational damage and accompanying costs have justified the timing of this study.

Four companies selected for a detailed analysis, have the following distinguishing features:

- PwC (2013), report 'Highlighting trend in the South African construction Industry' was used to identify the top 10 construction companies.
- They are all listed on the Johannesburg Stock Exchange (JSE).
- They are regarded as large enterprises, as their revenues exceed ZAR117 million (Statistics South Africa (Stats SA), 2015b). Their combined revenue is in excess of ZAR60 billion.
- They have CIDB rating 9 CE and 9 GB. According to the CIDB contractor grading system, the selected contractors have competence in executing projects with a contract

value exceeding ZAR130 million (CIDB Grade 9), mainly projects in Civil Engineering (CE) and General Building (GB).

- Total number of employees employed by the four companies exceeds 25 000.
- They are multi-disciplinary contractors, with operations divided into business units or divisions.
- All projects under review were executed under the FIDIC Red Book.

Due to confidentiality considerations, the names of the companies have been omitted. Distinguishing project related information has been omitted and claim related information slightly modified.

4.2 Company A

4.2.1 Background

The company is one of the major players in the development of infrastructure for both private and public sectors. They have been involved in flagship contracts in South Africa and other countries in Africa. Their corporate strategy incorporates developing their people, managing risk, enhancing sustainability, delivering customer value and building financial strength.

In support of this study, the following information was provided by the company:

- Enterprise Risk Management Policy, which provides the strategic overview.
- Enterprise Risk Management Plan, which outlines the risk management processes and methodology. The board has the responsibility to develop a risk management plan that satisfies the objectives of the risk management policy and overall strategic objectives.
- Quarterly Risk Dashboard, which provides a status in respect of risks categorised into strategic, business and project.
- Risk registers for strategic, business and project level inputs.

In addition, financial statements and integrated reports (as per the JSE requirement on corporate governance) available from the respective companies' websites have been reviewed.

4.2.2 Risk Management Approach

The company defines risk management as "*a process whereby organisations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities*." In line with this definition, the company regards risk management as integral to their strategic management. Furthermore, they recognise that the impact of risk events on the strategic objectives determines their appetite for risk and tolerance level.

The risk management process is governed by the risk management plan, which in turn has to conform to the objectives set out in the ERM Policy document. The risk management process is to identify and analyse risk factors that pose a significant possible threat to the business and to develop suitable risk responses and interventions to manage these risks. The company's risk management process is a five stage process comprising:

- Identification of key risks;
- Analysis and assessment of impact;
- Development of risk response and interventions;
- Monitoring and evaluation;
- Communication to stakeholders.

A detailed description and implementation of the stages listed above is included in the ERM Plan.

The above process is then utilised to categorise risks into strategic risk, operational risk and project level risk. At project level, the risk categories are populated into strategic, operational, finance and hazard. The risk matrix is used to classify the probability and impact of the identified risk.

4.2.3 Key Risks Identified

The key risks are firstly categorised into strategic, business and project level.

Strategic Risks

- Economical
  (i) Assessment of the external environment by reviewing threats and opportunities in the existing markets and potential new markets.
  (ii) In response to Government's focus on infrastructure projects, the company needs positioning resources required to execute such projects, ensure that transformation requirements are complied with.
  (iii) While the turnover in construction remains low, the increased competitiveness necessitates developing strategies that increase efficiency in operations, understanding client drivers and understanding the market and pricing trends.
- Financial, meeting the benchmark costs per tender, improve operational efficiency and apply project and construction management principles through ought the business.
- Banking, requires engaging with various institutions to optimise surety facility provision against balance sheet.
- Governance, avoid compliance breach with respect to the Companies Act and King Commission.

Business Risks

- Skills shortage, results in resourcing projects with insufficient skills.
- Operational efficiency mindset, develop culture.
- Contractual, requires access and understanding of contractual obligations, management of process and stakeholder management.
- Performance, lack of personal accountability.
- Procurement, lack of competitive supply chain pricing.

Project Risks

- Managing scope changes.
- Cashflow management.
- Client ability to pay.
- Realising profit margins.
- Management of resources.
- Underperforming contracts.

- Penalties.

Each of the assessed risks listed above is rated based on probability and impact, and corresponding mitigation strategies put in place.

4.2.4 Example of an Insurance Claim Investigated

4.2.4.1 Project Background

Company A was awarded a contract, as the main contractor for the construction of an up market three storey office building, including two levels of basement parking. The contract included the demolition of an existing building.

During the tender process, the contractor reviewed the preliminary designs and geotechnical information included in the tender documentation. Based on their technical appraisal, the contractor approached an independent consulting firm to provide them with a desktop geotechnical assessment in relation to the geotechnical report provided by the client. The consulting engineers confirmed that the geotechnical investigation was carried out when access was restricted and was therefore likely to be insufficient in respect of providing the comprehensive geotechnical profile of the site. Moreover, the geotechnical report recommended that additional testing was undertaken once the building was demolished. The contractor also established that the client were unwilling to commit to additional geotechnical expenditure at the time.

Subsequently, the contractor opted for an alternative design, proposing the installation of pipes to carry the loading. The associated costing was based on the price sourced from a specialist company, who were later appointed as a sub-contractor.

The proposed design presented by Company A was reviewed and accepted by the client, which was a determining factor in the contract award. The contractor was then provided with design specifications in terms of working loads, settlement tolerances and factors of safety.

4.2.4.2 Contractual arrangements

- Company A issued the specialist sub-contractor with a purchase order for the installation of more than 750 piles. No back-to-back conditions were discussed.

- Company A appointed geotechnical engineers to design the various pipes. Although the consultancy agreement was signed, the engineers limited their liability to twice their fees.

4.2.4.3 Circumstances leading to the loss

- According to the construction contract, Company A was required to test the completed piles as determined by the Site Engineer. The engineer selected several piles to be selected, costs of which were included in the contract value.
- The installation of the piles was completed approximately 12 months later. The engineer selected several piles to be tested, as per the provisional sum in the Bill of Quantities (BOQ). The test results revealed that the settlement was in excess of the requisite tolerances.
- Two (2) additional tests were conducted as per the Site Engineer's selection and they also did not comply with the client's specification. Subsequently, the contractor proposed extensive monitoring to measure the actual settlement for an estimated 24 months, with the end coinciding with the completion of construction.
- The initial monitoring results indicated that more than 25% of the piles did not meet the criteria. With time the results indicated that further movement had ceased, except for three piles that highlighted areas of poor performance on the same platform.

4.2.4.4 Causation

- Investigations into the cause of failure revealed that an incorrect safety factor was used during the design. This was compounded by the variation in the site geology, as the affected areas coincided with the presence of intrusive volcanic rocks, which were associated with the boulder formation. The pile head movements in these areas were as a result of having founded the piles on large hard rock boulders which were surrounded by zones of compressible residual soils.

4.2.4.5 Rectification and Claim Quantification

The rectification approach accepted by the employer was the underpinning of the four piles affected, which entailed the installation of micro piles around each of the affected.

The repair costs amounted to approximately ZAR15 000 000, which excluded the overhead costs at an additional 13,4% of the total repair costs. The summary below provides a proportion of the various cost items as presented by the contractor.

Table 4.1 Company A - Claim Quantification

Item No.	Description	Percentage Costs
1.0	**Design**	
1.1	Rectification design	16,41
1.2	Principal's Professional Fees	21,33
2.0	**Sub-contracts**	
2.1	Monitoring survey	12,75
2.2	Other sub-contracts (scaffolding, testing, security)	12,29
3.0	Contractor's direct costs (labour, plant materials)	37,22
4.0	**Total**	**100**

Insurance Policies effected for the project

In order to comply with the contract condition regarding insurances, the contractor arranged for the insurance cover listed in Table 4.2.

Table 4.2 Company A - List of Insurance Policies Effected for the Project

Type of Policy	Cover
Contractor's All Risks (CAR)	• Cover for the Works (including materials) against physical damage or loss, including materials in accordance with **Clause 18.2**. • The contract value exceeded the maximum contract limit stipulated in the contractor's annual policy, this necessitated a project specific policy in the joint names of the contractor and their principal. • Sum Insured should reflect the contract value at inception plus escalation expected at project completion. • Policy included Product Liability. In terms of Clause 4.1 (c) – the contractor are responsible for the works designed by themselves and shall be 'fit for purpose' upon completion.
Plant All Risks	• Cover for all plant against physical damage or loss, as stipulated in Clause **18.2**.
Compensation for Occupational Injuries and Disease	• Insurance for contractor's personnel as per **Clause 18.4** and Compensation for Occupational Injuries and Diseases Act[12]

[12] Compensation for Occupational Injuries and Diseases Act (COIDA).
"To provide for compensation for disablement caused by occupational injuries or diseases sustained or contracted by employees in the course of their employment, or for death resulting from such injuries or diseases; and to provide for matters connected therewith."
www.labour.gov [accessed 11 June 2016].

4.2.4.6 Adjudication of Insurance Claim

The CAR Policy provides cover for physical loss or damage to the Works. In the incident detailed above there was no damage to the Works and none of the Insured Perils had operated.

Even though the Insured had taken out the Product Liability Extension, the policy is only triggered once damage has occurred and the said section excludes damage emanating from any defects. The exclusion states:

> "*The Insurers will indemnify the Insured in accordance with the application of Indemnity Clause for the cost of repairing or replacing or making good any defective workmanship on or any defect in any product but only any part or parts of the product free of such defect and provided…..no liability is covered hereunder for the loss of use of any such defective product or part or parts thereof"*

The Product liability was not the correct cover. The contractor should have taken out Piling Guarantee, which states:

> "*The Insurers will indemnify the Insured in accordance with the Application of Indemnity Clause against all claims for which the Insured shall become legally liable to pay for the cost of repair or replacement of the Completed Foundation Work which fails to perform the function for which it was intended.*

4.2.4.7 Contractors' Available Recourse

Investigations into causation revealed that the design of the piles was insufficient. This was supported by the percentage of piles which did not comply with the design specification. However, according to the signed contract the engineers had limited their liability to double their fees. Therefore, the contractors could only recover costs which were less than a third of the reinstatement costs.

4.3 Company B

4.3.1 Background

The company is one of the leading construction companies in South Africa, a multi-disciplinary construction and engineering entity. Their core competencies include infrastructure, mining and energy, with a service offering including engineering and construction and project management.

In support of this study, the following information was provided by the company:

- Risk management Model;
- Master Risk register;
- ERM Plan.

This was supplemented by a review of the financial statements and integrated reports available on the public domain.

4.3.2 Risk Management Approach

The company has a holistic approach to risk, as they recognise that it is inherent in all business activities. Its main risk management strategy incorporates formalised processes in the identification, assessment and management of risk, including implementing mitigation mechanisms while leveraging opportunity.

Through ERM, the company regards risk as being intrinsic in their approach to managing resources, impacts on stakeholders, health and safety and sustainability of the environment within which the company operates.

The board is responsible for the risk management as it is integral to achieving strategic objectives. Management is accountable to the board for integrating risk management into the day-to-day activities.

The risk management protocol includes the following stages:

- Identifying risks.
- Assessment based on the impacts.
- Quantitative considerations, mainly focusing on financial impacts and ability to achieve strategic objectives.
- Qualitative considerations, assessment based on probability of occurrence, focusing on safety, legal, environmental and reputational impacts.
- The risks emerging from ERM are assessed based on whether their impacts by determining whether they are controllable or not.

4.3.3 Key Risks Identified

The risks emerging from ERM are listed below, in addition, they provide commentary regarding whether the risk identified is controllable or not:

- Safety – controllable;
- Liquidity and management of working capital – controllable;
- Macro-economic environment – uncontrollable;
- Operational performance – controllable;
- Securing quality work – controllable;
- Transformation – partially controllable;
- Labour instability and costs in South Africa – uncontrollable;
- Stakeholder relationships and reputation – controllable;
- Human capital – controllable;
- Problematic contracts – partially controllable.

4.3.4 Example of an Insurance Claim Investigated

4.3.4.1 Project Background

The company was appointed to upgrade mining infrastructure, with their scope comprising the construction of terraces, access roads, storm water dams and concrete structures such as spill ways and culverts, with a contract value below ZAR53 million and a project duration of 12 months.

The contractor established on site in June. This timing coincided with the winter period, which was favourable, as it allowed the earthworks to be completed during the dry season. The site work progressed until the contractors shut down between mid-December until mid- January. At that time they were about 30% behind schedule.

4.3.4.2 Contractual arrangements

The only contractual agreement in force was between the client and Company B.

4.3.4.3 Circumstances leading to the loss

During the shut-down period the area experienced intermittent rainfall. When site operations resumed on 10 January, the site management team discovered erosion in various areas and commenced with remedial work.

Whilst they were busy reinstating the storm related damage, which was regarded as minor at the time, additional severe storms were experienced on 18 January with rains measuring about 150 mm in 30 minutes, exacerbating the extent of erosion and resulting in material scouring in various areas

4.3.4.4 The Damage and Reinstatement

The subsequent storm resulted in the following damage:

(i) Damage to access roads

The scope included the construction of four access roads, two of which had been completed and the remaining two were still in progress. Both Road 2 leading to the terraces and Road 3 leading to the storm water retention dam were completed up to the selected subgrade layer. The resultant damage caused sections to be washed out. The roadbed comprised rock fill which had silted up.

To repair the damage, 700 m of Road 2 and 1 700 m of Road 3 were to be reconstructed.

(ii) Damage to the storm water dam

The earthworks for the dam, including the floor, had been completed. The rain resulted in the dam floor being silted up to approximately 700 m in places.

The reinstatement work comprised cleaning out the silt, bringing in imported material and re-compacting the floor.

(iii) Damage to embankment

The construction of the 5 m high embankment and spillway were still in progress. The already placed gabion baskets were washed out to the bottom of the embankment.

(iv) Damage to storm water channels

This was a concrete lined channel approximately 1 500 m long. Prior to the incident, the earthworks were completed and ready to be lined.

Following the heavy storm, the earthworks were scoured and water logged in places, resulting in increased width and depth, the floor was silted up and the side slopes were eroded. Approximately 1 200 m was affected.

(v) Terraces

There was damage to the completed earthworks due to erosion, material scour and inundation of water.

4.3.4.5 Claim Quantification

The contractor presented their claim amounting to approximately ZAR3 500 000 for the reinstatement work.

4.3.4.6 Adjudication of Insurance Claim

The contractor had submitted a claim to their Insurers against their annual Policy. However, this contract was excluded in terms of the policy, as it exceeds the maximum contract value of ZAR50 million.

It was later discovered that in terms of the contract, the Principal was responsible for insuring the works. The first amount payable on that policy amounted to ZAR2 million. By the time the correct Insurers were notified, the repairs had been completed. The Principal's insurers appointed a separate Loss Adjuster, who visited site and there was no damage observed at the time. The contractor was unable to adequately prove their loss.

To add to their woes, the employer terminated the contract due to a decline in commodity prices and lack of funding going forward.

4.4 Company C

4.4.1 Background

Company C is one of the largest construction companies in South Africa, with competence in buildings, civil engineering, roads and earthworks.

In support of this study, the following information was provided by the company:

- Risk manual, which is a comprehensive document that includes the risk management charter, risk management policy, governance structure, risk management framework, risk management plan, risk profile, audits and training.
- Operational risks/ opportunities register, which outlines the purpose, describes the various stages of the risk management process and the associated inputs. It also includes 'how' the risk matrix should be completed.
- Project risk assessment.
- Risk procedure manual which includes strategic objectives, key business assumptions, business challenges, success factors, identified strategic risks, operational risks (business unit) and project risks

4.4.2 Risk Management Approach

The board is responsible for setting strategic goals and implementing the corporate vision. The company realises that risk management is a fundamental management practice and imperative to good corporate governance. The risk management process provides a systematic approach to identify, prioritise and manage risk.

The Risk Committee is the custodian of the risk management, but does not assume the responsibility of the board. It assists and reviews the effectiveness and progress against the risk management model and assists the board in ensuring that key risks are identified and managed effectively.

ERM provides a holistic approach to risk. It provides a platform for identifying risks from the project and operational level and their influence on strategic risks. The risks are categorised and assessed based on their likelihood to occur and whether or not they are controllable.

The risk manual provides comprehensive details regarding the various stages of the risk management process. The risk management process consists of the 7 steps listed below:

- Establish context;
- Risk identification;
- Risk analysis;
- Risk evaluation;
- Risk treatment;
- Risk monitoring and review;
- Risk communication and consultation;

4.4.3 Key Risks Identified

The risks are categorised into strategic, divisional, tender and project risks as listed below:

Strategic Risks

- Volatile local currency;
- Shortage of skills;
- Unionised workforce;
- Political uncertainty;
- Selecting unreliable suppliers and clients;
- Increase competition in local and global markets;
- Major safety, health, environmental and quality incidents;
- Inability to deliver on current and future growth aspirations;
- Non-compliance to laws and regulations;
- Untimely loss of key personnel.

Divisional Risks

- Expensive and volatile global market;
- Inability of central government to unlock service delivery;
- Slow or no payments by clients;
- Slow delivery on employment equity targets;
- Inability to attract, retain and train critical skilled staff.

Project risks

- Unavailability of essential materials;
- Non-compliance to contractual agreements;
- Sub-standard product quality;
- Late or no payment by clients;
- Safety, health, environmental and quality incidents on site;
- Poor workmanship/ construction techniques;
- Adverse site conditions;
- Unavailability and cost of plant;
- Excessive project scope creep and/or changes;
- Sub-contractor availability, accountability and competency;
- Unrealistic client expectations;
- Contractual requirement to involve local communities/ suppliers/ sub-contractors.

Tender risks

- Inadequate time to complete the tender;
- Client worthiness;
- Inexperienced or overstretched professionals;
- Lack of understanding of technical/commercial requirements;
- Not having the right senior management to finalise the tender;
- Onerous commercial and legal terms;
- Not understanding market forces to secure tender;

4.4.4 Example of an Insurance Claim Investigated

4.4.4.1 Project Background

Company C was awarded a contract to upgrade ageing infrastructure. The scope of works comprised of:

- 12 kilometres (km) of the road network;
- 3,5 km of storm water pipes;
- 3 km of the bulk water services.

The estimated contract value was in excess of ZAR150 million.

4.4.4.2 Contractual arrangements

The works were designed by the employer. Company C appointed a sub-contractor for a portion of the work comprising the upgrade of 1,2 km of the storm water pipes located in various areas. The specification for the sub-contracted work called for the installation of specialist liner system inside the existing pipes. A 400 m section of the pipe discharged into a nearby river.

Company C obtained a quotation from the sub-contractor and the contractual agreement was concluded once Company C issued a purchase order to the sub-contractor with no accompanying terms and conditions.

4.4.4.3 Circumstances leading to the loss

The commencement of the works coincided with the rainy season (February/March). Due to access to the work area and safety considerations, the installation of the liner system required blocking off a storm water drain located upstream.

In mid-March, whilst the installation system was in progress, the area experienced thunderstorms with accompanying downpours, resulting in damage to the surrounding road network. The damage was attributed to the blocked drain, as it created a bottle neck in the storm water system. The employer's consulting engineers instructed the contractor to demolish the barrier.

Within two days of the barrier being removed, additional rainfall was experienced and this time it was persistent rains which lasted for at least 8 days, resulting in a section of the liner that was due to be cured being washed out.

4.4.4.4 The Damage

The incident resulted in damage to the liner system, which formed part of the contract works. Although there was damage to the road surfaces, the damage was limited to a section which formed part of the works and was due to be upgraded. Therefore, this section of the work did not require immediate attention.

4.4.4.5 Claim Quantification

The repair costs amounted to approximately ZAR3 5000 000 for retrieving the damaged liner, debris removal, procuring replacement material and reinstallation of the liner system.

4.4.4.6 Insurance and Adjudication

The insurance for the works was arranged by the employer, which included all contractors and sub-contractors as co-insureds. However the first amount payable amounted to ZAR5 000 000. Due to this high deductible, Contractor C had enquired through its broker regarding arranging the buy-down cover, but did not finalise the procurement of the cover. In addition, the contractor was unable to claim against its annual policy as the sub-contractor was not a co-insured and the policy included a non-contribution clause, which stated:

> "*This policy is not to be called upon in contribution and is only to pay any claim hereon to the extent of and liability, loss or damage against which the Insured is not indemnified by a more specific insurance, if any, affected for the benefit of the insured*."

Because the contract between the man contractor and sub-contractor was concluded through a purchase order, the sub-contractor were never notified of the high deductible. In addition, the sub-contractor was unable to rely on any contractual remedies such as arbitration. In the interim, the sub-contractor submitted a claim against its annual CAR policy. However, the contract value for their portion of the works exceeded the maximum contract value as stipulated in the annual CAR policy.

As expected, the two companies are in litigation for the cost of repairs.

4.5 Company D

4.5.1 Background

The company is a multi-disciplinary engineering and construction company, with its core business in South Africa and a service offering extending into Africa.

In support of this study, the following information was provided by the company:

- Risk Management Plan;

- Tender Finalisation Checklist;
- Tender and Risk Summary;
- Risk Registers;
- Contracts Management Procedures.

4.5.2 Risk Management Approach

The Company's strategy focuses on the effective and ongoing management of risk. Their risk management process includes early identification, quantification, assessment of risks and application of risk mitigation measures to reduce the potential impact on the business.

ERM ensures that key risks are identified and mitigated. Risk is assessed on an ongoing basis in a "bottom-up and top-down" approach.

4.5.3 Key Risks Identified

The key risks are categorised into strategic, finance and project.

Strategic Risks

- Sustainability dependency on government infrastructure spending;
- Sustainability cashflow;
- Transformation;
- Skills shortage;
- Unprotected strikes and community unrests;
- Governance and non-compliance to laws.

Finance Risks

- Debtor recovery;
- Exchange rate volatility;
- Under-utilisation of fixed assets;
- Oil price volatility.

Project risks

- Competition;
- Underperforming contracts;
- Material and equipment theft;
- Penalties;
- Overtrading;
- Material shortages/ delays on deliveries;
- Non adherence to tender process;
- Unsafe working conditions;
- Inadequate insurance coverage;
- Availability of plant;
- Construction contracts;

Each of the assessed risks listed above is rated based on probability and impact, and corresponding mitigation strategies are put in place.

4.5.4 Example of an Insurance Claim Investigated

4.5.4.1 Project Background

Company D was awarded a contract for the construction of approximately 850 units comprising 18 triple storey structures, including all civils services and finishings. The execution was divided into 5 phases, with each phase comprising 3 structures. The estimated project duration was 42 months.

The project was located in close proximity of several informal settlements. To comply with the contractual requirements approximately 40% of labour was sourced from the local communities.

4.5.4.2 Contractual arrangements

Company D was appointed as the main contractor and in turn appointed sub-contractors for various sections of the works. The estimated contract value was in the region of ZAR450 million.

During the course of the contract, the engineer issued various variation orders, within the first twelve months the contract value had increased by a least 35%. By the seventeenth month, the contract value was 41% higher than the initial estimate.

4.5.4.3 Circumstances leading to the loss

In a period of 2 years the project suffered several losses due to theft and community and labour unrests. A few of the losses affected the sub-contractors. This was until about 16 months into the project, when community commenced with another bout of unrests, which lasted for several weeks and escalated to violence.

4.5.4.4 The Damage

The reported damage was for damage to storage containers, offices, theft of office contents, small tools and equipment, fire damage to several construction plant and damage to the works.

4.5.4.5 Claim Quantification

The contractor submitted a claim to the plant all risk insurers for the containers, plant and small tools and equipment, with reinstatement of below ZAR9 million.

The CAR insurers were also notified of the damage to the Works. The estimated reinstatement costs were below ZAR22 million.

In turn, the respective insurers notified the South African Special Risks Association (Sasria), a state-owned company and the only short-term insurer that provides cover to all the people and businesses that have assets in South Africa, as well as to government entities, against special risks such as civil commotion, public disorder, strikes, riots and terrorism. However, cover cannot be purchased directly from Sasria; it is an extension on underlying policies.

Table 4.3 Company D - List of Insurance Policies Effected for the Project

Type of Policy	Cover
CAR**,** including Sasria	• Cover for the Works (including materials) against physical damage or loss, including materials in accordance with **Clause 18.2**. • The contract value exceeded the maximum contract limit stipulated in the contractor's annual policy, this necessitated a project specific policy in the joint names of the contractor and their principal. • Policy included Piling Guarantee extension. In terms of Clause 4.1 (c) – the contractor are responsible for the works designed by themselves and shall be 'fit for purpose' upon completion.
Plant All Risks (annual)	• Cover for all plant against physical damage or loss, as stipulated in Clause **18.2**.
Assets All Risks (annual)	• To provide cover for assets such as office equipment and furniture.
Compensation for Occupational Injuries and Disease	• COIDA for occupational injuries and diseases.

4.5.4.6 Adjudication of Insurance Claim

The CAR policy included an escalation clause up to 15% of the initial contract value. Therefore, the contractor was required to notify insurers of any changes to the scope and/or contract value.

The underlying policy excludes damage caused by civil commotion, labour disturbances, riot strike, lockout or public disorder. However, if Sasria cover is included as part of the CAR cover, the contractor's indemnity will be based on the conditions of the underlying policy.

- Sasria accepted liability in respect of the claim for assets and plant all risks, subject to the investigation carried out by the appointed Loss Adjuster and the outcome thereof.
- After various meetings between the CAR insurers and Sasria, both insurers agreed that the contractor had opportunities to inform the CAR insurer of the increase in scope and associated price adjustments. By the time the incident occurred the contract value was around 57% above the Sum Insured listed in the policy document.

  The claim was rejected based on the fact that the contract value was exceeded. As the policy does not have an average clause, the view was that the contract was no longer covered in terms of the policy. Under General Conditions, material change in risk stated:

  "*If any change shall occur materially varying the facts existing at the commencement of this insurance or any defects or conditions of working which render the risk more than usually hazardous is discovered the insured shall forthwith notify the Insurer(s)*

and shall cause such additional precautions to be taken as circumstances may require the premium and other terms may be subject to adjustment at Insurers' discretion".

4.6 Summary of Findings

The information reviewed indicates that all four companies have documented risk management protocols. Most importantly, they all recognise that risks cannot be eliminated, especially in the environment within which they operate. Therefore, effective identification and assessments of risks are integral in achieving their respective strategic goals.

The insurance claims were selected to illustrate that not all risks are identifiable; even expected risks may not be apparent during the risk identification process. For example, it is expected that undertaking bulk earthworks during the rainy season is likely to result in a claim. What is important should not be whether there is adequate cover, but rather whether the risk has been identified and what mitigation has been put in place to minimise any exposure. It should be noted that the negative outcome of the claims is not necessarily a trend, as each claim should be judged on its merits.

5 DISCUSSION OF FINDINGS

5.1 Introduction

This chapter focuses on interpreting the findings as detailed in the preceding chapter. The risk management protocols reviewed appear to be similar, with the level of detail and implementation being the distinguishing factors. The most common themes emerging from the case studies and literature review revolve around the inherent presence of risk within the construction environment and that the strategic drive is to identify, assess and manage risk in order to achieve the organisation's goals.

During the literature review, it became apparent that although risk management is intrinsic to organisational sustainability, there is no standard approach. It therefore indicates that best practice is based on documenting a risk management protocol that subscribes to the guidelines outlined in ISO 31000. It is on that basis that the analysis measures whether the protocol aligns with the ISO 31000 guidelines, consisting of the risk management principles, as presented by IRM (2002, 2010).

5.2 Comparing the Risk Protocol with Best Practice

The risk management processes of each company were reviewed against the risk management principles listed in Chapter 2. Each of the companies' risk management approaches correspond with the principles.

- Principle 1 - Risk management should create value

  The organisations use risk management with the goal of achieving sustained benefit and they recognise that the process is a central part of strategic management. They further report that they understand the impact of risk events on the strategic objectives, determine their risk appetite and are aware of the risk tolerance level.

- Principle 2 - Risk management should be part of all processes and decision making

Three organisations' approach to risk is top down, with responsibility cascading from the board, to business units and project environment. Whereas, Company D's approach is "bottom-up and top-down". Their approach diverges because they have identified that a substantial proportion of their risks originate from projects. The details are then rolled-up from project to operational to strategic level. However, the board is still responsible for developing and driving the risk management process.

- Principle 3 - Risk management should be used to handle uncertainty

The risk management policies are used to identify and analyse risk response factors that pose possible threats and develop suitable risk responses and interventions to manage these risks.

- Principle 4 - Risk management should be systematic and timely

Each company indicates that risks are reviewed and monitored at appropriate and required intervals. The approach should contribute to efficiency and generate reliable results. They recognise that without parameters it is difficult to measure efficiency.

- Principle 5 - Risk management should be based on the best data possible

The Risk or Audit Committees develop strategies to enhance communication and flow of information between operations and the board

- Principle 6 - Risk management should be tailored to its environment

The risk profiles are based on risk drivers from internal and external factors, with risk categorised into strategic, operational or project. This risk classification is then used for the identification of key risks, the assessment of their probability and the development of appropriate management and responses.

Although Company B did not categorise the risks, according to their ERM, they report using a triple defence approach, which incorporates the categorising into the relevant groups.

- Principle 7 - Risk management should be transparent and inclusive

The risk management strategy is communicated to stakeholders through the risk management plan and policy.

- Principle 8 - Risk management should be responsive, iterative and support continual improvement

Through risk management training, the companies' promote risk management as part of management and introducing incentives. The companies have identified that risk management must be reviewed on an on-going basis and reported to the relevant stakeholders.

In summary, although the risk management processes are slightly varied, they still cover all of the salient stages. The risk architecture and strategy are also in line with the framework presented in Chapter 2. However, while the risk protocol entails 'specifying the risk management methodologies, tools and techniques that should be used', the information was not included in the information reviewed. At this stage, the assumption is that the risk assessment is more qualitative than quantitative.

According to the principles discussed above, risk management should be on-going. However, the registers and checklists reviewed are onerous and unless these tasks are carried out by risk specialist, the processes are unlikely to be fully complied with at frequent intervals.

5.3 Key Risks Identified

The key risks identified by each company, although presented differently, correlate with most of the risks summarised by the PwC (2014, 2016) studies of the construction industry and these are illustrated in Table 5.1.

Table 5.1 Comparison of Key Risks Identified by Each Company

Risk Description	Company A	Company B	Company C	Company D
B-BBEE and transformation	Y	Y	Y	Y
Health safety and environmental sustainability	Y	Y	Y	Y
Industrial action and community unrests	Y	Y	Y	Y
Liquidity risk	Y	Y	Y	Y
Talent management (skills shortage)	Y	Y	Y	Y
Growth, expansion and operational performance	N	Y	Y	N
Macro-economic environment	Y	Y	Y	Y
Tender risk	Y	Y	Y	N
Legislation and regulatory compliance	Y	Y	Y	Y
Project execution	Y	Y	Y	Y
Understanding contracts	Y	N	Y	Y
Lack of personal accountability	Y	N	N	N
Underperforming contracts	Y	N	N	Y
Cyber Threats	N	Y	N	N

Legend: Y = Yes and N = Not identified as key risk

Cyber threats are emerging at the top of organisations' strategic risks, with some insurance claims in excess of USD1 billion[13]. Companies should therefore safeguard their systems against these malicious attacks. As indicated, only Company B have considered cyber-attacks as a key risk.

The information gathered from the case studies corresponds with literature, with similar themes emerging regarding the importance of risk management to organisations (Akintoye & Macleod, 1997; IRM, 2002), categorising risks to enhance identification, assessment and management thereof (Zou, Zhang & Wang , 2007), risks come from many sources (Kendrick, 2003), risks as allocated in contract influence the risk profile on projects (Rahman & Kumaraswamy 2002), risk management is a top-down approach, though some companies apply a dual directional approach (bottom-up and top-down).

Risk tends to be expressed in monetary terms, with negative impacts and consequences costing money. For example in 2014, Esor, regarded as one of the large construction companies, reported that a roads project took 42 months to complete overshooting its initial project duration by 12 months, with a net loss amount of ZAR158 million (Creamer Media, 2015).

[13] Munich RE, Claims Managers' Forum titled "Cyber Insurance & Claims: Striking a Balance between Risk & Opportunity" held on 7 March 2018.

In the same year, Civil Engineering group Protech Khuthele filed for business rescue, with one of the major contributory factors being a 33,3% stake in a project in the Democratic Republic of Congo. The company incurred an after tax loss of ZAR111,2 million. The company has since been liquidated. In the year preceding the liquidation, the company had identified a shortfall in their approach, which necessitated creating risk, project and construction management functions, to enhance profitability by achieving tender margins. Although the infrastructure sector has been subdued, the contractor has identified that their poor performance was attributable to inadequate risk management processes. This company is one of the case studies discussed in this study, despite having had a risk management protocol that looks good on paper. It is for such examples that this study has been validated and deemed necessary.

5.4 FIDIC Conditions vs Insurance Provisions

The examples of insurance claims presented in Chapter 4, were selected intentionally, to highlight how various exclusions apply and to illustrate that purchasing the wrong cover may not be in the company's best interest.

This section summarises the various insurable and uninsurable risks as structured through FIDIC.

Table 5.2 a) Insurable and Uninsurable Risks as Structured through FIDIC

Clause	Insurance Policy and Provisions
Care and supply of documents (**Clause 1.8**)	• Insurable under CAR Policy under 'Records' or 'Documents' "The Insurers agree to indemnify the Insured in respect of costs necessarily incurred by the Insured in replacing records which shall include but not limited to (i) Written or printed or otherwise inscribed documents of every kind……. (ii) Maps, models, drawings, photographs……. (iii) Tapes, memory banks……. (iv) Engineering and other reports and data
Subcontractors (**Clause 4.4**)	• The Contractor shall be responsible for the acts or defaults of any Subcontractor…..as if they were the acts of the Contractor The Contractor should ensure that the Subcontractor is a named co-insured under the Contract Works or CAR Policy
Contractor's Equipment (**Clause 4.17**)	• Contractor's equipment is insurable under Plant All Risk Policy against physical damage or loss.

Table 5.2 (b) Insurable and Uninsurable Risks as Structured through FIDIC (continued)

Clause	Insurance Policy and Provisions
Unforeseeable Difficulties (**Clause 4.12**) – Silver Book	• Insurable under CAR if damage fortuitous and is due to an Insured Peril and not defective design, defective workmanship and defective material.
Employer's Equipment and Free-Issue Material (**Clause 4.20**)	• Insurable • Equipment under Plant All Risks. However, up to the limit of liability stated in the Policy or market value • Free issue material is insurable once ceded to the insured for incorporation in the Works. However, the contractor should ascertain that the full value is included in the contract value.
Design (**Clause 5.1**) – Silver Book	• Insurable • Under Professional Indemnity or Product Liability or Product Guarantee or Piling Guarantee. Depending on the design requirement
Remedial work (**Clause 7.6**)	• Insurable if rework is due to accidental damage or unforeseeable event, which is not excluded in terms of the Policy.
Suspension of work (**Clauses 8.8 and 8.11**)	• During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage. • If Works covered by the Contractor, they should inform Insurers of the Suspension, especially if it exceeds 90 days. The Contractor is required to inform Insurers of any change in risk.
Defects liability (**Clause 11**)	• Insurable under CAR • The Policy should include the defects liability or maintenance period. • It will only cover damage caused before the defects liability period, but manifests during the said period.
Employers Risks **(Clause 17.3**)	• Risks listed from (a) – (e) are uninsurable
Insurance (**Clause 18**)	• All sections are insurable. • Contract Works under CAR • Plant and Equipment under plant all risks • Injury to personnel - COIDA

Based on the information detailed above, the following information may be concluded

- Firstly, the insurance policy follows the contract and not the other way around. For example, if the contract between the main contractor and their sub-contractors is that the main contractor shall effect the insurance for the works, only the main contractor's policy can be called upon in the event of a loss. The main contractor will be required to include their sub-contractors as co-Insureds for the Policy to entertain the loss. It is therefore paramount for all parties to read the contract and understand their responsibilities as set-out therein.
- Not all risks are insurable.
- Specific risks are covered under specific policies. A contract works and public liability policy tends to exclude damage to plant, scaffolding, construction aids etc.
- In general, for a policy to respond, damage or loss has to be sudden and unforeseen instead of inevitable, which tends to be excluded if due to defective design, workmanship, plan specification and material.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This section draws conclusions in relation to the initial objectives of the report. In addition, it provides a summary of the findings and recommendations.

6.2 Summary of Research Findings

The following objectives were derived in order to answer the research questions stated earlier.

The first objective was to investigate the various construction risks and to provide an overview of the risk environment.

The various case studies provided an overview regarding the risk management approaches that were applied. The findings revealed that risk management is a process which requires integration into general management principles in order to realise the advantages. The ERM protocol enabled the entities to provide a procedure and company standard for identifying and assessing risk.

Each of the companies investigated regarded the management of risks as being important in achieving organisational objectives because they operate in a high risk environment, which is influenced by internal and external factors. The project environment is one of the areas where risks are likely to affect the profitability of the entity, especially during periods when margins are constricted. The categorisation of risks allows the entities to identify the risks based on how they interact with the organisational strategy, operational drive or service delivery on projects.

The second objective was investigating the legal implications and contractual framework. As already highlighted in the literature survey, the main purpose of the construction contract is to allocate risks and accompanying responsibility to the party that is best suited to bear it. In addition, the contract should clearly and unambiguously outline how the various risks are to be addressed. Although the construction industry has been using standard contracts for several decades, the risks identified herein indicate that the contract conditions are still not well understood.

The third objective was to investigate whether the South African construction industry subscribes to best practice. A detail review of the companies' risk management processes and procedures have revealed that their documented system are in line with best practice. Bearing in mind that the literature survey has indicated that each company has to tailor make its risk management protocol. Albeit, the companies do not necessarily adhere to the documented protocols, as they appear cumbersome.

Finally, the risk matrix provides a rating for each risk identified in terms of whether the risk is likely to occur and gives a measure in respect of the probability of its impact to the organisation. This classification outlines the organisation's risk appetite. Transferring risk through the purchase of insurance or transferring to sub-contractors is still an effective tool. However, it requires a thought process to drive it, as premiums tend to be expensive. The industry relies on their brokers for advice regarding the type of cover required. It may be more beneficial for the companies to first establish the type of cover available and policy provisions as this would ensure only cover that is necessary and required in terms of the project profile, instead of using lessons learnt to purchase cover on the next project. Although some of the risks under the case studies revolve around the policy provisions not being read or understood, none of the companies regard this as a risk. An insurance policy is a legal document that outlines the contractual relationship between insurer and the contractor.

The study had intended to investigate the decisions preceding the purchasing of insurance, but the documents did not provide information in this regard. Only one company provided an insurance needs analysis which is completed at tender stage and evaluated once the contract has been awarded. However, from the examples of the insurance claims presented herein, the conclusion drawn is that despite the potential of high value losses, which can effectively be hedged using insurance, contractors are still lacking in their understanding of the products available and how they can be utilised efficiently.

The construction companies investigated have been operating in the industry for decades. The top tiered companies are the reason the South African construction industry is regarded as "well developed". Following the review of the documentation accessed for the purpose of this study, the construction companies are aware of the risk environment within which they operate. However, their preparation for the risk exposure and accompanying liability is still a work in progress, as illustrated in the key risks presented.

6.3 Recommendations

Projects are unique endeavours. With this in mind, it is very rare for two projects to suffer similar losses, especially if they are executed by the same company. Therefore, entities should have a well-designed plan for the use of information derived from lessons learnt.

The industry may wish to consider sharing information with peers, using platforms such as the CIDB or South African Federation of Civil Engineering Contractors (SAFCEC), to enhance the early identification and assessment of some of the risks.

This study was limited to studying four companies. In order to provide scope for generalisations, a wider sample should be considered.

7 REFERENCES

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

Adriaanse, J. 2007. *Construction Contract Law*, Second edn. Palgrave Macmillan, Hampshire and New York.

Anguera, R. 2006. "The Channel Tunnel – an Ex Post Economic Evaluation", *Transportation Research Part A, pp 291 – 315.*

Arjoon, S. 2005. "Corporate Governance: An Ethical Perspective", *Journal of Business Ethics*, vol. 61, no. 4, pp. 343-352.

Aveng .undated. *Performance Highlights: Salient Features: Performance.* https//www.aveng.co.za/finacials/performance-highlights. Online. [Accessed 22 January 2018].

Aveng.2015. Integrated Report 2015, Building a lasting legacy. www.aveng.co.za/sites/group/files/downloads/financials/annual_results/download-1444308445 aveng-group-iar2015-lo-re.pdf. Online. [Accessed 22 January 2018].

Aveng. 2016. Aveng Integrated Report 2016. www.aveng.co.za/sites/group/files/downloads/financials/annual_results/aveng-ir-2016.pdf. Online. [Accessed 22 January 2018].

Baloi, D. & Price, A.D.F. 2003. "Modelling global risk factors affecting construction cost performance", *International Journal of Project Management*, vol. 21, no. 4, pp. 261-269.

Basil Read.2015. Basil Read Risk Committee's Report. www/basilread.co.za/downloads/investors/2016/corporate-Governance/BSR RiskCommitteeReport2015.pdf. Online. [Accessed 22 January 2018].

Basil Read.undated. King III Register. www/basilread.co.za/downloads/investors/2016/corporate-governance/BSRKindIII.pdf.Online. [Accessed 22 January 2018].

Beeby, R.E. 1989. An Investigation into the Nature of Contractor's All Risks Insurance with Particular Reference to Civil Engineering and Building Risks. Johannesburg: University of Witwatersrand, unpublished. MSc Research Report.

Bennington Copeland & Associated Training. 2011. 2 Day Workshop on FIDIC Documents. FIDIC Workshop. Johannesburg.

Bunni, N.G. 2003. *Risk and Insurance in Construction*, Second edn. Spon Press, London and New York.

Calgro M3. 2017. Calgro M3 Group 2017 Integrated Report. www.calgrom3.com/images/pdfs/Annual_Reports/Calgro-IAR-2017.pdf. Online. [Accessed 22 January 2018].

Calgro M3. 2015. Calgro M3 Integrated Report 2015. www.calgrom3.com/images/pdfs/Annual_Reports/Integrated_Annual_Report 2015.pdf. Online. [Accessed 22 January 2018].

Chang, CY. & Ive, G. 2007. "The hold-up problem in the management of construction projects: A case study of the Channel Tunnel*", International Journal of Project Management*, vol 25, no. 4, pp 394 – 404.

CIDB.2004. Construction Contracts – an Introduction, The 3Rs Basic Guide for SME's, A CIDB Best Practice Guide. Online. www.cidb.org.za.

CIDB, undated, Code of Conduct for all parties engaged in construction procurement. Online. www.cidb.org.za. [Accessed 27 May 2016].

Cokayne, R. 2018. 'Group Five Bleeds Further from Kpone'. *Business Report*. 3 April 2018. Online. https://www.iol.co.za/business-report/Companies/group-five-bleeds-further-from-kpone/14212271. [Accessed 3 April 2018].

Creamer Media. 2015. Construction – A Review of South Africa's Construction Sector. Research Channel.

Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A. & Sheikh, A. 2011. "The Case study approach". *BMC Medical Research Methodology*.

Deneys Reitz Attorneys. 2006. "Doing Business in South Africa", Key workplace Documents, Cornell University ILR School, Digital Commons@ILR. http://digitalcommons.ilr.cornell.edu/lawfirms. Online. [Accessed 13 February 2014]

Drennan, L.T. 2004. "Ethics, Governance and Risk Management: Lessons from Mirror Group Newspapers and Barings Bank", *Journal of Business Ethics*, vol. 52, no. 3, pp. pp. 257-266.

Ernst & Young. 2009. King III Integrated Report Disclosure Checklist. Online. www.ey.com

Esor 2017. Esor Abridged Consolidated Results for the Year Ended 28 February 2017. www.esor.co.za/sites/default/files/Annual Results/Audited Condensed Consolidated Results for the Year Ended 28 Feb 2017.pdf. Online [Accessed 22 January 2018].

Esor Undated. Terms of Reference Risk Committee. www.esor.co.za/sites/default/files/Esor Risk Com Terms of Reference. Online [Accessed 22 January 2018].

Esor 2015. Integrated Report 2015. www.esor.co.za/sites/default/files/Annual Reports/Integrated Report 2015_1.pdf. Online [Accessed 22 January 2018].

Flanagan, R. & Norman, G. 1993. *Risk management and construction*, Blackwell Scientific, Oxford.

Frimpong, M. 2003. *Project Management For Non-Profit Organizations – A Practical Guide for Managing Developmental Projects*, First edn, Repro Centre, Johannesburg. G. 1993.

Gordhan, P. 2014. Budget Speech. www.treasury.2014. Online. [Accessed 13 May 2016].

Group Five.Undated. Risk Management. www.g5.co.za/sis_risk.php. Online. [Accessed 22 January 2018].

Group Five. Undated. Corporate Governance. www.g5/sus_corpgov.php. Online. Accessed 22 January 2018.

Group Five. 2017. Integrated Annual Report 17. www.g5/reports/ar-2017/pdf/integrated-repor-2017.pdf. Online. Accessed 22 January 2018.

Hamburger, D.H. 1990. "The Project Manager: Risk Taker and Contingency Planner", *Project Management Journal*, vol. xxi, no. 4, pp. pp. 11 – 16.

Hollard Insurance Limited, Contractors All Risks Policy Wording.

ILO.2014. Employment Trends 2014: Risk of a Jobless Recovery. Geneva

IRM.2002. A Risk Management Standard. Online. https://www.theirm.org. [Accessed June 2011].

IRM.2010. A Structured Approach to Enterprise Risk Management (ERM) and the Requirements of ISO 31000. Online. https://www.theirm.org. [Accessed June 2011]]

Kendrick, T. 2003. *Identifying and Managing Project Risk - Essential Tools for Failure-Proofing your Project*, AMACOM, a division of American Management Association, New York, USA.

Kerzner, H. 2003. *Project Management - A Systems Approach to Planning, Scheduling and Controlling*, Eighth edn, John Wiley & Sons Inc., Hoboken, New Jersey.

Kliem,R.L. & Ludin, I.S. 1997. *Reducing Project Risk*, Gower Publishing Ltd., Hampshire, England. Online. https//books.google.co.za/books?id.

Leedy, P.D. & Ormrod, J.E. 2010. *Practical Research: Planning and Design*, Nineth edn, Pearson Education International, New Jersey.

Magubane, K. 2018. "Basil Read Reports R1bn Loss in Full-year Results'. *Fin 24*, 28 March 2018. Online. https://fin24.com/Companies/Industrial/basil-read-reports-r1bn-loss-in-full-year-results-2080328. [Accessed 28 March 2018].

Mahadea, D. 2005. "Employment and Growth in South Africa: Hope or Despair". *The South African Journal of Economics*, Vol 71:1 pp 21 - 47

Massey, I. 2010. "Vital Tools for Effective Project Management in the Modern Construction Environment". *Civil Engineering*, vol. 18, no.6. SAICE, pp 28 - 29

McCutcheon, R.T. 1991. “A Strategy for Innovative and Productive Employment Creation in the Construction Industry”. *Managing People and Communications in Projects*. *Proceedings* of the *International Symposium of the Project Management Institute*. PMI. 21 – 23 February 1991, Midrand, Johannesburg, pp 1 - 12.

Michalowski, R. & Kramer, R. 2003. "Beyond Enron: Toward Economic Democracy and a New Ethic of Inclusion", *Risk Management*, vol. 5, no. 2, Special Issue: Regulation, Risk and Corporate Crime in a 'Globalised' Era, pp. pp. 37- 47.

Miller, R. & Lessard, D. 2001. "Understanding and managing risks in large engineering projects", *International Journal of Project Management*, vol. 19, no. 8, pp. 437- 443.

Morris, J. & Warwick, G.2014. Global Projects and Construction FIDIC Workshop. Clyde & Co. October 2014, Johannesburg.

Murray & Roberts. Undated. Risk Management. www.murrob.com/sus-risk-management.asp. Online.[Accessed 22 January 2018].

Murray & Roberts. Undated. King III Governance Principles – Murray & Roberts Application. www.murrob.com/sustainability/king-iii-governance-principles.pdf. Online. [Accessed 22 January 2018].

National Treasury. 2017. *Budget Review 2017, Annexure D.* www.treasury.gov.za/documents/national budget/2017/Review/AnnexureD.pdf. Online. [Accessed 8 February 2018].

Neethling, J. & Potgieter, J.M. 2010. *Visser Law of Delict.* Sixth edn, Lexis Nexus.

Nkado, R.N. 2010. "Cost escalation of major infrastructure projects: A case study of Soccer City Stadium in Johannesburg" In: Laryea, S., Leiringer, R. & Hughes, W. (Eds), *Proceedings of the West Africa Built Environment Research (WABER) Conference*. 27 – 28 July 2010, Accra, Ghana, pp. 267 – 270.

Ofori, G., Hindle, R. & Hugo, F. 1996. "Improving the construction industry of South Africa: A strategy", *Habitat International*, vol. 20, no. 2, pp. 203-220.

Pricewaterhouse Coopers. 2013. SA Construction, Highlighting Trends In The South African Construction industry. December 2013. First edn. www.pwc.co.za/construction. Online. [Accessed 27 May 2016].

Pricewaterhouse Coopers. 2016. SA Construction, Highlighting Trends In The South African Construction Industry. November 2016. Fourth edn. www.pwc.co.za/construction. Online. [Accessed 27 October 2017].

Project Management Institute 2004. *A Guide to the Project Management Body of Knowledge*, 3rd edn, Project Management Institute, Inc., USA.

Quainoo, H.A. 2010. Comparative Study of Five Country-Specific Labour-Intensive Infrastructure Development Programmes: Implications for South Africa. Johannesburg: University of Witwatersrand, unpublished. PhD Thesis.

Rahman, M.M.& Kumaraswamy, M.M. 2002. "Joint risk management through transactionally efficient relational contracting", *Construction Management and Economics,* vol. 20, no. 1, pp. 45-54.

Rahman, M.M. & Kumaraswamy, M.M. 2004. "Contracting relationship trends and transitions", *Journal of Management in Engineering*, vol. 20, no. 4, pp. 147-161.

Raubex. 2015. Integrated Report 2015. www.raubex.co.za/content/old/financials/16_33_1/Raubex 2015 IR_WEB.pdf. Online. Accessed 22 January 2018].

Raubex. 2015. Integrated Report 2017. www.raubex.co.za/content/old/financials/16_14_36/Raubex IR 2017_WEBFA.pdf. Online. [Accessed 22 January 2018].

Ren, H. 1994, "Risk lifecycle and risk relationships on construction projects", *International Journal of Project Management,* vol. 12, no. 2, pp. 68-74.

Saunders, M, Lewis, P., Thornhill, A. 2009. *Research Methods for Business Students.* Fifth edn, Pearson Education, England.

Smith, J, Love, P.E.D, Jackson, N. Undated. Changing Construction Procurement for the Millenium. Online. www.researchgate.net

Statistics South Africa. 2001. *Discussion Paper 1 Comparative Labour Statistics Labour Force Survey: First Round Pilot*. Online. www.statssa.gov.za. [Accessed 20 March 2016].

Statistics South Africa. 2015a. *Stats in Brief*. Online www.statssa.gov.za. [Accessed 20 March 2016].

Statistics South Africa. 2015b. *Construction Industry, 2014 (Preliminary). Statistical Release P5002*. Online. www.statssa.gov.za. [Accessed 20 March 2016].

Statistics South Africa. 2018. *Quarterly Labour Force Survey, Quarter 4: 2017. Statistical Release P0211*. Online. www.statssa.gov.za. [Accessed 21 February 2018].

Stefanutti Stocks.undated. Ethical Leadership & Corporate Governance. www.stefanuttistocks.com/investor-relations/corporate-governance.Online. [Accessed 22 January 2018].

Stefanutti Stocks.2017. Stefanutti Stocks Integrated Report 2017. www.stefanuttistocks.com/media/downloads/token/viewinfo/itemid/139/stefanutti-stocks-integrated-report-2017.Online. [Accessed 22 January 2018].

Stefanutti Stocks.2017. Stefanutti Stocks Holdings Financial Statement 2017. www.stefanuttistocks.com/media/downloads/token/viewinfo/itemid/138/stefanutti-stocks-holdings-financial-statements-2017.Online. [Accessed 22 January 2018].

Thomas, T., Schermerhorn, J.R.,Jr., Dienhart, J.W. & Bartles, D.L. 2004. "Strategic Leadership of Ethical Behavior in Business and Executive Commentary", *The Academy of Management Executive (1993-2005)*, vol. 18, no. 2, pp. pp. 56-68.

Valsamakis, A.C., Vivian, R.W., du Toit, G.S. 2010. *Risk Management*, Fourth edn, Heinemann Publishers, Sandton.

Winegard, L.A. & Warhoe, S.P. 2003. "Understanding Risk to Mitigate Changes and Avoid Disputes", *47th Annual Meeting of AACE International*, 22 June 2003 through 25 June 2003.

www.moneyweb.co.za/archive/competition-commision-fines-firms-r1. Online. [Accessed 22 October 2017].

Zhao, Z.-. & Duan, L.-. 2008. "An integrated risk management model for construction projects", *Portland International Center for Management of Engineering and Technology, Technology Management for a Sustainable Economy, PICMET '08*, 27 July 2008 through 31 July 2008, pp. 1389.

Zou, P.X.W., Zhang, G. & Wang, J. 2007. "Understanding the key risks in construction projects in China", *International Journal of Project Management*, vol. 25, no. 6, pp. 601-614.

8 BIBLIOGRAPHY

Alexander Forbes Risk Services, Construction Risks Insurance Policy Wording.

Alexander Forbes Risk Solutions, Project Professional Indemnity Insurance Policy Wording.

Consort Underwriting Managers, Contract Works & Public Liability Insurance Policy Wording.

Glencairn, Combined Liability Insurance Policy Wording.

Hollard, Annual Contract Works & Contractors Public Liability Insurance Policy Wording.

Mirabilis Underwriting Managers, Contractors' All Risks Insurance Policy Wording.

Munich RE.2011. Builders' Risk Engineering Insurances.

Willis South Africa (Pty) Limited, Contract Work & Public Liability Insurance Policy Wording.

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APPENDIX A: LETTER OF SUPPORT TO COLLECT DATA

Dr. J. G. Ndiritu
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Email: John.Ndiritu@wits.ac.za

6 March 2013

Dear Sir/Madam

To Whom It May Concern

This letter serves to confirm that Comfort Sekano student number 9409460X is registered in the School of Civil and Environmental Engineering in the Faculty of Engineering and the Built Environment, University of the Witwatersrand as a postgraduate student.

She is conducting a research in partial fulfilment of her MSc degree and the title of the study is "Contractor liability on construction projects: risk management as structured through FIDIC contracts for projects in South Africa, with Specific reference to the risk transfer tool of insurance".

As part of the investigation, she is conducting a survey on the subject. The School will be very grateful for your assistance by giving her time for an interview with you and furnishing her with any data she might need for the investigation.

You are assured that all the information supplied will be treated in full confidentiality and if you wish to verify her identity, do not hesitate to contact the Head of School, Prof Mitchell Gohnert.

Yours sincerely,

John Ndiritu (PhD)
Post Graduate Coordinator
School of Civil and Environmental Engineering
University of the Witwatersrand.