

**COMPLIANCE WITH SECURITIES AND CONTRACTORS' ALL RISK
INSURANCE REGULATIONS AMONG KEY ZAMBIAN CONSTRUCTION
INDUSTRY STAKEHOLDERS IN LUSAKA**

By

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**A dissertation submitted to the University of Zambia in partial fulfilment of the
requirements for the degree of Master of Engineering in Project Management**

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Declaration

I, Vennah Beene Ng'andu, hereby declare that the submitted thesis entitled “**Compliance with Securities and Contractors’ All Risk Insurance Regulations among Key Zambian Construction Industry Stakeholders in Lusaka**”, is based on my original work except for duly acknowledged quotations and citations. I declare that this dissertation herein presented for the degree of Master of Engineering in Project Management has not been previously submitted either in whole or in part for any other degree at this or any other university, nor is currently submitted for any other degree.

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Abstract

The risks associated with construction can be transferred to insurance. However, the levels of knowledge and use of insurance covers in the Zambian construction industry (ZCI) are not known. Knowledge and use of insurance covers have not been previously described. The study was designed to cover this knowledge gap among employees in both government and private sector construction institutions; insurance and financial institutions. A cross-sectional evaluation of 68 participants from government and private construction industry organisations was conducted between July and October 2019 in Lusaka using a questionnaire and focused in-depth interviews who were purposively sampled. The frequencies of responses among government employees were compared with those of private organizations using Chi-square and Fischer's exact tests where appropriate. The participants consisted largely of the private sector (67%). Private sector personnel were more likely to have had five or more years of work experience than those of the Government of the Republic of Zambia (GRZ) institutions (86% vs 36%, $p=.001$). The majority (at least 88%) of the participants knew securities and contractors' all-risk insurance, and there was no difference between GRZ and the private sector. Personnel from GRZ institutions were more likely to have used CAR-insurance security in one or more projects than those from the private sector (100% vs 47%, $p=.009$). Most of the participants knew securities and contractors' all-risk insurance, but there was variation in their use. Majority of the participants had valid securities and successful implementation of securities. There were variable levels of compliance among different stakeholders towards securities. About half of the participants had systems for monitoring performance of securities; the majority of the systems were said to be effective.

Keywords: Insurance, Securities, Contractor's all risk insurance, construction

Dedication

This thesis is dedicated to my husband (Fred Maate), my three Children (Lubono, Lushomo and Luyando Maate) and my family at large, for their continued support and belief in me.

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Abbreviations

ADB.....	African Development Bank
BIM.....	Building Information Modelling
CAR.....	Contractors' All Risk Insurance
CIDB.....	Construction Industry Development Bank
CSO.....	Central Statistics Office
GDP.....	Gross Domestic Product
IRM.....	Integrated Risk Management
NCC.....	National Council for Construction
PAM.....	Preurban Arkitek Malaysia
PWD.....	Public Works Department
ZCI.....	Zambian Construction Industry
ZPPA.....	Zambia Public Procurement Authority

1.0 CHAPTER ONE: INTRODUCTION

1.1 Background

The construction industry is a high-risk industry. It is subject to more risk and uncertainty than many other industries (Babu & Kachana, 2014). Some of the risks include failure of project completion, non-payments of funds to contractors and/or subcontractors, contractors' failure to return advance payments, poor work quality and physical injuries of any person involved in the implementation of a construction project, among others (Jones, 2017).

Globally, risks associated with construction processes tend to be insured. This provides protection both for the insured and for the party to whom the insured has a liability (Cantor, 2020). For construction projects funded by the Zambian government, it is a requirement by law for contractors to have securities and insurance covers including performance security, advance payment security and contractors' all-risk insurance (ZPPA, 2012). However, no such known laws are governing non-government-funded construction projects.

There are generally five categories of players in construction. These include clients (public and private), architects/ designers (building designers, draftsmen) building contractors (including sub-contractors), input suppliers (including building material producers and importers) and allied service providers and Customers/end users (International Labour Organisation, 2015). In Zambia, there were over 1000 National Council for Construction (NCC), -registered contractors. Many of these were local contractors (National Council for Construction, 2020).

The different players in the construction industry are exposed to construction-related risks. It is therefore expected that they should be aware of how to protect themselves against risks through securities and insurance. This is important because, for many of the players, the government serves as the principal client (International Labour Organisation, 2015). Lack of knowledge about securities and insurance can potentially result in not utilizing or ineffectively implementing them; it can also result in full exposure to risks. For example, it was reported that poor knowledge and experience about risk management among local contractors resulted in insurance claims that were under settled (34%) or rejected by insurance companies (53%) (Parera, et al., 2008).

According to the Zambia Public Procurement Authority (ZPPA)'s Standard Bidding Document-Goods and Services, stakeholders are required to implement securities. These securities include Performance Security, Advance Payment Security and BID security. However, the compliance of key stakeholders with the regulations about securities and CAR insurance is unknown. This research was conducted to assess the knowledge of key Zambian construction industry (ZCI) players about securities and contractors' all risk (CAR) insurance. It was meant to also assess their compliance with securities and CAR insurance regulations. The study would also determine if the stakeholders knew any tools for assessing compliance with securities and CAR insurance. The information obtained would help identify any gaps in knowledge among key stakeholders and suggest possible solutions including the proposition of a tool of assessment of compliance.

1.2 Statement of the Problem

According to the Zambia Public Procurement Authority (ZPPA)'s Standard Bidding Document-Goods and Services, stakeholders are required to implement securities. These securities include Performance Security, Advance Payment Security and BID security. However, the compliance of key stakeholders with the regulations about securities and CAR insurance is unknown.

1.3 Aim

To assess the compliance of key Zambian Construction Industry (ZCI) stakeholders in Lusaka with securities and Contractors' all-risk insurance (CAR) regulations.

1.4 Research objectives

1. To determine the frequency of key ZCI stakeholders with knowledge about securities and CAR insurance
2. To determine the compliance of key ZCI stakeholders with securities and CAR insurance regulations.
3. To determine the availability of systems that monitor compliance with securities and CAR insurance regulations in Lusaka, Zambia.

1.5 Research Questions

1. What is the frequency of key ZCI stakeholders who know securities and Contractors' all-risk insurance?
2. How compliant are key stakeholders to regulations about securities and Contractors' all-risk insurance in the ZCI?
4. Are there any existing systems that monitor the compliance with regulations about securities and CAR in the ZCI?

1.6 Limitations of the Study

This study may have been limited by recall bias among the respondents. Therefore, some of the responses to the questions may have been influenced by the respondents' inability to recall certain information. Further, the study was localised to key players in Lusaka and hence may not be a representative of the Zambian construction industry.

1.7 Research Methodology

The research was a cross-sectional evaluation of the compliance of key stakeholders in the Zambian construction industry to securities and CAR insurance regulations.

1.8 Data Collection Techniques

Objective 1 of this research aimed at determining the frequency of key ZCI stakeholders with knowledge about securities and CAR insurance. This was achieved by administering a structured questionnaire. Objective 2 was aimed at determining the compliance of key ZCI stakeholders with securities and CAR insurance regulations. This too was achieved by administration of a questionnaire and also by in-depth interviews. Objective 3, was aimed at determining the availability of systems that monitor the compliance with securities and CAR insurance regulations in Lusaka, Zambia. This was achieved by administering a questionnaire and in-depth interviews.

1.9 Bias

Indeed the stakeholders may have had recall bias. This was minimised by conducting in-depth interviews. However, this bias may not have been completely excluded as there was no documentary evidence to the responses.

1.10 Organization of the Dissertation

The study is organised in the following chapters.

- i. **Chapter 1** outlines the background, statement of the problem, aim research objectives, limitations of the study, research methodology summary, collection techniques, bias, and organisation of the dissertation.
- ii. **Chapter 2** presents a review of the literature on the types of securities, knowledge of securities and CAR insurance, compliance with securities and CAR insurance, availability of systems for monitoring compliance to securities and CAR insurance and the influence of securities and CAR on the construction industry.
- iii. **Chapter 3** highlights of the research methodology including the study design, data collection, research approach, study site, population, sampling frame and the data analysis.
- iv. **Chapter 4** presents the results of the survey research aligned according to the objectives of the research. It also presents a discussion of the findings.
- v. **Chapter 5** presents the conclusion and recommendation of the study.

1.11 Summary

In this chapter, the background of the study, the statement of the problem, the aim of the research, the research objectives, the research questions were presented, as well as the outlines and summary of the study.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter provides a general overview of project risk management and the types of risks. The chapter further provides a review of existing knowledge of securities and CAR insurance and compliance with regulations of securities and CAR Insurance. The chapter provides the readership with information about the availability of monitoring systems for compliance with securities and CAR insurance regulations and how these influence contract performance.

2.2 General Overview of Project Risk Management

Project risk management is a tool of project management that ensures the safe execution of construction projects. It contributes to the proper management of projects. This in turn ensures successful implementation of project objectives and positive impact on economic growth (Wells, 2015). Project risk management includes planning, risk identification, risk analysis, risk response planning, and control (Sanchez, 2013). Zou, et al., 2007).

Construction projects are perceived to have more inherent risks due to the involvement of many contracting parties such as owners, designers, contractors, subcontractors and suppliers (Sayegh, 2007). A risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on project objectives (Larson & Gray, 2009). Therefore, every project that is undertaken

Risks are bound to occur in during implementation of construction projects (Zubair, et al., 2016). Improper management of these risks can significantly influence the achievement of project objectives (Zou, et al., 2007).

Meanwhile, Larson and Gray (2009) state that risk management identifies as many risk events as possible (what can go wrong), minimizes their impact (what can be done about the event before the project begins), manages responses to those events that do materialize (contingency plans) and provides contingency funds to cover risk events that materialize as this increases the chances of achieving the project goal. The construction industry all over the world is realizing that effective risk management can lead to the success of the project simultaneously achieving the goals laid out by the organizations (Zubair, et al., 2016). However, Tembo (2017) states that it is unknown the extent to which risk management is used to aid the effective use of resources and

prevention of risk management in the Zambian Construction Industry. Zubair et al. (2016), affirms that recent studies have established the fact that effective risk management carries bright prospects not only for the contractor in terms of profit but for the owners as well through financial control and timely completion. This study zooms in to look at a part of risk management in form of risk transfer as risk response.

Risk transference is a risk response strategy whereby the project team shifts the impact of a threat to a third party, together with ownership of the response (Sanchez, 2013). Transferring the risk simply gives another party responsible for its management and does not eliminate it.

There are three main categories of risks in construction that relate to health and safety (Ndekugri & Rycroft, 2009). First, there is the risk of injury or death to people on or passing by the site. Second, the carrying out of the works may cause damage to property other than the works themselves. There may be an unlawful interference with personal rights associated with ownership or occupation of such property (e.g. noise, dust, vibrations and smells). Third, there is the possibility of damage or loss to the works or site materials (Ndekugri & Rycroft, 2009). Other risks include project failure, failure of project completion, physical injuries, non-payments of funds to contractors and/or subcontractors, failure of contractors to pay back advance payments, poor work quality, and shod works (Jones, 2017).

Furthermore, risk transference nearly always involves payment of a risk premium to the party taking on the risk (Sanchez 2013). Transference tools can be quite diverse and include but are not limited to, the use of insurance, performance bonds, warranties, guarantees among others. Contracts or agreements may be used to transfer liability for specified risks to another party. It can be said that the insurance industry is a key industry in an economy as it reduces the risks of the investments faced by individuals and firms (both private and public) as well as uncertainties of life (Kaonga, 2015). The transfer of risks to an insurance policy is an accepted method worldwide. (Parera et al., 2008).

2.3 Securities

The construction industry is a multi-party industry because it involves a lot of stakeholders such as funders/ client, contractor, consultants, suppliers etc. A development project often comprises the following parties: funders/

employers/developers' professional consultants, such as architects, engineers (structural and mechanical and electrical), quantity surveyors, cost consultants, CDM coordinators and project managers. Sometimes this team will be augmented by specialist consultants, such as acoustic consultants and sustainability consultants, contractors; and sub-contractors (Greene, 2013) . All stakeholders have to meet their objectives and have to be satisfied hence the need for securities.

The purpose of contract security is to guarantee that all parties will perform all their obligations (Northwest Territories, 2010). Guy (2013) also says that a major benefit of using securities is that the parties can normally be assured that the institution has the creditworthiness to satisfy the security in the event of default. It is important to understand basic legal principles relating to bonds and guarantees, which are forms of security often used in the construction industry (Greene, 2013). Although securities form a part of a contract, some forms of contract like Joint Liaison Committee (JCL) 1970 edition does not highlight the requirement of Advance payment security, Performance security and Retention security. Securities come in form of a guarantee or bond. Bonds and guarantees have much in common but there can be a degree of misunderstanding about what each type of security is intended to achieve (Greene, 2013). The writer further makes it clearer that in construction projects, bonds and guarantees are typically used as security for performance of the contractor but bonds and guarantees are increasingly provided as an alternative to retention monies and also as security for the employer's performance (i.e. payment).

A bond is a debt security, in which the authorized issuer owes the holders a debt and, depending on the terms of the bond, is obliged to pay interest (the coupon) and/or to repay the principal at a later date, termed maturity (Oke, et al., 2013) while a company guarantee is a contract between a parent company and a third party beneficiary by which the parent (as guarantor) guarantees the performance of one of the subsidiaries. A bond constitutes a legal guarantee that the project will be completed as expected. These forms of risk transfer tool are in the post-contract stage of the project. There is a need then to know what exactly what these sureties are.

2.4 Types of Securities

2.4.1 Performance Securities

Performance security also called surety bond is a risk transfer mechanism where the surety company assures the project owner (obligee) that the contractor (principal) will perform a contract following the contract documents. (Surety Information Office, 2012). This is probably the most common form of guarantee, which protects the Employer / Principal against the risk of the contractor failing to perform or comply with the conditions of the contract (Zurich, 2013). They provide financial security and construction assurance by assuring project owners that contractors will perform the work and pay specified subcontractors, labourers, and material supplier. According to Koksai (2011), in Construction Contracts, the Contractor's obtaining performance security from a bank, insurance company or another third party to submit it to the Employer is common (Koksai, 2011) as opposed to the employer submitting to the contractor. Obtaining bonds and delivering them to the owner is the responsibility of the contractor, who will consult with a surety bond producer (Surety Information Office, 2012)

The other principal purpose is to cover the Employer for the increased cost of completion as a result of the non-performance of the contractor (Zurich, 2013). In line with Zurich, Kaksai (2011) states that the purpose of the security is to avoid any damage suffering the Employer in case of failure of contractor in the performance of contractual obligations. A performance bond will rarely guarantee the performance of all of the contract party's obligations; rather it provides the recovery of financial loss up to the stated amount, often framed as a percentage of the contract price (Guy, 2013). Alternative forms of financial security, such as letters of credit and self-insurance do not provide the 100% performance protection and 100% payment protection of surety bonds nor do they assure a competent contractor (Surety Information Office, 2012). This then means that performance security is an option of surety for non-performance on project or contract.

The performance security is offered as either a guarantee or a bond. A Bank Guarantee shall be unconditional from a bank while a performance bond is an undertaking by a bonding or insurance company to complete the construction in the event of default by the contractor or to pay the amount of bond to the employer (ZPPA, 2012). If the Performance security is in the form of a bank guarantee, this guarantee must be issued

by a bank in the country of the employer or, a foreign bank through a correspondent bank of the employer's country (Koksal, 2011). Performance guarantee, in some cases, may be supplied with the security of reimbursement. To bond a project, the owner specifies the bonding requirements in the contract documents and is underwritten with little expectation of loss (Surety Information Office, 2012). It can be deduced from the literature reviewed that performance security is a contractual obligation although they are some procurement methods which do not have a provision for it, for example shopping as the works are warranted by the employer. Despite the observation, “FIDIC General Conditions of Contract, issues the performance bond as a discretionary, however, in the case provided for by the Construction Contract between the parties, the performance bond will be required. According to the report under Surety Information Office (2012) performance bonds are mandated by law on public works projects through on privately-owned construction projects is at the owner’s discretion.

a. Period of submission

Different contract types give a specific period in which the security is supposed to be submitted. According to Sub-Clause 10.1 of the FIDIC contract titled as “Performance Security”, if the Contract requires the Contractor to obtain security for his proper performance of the contract, he shall obtain and provide to the Employer such security within 28 days after the receipt of Letter of Acceptance, in the sum stated in the Appendix to Tender (Koksal, 2011). This is in line with the clause 41.1 of general conditions of contract as it stated within twenty-eight (28) days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security following the conditions of contract (ZPPA, 2012). However, a contract under Auditor General provides that Within 21 days after receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in the amount and in the form (Bank Guarantee and/or Performance Bond) stipulated in the BDS, denominated in the type and proportions of currencies in the Letter of Acceptance and accordance with the General Conditions of Contract (The Head of Procurement and Supplies Unit, 2015).

In contrast with what is provided above, the Public Works Department or Jabatan Kerja Raya (PWD) 203 2007 form states that performance bond provides at the date of site possession via an approved licensed bank or financial institution. Pertubuhan Arkitek Malaysia (PAM) form explain that the bond should be submitted to the employer by

the contractor before the date of commencement of works (Kwang & Ting, 2009). Kwang and Ting (2009) further state that Construction Industry of Development Board (CIDB) form maintain that the performance bond should be provided to the employer as per the amount stated in the Appendix within 14 days of the letter of an award before the commencement of work. The consistence thing to note in all these different forms of contract is that the performance bond is required after the contract had been awarded and before the commencement of works.

b. Percentage of performance security

Surety bond premiums vary from one surety to another but can range from 0.5% to 2% of the contract amount, depending on the size, type, and duration of the project and the contractor (Surety Information Office, 2012). This security shall be provided in an appropriate form and amount, as specified by the Borrower in the bidding document and the amount of the security may vary, depending on the type of security furnished and, on nature, and magnitude of the works (African Development Bank, 2012). However, Zurich writes that traditionally, the guarantee amount is equal to 10% of the contract sum. He further stated that the amount (which may vary greatly, depending on the case, and is between 5 and 15% of the contract price) and the validity period (the validity period is normally about one year after completion of the work) should be reasonable in the light of international business practice. Kwang and Ting (2009) assert that the government should be the beneficiary of the bond amount to 5% of the contract sum and it may be in the form of cash banker draft, a banker bond or all insurer's bond as per the requirement of the contra or approved by the employer in the case where it is not mentioned in the contract. FIDIC General Administrative Conditions of Contract in General conditions does not explain the amount of the performance bond and its rate according to the Contract price.

In the ZPPA Standard Bidding Document provides that an amount of 5 to 10 per cent of the Contract Price is commonly specified for Performance Bank Guarantees and an amount of 30 per cent of the contract price internationally.

c. Validity of security

According to FIDIC under Sub-Clause 10.2., the performance security shall be valid until the Contractor has executed and completed the works and remedied any defects therein per the Contract (Koksal, 2011). No claim shall be made against such security

after the issue of the Defects Liability Certificate following Sub-Clause 62.1 and the security shall be returned to the Contractor within 14 days of the issuance of Defects Liability Certificate. The procurement standard for ZPPA provides that the Performance Security shall be valid until a date 28 day from the date of issue of the Certificate of Completion in case of a Bank Guarantee, and until one year in the case of a performance Bond (ZPPA, 2012). Different from the duration given in FIDIC form of contract and ZPPA standard form of contract, PAM and CIDB forms of contract provides that the bond shall remain valid until three months after completion date, should the works be not completed by the completion then the contractor should extend the duration of the bond to expire three months after the projected practical completion of work. Failure of the contractor to provide or maintain the bond gives the employer the right to withhold or deduct an amount of payment due to the contractor equal to the performance bond.

d. How the security works

As stated under the period of the submission of the security, the performance security has to be acquired in a specific period depending on the type of contract form that is being used. When acquiring the bond or guarantee certain procedures have to be followed and certain procedures have to be followed in case of default by either the contractor or employer. When providing such security to the Employer, the Contractor shall notify the project manager. Such security shall be in the form annexed to these Conditions or in such other form as may be agreed between the Employer and the Contractor. The institution providing such security shall be subject to the approval of the Employer. The cost of complying with the requirements of the Clause shall be borne by the Contractor unless the Contract otherwise provides (Koksal, 2011). The Contractor shall obtain the Performance Bond from an Entity which is registered or licensed to do business in the country where the Works shall be executed

Sureties can accept the risk of contractor failure based on the results of a thorough, rigorous, and professional process in which sureties prequalify the contractor. According to Surety Information office (2012), before issuing a bond the surety company must be fully satisfied that the contractor has, among other criteria:

- Good references and reputation
- The ability to meet current and future obligations

- The experience matching the contract requirements
- The necessary equipment to do the work or the ability to obtain it
- The financial strength to support the desired work program
- Excellent credit history and
- An established bank relationship and line of credit

When the contractor satisfies the specification stated above then percentage and validity are followed as specified the contract being used. Failure of the successful bidder to submit the performance security or sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security (ZPPA, 2012). In such a situation the employer may award the Contract to the next best-evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.

Under FIDIC contract, no claim shall be made against such security after the issue of the Defects Liability Certificate following Sub-Clause 62.1 and such security shall be returned to the Contractor within 14 days of the issue of the said Defects Liability Certificate. Before claiming the performance security the Employer shall, in every case, notify the Contractor stating the nature of the default in respect of which the claim is to be made (Koksal, 2011).

2.4.2 Advance payment security

Advance payment security is another form of contract security used in risk management. Some contracts make provision for Employers / Principals to pre-finance a contractor by making payments before the commencement of the contract and this kind of payment is called Advance payment. Advance payment to contractors is the live wire catalyst of the most successful project in the construction industry (Oke, et al., 2013). Hussin and Omran (2009), define advance payments as advances of money by the client of any project to a prime contractor before, in anticipation of, and for complete performance under one or more contract as they are expected to be liquidated from payments due to the contractor incident to the performance of the contracts. Advance Payment Bond is a written statement given by the contractor that he will repay or settle the advanced money paid by the owner related to contract (Oke, et al., 2013). Analysing from the Hussin and Omran (2009)'s statement the advance payment is given to liquidate the contractor. However, the good intention of the employers is abused by some contractors who saw it as a quick way of making money. They could

collect the mobilization advance after the contract and disappear afterwards, leaving the project unexecuted. This eventually led to the introduction of advance payment bond (Hussin & Omran, 2009).

Advance payment in effect provides the contractor with an interest-free loan during the initial phase of the contract where the greatest strain is placed on a contractor's cash flow (Oke, et al., 2013). The ZPPA document (2012) clarifies the purpose of the advance that the Contractor is to use it only to pay Equipment, plan, materials, and mobilization expenses required specifically for the execution of the contract. The contractor is sometimes asked to provide invoices as evidence of the use of money. Against this money in the Advance guarantee or bond is given which is also called security of reimbursement.

Security of reimbursement, if the employer has made advance payments on account the Contract price and if the Employer has concerns that the Contractor would not perform the Conditions of Contract, is provided to protect the Employer from these possibilities (Koksal, 2011). Advance payment guarantee is used where a developer makes an advance payment to a contractor and obtains a bank guarantee as security against that payment (Hussin & Omran, 2009). Purpose of advance payment bond includes: to solve the financial problem of delay of payment; to speed up the progress of work; to prevent the delay of work; and to ensure the quality of work (Oke, et al., 2013). Judging from the definition of security reimbursement and advance bond, the security reimbursement goes beyond just covering for the advance payment but also for the non-performance of the contractor. Oke et al 2013 further says given the above facts, it is observed that advance payment to contractors should have an impact on construction project delivery

a. Period of submission

The Advance Payment Bond is effected before the advance payment is given to the contractor. The advance payment security is attached to the Advance Payment Certificate (ZPPA, 2012).

b. Percentage of the security

In most cases, the employer determines what percentage of advance payment to give depending on the Size, nature and urgency of the project (Hussin & Omran, 2009). The Federal Government introduced advance payment ranging from 10-30% of the

total contract sum and the suit was followed by the State Government and private sectors. This amount of money is usually between 10-30% of the total contract sum and is gradually deducted from the interim payment made to the contractor before the completion of the project (Oke, et al., 2013). The Employer will provide an Advance Payment on the Contract Price as stipulated in the Conditions of Contract, subject to the amount stated in the BDS (ZPPA, 2012).

c. Validity of security

The repayment of mobilization advance is usually completed within the contract period (Oke, et al., 2013). According to the ZPPA standard Bidding document for procurement of small work (2012), the Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the contractor. The security is valid until the advance payment is recovered fully.

d. How the surety works

According to clause 9.0 of Advance payment Guarantee used in the joint Building Contract Committee (JBCC, 2000) principle Building Agreement or N/S subcontract Agreement, this Advance Payment Guarantee is neither negotiable nor transferable and shall expire in terms of payment of the full outstanding balance, or payment in full of the Guarantee. Advance Payment Sum or on the Guarantee expiry date, whichever is the earlier, where after no claims will be considered by the Guarantor. The Advanced Payment bond ensures that the contractors fulfil the contract within the contract period (Oke, et al., 2013). The Employer / Principal secures such a risk by requiring an advance payment guarantee/bond in return. Usually, the guaranteed amount will decrease per the percentage of the work certified (Zurich, 2013).

The guarantee is payable on demand and contains optional wording for the value of the guarantee to reduce as interim payments are made under the contract as asserted in the ZPPA document. The Advance Payment Guarantee is almost invariably in an 'on-demand' form, as in a document, with the Bank, which provides the Guarantee undertaking to repay the advance upon demand. The original of this Advance Payment Guarantee shall be returned to the Guarantor after it has expired

2.4.3 Contractor all-risk insurance

Among the insurance covers used in construction, Contractors' All Risk (CAR) policy has been accepted worldwide as a comprehensive cover by which all the material damages and third-party damages are included (Parera, et al., 2008). Babu and Kachan (2014) assert that CAR insurance policy has become a mandatory insurance requirement. Parera, et al., (2008) define Contractors' All Risk insurance is an all-inclusive insurance cover used in construction contracts as the contract may specify whether the contractor or employer carries the insurance. CAR insurance mainly protects the works, and material, equipment and machinery connected with it. According to Clauses 23-25 of FIDIC contractor, the Contractor shall ensure the Workmen and against the third-party risks, however, if the Contractor fails to effect and keep in force any of the insurances, the employer may effect and keep in force any such insurances (Koksal, 2011). All risk insurance contracts (insurance against all construction and assembly risks) in the professional literature (construction all risks) contracts and they cover risks connected with a physical loss of or damage to materials and equipment kept on a construction site, consequences of a force majeure event, except for events explicitly specified in an insurance policy (Tworek & Tomerki, 2012). As opposed to what the other writer above writes, Babu and Kachana (2014) write that this policy is specially designed to give financial protection to the Civil Engineering Contractors in the event of an accident to the civil engineering works under construction. The CAR insurance policy covers most of the risks specified in projects.

a. Period of submission

The policies and certificate for insurance shall be delivered by the contractor to the Project Manager for approval before the start date (ZPPA, 2012). The policy is submitted after the award of a contract.

b. Percentage of the CAR insurance

The percentage is given to each risk that the insurance policy covers and the amounts are equal to the contract sum. According to ZPPA (2012), CAR Insurance requires that the sums insured (material damages shall not be less than the full value of the contact of works after construction, inclusive of items and/or materials supplied by the employer. In most government project, the minimum insurance amounts and

deductibles shall be: (a) for loss or damage to the Works, Plant and Materials: Tender sum plus 10%, (b) For loss or damage to Equipment: 10% of Tender sum, (c) for loss or damage to property (except the works, plant, materials, and equipment) in connection with contract ZMW 20,000.00, (d) for personal injury or of the contractor's employee: As per workman's compensation ACT and of other people: ZMW 5,000.00.

c. The validity of CAR insurance

According to ZPPA (2012), CAR insurance cover from the Start Date to the end of the Defect Liability Period. The cover attaches as from the commencement of work, or after the items entered in the schedule of the policy have been unloaded at the site, and terminates when the complete structure or any complete part thereof is taken over or put into service (Oman Insurance Company, 2017). Where necessary, the policy cover can be extended to include a maintenance period.

d. How the security works

Client's requirements and the Conditions of Contract are the most significant factors influencing the contractor to obtain a CAR insurance policy. The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the State Date to the end of the Defects Liability Period, in the amount and deductibles stated in the particular conditions of Contract for the events which are due to the Contractor's risk (ZPPA, 2012). All such insurance shall provide for compensation to payable in types and portions of currencies required to rectify the loss or damage incurred. In case the policy period exceeds 12 months, the premium can be paid in quarterly instalments with the first instalment being more by 5% and the last instalment being paid 6 months before the expiry of the policy (Babu & Kachana, 2014). For the police to work effectively, Insurance companies and contractors should maintain a cordial relationship utilizing active communication especially with underwriters, loss adjusters, etc. (Babu & Kachana, 2014). All risks insurance typically covers the full reinstatement value of the works plus a mark-up for any ancillary costs (such as consultancy and professional fees) that are incurred (Lloyd, 2014). Lloyd further stated that this insurance is only generally available if the works are being undertaken following well established (rather than evolving) construction techniques. ZPPA (2012) states that all alterations to the term of an insurer shall not be made without the approval of the Project Manager.

2.4.4 Retention security

Retention security is security held by a procuring contractor to guarantee the performance of supplying contract and safeguard against defects in that supplying contractor fails to satisfactorily rectify them (Rynerson, 2017). The security is usually in the form of cash withheld but is often substituted for a bank guarantee or insurance bond. For example, in the ZPPA (2012) the employer shall retain from each payment due to the contractor the proportion stated in the Specific Conditions of Contract until completion of the whole of the works. Like other securities, retention security can come in a form of a bond or a guarantee. Rynerson further suggests that retention Bond is a type of Performance Bond. Like all surety bonds, it involves three parties: a contractor (Principal), its client (Obligee), and the bond provider (Surety Company). The PD (2015) also confirms that a retention Bond is a type of performance bond that protects the risk of the contractor's failure to perform the contract after the contractor finishes work or project. It is an agreement between a contractor and client by a third party known as a bond provider which acts as a guarantor. The Bond agreement states that in return for the client not holding cash retention, the bond provider will undertake to pay the client up to the amount that they would have had by way of cash retention should the contractor fail to carry out the works or remedy defects (ThePD, 2015). Retention monies are normally viewed as security for the cost of rectifying defective works. In international Construction FIDIC Contracts, the Contractor's certain amount of money is usually retained against the risk of non-compliance of work on time (Koksal, 2011). In this case, a certain percentage of the contractor monies are retained by the employer as opposed to having security. To be sure that the Contractor executes his obligations under an international Construction Contract, the Contractor shall be entitled to retain 5 or 10 % of the total contract price for a certain period such as 6 or 12 months.

a. Percentage of security

The amount of the bond is established by the obligee and is usually a predetermined percentage of the total value of the contract. The principal pays only a small percentage of that bond amount, which is determined by the surety based on the principal's credit history and financial performance (Contractor Surety Group, 2019). The security retention is made up of 5% of turnover over the past 180 days. It may sometimes appear that the security retention is higher than 5% at a given time, as the security retention

is not based on 5% of the current account balance, but turnover in the past 180 days (Dubalski, 2019).

b. Validity of security

Retention Bond usually includes an expiry date, so there will be no confusion as to when contractors have been released from their obligations (Rynerson, 2017).

c. How the security works

The Contractor has requested the execution of this Guarantee Bond by the Guarantor undertakes to the Guarantor (without limitation of any other rights and remedies of the Employer or the Guarantor against the Contractor) to perform and discharge the obligations on its part set out in the Contract. This Guarantee Bond and the benefit thereof shall not be assigned without the prior written consent of the Guarantor and the Contractor.

Assuming that an obligee requires a retention bond with an expiration date that's calculated to fall 12 months after the project completion date. Up until that expiration date, the obligee may file a claim against the bond for the cost of any work that must be done to correct the principal's work defects. The surety will verify that the principal has failed to live up to its contractual obligations before paying the claim. Once the obligee's claim has been paid, the surety will seek reimbursement of that amount from the principal.

In some cases, the terms of the bond permit the principal to correct any work defects within a specified time after being notified of a problem. The obligee's claim will only be paid by the surety if the principal fails to correct the problem. Once a claim is paid, the principal is then obligated to reimburse the surety (Contractor Surety Group, 2019).

2.5 Knowledge of securities and CAR insurance

Knowledge is defined as what is learned, understanding or aware of something (YourDictionary, 2018). It also defined as the insights, understandings, and practical know-how that people possess and are the fundamental resource that allows an individual to function intelligently (Sunassee & Sewry, 2003). The study adopted of knowledge as the understanding, practical know-how and familiar with the securities and CAR insurance. This study will measure how knowledgeable the stakeholders are about the securities and CAR through their understanding, familiarity and successful

use (practical know-how) in their projects. Knowledge is a critical resource required for an organisation to survive and succeed in the global market (Kaliba, et al., 2015). It is a vital aspect of the implementation of anything.

According to the study done by Parare el at., (2008), Poor knowledge & experience on risk management of local contractors, insufficient and erroneous supplementary data were the reasons for poor compliance and the considerable percentage was rejected due to foreseeable damage. The confusion and potential trigger to a dispute are caused by the lack of sufficient understanding of the exact nature of these instruments and the use of medieval language in their wording, compounded further by a miscellany of confusing terminology used virtually interchangeably (Hassan & Adnan, 2018). The writers suggest that stakeholders require knowledge to understand the procedural requirement of the risk management measures they are taking to avoid confusion and disputes during implementation. Tembo (2017) agrees that lack of knowledge is one of the barriers to risk management.

In a broader picture of risk management, the Zambian study by Tembo el at., (2015) established that lack of knowledge on various risk-mitigating to minimize poor quality, cost overruns may lead to project abandonment. This entails that lack of knowledge affects the acquisition and use of securities and insurance policy used in risk management. Parare el at., (2008) confirms that lack of knowledge affects the selection of CAR insurance policy among contractors. The study further established that foreign contractors had higher knowledge and skill in CAR insurance compared to local contractors. Another study in Sri Lanka agrees with Parare el at., that lack of awareness among stakeholders of the risks to be covered by CAR insurance was one of the major reasons for the breach of trust (Halwatura, 2015). The writer then recommended that it is important that insurer educate the contractor on all foreseen and unforeseen damages and possible exclusions before signing the security agreement (Halwatura, 2015). The two studies suggested that most of the stakeholder in the Sri Lankan construction industry did not fully understand how CAR insurance works. However, it is unclear how knowledgeable stakeholders are about securities and CAR insurance in the Zambian Construction Industry. While it is unclear for the ZCI, a study conducted by Oke, et al., (2013) in Nigeria recommended that there was a need for stakeholders to properly understand the concept of an advance payment bond to ensure efficient construction project delivery.

2.6 Compliance with Regulations of Securities and Car Insurance

Compliance is defined as an act of being in alignment with guidelines, regulations or legislature (Rouse, 2015). Securities and CAR insurance also have a guideline that governs their use. The study was looking at compliance with securities and CAR insurance by following the procedural requirement of the stakeholders during project implementation.

Generally, compliance to bonds and sureties is poor in most construction industry unless in countries that the government has taken a significant role to enforce their use (Zou, et al., 2007). Parare el al., agree with Zou et al although they attributed non-compliance to lack of knowledge about the security and what kind of risks it covers. Knowledge or understanding of the requirement and the processes involved in the use of securities and CAR insurance is directly linked to compliance. Key players' knowledge (or the lack of it) about bonds and sureties influences their implementation (Parera, et al., 2008) For instance lack of knowledge among contractors and lack of enforcement of regulations by authorities were reported as a cause of poor safety management practice; in contrast, lack of financial resources was cited as a reason among government officials (Dorji & Hadikusumo, 2006).

The poor relationship between contractor and insurer is one of the causes of non-compliance in the use of insurance (Perera, et al., 2008). Halwatura (2015) established that more importantly insurance claims are generally disclaimed and payment is denied by insurers as a result of technical exclusions existing within the policy or simply because policy claim conditions and procedures have not been strictly complied by the insured contractor. The contractors are supposed to fully understand the conditions of the securities and CAR insurance before using them on a contract.

Despite Zou et al., asserting that they poor compliance to bond and sure in the most construction industry, it is unknown whether stakeholder in the ZCI is compliance to procedural requirement of the securities and CAR insurance. This study is designed to establish the compliance to securities and CAR in the ZCI particularly in Lusaka.

2.7 Availability of a monitoring system for compliance with securities and CAR insurance

Monitoring systems are important to avoid adverse situations that can ensure that preventive checks could be taken before the entire system crashed leading to direct business loss (Waltzer, 2011). The writer ascertains that in most primary form, monitoring systems are directly related to production. Bartle (2011) defines monitoring as a regular observation and recording of activities taking place in a project, system or programme. A system monitoring compliance in the contents of this study is a system that will help to ensure that the securities and CAR insurance are properly acquired, valid and all stakeholders involved are compliant to procedural requirements and well-informed during contract implementation.

Several systems or models have been used in risk management in the construction industry. In the study, it was established that most firms have un-formalised and unsystematic risk management and most professions do not do risk monitoring (Tembo & Khatleli, 2016). The study recommended Gilbert's Behavioural Engineering as a human perspective model to improve risk allocation. Silungwe and Khatleli (2020) in another study recommended Pareto analysis as a model for allocating pertinent risk in the Zambian building sector (Silungwe & khatleli, 2020). The integrated Risk management approach is another system recommended for risk reduction on infrastructure projects in Zambia due to its ability to enhance communication and builds a relationship that aids collaboration among stakeholders. Effective communication and collaboration are always required for successful risk management (Zou, et al., 2015a). The collaboration allows all stakeholders to be well informed and gives a window of monitoring all stage of project implementation.

Another system that has been widely recommended and adopted for use of risk management is Building Information Modelling (BIM). Zou et al., (2015b) confirms that adoption BIM and BIM-related digital for risk management has become a growing research trend due to rapid development in the construction sector. BIM is considered as the next-generation solution to improve the productivity of stakeholders in the construction industry and facilitate the delivery process of buildings and structure (Ozorhon, et al., 2017).

Zou et al.,(2015a) defines BIM as a modelling technology and associated set of processes to produce, communicate, and analyse building models' and allows a three-dimensional representation of non-redundant data while Zyang et al.,(2015) defines it a digital representation of the building process which can facilitate the exchange and interoperability of project information management, and promotes a collaborative process for the Architectural, Engineering, Construction and Facilities Management (AEC/FM) industry. It is a development and use of a computer software model to simulate the construction and operation of a facility (Emstom, et al., 2010).

Zou et al., (2015b) established that BIM can be used to support the project development process, a core data generator and a platform to allow another BIM-based tool to perform father risk analysis. A system is a tool for generating and managing building data through the use of CAD and ICT tools (Aladog, et al., 2016).

BIM can facilitate a collaborative and communicative environment to enable management of a construction project (Zou, et al., 2015a). This is so because the platform allows all the parties (e.g., government departments, owners, construction managers, designers) to utilize information in the models throughout the entire project lifecycle (Ozorhon, et al., 2017). The model integrates all parties of the project cycle and is highly appreciated for increasing the coordination at the site by ensuring the integration among various disciplines. Figure 1 shows the collaboration among the multiple disciplines.

The design and construction processes signal the need for contractors to review not only their overall risk profiles but also their risk-financing programs. BIM presents many of the same risk management questions contractors already face as they increasingly provide preconstruction services that require them to analyse, price, and suggest modifications to the architect's design before its completion (Emstom, et al., 2010). The model is also used to monitor risk throughout the project implementation hence encouraging good risk management (Zou, et al., 2015a). In the literature reviewed, it is unclear whether there is an existing system that monitors compliance with the procedural requirement of securities and CAR insurance hence the third research objective.

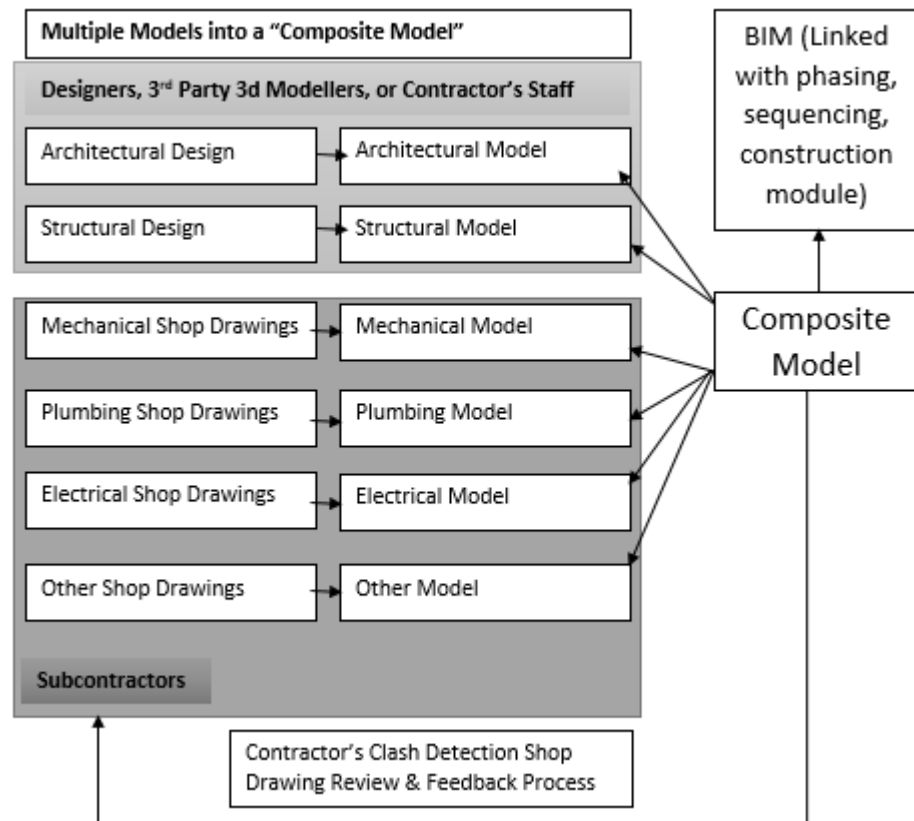


Figure 1: BIM Multi-model (Elmstom et al., 2010)

2.8 Influence of securities on contract performance

The importance of Risk management to contractor performance cannot be overemphasized. It is nationally significant as it eases the development of infrastructure thereby boosting business in various industries hence increasing gross domestic product (Tembo, 2017). Risk management through the use of securities and insurance are mostly used in the construction industry to enhance project performance.

The purpose of contract security is to guarantee that the contractor will perform and complete the work according to the contract requirements, discharge lawful obligations and satisfy lawful claims against the contractor and ensure that subcontractors discharge their lawful obligations and satisfy lawful claims against them (Northwest Territories, 2010). In other terms, securities are provided to cushion failure of contracts since construction is a risk-filled enterprise, and even capable and well-established contractors can ultimately fail (Surety Information Office, 2012). The literature seems to indicate that an absence of the securities would harm contract performance. Insurance, therefore, protects you from financial loss and creates

stability in difficult times (Babu & Kachana, 2014). The performance and retention securities seem to fall under this type of insurance. This stability translates to the ability to continue to invest in the economy, which stabilizes the financial situation of the entire country and greatly influences foreign trade relationship (ibid).

Hussin and Omran put it clear that Advance payment is given to liquidate the contractor hence impacting on the good contract performance as the contractor will have a fund to kick start the project. Oke, et al, (2013) defines Advance Payment Bond as a written statement given by the contractor that he will repay or settle the advanced money paid by the owner related to the contract. Lenders do not provide funds and support for individuals and businesses unless they have some evidence that their investment is safe because they do not want to risk financial loss. Insurance shows lenders that they have some guarantee of getting money back in the event of a disaster (Babu & Kachana, 2014). Oke, et al., established that the successful completion of a project is highly dependent on how beneficial advance payment bond is to various construction project since advance payment bonds enable a project to be completed within a stipulated period and enables the contractors to compete more effectively in the global market. This shows that there is a link between bonds and project delivery.

CAR insurance mainly protects the works, materials, equipment and machinery connected with it (Parera, et al., 2008). In the absence of protection to these, overall project performance is affected. Moreover, insurance helps in decreasing the likelihood of financial hardship in case of a disaster or loss (Babu & Kachana, 2014).

Sureties have played an important role in the construction industry's success, allowing the industry to sustain its position as one of the largest contributors to the nation's economic stability and growth (Surety Information Office, 2012).

2.9 Chapter summary

The chapter presented what performance security, Retention Security Contractor's all risk insurance and Advance payment security are and their importance to a running contract. The chapter also highlighted the knowledge, compliance and availability of a system to monitor compliance to procedural requirement of securities and CAR insurance. The literature reviewed that it compliance with securities and CAR insurance were not clearly known in the ZCI and they had an influence contract performance.

3.0 CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter provides the method that was used in conducting this research. Ojo (2003), explains that research methodology is the validated rules and procedures to be applied during the research and appropriate evaluation of the knowledge claims. The chapter explains the research approach, research design, data collection tools, study population sample size, sampling techniques, data analysis, reliability, and validity.

3.2 Study design

The researchers (Creswell et al., 2003), states that it requires the consideration of three critical issues namely priority, implementation, and integration in selecting the research design. Safaie et al (2018), expresses priority as to what specific approach is to be taken, either quantitative or qualitative so that the emphasis is given. And the priority is closely connected with the types of research questions such as “what” and “how” in qualitative studies or “if” in quantitative studies.

Secondly, the implementation determines the sequence of data collection and analysis either quantitative or qualitative and sometimes it could be done in parallel. Finally, integration refers to the stage when researchers strive to mix or connect the data after the data collection process (Berman, 2018).

3.3 Data Collection

Data to meet all the three specific objectives of this study were collected using a questionnaire and in-depth interviews. A questionnaire can be defined as a general term to include all techniques of data collection in which each person is asked to respond to the same set of questions in a pre-determined order (Saunders et al. 2007). This was the main used tool of primary data collection in this research and it was personally delivered to companies within Lusaka that is delivery and collection questionnaire. The questionnaire survey was used to achieve all three research objectives. It contained two primary forms which are open and closed-ended.

The latter were conducted to clarify any ambiguous responses to open-ended questions in the questionnaire. In-depth interviews were also conducted to countercheck/ verify the responses to the questions in the questionnaire.

3.4 Research methodology

An accurate methodology is an important aspect of contributed knowledge as the lack of it can result in invalid conclusions (Saunders, et al., 2009). The methodology of choice is useful in identifying relevant variables, their mechanisms and impact on the environment (Fellow & Liu, 2008). The majority of research methodologies fall into two categories: qualitative or quantitative. This study was both qualitative and quantitative. A qualitative methodology was the main methodology used as the data generated from the questions was numeric. However, in the analysis of the open-ended questions of the in-depth interviews, the only qualitative methodology could be used. The use of the two methods was done as this combination allows for two different methods to be complementary (Saunders, et al., 2007).

Quantitative methods are utilised for studies where the data collection technique (such as a questionnaire) generates numerical data (Saunders et al. 2007). On the other hand, qualitative methods are utilised when data is collected through interviews or other methods that generate non-numerical data. The present study used the questionnaire as the main tool for data collection and semi-structured interviews hence the use of the mixed method. The use of the mixed methodology in the present study is justified because both numeric and non-numeric data were generated; other studies utilised similar methodology, in particular questionnaires (Babu & Kachana, 2014), (Halwatura, 2015), (Oke, et al., 2013), (Parera, et al., 2008), (Tembo, 2017), (Tembo, et al., 2015) and semi interviews (Silungwe & khatleli, 2020).

3.5 Research approach

The theory of research needs to be clear at the beginning of a research project as it determines the design of the project (Saunders et al. 2007), that is, whether a deductive approach or an inductive approach is used. In a deductive approach, a theory is developed or hypothesis (or hypotheses) is developed. Then a research strategy to test the hypothesis is formulated. On the other hand, in an inductive approach, data is collected first. Then, a theory is formulated from the analysis of the collected data.

The deductive approach is more scientific than inductive research as it involves the development of a theory that is subjected to a rigorous test (Saunders et al. 2007). This research approach calls for someone to critically come up with a hypothesis/ theory which has to be tested using the information that is collected. It also gives allowance

for the theory to be modified according to the findings and analysis (ibid). The deductive approach also seeks to explain the causal relationship between variables to come up with a theory that would be put to a test (Greener, 2008). To pursue the principle of scientific rigour, deduction approach dictates that the researcher should be independent of what is being observed (Singh, 2006) of which this would necessitate the use of questionnaires in the research.

On the other hand, the inductive approach is an approach of building a theory based on the information or data collect meaning that information has to be first collected and from that, a theory is created. The result of the analysis of the data collected would be the formulation of a theory. This approach is mostly used in a social science report and there is much of human interaction. Therefore the study of a small sample of subjects might be more appropriate than a large number for the deductive approach (Saunders et al. 2007).

This research used both inductive and deductive approach. It was inductive in that information was collected on the stakeholders' knowledge and compliance to procedural requirements of securities and CAR insurance in the ZCI while it was deductive in that it reviewed literature about knowledge, compliance and availability of systems that monitor compliance to procedural requirements of securities and CAR insurance. Literature was used to identify various models used in risk management as a whole. The time factor is another reason that necessitates more use of both approaches because especially that deductive research can be quicker to complete, albeit that time must be devoted to setting up the study before data collection and analysis (Saunders et al. 2007).

3.6 Study sites

The study was conducted in Lusaka, the capital city of Zambia at selected government and private institutions. The government institutions included the department of Preventive Maintenance services at the Ministry of Works and Supply and the Department of Public Infrastructure at the Ministry of Infrastructure. The private institutions included consultants, contractors and financial institutions (banks and insurance companies).

3.7 Target Population

The research involves three different groups. One targeted population is large-to-medium contractors. They are classified as grade 2-5 in category B as they do most of the major public works. Time is also a factor in selecting the category of contractors. Department of preventive maintenance under the Ministry of Works and Supply and department of public infrastructure under the Ministry of Housing and Infrastructure development consultants were government bodies that are involved in the research. Two ministries were picked because the government acts as the principal client of the majority National Council for Construction (NCC) registered building contractors ((ILO), 2014). The private consultant was also involved. The other sectors involved were the banks and insurance industry as they are the sector that offers the sureties and the bonds in the construction industry.

3.8 Sampling Frame

The study purposefully targeted 68 persons based on a sample size calculation. Purposive sampling is a non-random (nonprobability) sampling technique in which participants are selected for a study because of some desirable characteristics, like expertise in some area (Beins & MCarthy, 2012) This is the method of selecting participants who are highly likely to display the process being examined. The sample size was calculated using Smith (2010) Formula:

$$\text{Sample Size} = \frac{(Z\text{-score})^2 * (\text{Std Dev})^2}{(\text{Margin of error})^2}$$

Where:

Z-score: Corresponds to the confidence level (CI)

This study used the 90% CI= 1.645 confidence

Std Dev: Standard deviation

This study utilised a standard deviation of 0.5

The margin of error: This study used a margin of error of +/- 10%

Therefore, the sample size with a 90% CI, 0.5 Std. dev., and a margin of error of +/- 10%: The sample size is as follows: Sample Size

$$\begin{aligned} &= [(1.645)^2 \times 0.5(0.5)] / (0.1)^2 \\ &= (2.706 \times 0.25) / 0.01 = 0.6765 / 0.01 \end{aligned}$$

= 67.65

= 68 respondents were needed

3.9 Data Analysis

The information obtained was managed using Excel and transferred to the statistical package SPSS version 22 for analysis. Both qualitative and quantitative analyses were used. Inferential analysis was used under quantitative which is concerned with the process of generalization (Kathari, 2004).

To further obtain a better understanding relating to the research objectives among the respondents, in-depth interviews were conducted. In the interviews, respondents were asked further questions regarding their knowledge about and compliance with securities and CAR insurance regulations, and availability of systems to monitor the same. The responses to the in-depth interview questions were immediately recorded. The recorded information was grouped and analyzed using a thematic qualitative approach, as a modification of a KAP survey. This present study only analyzed knowledge and practice (K and P). This qualitative analysis assessed the following: the knowledge of players in the ZCI about the common impact of securities and CAR insurance on contract performance and the names of the available systems for monitoring securities and CA insurance. The latter was grouped under the theme of practice.

In the quantitative analysis, the data are presented as frequencies. The frequencies of responses among GRZ employees were compared with those of private organizations using Chi-square or Fischer's exact tests where appropriate. A p-value of less than 0.05 was considered significant. In the qualitative analysis, we documented the opinions of the various participants.

3.10 Recruitment

A total of 68 questionnaires were distributed. Most of the respondents returned the questionnaire (68% response rate). Some submitted those late (10%) and others did not return them at all (27%) (Figure 2).

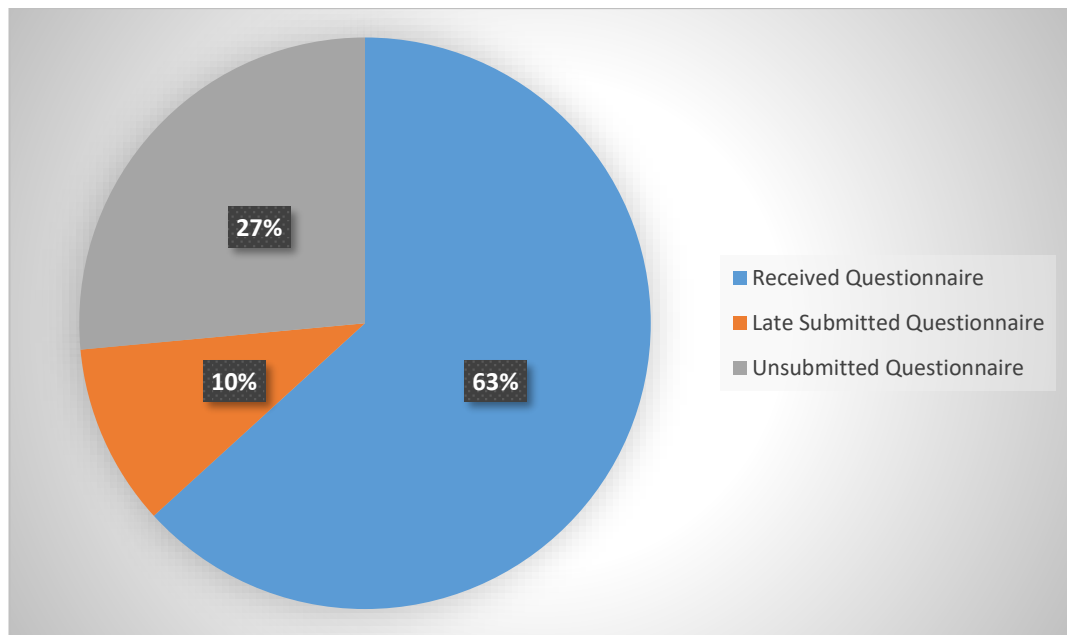


Figure 2: Questionnaire Distribution

3.11 Chapter Summary

This Chapter presented the methodology, approach and methods that were used to get data in order to achieve the objectives of the research. The primary data was collected from interviews and questionnaires. The secondary data was collected from books, journals, internet, reports, newspapers and conference proceedings. The sampling methods employed in the study was purposive sampling. The collected data was analysed using excel and SPSS.

4.0 CHAPTER FOUR: RESULTS AND DISCUSSION

4.1 Introduction

The chapter presents the results of the study in line with the research objectives. The results include both quantitative and qualitative data.

4.2 General characteristics of participants

4.2.1 Professional background

Most of the participants (42%) were quantity surveyors followed by engineers (16%). Accountants were the least represented (7%) (Figure 3). The rest included architects and insurance underwriters among others.

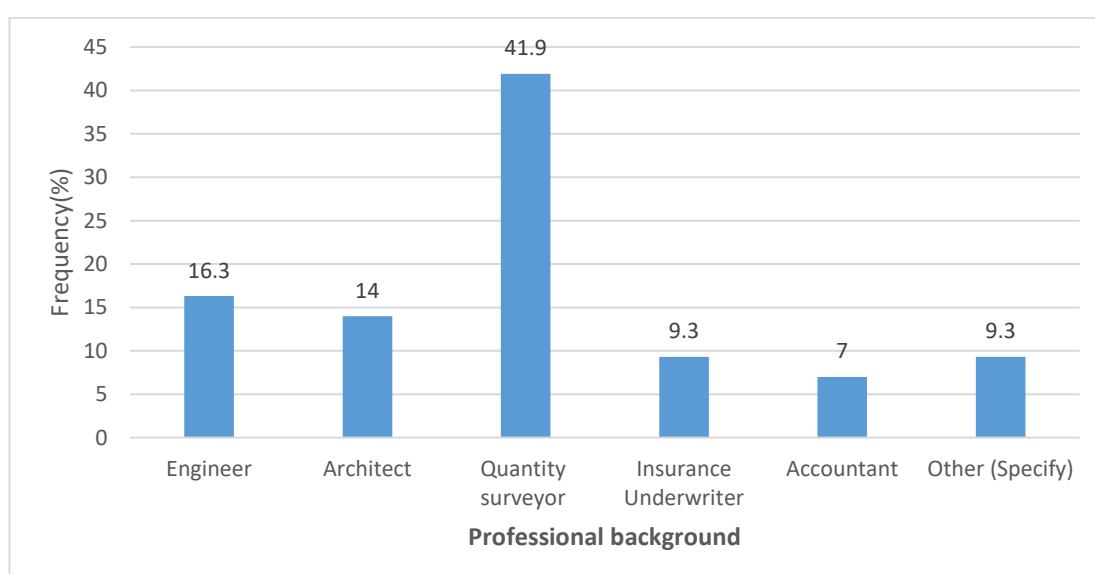


Figure 3: Professional background of respondents

4.2.2 Work experience

The majority of the participants had more than five years of work experience (70%). Private sectors personnel were more likely to have had five or more years of work experience than those of the Public sector (86% vs 36%, $p=.001$) (Table 1).

Table 1: Work experience

		All participants	GRZ	Private	P-value*
		N (%)			
Work experience	<5 years	13 (30)	9 (64)	4 (14)	0.001
	≥5 years	30 (70)	5 (36)	25 (86)	

4.2.3 Sector distribution of participants

The participants consisted largely of the private sector (67%) accounted for largely by contractors (37%) followed by private consultants (14%) and financial/ insurance institutions (14%). Government personnel accounted for 33% (Figure 4). A larger proportion of the respondents were from the private sector (67%). Government respondents accounted for 33%.

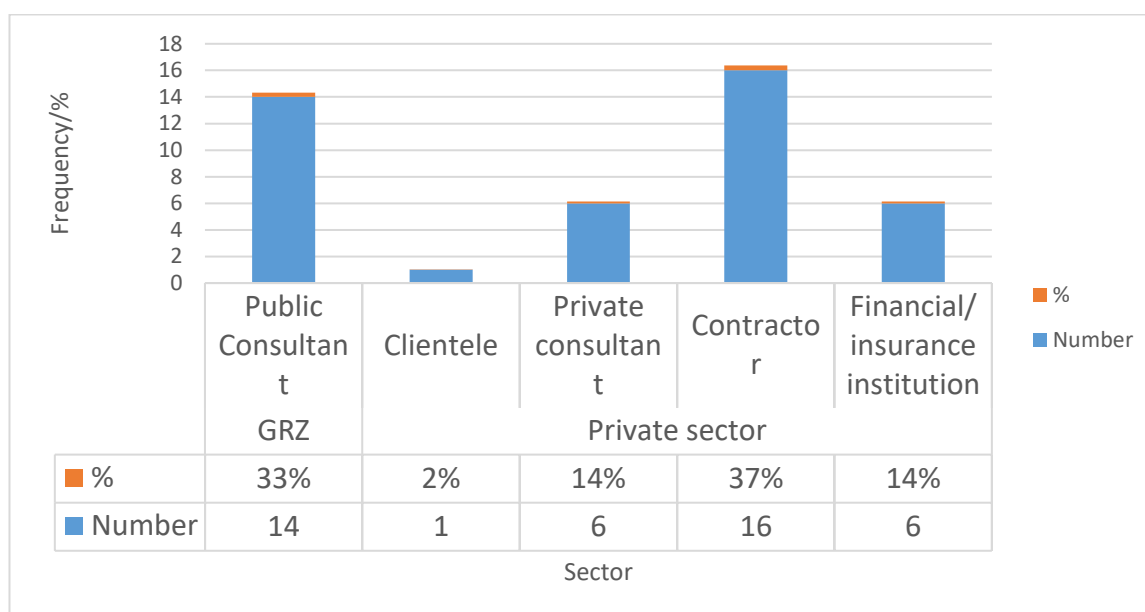


Figure 4: Distribution of Participants according to Sector

4.3 Knowledge of securities and Contractor's All Risk Insurance

4.3.1 Knowledge level

Nearly all the participants stated that they knew about advance PS (93%), PS (95%), RS (88%) and CAR (91%), and there was no statistically significant difference between GRZ and private sector personnel ($p=1, 1, 0.151$ and 1 respectively) (Table 2).

Table 2: Knowledge of securities and CAR insurance

		All	GRZ N (%)	Private	P
Knowledge of securities					
Advance Payment security	Don't know	3 (7)	1 (7)	2 (7)	1
	Know	40 (93)	13 (93)	27 (93)	
Performance Security	Don't know	2 (5)	0	2 (7)	1

	Know	41 (95)	14 (100)	27 (93)	
	Don't know	5 (12)	0	5 (18)	0.151
Retention security	Know	37 (88)	14 (100)	23 (82)	
	Don't know	4 (9)	1 (7)	3 (10)	1
CAR Insurance	Know	39 (91)	13 (93)	26 (90)	

4.3.2 Projects with Securities and CAR insurance

From the 43 participants, only 31 responded to the question of the use of securities and CAR insurance. Out of 31 participants, three quarters (74%) reported that they had used AP in one or more projects and there was no statistically significant difference between GRZ and private sector personnel ($p=.676$).

Out of 28 participants, nearly all (93%) reported that they had used PS in one or more projects with no statistically significant difference between GRZ and private personnel ($p=.524$). (Table 3)

Table 3: Project with securities and CAR insurance

Projects with securities		All participants	GRZ	Private	P-value*
		N (%)			
Advance Payment security(N=31)	None	8 (26)	2 (18)	8 (30)	0.676
	≥1 project	23 (74)	9 (82)	14 (70)	
Performance Sec (N=28)	None	2 (7)	0	2 (11)	0.524
	≥1 project	26 (93)	10 (100)	16 (89)	
Retention Sec (N=4)	None	1 (25)	0	1 (25)	N/A
	≥1 project	3 (75)	0	3 (75)	
CAR# Insurance (N=27)	None	9 (33)	0	9 (53)	0.009
	≥1 project	18 (67)	10 (100)	8 (47)	

*All P values are from Fischer's exact test; CAR=contractor's all-risk insurance

4.3.3 Common reasons for not having securities and CAR insurance

The results suggest that the securities and CAR not being a project requirement was the most generic reason scoring 28% for Advance Payment security, 5% for Performance Security, 33% for Retention Security and 29% for CAR insurance in Figure 5.

The second common reason attributed the absence of securities and CAR insurance was that the projects would be implemented without despite them being a requirement scoring 33% for Advance payment security, 28% for Retention security and 24% CAR insurance. The third and fourth reasons were the size of the project and difficult procedure to acquire respectively. The least common reason was the securities and CAR insurance being costly to acquire scoring 6% for Advance payment, 5% for Retention security and 9% for CAR insurance. The findings were suggesting the securities and CAR are generally affordable in the Zambian Construction Industry.

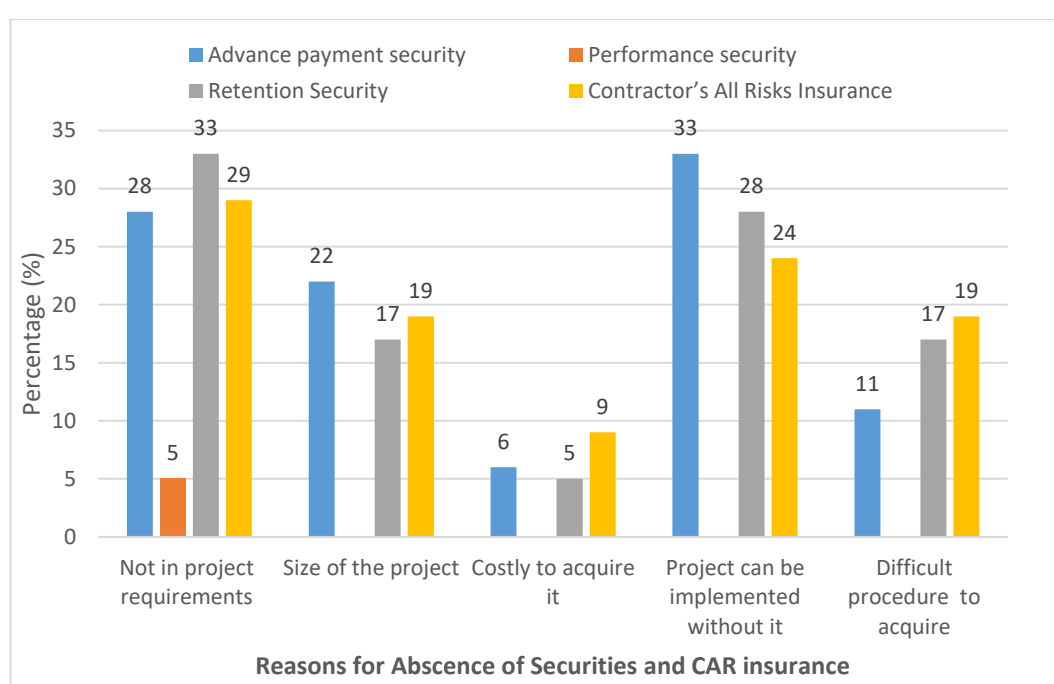


Figure 5: Common reasons for the absence of securities and CAR insurance

The most common reasons advanced for not having securities and CAR insurance were as follows: the security or CAR insurance was not part of the requirements for a project/s or that a project/ projects could be implemented without it.

4.3.4 Issued securities and CAR insurance

The study further confirms the understanding of the securities and CAR insurance through the number of securities that financial institutions (banks and Insurance companies) offered in the last two years. The number of issued securities and CAR also affirmed the continuous use of them. Figure 6 shows the number of securities and CAR issued in the last two years (2017-2018).

The Banks and insurance companies are constantly out securities due to the high demand on the market. The results showed that several financial institutions had issued above 150 showing the highest percentages of 40% Performance Security, 25% Retention security and CAR 60 %. The continuity of issuance can be seen from the wide spectrum of the numbers issued in the last two years.

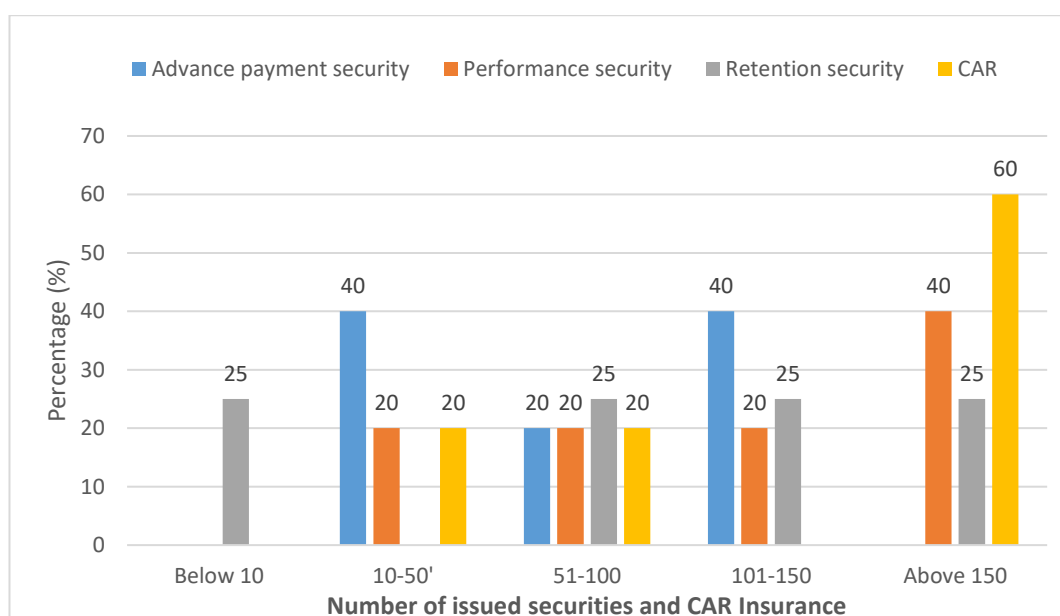


Figure 6: Issued securities and CAR insurance

4.3.5 Acquiring of securities and Contractors All Risks Insurance (CAR)

To establish where securities and CAR insurance are acquired, respondents were asked to provide a preferred source of the securities and CAR. Figure 12 provides the results.

The participants who reported that they preferred the bank as a source of securities and CAR insurance were as follows: PS (32%), APS (46%), RS (43%) and CAR (7%) while those who preferred the insurance company were PS (68%) APS (54%), RS (57%) and CAR (93%) (Table 4). The results show that there is no significant difference ($p=1, 0.493, 0.702$ and 1 respectively).

Table 4: The preferred source of securities and CAR insurance

securities	Source	All participants	GRZ	Private	P- value
N (%)					
Advance payment Security	Bank	15(46)	7(54)	8(40)	0.493
	Insurance company	18(54)	6(46)	12(60)	
Performance Security	Bank	11(32)	4(31)	7(33)	1
	Insurance company	23(68)	9(69)	14(67)	
Retention Security	Bank	12(43)	6(50)	6(38)	0.702
	Insurance company	16(57)	6(50)	10(62)	
CAR insurance	Bank	2(7)	1(9)	1(6)	1
	Insurance company	26(93)	10(91)	16(94)	

4.3.6 The necessity of securities and Contractor's All Risks Insurance

The majority of the participants reported that the securities and CAR insurance was necessary during contract implementation RS (71%), CAR insurance (71%), AP (83%) and PS (81%). The highest frequencies were those of ASP (83%) followed by PS (81%) (Table 5).

Table 5: Necessity of Securities and CAR insurance

Securities	Necessity	All participants	GRZ	Private	P-value
N (%)					
Advance payment security	Necessary	39(93)	13(93)	26(93)	1
	Not necessary	3(7)	1(7)	22(7)	
Performance security	Necessary	41(100)	14(100)	27(100)	N/A
	Not necessary	0(0)	0(0)	0(0)	
Retention security	Necessary	36(90)	13(93)	23(89)	1
	Not necessary	4(10)	1(7)	3(11)	
CAR insurance	Necessary	36(88)	13(93)	23(86)	0.64
	Not necessary	5(12)	1(7)	4(14)	

4.3.7 Impact of the absence of securities and CAR

At least 71% of the participants reported that the absence of securities had impacts on contract performance, AP (83%), PS (81%), RS (71%) and CAR insurance (71%) (Table 4). There was no statistically significant difference in these findings between government and the private sector.

Table 6: Impact of the absence of securities and CAR insurance

Impact of the absence of securities and CAR	Impact	All	GRZ	Private	P-value
		N (%)			
Advance payment security	Yes	30(83)	12(100)	18(75)	0.079
	No	6(17)	0(0)	6(25)	
Performance security	Yes	29(81)	12(100)	17(71)	0.70
	No	7(19)	0(0)	7(29)	
Retention security	Yes	24(71)	10(83)	14(64)	0.432
	No	10(29)	2(17)	8(36)	
CAR insurance	Yes	25(71)	9(90)	16(64)	0.115
	No	10(29)	1(10)	9(36)	

4.3.8 Common Impacts of Absence of Securities and CAR Insurance

The study further sought to find out some of the common impacts since the overwhelming percentage of respondents indicated that the absence of the securities and CAR insurance had an impact on contract performance. Tables 7 and 8 show the common impact on contract performance.

Table 7: Common impact of Securities and CAR insurance on contract performance
(a)

	Advance payment security	Performance security	Retention security	CAR
1	Absence of Advance payment security puts the client at risk as the contractor can misuse the Advance payment	Risk of the works being abandoned	If a project is not project executed you can recover from the retention	Important for a contractor in terms of risk control
2	Allows the contractor to quickly mobilize and start the project	Compromise the execution of the project in its absence	If any variation in the project in the project costing retention security is used	In case of the building getting damaged, they would be no cover
3	Delayed mobilization in its absence since the contract can't get Advance payment	Encourages diligence and best practice by a contractor to complete projects	If the principal does not perform the would not receive the balance from the main client or contractor	In case of unforeseen circumstances like accident and third part protection
4	Discourage misuse of the fund by contractors give confidence to the client	Ensures quality is maintained	In case the contractor does not attend to defects during defects liability period hence a loss	Losses of property, machinery, materials due to unforeseen circumstance
5	Funds may be misappropriated thus affecting the project Performance	If the awarded contractor defaults, the money will be again spent to engage another contractor	In case the contractor doesn't work on defects, another contractor can be engaged	More secure for the client

Table 8: Common impacts of securities and CAR insurance on contract performance
(b)

	Advance payment security	Performance security	Retention security	CAR
6	If the Contractor fails to perform the project and there was no cover for the Advance payment then the client losses as they have to engage another contractor	If the contractor or client default it's easy to recover the money and allow the project goes on	In instances where there is not retention, the Contractor go away with bids of works might	Property Damage in case of an accident on a project
7	The most common cause is that of local contractors who tend to abandon the project once the advance payment is paid	Risk of exposure of the client since the projects are an investment meant to bring in returns with time, cost and quality	The client becomes liable for any damages or catastrophe that may arise after partial completion of the project	The client becomes liable for any damages or catastrophe that may arise during project execution.
8	The client becomes willing to avail for funds to kick-start project hence helps accelerate project	Safeguards the client in case the contractor fails to execute the contract	The Contactor would not attend to defects.	There is no cover in case of fire, the collapse of the building or third-party injury
9	Risk of exposure of the client since the projects are an investment meant to bring in returns with time, cost and quality		This can help in time of recovering the contractor money	Very vital in case of injuries on site

4.4 Compliance to procedural requirement of securities and Contractor's All Risk insurance

4.4.1 The validity of securities and CAR insurance

The majority of the participants reported that they had valid RS (92%), CAR insurance (90%), AP (83%) and PS (79%). The highest frequency of expired securities was of PS (21%) followed by AP (17%) (Table 9).

Table 9: Status of securities and CAR insurance during project implementation

Securities	Status of security	All participants	GRZ	Private	P-value
N (%)					
Advance payment Security	Valid	29(83)	11(85)	18(82)	1
	Expired	6(17)	2(15)	4(18)	
Performance Security	Valid	30(79)	8(62)	22(88)	0.094
	Expired	8(21)	5(38)	3(12)	
Retention Security	Valid	22(92)	9(100)	13(87)	0.511
	Expired	2(8)	0(0)	2(13)	
CAR insurance	Valid	28(90)	8(89)	20(91)	1
	Expired	3(10)	1(11)	2(9)	

4.4.2 Number of projects with a successful implementation of securities

Approximately three out of four participants reported that they had $\geq$ one project with a successful implementation of PS (90%), AP (82%), RS (76%) and CAR insurance (74%). The highest frequency of unsuccessful implementation of securities were those of CAR insurance (26%) followed by RS (24%) (Table 10).

Table 10: Projects with a successful implementation of securities and CAR insurance

Securities	Number of projects	All participants	GRZ	Private	P-value
N (%)					
Advance payment security	None	7(18)	1(8)	6(23)	0.388
	≥ 1 project	32(82)	12(92)	20(77)	
Performance security	None	4(10)	1(7)	3(12)	1
	≥ 1 project	36(90)	13(93)	23(88)	
Retention security	None	9(24)	2(14)	7(29)	0.438
	≥ 1 project	29(76)	12(86)	17(71)	
CAR insurance	None	10(26)	2(15)	8(32)	0.441
	≥ 1 project	28(74)	11(85)	17(68)	

4.4.3 Compliance level of stakeholders to securities and CAR

The frequency of participants who reported a high level of compliance among consultants, insurers/ banks, clients, and contractors was as follows: 80%, 72%, 68%

and 55%, respectively. The highest frequency of participants reporting low compliance was among contractors (44%) followed by banks/ insurers (22%) (Table 11).

Table 11: Compliance of stakeholders

Compliance of stakeholders		All participants N (%)	GRZ	Private	P-value
Consultant	High	31(80)	11(85)	20(77)	0.694
	Low	8(20)	2(15)	6(23)	
Client	High	26(68)	8(67)	18(69)	1
	Low	12(12)	4(33)	8(31)	
Insurers/Bank	High	28(72)	8(62)	20(77)	0.453
	Low	11(28)	5(38)	6(23)	
Contractor	High	21(55)	5(39)	16(64)	0.178
	Low	17(44)	8(61)	9(36)	

4.5 Model/system checking the compliance

4.5.1 Presence of a model/system

The participants who reported that they had models for monitoring securities were as follows: PS (58%), AP (54%), RS (47%) and CAR (41%). At least 80% of the participants reported that the tools for monitoring securities were effective: AP (90%), PS (89%), RS (87%) and CAR insurance (80%) (Table 12). There was no statistically significant difference in these findings between government and the private sector

Table 12: Availability of systems for monitoring compliance

Securities	Availability of model	All participants N (%)	GRZ	Private	P-value
Advance payment security	Yes	21(54)	6(5)	15(56)	1
	No	18(46)	6(5)	12(44)	
Performance security	Yes	22(58)	6(5)	16(62)	0.725
	No	16(42)	6(5)	10(8)	
Retention security	Yes	16(47)	5(4)	11(50)	0.729
	No	18(53)	7(5)	11(50)	
CAR insurance	Yes	14(41)	3(2)	11(50)	0.275
	No	20(59)	9(7)	11(50)	

4.5.2 Name of the monitoring system

Table 13 shows the various systems the participants used to monitor compliance with the securities and CAR insurance during project implementation.

Table 13: Names of the monitoring system

	Advance payment security	Performance security	Retention security	CAR
1	Adapted internally according to market conditions	Adapted internally according to market conditions	Checking manually	Adapted internally according to market conditions
2	Checking manually	Checking manually	Constant checking	Checking manually
3	Evaluations	Evaluations	Imex	Evaluations
4	Frequent check-up	Frequent check-up	Informatics	Frequent check-up
5	Imex	Imex	Market System Analysis	Informatics
6	Informatics	Informatics	Open-ended	Open-ended
7	Market System Analysis	Market System Analysis	Prema System	Prema System
8	Open-ended	Open-ended	Quarterly Checkup	Security Register
9	Prema System	Prema System	Security Register	Set a Reminder
10	Quarterly Checkup	Quarterly Checkup	Set a Reminder	verification system with the Insurance company
11	Security Register	Security Register	Verification system with the Insurance company	
12	Set a Reminder	Set a Reminder		

4.5.3 Effectiveness of the model/system

The participants who reported that they had models for monitoring securities were as follows: PS (58%), AP (54%), RS (47%) and CAR (41%). At least 80% of the participants reported that the tools for monitoring securities were effective: AP (90%), PS (89%), RS (87%) and CAR insurance (80%) (Table 14).

There was no statistically significant difference in these findings between government and the private sector.

Table 14: Effectiveness of the Systems

Securities	Effectiveness	All participants N (%)	GRZ	Private	P-value
Advance payment security	Effective	17(90)	4(80)	13(93)	1
	Not effective	2(10)	1(20)	1(7)	
Performance security	Effective	16(89)	3(75)	13(93)	0.405
	Not effective	2(11)	1(25)	1(7)	
Retention security	Effective	13(87)	4(80)	9(90)	1
	Not effective	2(13)	1(20)	1(10)	
CAR insurance	Effective	12(80)	1(33)	11(92)	0.081
	Not effective	3(20)	2(67)	1(8)	

4.5.4 Models of Monitoring Securities and Their Effectiveness

This study did not explore why there was an almost 1:1 ratio of those participants who had systems for monitoring performance of securities to those who did not have. These findings may explain why there are at least some participants who reported having expired securities and unsuccessful implementation of securities. While the majority reported that their systems of monitoring were effective, the validity of this report may have been biased and may need to be evaluated by further objective research methodology.

Building information modelling (BIM) is a “digital technology which allows for planning, design, construction and operation of a project/facility in an accurate virtual model” (Swart, 2016). It essentially can be used for generating and managing construction data (Aladog, et al., 2016) . BIM is widely used in many countries including the United Kingdom and South Africa. It can potentially eliminate collaboration challenges among key players in the construction and be used for project monitoring.

BIM affords efficient communication and coordination among project parties. This is important because construction projects involve the exchange of information among the many stakeholders (Chiponde, et al., 2017). It is considered as the next-generation solution to improve the productivity of stakeholders in the construction industry and

facilitate the delivery process of buildings and structure. Not only can BIM be utilised to support the project development process as a systematic risk management tool, but it can potentially also serve as a core data generator and platform to allow other BIM-based tools to perform further risk analysis (Zou, et al., 2017).

This study proposes the use of BIM as a monitoring and collaboration tool in the implementation of securities and CAR insurance. It would also be used as a tool to assist stakeholders to reduce liabilities for their project's dues to its collaboration properties.

4.6 Discussion

4.6.1 Knowledge about securities and contractors' all-risk insurance

The study determined how knowledgeable the respondents were through establishing the understanding, use in projects and financial issuance of securities and CAR insurance. The study further assessed how knowledgeable the ZCI through checking if the respondents understood the necessity and influence of the securities and CAR insurance on the contract performance. The high frequency of participants with knowledge about the securities and CAR insurance may be because the government is a primary client for most contractors and that for government-sponsored construction projects, certain securities are a mandatory under Zambian construction contract laws (International Labour Organisation, 2015) (ZPPA, 2012). The finding of higher frequency of participants with knowledge about PS (95%) more than the other securities (88%, 93%) and CAR (91%) insurance was consistent with previous reports elsewhere which showed that performance security was the most common form of guarantee (Zurich, 2013).

The use of securities and CAR insurance in the respondents' projects is another way that confirmed that the industry was knowledgeable. The finding of a high frequency who reported use of AP, PS and CAR insurance among GRZ employees is reflective of the legal requirement under ZPPA to have these securities for government-funded projects (ZPPA, 2012). The lack of use of RS among government players may because this is not mandated under Zambian construction contract laws. The lack of regulation of the private sector by ZPPA may explain the relatively higher (compared to the government) frequency of participants who did not implement securities and CAR insurance and it agrees with Dorji and Hadikusumo (2006).

GRZ personnel were more likely to use CAR insurance than those from the private sector. The most common reasons for the absence of securities and CAR insurance in the participants' projects were the securities not being part of the project requirements, the projects could be implemented without securities and CAR insurance and the size of the project. Other participants attributed the absence of securities and CAR insurance in their projects too costly and difficult procedures to acquire them. However, some of the factors previously reported to impact the use of CAR insurance included varied client's requirements, conditions of a contract, contractors' interest knowledge and experience (Parera, et al., 2008).

The findings showed that the highest percentage of respondents preferred to get their securities and CAR insurance from insurance companies compared to banks. The respondents attributed their preference to it being easy and cheaper to get securities and Contractor's all risk from the insurance companies. It was also said that the procedural requirement is easier in an insurance company compared to a bank. Insurance companies were the most preferred sources for Contractor's All Risk insurance because it is a policy and it can only be sourced from the insurance companies.

The reported high level of knowledge was however not consistently comparable to the use of the securities and CAR insurance. Some of the respondents who earlier responded that they knew about certain securities and CAR insurance could not answer the follow-up question about the use of the same.

Literature and findings agree that regulations assist in the implementation of securities and CAR insurance. Further, it shows that while there was a high frequency of both government and private sector players who knew securities and CAR, an implementation may have been influenced by the Zambian construction contract laws which apply only to government-sponsored contracts.

The wide use of securities and CAR insurance was also seen the securities and CAR insurance the financial institutions had issued in the previous two years. Most of the financial institutions had issued more 10 securities and CAR in the last two previous year.

The findings showed that most participants agreed that the securities and CAR insurance are necessary during contract implementation. There were GRZ personnel who stated that the securities and CAR insurance was necessary to contract performance compared to the private personnel. This would be attributed to the knowledge they acquired from the ZPPA standard bidding document. The participants further highlighted the influence of securities and CAR insurance on contract performance in Tables 7 and 8.

4.6.2 Compliance to procedural requirement of Securities and CAR insurance

The findings of this study regarding the status of securities during project implementation, project security implementation, compliance of stakeholders to procedural requirements of securities and CAR insurance have not been previously described. Although the frequency of participants who reported having valid securities was high, there was at least some which were expired. However, this presence of expired securities especially Performance Security, and Advance payment security, entails that the participants' organisations were not protected from risks. Some of the reasons for having expired securities reported by some participants during interviews included the high cost of renewing securities, lack of knowledge about when securities would expire, and the long procedures for renewal.

The successful use of the securities and CAR insurance implied acquiring them at the right time, maintaining their validity, renewal when necessary and withdrawing them after the intended use. The reasons for the unsuccessful implementation of securities were beyond the scope of this study.

The relatively high frequency of participants with low compliance with securities among contractors and insurance companies has not been previously described in Zambia. However, some of the reasons cited in other regions among contractors and government officials included lack of knowledge, lack of regulation enforcement and inadequate/ lack of financial resources (Dorji & Hadikusumo, 2006).

4.6.3 Models of Monitoring Securities and Their Effectiveness

This study did not explore why there was an almost 1:1 ratio of those participants who had systems for monitoring performance of securities to those who did not have. These findings may explain why there are at least some participants who

reported having expired securities and unsuccessful implementation of securities. While the majority reported that their systems of monitoring were effective, the validity of this report may have been biased and may need to be evaluated by further more objective research methodology.

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BIM affords efficient communication and coordination among project parties. This is important because construction projects involve the exchange of information among the many stakeholders (Chiponde, et al., 2017). It is considered as the next-generation solution to improve the productivity of stakeholders in the construction industry and facilitate the delivery process of buildings and structure. Not only can BIM be utilised to support the project development process as a systematic risk management tool, but it can potentially also serve as a core data generator and platform to allow other BIM-based tools to perform further risk analysis (Zou, et al., 2017).

This study proposes the use of BIM as a monitoring and collaboration tool in the implementation of securities and CAR insurance. It would also be used as a tool to assist stakeholders to reduce liabilities for their project’s dues to its collaboration properties.

4.7 Chapter summary

This chapter presented the discussion of the findings of the study in tandem with the objectives. The chapter analysed the understanding of securities and CAR, how to acquire, necessity, compliance and models or systems of securities and CAR in the Zambian Construction Industry. The results established that there was a wide understanding of securities and Contractors ‘All Risks insurance in the ZCI. According to the findings they most preferred sources of securities and CAR is insurance companies. The findings further showed that there was a high level of compliance among key stakeholders in the ZCI.

5.0 CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATION

5.1 Chapter Recapitulation

This research is made of five chapters. Chapter one laid down the bases on which the assessment of compliance to securities and Contractors' All risk insurance would be carried on. It highlights the research background, problem statement, the research aim, research objective, research question, and justification of the research. The chapter also gave a brief of the literature that would be reviewed to achieve the objectives. And in meeting the set-out objectives the following chapters were discussed.

Chapter two highlighted what different pieces of literature state about securities and CAR insurance. It also went into details of what individual securities are and how they contribute to proper overall contract performance. The chapter also highlights how BIM is used in risk management.

The third chapter discussed the methodology adopted for this research, this was accomplished by firstly discussing the research approach, design and target population, thereafter, the sample size was discussed as well as the sampling process and justifications employed this was important in ensuring the representativeness of the research population methods of data collection and instruments used were discussed as well as research methodological reliability and validity.

Having laid the basis for the study chapter four presented the actual findings as obtained from the interviews and questionnaires administered to relevant research samples. The results were also analysed in this chapter.

This final chapter provides the discussion of the results, conclusion and recommendations based on the findings and analysis of the research relative to the existing literature on the subject.

5.2 Conclusions

Most of the participants knew securities and contractors' all-risk insurance, but there was variation in their use. Uptake of retention security was low and there would need to study the benefits of using retention funds over retention security. The knowledge and understanding of the securities and CAR insurance were attributed to the common form of contract used in the ZCI which demanded the presence of those securities and CAR insurance. The study established that the use of securities and CAR insurance

does not fully match with the knowledge levels hence it creates a base to further study the cause. Knowledge is a vital aspect of the successful implementation of risk management through securities and CAR insurance in the Zambian Construction Industry.

The majority of key stakeholders were compliant to regulations of securities and CAR insurance in the ZCI. The compliance to procedural requirement of the securities and CAR insurance among key stakeholders in the ZCI was confirmed through the results although the literature review did not state the position. The results confirmed that most of the securities and CAR insurance were valid, renewed when necessary and withdrawn when required. The respondent's number of projects that successfully used the securities and CAR insurance also confirmed the high-level compliance.

There was variation in the availability of monitoring systems for securities and CAR insurance in the ZCI. The variance in the availability of monitoring systems in the use of securities and CAR insurance was established also checking the effectiveness of systems which were used to monitor the validity and use during and after project implementation. Although the results showed that there were systems in place, the respondents deemed some of the systems ineffective. The most common system was a routine check on the validity and use of the securities and CAR insurance in the ZCI

5.3 Recommendations

Because of the foregoing objective, literature review, findings and conclusions made herewith, the following are the recommendations for the study.

- i. A larger study to be carried out that would target respondents from various provinces in Zambia to determine the national picture. This would bring out more ways of maintaining and enhancing the high knowledge levels of securities and CAR among stakeholders in the Zambian Construction Industry.
- ii. The Government and professional bodies in ZCI would formulate an independent body to enforce compliance to securities and CAR insurance to ensure total compliance as it affects the contract performance. This body will ensure that all procedural requirements of the securities and CAR insurance are followed by stakeholders and penalties are given to uncompliant.
- iii. Formulate incentive to encourage compliance to procedural requirements to securities and CAR insurance in the ZCI. Various players in the construction

industry who have a high level of knowledge and compliance should be rewarded.

- iv. The adoption of building information modelling (BIM), as a better system for the monitoring of compliance to securities and CAR insurance in the ZCI.

5.4 Area for Further Research

The following are the suggestion for further studies:

- i. Building Information modelling: use of BIM in enhancing risk management in the ZCI.
- ii. Effectiveness of securities and CAR insurance in road construction in the Zambian Construction industry.
- iii. Factors that affect the use of Building Information Modelling in monitoring compliance with securities and CAR insurance in the ZCI

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7.0 APPENDICES

APPENDIX I: QUESTIONNAIRE

THE UNIVERSITY OF ZAMBIA

SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Research Topic:

Compliance with Securities and Contractor's All Risk Insurance and its impact on contract performance in the Zambian Construction Industry

Be assured that the information I am collecting, will be used purely for academic purposes and will be treated with maximum confidentiality.

To participate, you will need to give your informed consent. By ticking the boxes, you are indicating that you understand the nature of the survey and that you agree to participate in the research.

Please tick the following points if you agree to take part voluntarily

I understand that I have been provided with an explanation of the survey in which I am participating and have been given the name and telephone number of an individual to contact if I have questions about the research.

☐

I understand that participation in the survey is voluntary and that I can withdraw at any time

☐

INSTRUCTIONS

Do not indicate your name on the questionnaire.

Please indicate your answer by ticking a box in the table provided for each question or giving a narration as requested.

SECTION A: Demographic characteristics

Please answer all the questions. Choose only appropriate answer(s) by ticking

Which of the following sectors do you belong to?

Clientele	Private consultant	Public consultant	Contractor	Regulatory body	Financial insurance Institution

What is your professional background?

Engineer	Architect	Quantity surveyor	Insurance Underwriter	Accountant	Other (Specify)

How many years have you been practising in your sector?

Below 5 years	5 – 10years	11 – 15years	16 – 20years	Above 21years

SECTION B: Knowledge of Securities and Contractor's All Risks Insurance

Respondents without financial background (For those with a financial background or others skip to question 10)

4. How would you rate your understanding on the following?

	Never heard about it	Heard about it but not sure what it is	Sure	Very sure about it
Advance payment security				
Performance security				
Retention Security				
Contractor's All Risk Insurance				

5. How many projects are you currently involved in?

Below 5	5 – 10	10 – 15	15 – 20	Above 20

Of the number of projects, you have indicated in question 5, how many have the following securities and Contractor's All Risks Insurance?

	None	Below 5	5 – 10	10 – 15	15 – 20	Above 20
Advance payment security						
Performance security						
Retention Security						
Contractor's All Risk Insurance						

7. If your answer in question no.6 is none, tick if the following are the reasons.

	Advance payment security	Performance security	Retention Security	Contractor's All Risks Insurance
Not in project requirements				
Size of the project				
Costly to acquire the securities and Contractor's All Risks Insurance				
The project can be implemented without them				
Difficult procedure to acquire the securities and Contractor's All Risk Insurance				
If others specify				

8. Which of the following is the preferred source of the securities and Contractor's All Risks Insurance banks or insurance company?

	Bank	Insurance company
Advance payment security		
Performance security		
Retention Security		
Contractor's All Risk Insurance		

9. Are there reasons for the preference?

Advance payment security.....

Performance security.....

Retention Security.....

Contractor's All Risks Insurance.....

SECTION C: Knowledge of Securities and Contractor's All Risks Insurance

Respondents with a financial background (For non-financial background respondents skip to question 15)

10. How would you rate your understanding on the following?

	Never heard about it	Heard about it but not sure what it is	Sure	Very sure about it
Advance payment security				
Performance security				
Retention Security				
Contractor's All Risk Insurance				

11. How long have been issuing the following Securities and Contractor's All Risks Insurance

	Below 5 years	5 – 10 years	10 – 15 years	15 – 20 years	Above 20 years
Advance payment security					
Performance security					
Retention Security					
Contractor's All Risk Insurance					

12. How many Securities and Contractor's All Risks Insurance have been issued in the last 2 years?

	Below 10	10 – 50	51 – 100	101 – 150	Above 150
Advance payment security					
Performance security					
Retention Security					
Contractor's All Risk Insurance					

13. Is the issuance of such securities and Contractor's All Risks Insurance dependent on a class of the project?

	Yes	Not sure	No
Advance payment security			
Performance security			
Retention Security			
Contractor's All Risk Insurance			

14. If the answer in question 13 is yes, tick any of the following that determines the class and if other(s), fill in the space provided.

	Advance payment security	Performance security	Retention Security	Contractor's All Risks Insurance
Scope of the project				
Cost of the project				
Type of contract				
Type clients				
Prevailing economic status				
The urgency of the project				
Weather				
The sensitivity of the project				
Other(s), specify				

SECTION D: Necessity of securities and Contractor's All Risks Insurance and level of compliance (To be answered by all respondents)

15. Using your experience on projects, how would you rate the (securities and Contractor's All Risks Insurance) necessity to the project?

	Very necessary	necessary	Don't know	Not necessary
Advance payment security				
Performance security				
Retention Security				
Contractor's All Risk Insurance				

16. If your answer for question 15 is not necessary, would you recommend replacing the securities and Contractor's All Risks Insurance?

	Yes	Not sure	No
Advance payment security			
Performance security			
Retention Security			
Contractor's All Risk Insurance			

17. Using your project experience, does the absence of these securities and Contractor's All Risks Insurance have an impact on the project performance?

	Yes	Don't know	No
Advance payment security			
Performance security			
Retention Security			
Contractor's All Risk Insurance			

18. If the answer in question 17 is yes, what are some of the common impacts to the project performance? Please State.

Advance payment security.....

Performance security.....

Retention Security.....

Contractor's All Risks Insurance.....

19. Using your experience in projects, what is the common status of the securities and Contractors All Risk Insurance during project implementation?

	Valid	Not sure	Expired
Advance payment security			
Performance security			
Retention Security			
Contractor's All Risk Insurance			

20. Using your experience in previous projects, how many of the securities and Contractor's All Risks Insurance have been successfully used until the close of the project (validity renewal and withdrawn)

	None	Below 5	5-10	11-15	16-20	20 and above
Advance payment security						
Performance security						
Retention Security						
Contractor's All Risk Insurance						

21. How do you rate the level of procedural adherence to the security and Contractor's All Risks Insurance requirement of each of these stakeholders during project implementation?

	Very High	High	Don't know	Low	Very Low
Consultants					
Client					
Insurer or banks					
Contractor					

SECTION E: Models/systems for checking compliance

22. Do you have any model/system for checking the procedural adherence to security and Contractor's All Risks Insurance during project implementation?

	Yes	Don't know	No
Advance payment security			
Performance security			
Retention Security			
Contractor's All Risk Insurance			

23. If the answer in question 22 is yes, Please State the name.

Advance payment security.....

Performance security.....

Retention Security.....

Contractor's All Risk Insurance.....

24. If your answer to question 23 is yes, how effective is it to make sure all requirements are adhered to?

	Effective	Not sure	Not effective
Advance payment security			
Performance security			
Retention Security			
Contractor's All Risk Insurance			

THANK YOU FOR YOUR PARTICIPATION

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