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**KWAME NKURUMAH UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**COLLEGE OF ARCHITECTURE AND PLANNING  
DEPARTMENT OF BUILDING TECHNOLOGY**

***“THE SIGNIFICANCE OF PERFORMANCE SECURITY- A RISK MANAGEMENT  
OPTION BY EMPLOYERS IN THE GHANAIAN CONSTRUCTION INDUSTRY”***

A PROJECT OUTPUT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE  
MSc. IN CONSTRUCTION MANAGEMENT, BY GEORGE OSEI.

FEBRUARY 2012

## DECLARATION

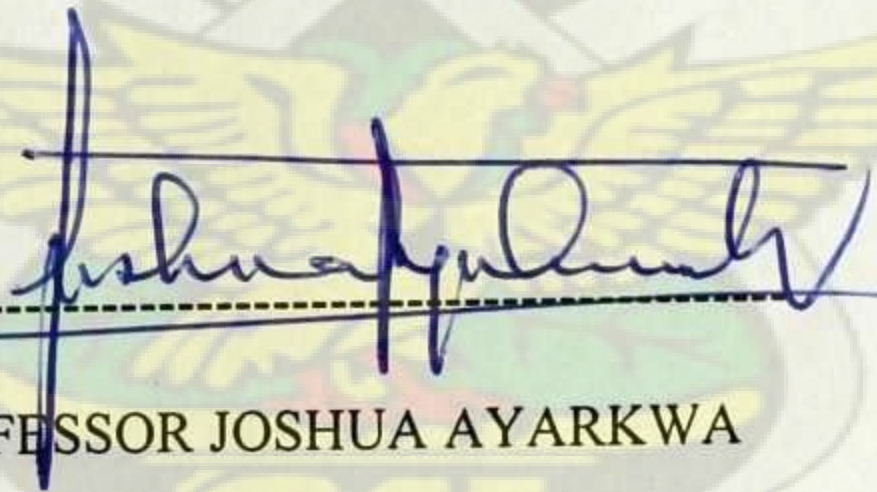
I hereby declare that this work is the result of my own original research and this thesis has neither in whole nor in part been prescribed by another degree elsewhere. References to other people's work have been duly cited.



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## DEDICATION

This work is dedicated to God, family and friends for their gargantuan support through this study.

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## ACKNOWLEDGEMENT

My profound gratitude goes to the almighty God for the guidance and help given me throughout this programme especially in hard times. I am particularly grateful for the immense support from my supervisors, Dr. Kwame Danso and Mr. Peter Amoah, may the almighty God shower His blessings on you, now and forevermore. My continuing gratitude goes to lecturers and staff of the Department of Building Technology, Kwame Nkrumah University of Science and Technology for their unflinching support throughout my stay on campus. I also thank my parents Mr Osei Manu (Ex-serviceman) and Madam Adwoa Manu. My thanks go to my siblings: Owusu, Akosua, Afua, Osei, Ama and Agyemang for their moral support.

I further wish to express my sincere appreciation to Mr and Mrs Amponsah of Liberty House, Nsenie, Kumasi for accommodating me throughout my stay on campus. Finally, I wish to thank all my colleagues at Asikuma-Odoben-Brakwa District Assembly, Breman Asikuma.

**\*\* GOD BLESS YOU ALL \*\***

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## ABSTRACT

Risk abound in the construction industry and clients in their quest to guarantee performance and prevent default on the part of employees, have over the years, adopted several risk mitigating tools. Performance Security is, basically, the transfer of risk to a third party. However, Contractors encounter a lot of difficulties acquiring a Performance Guarantee from the Banks and Performance Bond from Insurance Companies. The main reasons being; collateral demanded by Banks and Insurance companies, payment of premiums (calculated as percentage of the security amount), bureaucracy and delay in the issuance of securities because of the time spent by Banks and Insurance companies to conduct due diligence on contractors to ascertain their capacity and capability. This study therefore sought to ascertain the relevance of performance securities in construction contracts and the basis for the amount of securities requested by employers. Furthermore develop a basis for determining the security amount for construction projects vis-à-vis the risk anticipated.

Consequently, a survey was conducted, through the use of questionnaire, to extract views from quantity surveying firms, Ministries, Departments and Agencies, Insurance Firms and Banks. The survey established that performance security (a risk transfer option) can be made less use of and other alternatives adopted as guarantee for performance and also a relationship can be developed between the amount of performance security employers request from contractors and anticipated risk by using a simple risk frequency/impact matrix.

## CHAPTER ONE

### GENERAL INTRODUCTION

#### 1.0 INTRODUCTION

The introductory chapter gives an overview of the research with regards to the background of the study and problem statement. Furthermore, the aim and objectives of the study are presented followed by a summary of the research methodology adopted. The chapter is then concluded with highlights of the organisation of the study.

#### 1.1 BACKGROUND

All engineering and construction projects are subject to risk which can affect their successful completion. Risk can influence the delivery of project with respect to time, cost and quality. The generic sources of risk on such projects include commercial and legal relationships, economic circumstances, human behaviour, natural events, political circumstances, technology and technical issues, management activities and controls and individual activity (CIBD, 2004). Risk cannot be eliminated, therefore it should be managed. Procurement risk should be identified, assessed on case by case basis. As a general rule, the aim should be to allocate risk to those best able to manage them provided that the cost of transferring them to the party does not exceed the cost of retaining them (CIBD, 2004). Employers manage the risk of default, or abandonment of the contract by the contractor, or insolvency of the contractor, by retaining the anticipated risk but require the contractor to furnish a Performance Security for part of the contract sum to be invoked in the event of default (CIBD, 2004).

Performance security is a generic term used to cover the following; Performance Guarantee (On Demand), Performance Guarantee (Conditional) and Performance Bond (Asare, 2005).

A security could be bond if issued by an insurance company or a guarantee if issued by a bank. According to Clough (1981) a Performance Bond acts primarily for the protection of the employer. It guarantees the faithful performance of the contract by the contractor in substantial completion in accordance with the terms of the contract.

## 1.2 STATEMENT OF THE PROBLEM

Literature has identified risk mitigation measures including; risk avoidance, risk reduction, risk retention and risk transfer. Performance Security is a risk transfer option that clients prefer. Contractors, before entering into a contract with an employer, are required to provide a Performance Bond or Guarantee as security against any default under the contract. For instance projects that are funded by public, the Public Procurement Act, 2003 (Act 663), Section 65(7) demand of successful contractors to sign a procurement contract with the procurement entity within 30 days of the receipt of the notice of acceptance and provide the required security for the Performance of the contract. Failure to comply with the above leads to the cancellation of the contract and the forfeiture of the Tender Security, submitted during bidding. The practice, currently, is for the successful bidder to provide either a performance security in the form of an unconditional Bank Statement in the amount of 10% of the Contract Sum; or a Performance Bond issued by an Insurance Company in good standing with the National Insurance Commission and acceptable to the Employer in the amount of 30% of the Contract Sum. These amounts are The World Bank's recommendation (World Bank, 1984).

The performance security requirement is spelt out in the Conditions of Contract and Instruction to Tenders and the amount of security spelt out in the Tender Data Sheet, Contract Data Sheet and Letter of Acceptance. However, clients, represented by their advisors, fail to identify prevailing risk factors before deciding on the risk mitigating option to adopt and also if Performance Security (a risk transfer option) is adopted the amount of security does not correspond to the prevailing risk factors. An investigation conducted by Fugar and Odei (1999) revealed that State Insurance Corporation (now State Insurance Company Ltd) had been requested, once by an employer to assume responsibility for the default of a contractor for whom they had been sureties from 1988 to 1998 and Enterprise Insurance, Donewell Insurance, Vanguard Assurance and Continental Assurance, twice. The study, however, did not indicate the number of underwritings the above-mentioned companies executed, during the period in question, to ascertain the level of invocation of securities by employers as a result of default on the part of contractors. Contractors encounter a lot of difficulties in acquiring a Performance Guarantee from the Banks and Performance Bond from Insurance companies. The main reasons being; collateral demanded by Banks and Insurance companies, payment of premiums (calculated as percentage of the security amount), bureaucracy and delay in the issuance of securities because of the time spent by Banks and Insurance companies to conduct due diligence on contractors to ascertain their capacity and capability. A study by the Ministry of Roads and Transport of the times of submission of performance bonds by contractors on a sample of projects under the National Feeder Roads Rehabilitation Programme Phase 1 indicated an average of 42 days for all classes of contractors (Twumasi-Boakye 1997).

According to Fugar and Odei (1999), the period for release of bonds and guarantees to the contractor are stipulated either in the Bidding documents or Contract documents. Employers are expected to adhere strictly to this. Unfortunately, this is not generally the case.

Some employers have to be reminded before the securities are released. The longer the security remains with the employer, the more financial burden imposed on the contractor. Fugar and Odei (1999) recommended that the level of bond amounts required should be realistic to reflect the risk anticipated and the local circumstances.

### 1.3 RESEARCH QUESTIONS

- i. Are Performance Securities necessary in construction contracts?
- ii. Is the current amount of security requested by clients realistic?
- iii. Is it possible to develop a direct relationship between the employer's anticipated risk and the security amount? That is, the lesser the anticipated risk the lesser, the amount of security and vice versa.

### 1.4 AIM

The aim of the research is to investigate the relevance of Performance Securities in construction contracts in Ghana.

### 1.5 OBJECTIVES

The targeted objectives for addressing the above aim are:

- i. Identify risk factors associated with construction contracts that demand for performance securities by clients from contractors.
- ii. Ascertain the basis for the amount of Performance Securities demanded by clients, currently, in the construction industry.
- iii. Develop a basis for determining the security amount for construction projects vis-à-vis the risk anticipated.

#### **1.6 RESEARCH METHODOLOGY/ DESIGN**

There was a thorough search for literature with the aim of having a better understanding of recent developments in the area of risk management and performance security. Subsequently, structured questionnaires were used in obtaining data from construction industry professionals and performance security-issuing institutions. A purposive sampling method was adopted to select Quantity Surveying firms registered with the Ghana Institution of Surveyors and governmental agencies like the Department of Feeder Roads, Department of Urban Roads, Ghana Highways Authority, Public Works Department and the Architectural and Engineering Services Limited in Kumasi and Accra. These respondents who act as Consultants to the construction industry's clients and are involved in the preparation of tender and contract documents were purposely chosen because they are relevant to the research topic. Furthermore Banks and Insurance companies in good standing with the Bank of Ghana and the National Insurance Commission respectively were surveyed.

Finally, the results of the survey were presented using tables and figures. Microsoft Excel was, however used for the frequency/impact index.

## 1.7 ORGANISATION OF THE CHAPTERS

The dissertation was organized into five chapters as follows:

- Chapter one was devoted to the general introduction of the study, problem statement, aims and objectives of the research and research methodology adopted.
- Chapter two was devoted to the literature search and touches on a review of risk management practice and performance security in the construction industry.
- Chapter three elaborates on the research methodology employed and the statistical methods and software used in collecting and analysing the data.
- Chapter four contains the analysis of data collected, discussion and comments on the findings.
- Chapter five was devoted to conclusions of the study and recommendations based on the findings of the study.

## CHAPTER 2

### A REVIEW OF RISK MANAGEMENT AND PERFORMANCE SECURITY IN THE CONSTRUCTION INDUSTRY

#### 2.0 INTRODUCTION

This chapter presents the literature review. The review has been divided into two (2) main sections. The first section deals with a review of risk management practice in the construction industry whilst the second section of the review deals with performance security as a risk response tool in the construction industry.

#### 2.1 RISK MANAGEMENT

##### 2.1.1 The Construction Industry

The construction industry is an important sector and plays a vital role in any nation's economy due to the usage of its end products such as roads, buildings, dams etc. It is also used as an economic regulator by government who is a major client of the industry by turning the tap on or off in order to regulate performance. It may defer or cancel construction projects for other reasons such as to reduce the public sector borrowing requirement, which in turn often creates a knock-on effect. Further to these, it contributes significantly to the nation's gross domestic product (GDP) which is a measure of the volume of national output and input. British construction industry in the late 1980s accounted for about 6% of GDP when it experienced a rapid growth with a total value of output reaching almost £50bn by 1990 (Ashworth, 1999). According to Mr. Agyenim Boateng Adjei, the Chief Executive Officer of the Public Procurement Authority, public procurement represented between 50 and 80 per cent of the

national budget and about 14 percent of the Gross Domestic Product (GDP) of the Ghana. He pointed out that total public procurement expenditure for 2005 was over GH¢ 1.4 billion and GH¢ 1.78 billion for 2006 (Daily Graphic, 26<sup>th</sup> March, 2008). The construction industry embraces a wide range of loosely integrated organizations that collectively construct, alter and repair a wide range of different building and civil engineering structures. The industry has certain unique characteristics, stemming mainly from the physical nature of the construction products and its demand. No two projects are identical and site characteristics also vary extensively (Seeley, 1984). The construction industry is essentially an assembly industry, assembling on site the products of the industry. The designer's intentions are portrayed in drawings and other documents, and skilled operatives undertake the work of construction and assembly of components on the site. Construction work is mainly carried out on site and is thus subject to the vagaries of the weather and of ground conditions (ibid).

### **2.1.2 Procurement in Ghana**

Private sector procurement is mainly undertaken by rules and regulation laid down by the individual clients to suit their peculiar situation or situations. However, public sector clients, viz; central management agencies, ministries, departments and agencies, governance institutions, state owned enterprises (when using public funds), public universities, hospitals etc. make use of the provisions in the Ghana Public Procurement Act, 2003 (Act 663) for their procurement. Procurement is, almost invariably, the conventional/traditional (bill of quantities) type of procurement, where the client, the commissioner of the project, employs a team of advisors – architects, engineers, quantity surveyors etc. – who in turn procure a contractor to undertake the

project. The design team is responsible for the interpretation of the client's ideas and intentions, that is to say, they convert the client's ideas or intentions into drawings and ascertain the estimated cost and also administer the project. The contractor undertakes the physical erection of the structure on site.

### 2.1.3 Risk and the Construction Industry

The construction industry is subject to more risk and uncertainty than many other industries (Flanagan and Norman, 1993). Construction projects involve complex and time-consuming design. The processes of construction are also characterized by unforeseen circumstances. The industry usually requires a multitude of people with different skills and interest and the coordination of a wide range of disparate, yet interrelated, activities. Such complexity is further compounded by many external and uncontrollable factors. Risk can manifest itself in numerous ways varying over time and across activities (Flanagan and Norman, 1993). Thus it is very common to have the risk of projects time overruns and cost overruns (Shen et al, 1996). Ward and Chapman (2003) identified four categories where risk and uncertainties exist in a project, namely:

- Uncertainties about the basis of estimates
- Uncertainty about design and logistics
- Uncertainty about objective and priorities
- Uncertainty about the project organization.

Radujvic (1996) averred that, for project management the most serious consequence of risk involves:

- Failure to meet the budget constraint
- Failure to keep to the construction time
- Failure to maintain contracted quality

Radujvic (1996), quoting Thompson et al, added that the construction industry has a bad reputation in respect to planned costs and construction time overruns. World Bank data for the 1974-1988 period show average planned costs and construction time are exceeded by 40% and 70% respectively (World Bank, 1990 cited Radujvic). Data for Great Britain show that construction time for public sector is exceeded by more than 40% in every sixth project and that for a large number of projects it is exceeded by over 80% (Thompson et al, 1992 cited Radujvic, 1996).

#### 2.1.4 Definition of Risk

Risk has been defined in a number of ways (Shen et al, 1996). In the Oxford Dictionary of Current English, risk is defined as (i) a situation that could be dangerous or have bad outcome (ii) the possibility that something unpleasant will happen. BS 6079-1 (2000) Guide to Project Management, though not containing a definition, characterizes risk from the perspective of a project manager as: "Project risk is primarily the likelihood of negative occurrence adversely affecting the project so that its objectives become more difficult or even impossible to achieve" Risk, in this sense, is entirely negative and, in a construction project, may affect one or more parties and will almost certainly involve financial loss.

Indeed, no matter what type of risk we are considering, some financial impact is almost certain. This concurs with Chapman and Wards (2006) observation that risks are potential adverse effects

on the project performance and that sources of risk are “things that might go wrong” or threats to the project. Shen (1990 cited Shen and Cheung, 1996) defined risk as the probability of not receiving what is expected and the difference between expectations and realizations. CIBD (2004) defines risk as “the chance of something happening that will have an impact upon objectives. The above definitions acknowledge the possibilities of positive effects of risk. Indeed, the definitions by two of the main international professional bodies governing project management, The Project Management Institute (PMI) and The Association for Project Management (APM), gives credence to the positive and negative effects of risk. The PMI’s Project Management Book of Knowledge (2000) defines risk as: “An uncertain event or condition that, if occurs, has positive or negative effects on a project’s objectives” and The APM defines risk as: “An uncertain event or set of circumstances that should it occur, will have an effect on the achievements of a project’s objectives”. These definitions work in theory but fails in practice. Despite the enlightened definition, opportunity is neglected when it comes to practical use (HWU, ca 2007). According to PMI, risk includes upside effects, the opportunities, but tradition focuses on the downside, i.e. the negative effects (Simu, 2006). The positive risk factors, therefore, must also be identified and their effect maximised.

### **2.1.5 Sources of Risk in the Construction Industry**

The source of a risk refers to ~~where~~ in the project environment, internal or external, the risk emanates from. At the general environment level, extreme weather conditions such as prolong rain; frost or high winds are a source of risk that could potentially affect the project – usually negatively.

At the project level any of its participants directly or indirectly involved, are potential sources of risk. In the process of identifying risks in a project, it is necessary to consider the different sources of risks present in the project and the different classifications of risks that could be of current interest. Risk can be categorized as; controllable – risk that can be managed and controlled and its likelihood of occurrence directly related to competency of management on a construction project and to the performance of site personnel and operatives or uncontrollable – risk that is out of the control of any of the parties to a project. It is also important that there is a clear distinction between the risk source and a risk effect (Flanagan & Norman, 1993). The effects of risk refer to what impact or consequences it will have for a party or parties to the project. The impact can be measured in time, monetary or quality terms – though ultimately the impact of risk events (the actual manifestation of risk) occurring will be monetary somebody. Therefore, whilst it is true to say there are many sources of risk on a project, the effects are few. Risks abound in various stages of the project cycle from concept appraisal, design, construction, occupancy and disposal stages of built facilities (ibid). Literature on risk identifies a lot of risk factors associated with construction projects. Santoso et al (2003) provided a comprehensive list of risk factors that may have an impact on construction projects.

They include:

- a. **Physical risk:** earthquake, landslide and subsidence, fire, lightning, heavy rain, flood, typhoon, hurricane, pestilence.
- b. **Personnel risk:**
  - Technician and labour: frequent job change by skilled labour, lack of skilled labour, lack of labour, strikes and labour disputes, low productivity, poor workmanship, brawls and

fighting, use of illegal foreign labour, gambling on site, absenteeism, inability to understand drawings, communication problems.

- Subcontractor: lack of funds to proceed with work (insolvency), lack of required technical skill, inability to finish work on time, low quality of work, inability to find qualified subcontractor, low productivity, problems in coordination, subcontractor inability to afford adequate labour, subcontractor abandons project.
- Staff, foreman: incompetence and lack of responsibility, absenteeism, brawls, lack of experienced staff and foremen.
- Engineer: incompetence and lack of responsibility, absenteeism, brawls, lack of experienced engineers.
- Consultant: lack of understanding of role/duty, poor construction methods, delays in materials and shop drawings approval, communication and coordination problems, dishonesty, unaccountability of work.
- Client: interference, change orders, clients lacks managerial capability, quality expected beyond standards and specifications.

**c. Technical risk:**

- Material: affordable materials is more expensive than presented in bill of quantities (BOQ), proposed materials are not approved, materials shortage, late in material delivery, quality of material below standard, material damage during storage, material damage during transportation.

- Equipment: low productivity and efficiency, frequently out of order or damaged, inappropriate equipment, unavailability of spare parts or high cost, no reserve equipment, need to import from other countries, high maintenance cost.
  - Technique: new technique is required difficulty in achieving quality criteria.
  - Construction process: failure to construct as planned, coordination problems, delay in possession of site after contract, communication problems, red tape in liaison with public service consumers, irregularity of work load, low productivity due to severe climate, errors or omissions in BOQ, insufficient time to prepare bids, delay of information from designers.
  - Construction site: access problems, work hours limited, traffic congestion, local regulations, theft, threat by hooligans.
  - Ground conditions: no site investigation or boring log, inadequate site investigation, errors in information of site investigation, unforeseen problems.
- d. **Safety-accident risk:** occurrence of severe accidents, accidents due to inappropriate machine, operating a machine that is unchecked, lack of fence or protection net, lack of fire protection system on site.
- e. **Construction design risk:** inadequate or ambiguous specifications, errors in drawings, incomplete design scope, innovative construction method, new materials and equipment, non-standard details of drawings, error in estimate, likelihood of change, incompatibility between drawing and method.
- f. **Political and regulation risk:** frequent changes in law, war, revolution and civil disorder, requirements to use local labour, customs and import restrictions, unstable politics, embargo, long procedure for approval and permits, cost for corrupt government officials.

- g. Financial risk:** payment risk of completed work, slow payment by clients, retention money is not returned, liquidated damage for delay, inadequate payment for variations, financial problems due to errors in estimate, loss due to default of contractor, subcontractor, supplier or client, inflation, exchange rate fluctuation, local and national taxes are high, unfair calling of bid and construction bonds, insufficient insurance, labour cost is high than predicted, material cost is higher than predicted.
- h. Contractual risk:** unfair or unreasonable stipulation, ambiguous clauses that have several meanings, work conditions differ from contract, misinterpretation, red tape in litigation.
- i. Environmental regulations:** pollution due to construction process, waste treatment regulations and laws, preservation of historical findings, local environment regulations.

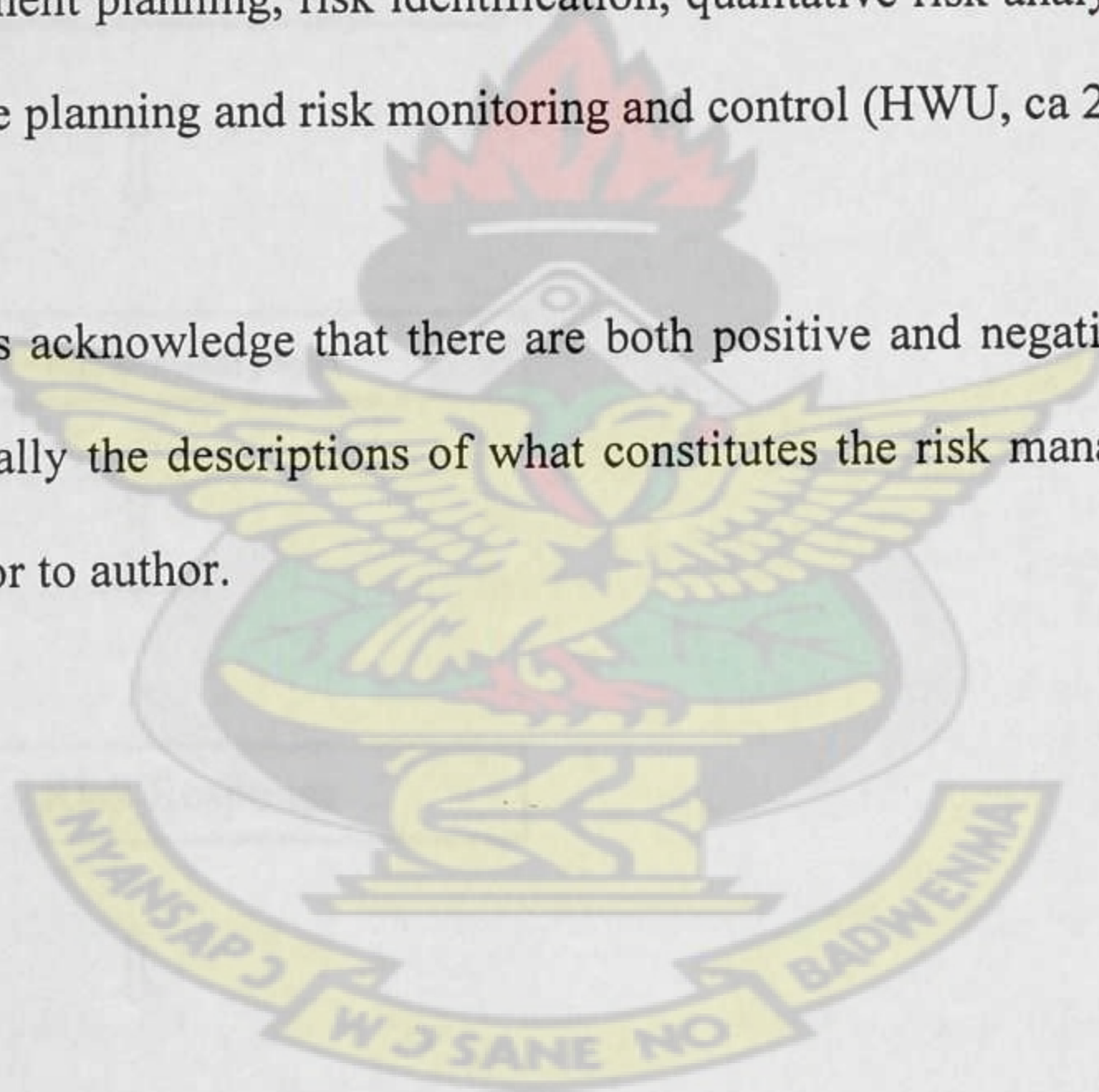
#### 2.1.6 Risk Management Defined

Risk cannot be eradicated, but can be managed; it is better to be proactive rather than reactive (CIBD, 2004). Risk management is a process that identifies loss exposures faced by an organization and select the most appropriate techniques for treating such exposures (Rejda, 2008).

The CIBD (2004) defines risk management as the logical method of establishing the context, identifying, analysing, evaluating, treating, monitoring and communication risk associated with any activity, function or process in a way that will enable losses to be minimised and opportunities to be maximised. It is as much about identifying opportunities as avoiding or mitigating losses (ibid). Klemetti (2006) support this definition thus: maximizing the results of positive events and minimizing the consequences of adverse events.

According to BSI Guide 73 (2002) “RM Vocabulary – Guidelines for use in Standards”, risk management is: “Coordinated activities to direct and control an organization with regards to risk and generally includes risk assessment, risk treatment, risk acceptance and risk communication”. The PMI’s Project Management Book of Knowledge (PMBOK) (2000) describes risk management as: The systematic process of identifying, analyzing and responding to project risk and it includes maximising the probability and consequences of positive events, and minimising the probability and consequences of events adverse to project objectives. The PMI’s PMBOK identify risk management planning, risk identification, qualitative risk analysis, quantitative risk analysis, risk response planning and risk monitoring and control (HWU, ca 2007).

The above definitions acknowledge that there are both positive and negative effects of risk on projects and are actually the descriptions of what constitutes the risk management process and they differ from author to author.



### 2.1.7 The Risk Management (RM) Process

A number of key steps are recognizable in all the definitions. The following, adapted from the PMI PMBOK, is a generic risk management process which fit any application:

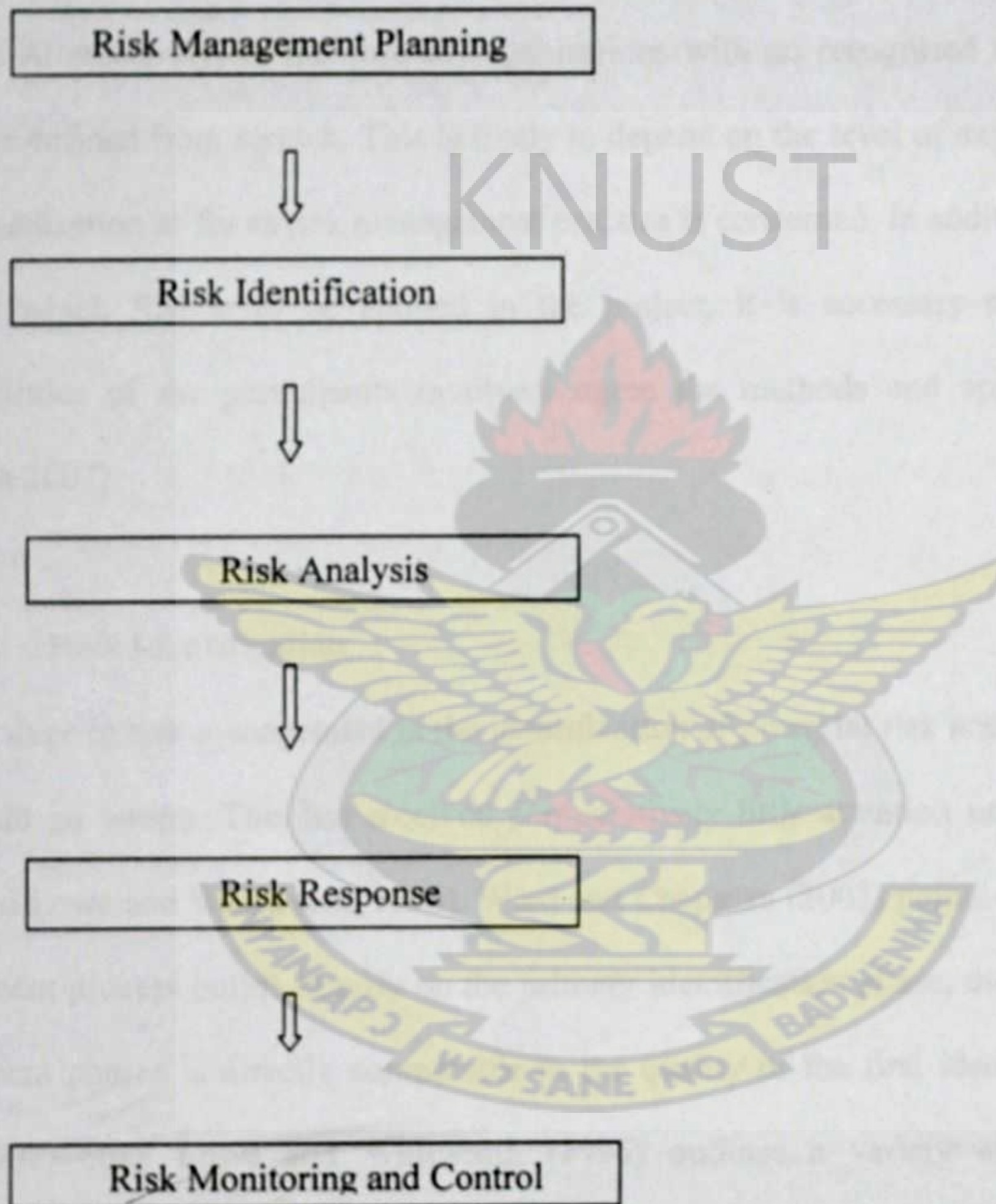


Fig 2.1: The Risk Management Framework

### **2.1.7.1 Risk Management Planning**

The first stage of RM is for the project team to actually define and agree the process to be followed at the outset as part of the overall project management plan. This may already be reasonably well defined where an established Project Life Cycle (PLC) framework is being followed. Alternatively, in the case of organisations with no recognised approach, this would have to be defined from scratch. This is likely to depend on the level of experience and maturity of the organization as far as risk management practice is concerned. In addition to identifying the points at which RM is to be applied in the project, it is necessary to identify roles and responsibilities of the participants involved, agree the methods and approaches to be used (HWU, ca.2007).

### **2.1.7.2 Risk Identification**

The first stage in risk management is the identification of potential risk and the determination of what could go wrong. This has received comparatively little attention until recently (Raftery, 1993 cited Lowe and Whitworth, 1996). Ward and Chapman (2003) points out that since the risk Management process builds heavily on the primary identification phase, the success of later risk management phases is directly comparable to the quality of the first identification phase. The CUP (1993) cited Lowe and Whitworth (1996) outlines a variety of approaches to the identification of risk ranging from standard checklists to brainstorming sessions. In addition structured review meetings with key staff and risk audit interviews with key staff are advocated by CUP (1993). Lowe and Whitworth (1996) averred that this process should lead to a schedule

of potential risks likely to affect the out-turn of the project, or to jeopardise the objectives of the project.

### **2.1.7.3 Techniques for Risk Identification**

#### **a. Historical Data**

The HWU (ca.2007), rates this means of assessing what the risky aspects of a project are as the most suitable. It involves drawing direct experience of similar past projects, since most projects contain a number of reasonably standard and recognizable risk situations. Useful historical data for risk identification in the construction industry may come from; the meteorological services (for weather forecasting), insurance companies (who are sophisticated in risk management and also rely heavily on historical records of the occurrence and impact of the past events for risk analysis) and bodies such as the Building Cost Information Service (who observe past trends on tender price levels and the effect inflation on labour and material markets). The HWU (ca.2007) however, contend that historical data is the most wanting in construction management. The extent of and usefulness of records kept within the organization itself will depend partly on how sophisticated its risk management operations are. If a risk register, or log of previous projects has been built up, this will provide a useful source of information.

#### **b. Checklists**

Generic checklists are useful source of information when compiling a list of possible risks associated with a project. It is simply a comprehensive list of risks that could affect any project. Although necessarily general in nature checklists can be used as prompts in determining what the potential risks are for the project under study. Published risk checklists in texts and journals

papers can be consulted as part of the risk identification process. Separate ones exist for clients, contractor and consultant perspectives.

Whilst checklists are undoubtedly a convenient and relatively simple approach to risk identification, it is important not to be over reliant on them. The danger is that they can act as a straitjacket and actually inhibit detailed thought on specific project risks that may not be recorded on a generic checklist (HWU, ca.2007).

### **c. Brainstorming**

This is a short-term intensive group exercise, where a team of individuals will generate as many ideas as possible for risk events that may adversely affect the project negatively (HWU, ca.2007).

#### **2.1.7.4 Risk Analysis**

The second phase of the RM process is risk analysis. This involves an assessment of the risk identified in the first phase. The objective of risk analysis is to determine what the impact and consequences would be of a risk event occurring. Not all of the risks identified at the risks identification stage will be given the same consideration since there are simply too many to consider. The point is to limit the analysis of project risks to those that are most serious, namely those that have a high impact on the project in terms of time, cost and quality. It is also worth considering risks which may have lesser, but still significant impact, if they are highly likely to occur since the cumulative effect of a number of low impact risk materializing may have serious impact. Ultimately, the effect of all risk directly or otherwise is in increased costs for one or

more parties to a project, whether client, contractor, subcontractor or consultant (HWU, ca.2007).

Risk analysis may be quantitative or qualitative in approach (CUP, 1993 cited Lowe and Whitworth, 1996). The technique adopted will depend on what is appropriate for the circumstances prevailing (HWU, ca.2007).

#### **a. Quantitative Risk Analysis**

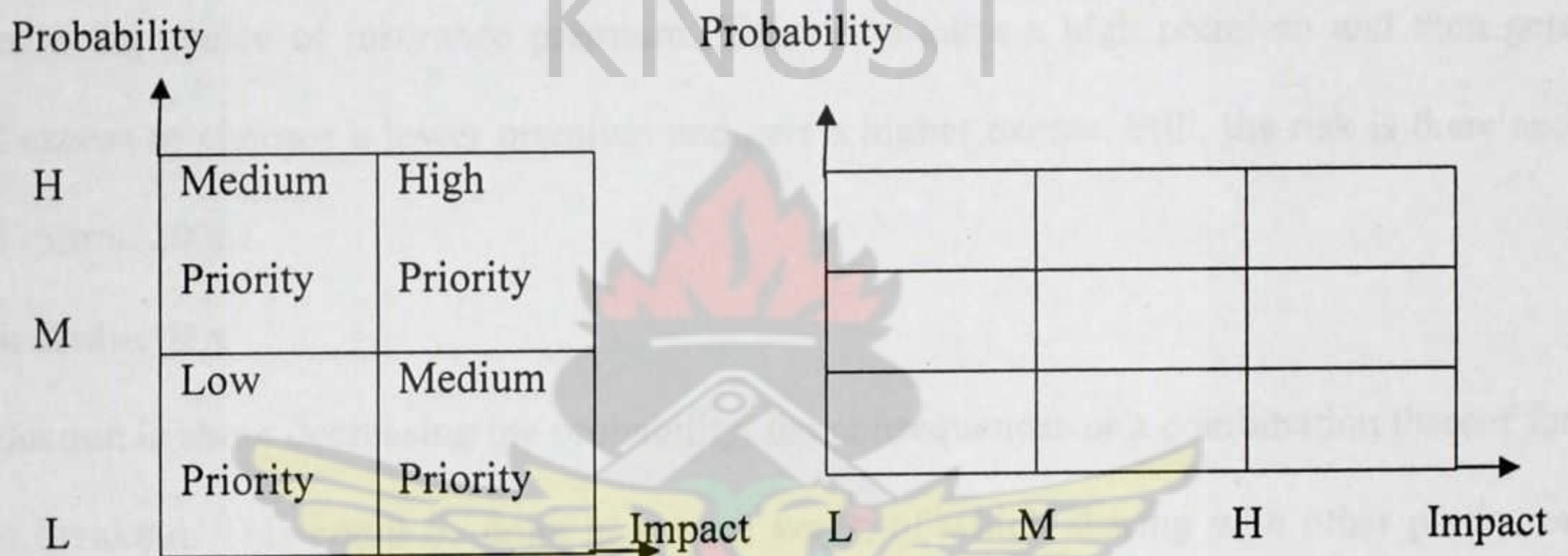
Quantitative approaches to risk analysis are more formal and clearly depend on the existence of data to enable probabilities and consequences to be quantified. The key elements required in a quantitative analysis include an estimate of the likely risk, the characteristics of the important risk including variability and the maximum likely risk estimate. A sensitivity analysis is useful in this respect (Lowe and Whitworth, 1996).

#### **b. Qualitative Analysis**

Qualitative assessment of risk involves the identification of a hierarchy of risk, their scope, factors that cause them to occur and potential dependencies (CUP, 1993 cited Lowe and Whitworth, 1996). The hierarchy is based on the probability of the event and the impact on the project (ibid). Qualitative risk analysis does not involve any mathematical manipulations or application of numerical techniques. Instead a subjective assessment based on the experience and intuition of the team conducting the analysis is used to determine risk impact (HWU, ca.2007). The most common way to estimate risk probability and impact in simple scales for example,

from 1 to 5 or from high to low boundaries can also be numerically defined. In Figure 2.2 a probability-impact grid is introduced, which is one typical and simple way to map risks.

Depending on which “box” on the grid each risk is placed in, based on probability and impact, it can be prioritized as having low, medium or high priority for further investigation and consideration. The advantage of the risk grid approach is that it is quick and easy to apply and can be readily understood by everyone (HWU, ca.2007).



**Fig 2.2: The Risk Matrix**

### 2.1.7.5 Risk Response

In the risk response step the action is taken to control the risks analyzed in the first two steps. Responses is often graded in four levels, namely risk retention, risk reduction, risk transfer and risk avoidance (Flanagan & Norman, 1993). Rejda (2008) categorized the above-mentioned risk response techniques into risk control and risk financing. The author classifies risk avoidance and risk reduction as risk control (i.e. reduction of the frequency and severity of loss) and risk retention and risk transfer as risk financing (i.e. provision for funding of losses). Hlaing et al,

(2008) in a study in Singapore concluded that risk response methods are favoured in the order of risk reduction, risk transfer, risk avoidance and risk retention.

**a. Risk Retention**

Risk retention concerns accepting the presence of risk and still conducting business as usual. The reasons for retaining the risk could be that the estimated probability, consequence or the combination of the two is low and at an acceptable level. A good everyday life example is when it comes to the choice of insurance premium. Either one takes a high premium and then gets reduced excess or chooses a lower premium and gets a higher excess. Still, the risk is there and retained (Simu, 2006).

**b. Risk Reduction**

Risk reduction is about decreasing the probability, the consequences or a combination thereof for a risk to breakout. This could be done in several ways, of which sharing with other parties or taking some action where the probabilities or consequences become reduced is common (Simu, 2006). Risk reduction may be accomplished by re-design, changing the materials used to avoid untried technology, or to change the project plan (Lowe and Whitworth, 1996). One action to reduce risks is through educational training of personnel to increase the awareness about possible risks and to make people think in terms of 'what if'. Other actions can be to physically reduce the risk by building systems, rails to eliminate falls, sprinklers to eliminate fire and so on.

There could also be involvement of a third party as an extra assurance and quality control of projects to ensure that nothing is forgotten or overlooked. A common way to reduce risks at

construction sites is through work planning. The work plans consist of timetables and allocation of resources such as staff and equipment (Simu, 2006)

### c. Risk Transfer

Transfer of risk to an insurer or alternatively to the contractor or sub-contractor(s) will make sense if the party to whom the risk is transferred is better able to control that risk (Lowe and Whitworth, 1996). Lowe and Whitworth (1996) cited as an example transferring the risk of inflation by clients to contractors by making contracts fixed price. The authors further advocated the transfer of risk from contractors or sub-contractors to a bond issuing bank as a way of creating confidence in the client or other contractors. They however contend that the overhead cost associated with the issue of bonds should be worthwhile. The HWU (ca 2007) however argue that transferring risk does not reduce the effect it would have, or the likelihood of its occurrence. It only passes the responsibility for it to another party.

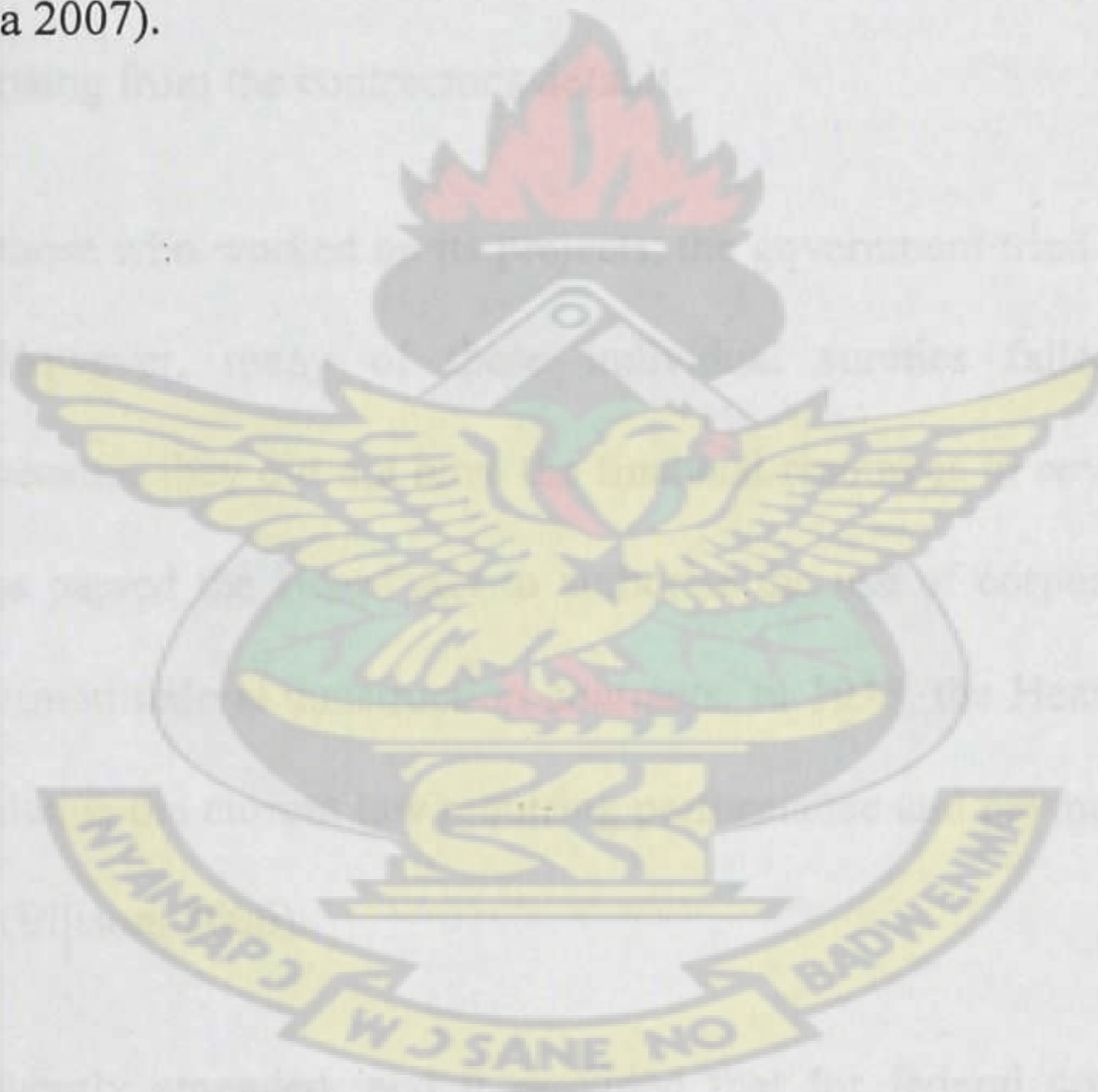
Allocation of risk is central to contract and procurement strategy. Traditional methods of procurement using competitive tender and bills of quantities give a fairly even split of risk between client and contractor. By contrast, procurement routes such as design and build allocate more risk to the contractor. Similarly, approaches such as construction management and management contracting leave the bulk of risk with the client (Lowe and Whitworth, 1996). Whatever procurement strategy is adopted, procurement documents are important tools for managing risks. The sharing of risk and requirements for indemnities, supporting insurance, sureties, retention money etc should be set out in the contract data. Standard conditions of contract, supplemented by contract specific data, normally perform this function (CIBD, 2004).

#### **d. Risk Avoidance**

Risk avoidance is about refusing to accept a risk. This is either done by simply refusing a project that is too risky to proceed with or by writing exceptional clauses in the tender (Simu, 2006).

#### **2.1.7.6 Risk Monitoring and Control**

The final step of the risk management process aims to monitor the status of identified risks, identify new risks, ensure proper implementation of agreed responses and review their effectiveness, as well as monitoring changes in overall project risk exposure as the project progresses (HWU, ca 2007).



## 2.2 PERFORMANCE SECURITY

### 2.2.1 Historical Background

Slightly more than 100 years ago, the federal government in the United States of America became alarmed about the high failure rate among the private firms it was using to perform public construction projects. It discovered that the private contractor often was insolvent when the job was awarded, or became insolvent before the project was finished. Accordingly, the government was frequently left with unfinished projects, and the taxpayers were forced to cover the additional costs arising from the contractor's default.

To protect itself and those who worked on its projects, the government tried using individuals to serve as sureties. However, many of these individual sureties failed to honour their commitments, often because they did not have the financial resources to cover their obligations. So, in 1894, Congress passed the Heard Act to authorise the use of corporate surety bonds to secure privately performed federal construction contracts. In 1935, the Heard Act was replaced by the Miller Act, which is the current law requiring performance and payment bonds on federal construction projects (Ellison, 2006).

The Act was subsequently amended, and it provided that for federal construction contracts beyond certain amount (U.S. federal government construction projects where the contract price exceeds \$100,000.00) should be protected by performance securities. Several states followed and enacted their versions of the MILLER ACT to apply to projects financed by the states (Clough, 1981).

It is no wonder that the business of insurance companies specialising in the provision of bonding services originated in the United States of America and gradually becoming the business of insurance companies in other parts of the world (Westring, 1985). It is not certain when bonds were first used in the construction industry in Ghana. There is no provision for their use in the traditional forms of contract building and civil engineering works (Fugar and Odei, 1999). Perusal of the Articles of Agreement and Conditions of Contract for Building Works, Fourth Edition, produced by the Ministry of Works and Housing (The Pink Form) confirms this fact.

Fugar and Odei (1999) averred that the advent of the government's Economic Recovery Programme (ERP), in the 1980s; saw the upsurge in the use of performance bonds. The authors assert that: "the need to ensure that loans and grants received by the government for the country's infrastructural reconstruction are secured and effectively utilised necessitated the introduction of bonds".

The donors of grants and loans, for example the World Bank, insist on various forms of bonds as requirement for construction contracts procurement (Ibid). Four out of ten insurance companies studied, State Insurance Company, Enterprise Insurance Company Ltd, Vanguard Assurance and Great African Insurance Company, were the earliest to start the business of issuing bonds in Ghana, and that began in 1988 (Ibid). The Ministry of Roads and Transport started insisting on bonds from 1988, and between 1988 and 1994 accepted bonds from only State Insurance Corporation (as it was then called). This was in pursuant of the operative decree NCRD 95 and 135 of 1972 which stipulates as follows: "An Insurance business relating to a body, risk,

property, job or project in which Government/State or a quasi-governmental organization has ownership interest of more than 50% should automatically be placed with the State Insurance Corporation (SIC). Otherwise the business can be placed with either SIC or any other competent local insurance company (Twumasi-Boakye, 1999).

### 2.2.2 The Requirement for Performance Securities in Ghana

As part of international and indeed some local procurement regulations, prospective bidders are required to provide bid security from financial institutions or surety companies acceptable to the employer as part of their tender documents and where the employer wishes to give the contractor some money in advance of the commencement of the work, the latter is required to provide a guarantee. After winning the contract, the contractor is required to provide performance bond as security against any default under the contract. The introduction of these checks and safeguards in the form of bonds have brought or expected to bring discipline and efficiency into the construction industry in Ghana (Fugar and Odei, 1999). On public funded projects, Public Procurement Act, 2003 (Act 663), clause 65(7) demand of successful contractors to sign a procurement contract with the procurement entity within 30 days of the receipt of the notice of acceptance and provide the required security for the Performance of the contract.

Failure to comply with the above leads to the cancellation of the contract and the forfeiture of the Tender Security, submitted during bidding. Chapter 5.17.1 of the manual to the Act also states that:

*Notice of the tender award shall be issued promptly to the successful Tenderer. The successful Tenderer shall be required to confirm in writing acceptance of the tender award and submit*

*the appropriate Performance Security (if required). The Tenderer shall be invited to attend for contract signature, or where this is not practical, provided with copies of the Contract for signature and return of signed copy of the Contract to the Procurement Entity. Failure of the Tenderer to confirm acceptance of the award, or to submit the Performance Security, or to sign the contract may constitute grounds for the annulment of the award and forfeiture of the Tenderer's Tender Security. In that event, the Procurement Entity may award the contract to the next lowest evaluated Tenderer, whose offer is substantially responsive and is determined to be qualified to perform the contract satisfactorily.*

The statement thus *"The successful Tenderer shall be required to confirm in writing acceptance of the tender award and submit the appropriate Performance Security (if required)"* in the clause above indicates that the Public Procurement Act, 2003 (Act 663), does not prescribe the issuance of Performance Security to procurement entities as a compulsory requirement to be undertaken by an award-winning contractor.

The FIDIC conditions of contract, adopted by most construction clients in Ghana, section 10.1 also states that:

*"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 the Letter of Acceptance, in the sum stated in the Appendix to Tender. When providing such security to the Employer, the Contractor shall notify the Engineer of so doing. 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 this Clause shall be borne by the Contractor, unless the Contract otherwise provides".*

### **2.2.3 Performance Bond/Guarantees Defined**

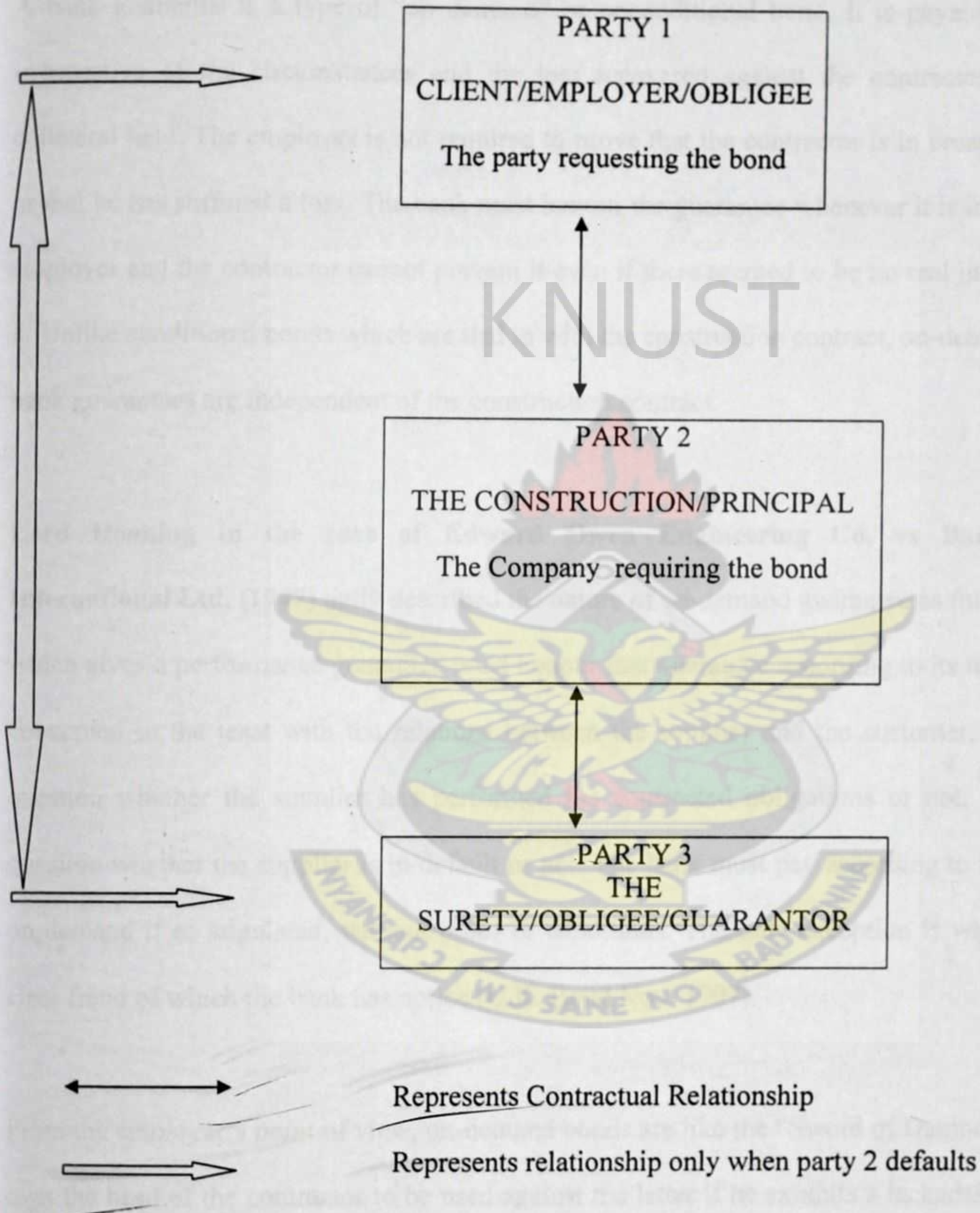
A security may be defined as something given or pledged as a guarantee especially for the payment of a debt (SIC Training Manual, 1994). Security could be bonds if issued by an insurance company or a guarantee if issued by a bank.

A bond is a contract where one party guarantees performance by another party an obligation or undertaking to a third party. It's a guarantee of correct performance of an obligation. That obligation may arise out of a contractual relationship, or it may exist because of a statute or ordinance governing the Principal's conduct. A surety bond is a written instrument in which two parties, the Principal and the Surety, become obligated to a third party, the Obligee, for the completion of an obligation or for the payment of a sum of money if the obligation is not fulfilled.

The party whose obligation or undertaking is performed is the **surety** and the one in whose favour the guarantee is given is the **beneficiary**. By the terms of construction contract bonds, the surety agrees to indemnify the employer (the Beneficiary/Obligee) against any default of the contractor (the Principal) (Fugar and Odei, 1999).

Contract bonds as can be seen are three party agreements that guarantee that the work will be completed as specified in the contract documents and that all construction cost will be paid (ibid).

The figure below illustrates the above-mentioned point:



Source: U.K. Bond Agent Ltd. Manual, 1997

**Fig 2.3: The relationship between parties to a contract bond.**

#### 2.2.4 Performance Guarantee and Performance Bond Compared

A bank guarantee is a type of “on demand” or unconditional bond. It is payable on demand irrespective of the circumstances and the loss recovered against the contractor and /or the collateral held. The employer is not required to prove that the contractor is in breach of contract or that he has suffered a loss. The bank must honour the guarantee whenever it is invoked by the employer and the contractor cannot prevent it even if there seemed to be no real justification for it. Unlike conditional bonds which are tied in with the construction contract, on-demand bonds or bank guarantees are independent of the construction contract.

**Lord Denning in the case of Edward Owen Engineering Co. vs Barclays Bank International Ltd. (1947)** aptly described the nature of on-demand guarantee as follows: A bank which gives a performance guarantee must honour that guarantee according to its terms. It is not concerned in the least with the relations between the supplier and the customer, nor with the question whether the supplier has performed his contracted obligations or not, nor with the question whether the supplier is in default or not. The bank must pay according to its guarantee, on demand if so stipulated, without proof or conditions. The only exception is when there is a clear fraud of which the bank has notice (U.K. Bond Nov. 1997).

From the employer's point of view, on-demand bonds are like the “Sword of Damocles” hanging over the head of the contractor to be used against the latter if he exhibits a lackadaisical attitude towards the project. Obviously therefore, on-demand bonds compel contractors to remain diligent.

Contractors on the other hand, are not generally enthusiastic about bank guarantees because from an accounting view point, a bank guarantee is treated as a contingent liability placed on the contractor's balance sheet. This restricts his future borrowing capacity and could have a dramatic effect on the contractor who might be having liquidity problems (Clough, 1981). Conditional Bonds are often provided by a surety or insurance company. Surety companies investigate claims to ensure that they are properly founded before deciding to pay or complete the contract. Bonds issued by surety companies do not reduce a contractor's working capital or ability to borrow money (Westring, 1985).

#### **2.2.5 Contract of Guarantee and Contract of Insurance Compared**

Insurance bonds, guarantees and other securities are not contracts of insurance. The most important fundamental difference between a contract of guarantee and a contract of insurance are:

- A contract of insurance is a two-party contract between an insurer and an insured in which the insurer undertakes direct obligation to the insured to indemnify him/her against a loss although the loss may be due to the default of the insured. A contract of guarantee on the other hand involves three parties, the employer, the guarantor and the contractor, where the guarantor in taking a fee from the contractor undertakes to answer for the contractor's obligation if the latter defaults.

- Under a contract of insurance there is usually no right of recovery against the insured. In a contract of guarantee, the contractor is ultimately liable for all circumstances of his default. A contract of guarantee therefore comes with yet another contract in which the contractor undertakes to indemnify the guarantor against the guarantor's expenses incurred as a result of the contractor's default. This ancillary contract is called a **counter indemnify or contract of indemnity**.

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- The premium charged in a contract of insurance is consideration of transfer of risk. On the other hand, the premium charged by a surety in a contract of guarantees is a fee or service charge for pledging a line of credit.
- A contract of insurance is a contract **uberrimae fide** (of utmost good faith). A contract of guarantee is not (Fugar and Odei, 1999).

#### 2.2.6 Merits of Performance Securities

According to Clough, (1981) contract bonds can be beneficial to contractors in a number of ways. When the contractor's ability to proceed with the works is being hampered by financial difficulties, the surety may choose to advance sufficient credit for the contractor to continue with work. Similarly, if claims have tied up the contractor's capital the surety may furnish bonds to discharge these claims to enable the contractor to proceed with the work.

They also added the following as some of the merits, i.e

- i. They serve as pre-qualification of contractors who are interested in bidding for a particular project
- ii. The cost is relatively small compared with the potential losses due to non-performance of a major construction or installation contract.

Asare (2005) also recommended the following, if considered by the various parties to a contract of guarantee, could be advantages of this requirement:

- The provision of financial assistance directly to a bonded contractor by a surety to keep the project moving. This assistance, he indicated, might occur without the involvement of the employer or without formal declaration of default.
- The guarantee of a line of credit by the surety to the contractor, when in financial difficulties. This assures a steady flow of materials to work site and payments to subcontractors.
- Make available professional expertise from the surety's outfit to minimise problems and losses on a project. To Asare (2005), one of the best tools for the risk management of construction projects is surety bonds.

#### **2.2.7 Demerits of Performance Securities**

The demerits of performance security, according to Westring (1985) are:

- i. The fact that smaller firms find it difficult to meet the requirement for obtaining performance bonds. The small-scale contractors generally have weak financial base. They hardly have the property of the value normally required as collateral for a performance bonds.

- ii. It is often the case that such contractors offer landed properties of friends and/or relatives as the collateral. The process of lawful transfer of such properties from the original owners to the contractors in the first place takes time. This, added to the red tape and bureaucracy involved in processing bonds, result in delay in the acquisition and submission of bonds. The bonding requirement limits the number of firms able to compete for a project and
- ii. From the employer's point of view, the circumstances under which the bond can be invoked are either specified in favour of the contractor and the surety or not specified at all.

The CSI Training and Development Paper No: POC/4 added the following demerits:

- i. Unnecessary additional cost on construction projects.
- ii. Reduction of contractor's overdraft facilities.
- iii. A charge on the company's assets that often require personal indemnities from directors.
- iv. Extreme variations in cost of securities due to the limited market for securities vis-a-vis the level of demand.
- v. Wastage of money by employers with a continuous and substantial construction programmes who request for securities having regard to the small number of occasions when bonds are called compared with the volume of work.
- vi. The assumption that a contractor's inability to obtain security means he/she is financially unsound.

#### **2.2.8. Default by the Contractor**

Construction contracts have two segments of performance period which are construction period and maintenance or defects liability period.

The surety may be liable in any of the following:

- i. If the work is not done at all
- ii. If the work is done but not completed within the agreed period
- iii. If the work is completed within the time but not as specified
- iv. If the work is completed within the stipulated time but defects/deterioration becomes evident within defects liability period (Binewoatsor 1994).

The contractor can also default in terms of the provision of critical key personnel and equipment, which he said he said he was going to provide at the time of underwriting (Asare, 2005).

The FIDIC conditions of contract section 63.1 identify the following as constituting a default by the contractor:

*“If the Contractor is deemed by law unable to pay his debts as they fall due, or enters into voluntary or involuntary bankruptcy, liquidation or dissolution (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or becomes insolvent, or makes an arrangement with, or assignment in favour of, his creditors, or agrees to carry out the Contract under a committee of inspection of his creditors, or if a receiver, administrator, trustee or liquidator is appointed over any substantial part of his assets, or if, under any law or regulation relating to reorganization, arrangement or readjustment of debts, proceedings are commenced against the Contractor or resolutions passed in connection with dissolution or liquidation or if any steps are taken to enforce any security interest over a substantial part of the assets of the Contractor, or if any act is done or event occurs with respect to the Contractor or his assets which, under any applicable law has a substantially similar effect to any of the foregoing acts or events, or if the Contractor has contravened Sub-Clause 3.1, or has an execution levied on his goods, or if the Engineer certifies to the Employer, with a copy to the Contractor, that, in his opinion, the Contractor:*

- (a) *has repudiated the Contract,*
- (b) *without reasonable excuse has failed*
  - (i) *to commence the Works in accordance with Sub-Clause 4.1.1, or*
  - (ii) *to proceed with the Works, or any Section thereof, within 28 days after receiving notice pursuant to Sub-Clause 46.1,*
- (c) *has failed to comply with a notice issued pursuant to Sub-Clause 37.4 or an*

instruction issued pursuant to Sub-Clause 39.1 within 28 days after having received it,

(d) despite previous warning from the Engineer, in writing, is otherwise persistently or flagrantly neglecting to comply with any of his obligations under the Contract, or

(e) has contravened Sub-Clause 4.1,

then the Employer may, after giving 14 days' notice to the Contractor, enter upon the Site and the Works and terminate the employment of the Contractor without thereby releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and authorities conferred on the Employer or the Engineer by the Contract, and may himself complete the Works or may employ any other contractor to complete the Works. The Employer or such other contractor may use for such completion so much of the Contractor's Equipment, Temporary Works and materials as he or they may think proper".

### 2.2.9. Remedies for Default by the Contractor

When the contractor properly performs his obligations under the contract and after the expiration of any agreed warranty period, the bond expires and the bond agreement is discharged and will no longer have any force or effect. If on the other hand, the contractor fails to discharge his obligations, the surety must complete the contract and pay all costs up to the face amount of the bond. The FIDIC conditions of contract states that:

*"Prior to making a claim under 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".*

How the surety company completes the contract is a matter for it to decide. The following alternatives are possible:

- i. Surety may give financial support to the prime contractor to complete the project under the supervision of a consultant employed by the surety.
- ii. Surety may select a new contractor through a competitive bidding to complete the works,  
or

- iii. Surety may select a new contractor to complete the works on a cost-reimbursement basis.
- iv. The new contractor will enter into a contract with the surety or the owner for the completion of the remaining work.

When the surety undertakes to complete the works following a default of the contractor, all rights and obligations under the contract are transferred from the prime contractor to the surety. The surety becomes entitled to all remedies the owner may have against contractor under the contract. The surety is entitled to be paid the residue of the contract amount which is: "the total amount payable by the employer under the contract and the amendment thereto, less the amount properly paid by the owner". The surety may also pursue any outstanding claims which the original contractor might have had against the employer (Clough, 1981).

A contract of guarantee is an accessory contract. That is, it is contract which is ancillary and subsidiary to some other prior or fundamental contract on which it is based or founded and without which it must fail. This means that if the employer is in breach of contract, for example, for not honouring interim payments as and when they become due, the contractor is released from any liability under the contract. In view of the fact that the obligations of the surety to the employer are the same as those of the contractor to the employer, any action or inaction of the employer that would release the contractor from his obligations also releases the surety (Clough, 1981).

## **2.2.10 Securing Bonds/Guarantees in Ghana**

### **2.2.10.1 Establishing the Credibility of the Contractor**

To access a bond or guarantee in Ghana, a contractor approaches a bank or an insurance company. The National Insurance Commission (NIC) publishes from time to time insurance companies of good standing and it is up to the contractor to cross-check for companies of integrity. The under-listed are licensed insurers, in current standing (2008), issued by the National Insurance Commission, Ghana:

1. CDH Insurance Co. Ltd
2. Donewell Insurance Co. Ltd
3. Enterprise Insurance Co. Ltd
4. Equity Insurance Co. Ltd
5. Ghana Union Assurance
6. Glico General Insurance Ltd
7. Global Alliance Insurance
8. Industrial and General Insurance Ghana Ltd
9. Metropolitan Insurance Co. Ltd
10. Phoenix Insurance
11. Prime Insurance Co. Ltd
12. Provident Insurance Co. Ltd
13. Quality Insurance Co. Ltd
14. SIC Insurance Co. Ltd
15. Star Assurance Co. Ltd



James Frank (1991) quoted by Fugar and Odei (1997) says that “by agreeing to issue a bond, the surety in fact is saying that he believes that the contractor is financially sound and has all the

resources to complete the contract in question.” In fact, before a surety company will issue a surety bond, a thorough pre-qualification is conducted to ascertain the financial the character, capacity and capital holding of the contractor. It involves a complete review of financial statements, capacity to perform, organizational structure, management, trade references, credit history and banking relationships. Because preventing contractor default is a key component to the surety business, surety companies and surety bond producers ought to be experts at sporting business practices and conditions that can lead to contractor failure. It must be satisfied that the contractor runs a well managed, profitable enterprise, deals fairly and performs obligations as agreed (Asare, 2005). Asare (2005) proposed the analysis of the following:

**Table 2.1: Factors to be analyzed by Surety Companies**

Financial Strength	Ability to Perform	Reputation with
Annual and interim financial statements	Prior experience on similar projects	Project owners
Investment strategies	Equipment	Subcontractors
Cost control mechanisms	Personnel	Suppliers
Work in progress	Past, current and future workload (bonded and non-bonded)	Lenders
Cash flow	Continuity plan	-
Net worth	Organization	-
Working capital	Management plan	-
Bank and other credit relationships		-

Asare (2005) further, advocated an analysis of external factors which may adversely affect a contractor’s ability to perform. He recommended that surety companies should retain consultants such as Quantity Surveyors, Architects and Engineers to assist in the underwriting process.

The Surety Information Office-USA supports a diligent pre-qualification of surety-seeking contractors. They aver that, although government's prequalification screening of contractors obviously is necessary for government projects. The government elected to use the surety mechanism, so the surety assumes the prequalification responsibility and protects the government against loss when a bonded contractor defaults. They outline a number of reasons why contractor prequalification by government employees is an unattractive alternative. For instance:

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- Every contractor is unique and every construction project is different. Thus, it is impossible to use purely objective standards in making sound contractor prequalification decisions. A subjective decision made by government employees is difficult for the government to defend if it is challenged by a disappointed applicant.
- *When the private surety industry is used as the prequalifier of the contractor applicant, this problem is eliminated for the government.*
- Contractors that are rejected by a government official have no place to go in search of a different result except to court. Lawsuits are expensive and time-consuming. Of course, if the suit succeeds, the government is now forced to use a contractor it wanted to avoid.
- *When a contractor is turned down by a surety, the contractor may seek a different result from a competitor.*
- When a government prequalifier makes a mistake in judgment, the taxpayer pays for the loss, not the government official who made the bad decision.

- *When the surety makes a mistake in judgment, it pays. This forces the surety to make prudent prequalification decisions, thus the government and the taxpayers are protected.*
- Whenever government officials are responsible for deciding which private contractors will be allowed to perform public contracts, it is virtually impossible to prevent contractors from using political influence to obtain a favorable prequalification decision.
- *When private sector sureties are used, the potential for such corrupt activity is practically eliminated.*
- Contractors may be reluctant to divulge business information to a government prequalifier who is, in effect, a representative of the potential owner of the construction project.
- *With private sector sureties, contractors are submitting their applications and business information to a third party, the surety, and not the party they will be contracting.*

Surety companies in Ghana normally require some or all of the following information from the applicant:

- Copy of the award
- Copy of certificate of incorporation
- Copy of current certificate of classification from Ministry of Works and Housing/Ministry of Roads and Highways
- Details of shareholders/directors of the company - (name, share, position in firm)

- Details of technical personnel of the company – (name, qualifications, years of experience, position in firm)
- Details of equipment holding of the company (type, model, age, number, remarks on the state of equipment)
- Details of work in-hand and stages of completion
- Details of projects executed within the last two years (title, contract sum, client, date of award, contract period, % completed, date of completion)
- Copy of programme of work
- Copy of bills of quantities
- Details of material prices
- Details of property to be used to be used as security for the facility (collateral)
- Company's current financial statement and for the last three years.

### **2.2.11 Amount of Securities Demanded by Employers**

The level of collateral required from contractors depends on the type of the bond and the bond amount. The bond amount, which depends upon the level of protection being sought by the employer, is stated in bidding and contract documents (Fugar and Odei, 1999).

A task force commissioned by the European Union in 2000 to study existing systems of contract bonds and consider how such systems contribute to prevention, detection and elimination of Abnormally Low tenders and if so study how any such successful systems could be developed or adapted as an appropriate and efficient system for the European Market, taking into account the

interest of SMEs revealed that: Performance bonds for a higher percentage (over 20%) are in use in some countries: in France, a performance bond, equivalent to 100% of the contract price, is required in the private housing sector, in Italy, a 100% performance bond for public contracts superior to Euro100million and in North America, the study discovered that bond values are; 100% of the contract value in the US and 50% in Canada.

The practice, currently in Ghana, is for the successful bidder to provide either a performance security in the form of an unconditional Bank Statement in the amount of 10% of the Contract Sum; or a Performance Bond issued by an Insurance Company in good standing with the National Insurance Commission and acceptable to the Employer in the amount of 30% of the Contract Sum. These amounts are The World Bank's recommendation (World Bank, 1984).

#### **2.2.12 Performance Security Premiums and Recovery**

The premium charged by surety/insurance companies and banks in Ghana vary and depends upon the value of the security, the security market and the risk perceived by the guarantor. It is calculated as a percentage of the bond amount and is within 1.0 – 2.0%. The premium for securities are paid in advance and the contractor will have either covered the cost in his prices for the contract or will be reimbursed the actual costs if the contract so provides.

In some contract documents for building works, where contractors are required to provide performance security, a provision is made in the **Preliminaries** section of the bills of quantities for the contractor to recover his cost (Fugar and Odei, 1999).

### 2.2.13 Release of Securities by Employer

As soon as the contractor has discharged his obligations and after expiration of any specified warranty period, the security agreement ceases to be of any effect and the employer is obliged to release the security to the contractor.

The FIDIC conditions of contract, section 10.2 states that: *"The performance security shall be valid until the Contractor has executed and completed the Works and remedied any defects therein in accordance with the Contract. No claim shall be made against such security after the issue of the Defects Liability Certificate in accordance with 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"*.

The period for release of bonds and guarantees to the contractor are stipulated either in the Bidding documents or Contract documents. In Ghana, it is normally one year for bonds and 28 days for guarantees from the date of issuance of certificate of completion. Employers are expected to adhere strictly to this. Unfortunately, this is not generally the case. Some employers have to be reminded before the securities are released. The longer the security remains with the employer, the more financial burden imposed on the contractor (Fugar and Odei, 1999).

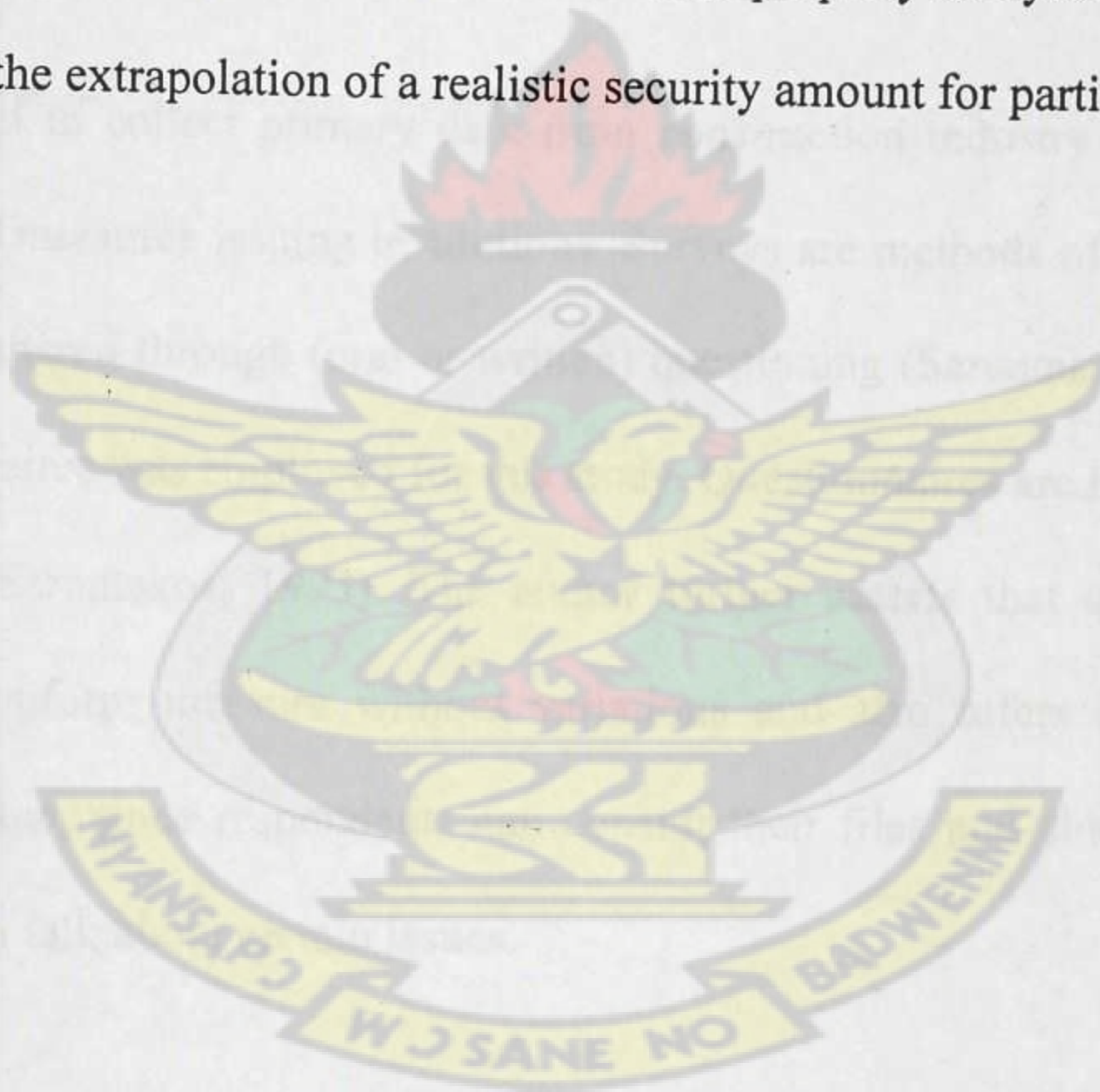
### 2.3. Conclusion

The Literature Review has, clearly, indicated that, although Performance Security is a tool for the client to transfer risk, other equally appropriate risk transfer options are available and can be

used to reduce the challenges that contractors encounter in the acquisition of a Performance Security.

Furthermore, security amounts specify by clients is arbitrary without recourse to a scientific analysis of particular projects. Each construction project has its own peculiar circumstances in terms of occurrences that will lead to a probable default, be it time or cost overruns or quality.

Finally, the list of factors that the literature identified when properly analysed, individually and collectively can lead to the extrapolation of a realistic security amount for particular project.



## CHAPTER THREE

### RESEARCH METHODS AND DESIGN

#### 3.0 INTRODUCTION

This chapter deals with the methods used for the conduct of the study. It spells out the sampling method, data collection method and analysis.

#### 3.1 SURVEY

A survey was conducted to collect primary data from construction industry professionals and Performance Bond and Guarantee issuing institutions. Surveys are methods of data collection in which information is gathered through (oral or written) questioning (Sarantakos, 1993). Written questioning or questionnaires was employed for this study. Questionnaires are less expensive and produce quick results (Sarantakos, 1993). The author further asserts that questionnaires are stable, consistent and uniform measure without variations and also offers a considered and objective view on an issue, since respondents can consult their files and since many subjects prefer to write rather than talk about certain issues.

#### 3.2 DESIGN OF QUESTIONNAIRE

The questionnaire (attached) consisted of both open-ended and fixed-alternative questions. The open-ended questions left the format of the answer to the respondent whereas the other offered a set of responses of which one must be considered.

The questionnaire was divided into five sections. The first set of questions was intended to seek information about the names of respondents and establishments in which they work.

The second set of questions dealt with the demography of the respondent (i.e. educational level and the position they occupy).

The third set of questions sought to ascertain respondents' general appreciation of risk management. The fourth section sought answers to questions on performance security. Finally, respondents, in section five were requested to give their opinions on the likelihood of occurrence and subsequent impact of a comprehensive list of risk factors associated with the construction industry that necessitate the demand for performance bonds/guarantees. Therefore 5-point likert scales were employed in the questions to indicate the likelihood of occurrence and degree of impact of each of the risk factors.

In relation to likelihood of occurrence, "1" represented very low, "2" represented low, "3" represented medium, "4" represented high and "5" represented very high, . In the case of degree of impact, "1" represented very low, "2" represented low, "3" medium, "4" represented high and "5" represented very high.

The second part demanded of respondents, based on their experience in the construction industry, to select the most appropriate risk response option to be adopted by clients for each of the risk factors.

### **3.2.1 Sampling Method**

A purposive sampling method was be adopted to select quantity surveying firms registered with the Ghana Institution of Surveyors and governmental agencies like the Department of Feeder

Roads, Department of Urban Roads, Ghana Highways Authority, Public Works Department and the Architectural and Engineering Services Limited in Kumasi and Accra.

These respondents who act as consultants to the construction industry's clients and are involved in the preparation of tender and contract documents have been purposely chosen because they are relevant to the research topic.

Furthermore Banks and Insurance companies in good standing with the Bank of Ghana and the National Insurance Commission respectively were surveyed. According to Sarantakos (1993), in purposive sampling, the judgement of the investigator is more important than obtaining a probability sample.

### 3.2.2 Questionnaire Administration

Questionnaires were sent to all the respondents mentioned above personally and a two month period was used for collection. The sample frame obtained is detailed in Table 3.1

**Table 3.1: Sample Frame of the Respondents**

<b>Respondent</b>	<b>No. of Respondents</b>	<b>No. of Questionnaires Allotted</b>
Quantity Surveying Firms and Government Institutions	70	70
Banks	26	26
Insurance Companies	17	17
<b>Total</b>	<b>113</b>	<b>148</b>

Source:

Quantity Surveying Firms: website of the Ghana Institution of Surveyors

Banks: : Bank of Ghana website

Insurance Firms : website of the National Insurance commission

### 3.2.3 Questionnaires Returned

As indicated in Table 3.2, a total of 84 questionnaires were sent to the respondents. A total of 59 questionnaires representing 70% of the total questionnaires administered were returned. Table 3.2 shows details of the questionnaires administered and the return rate.

*Table 3.2 Details of Questionnaires Administered and Returned*

Respondents	Sample size	No. of Questionnaires distributed	No. of Questionnaires returned	Percentage returned
Quantity Surveying Firms and Government Institutions	70	41	35	85
Banks	26	26	15	58
Insurance Companies	17	17	9	53
<b>Total</b>	<b>113</b>	<b>84</b>	<b>59</b>	<b>65</b>

Source: Field Survey, November –December, 2009

### 3.2.4 Data analysis Tool

The analytical tool used in analysing the responses from the survey was frequency index. This was employed to produce a Frequency- Impact Matrix in the form of figure 2.2 in the Literature Review.

## Index

Frequency index explains the usual occurrence or exhibiting of the characteristics of the factors. The nearer the value of frequency index to unity (1), the more likelihood of the various factors occurring.

A ranking of frequency indices were done to ascertain the most frequent factors.

$$\text{Frequency index (F.I.)} = \frac{5n_1 + 4n_2 + 3n_3 + 2n_4 + n_5}{5(n_1 + n_2 + n_3 + n_4 + n_5)}$$

Where:  $n_1$  –number of respondent answered 'very high'

$n_2$  –number of respondent answered 'high'

$n_3$  –number of respondent answered 'medium'

$n_4$  –number of respondent answered 'low'

$n_5$  –number of respondent answered 'very low'

Impact index facilitate the identification of degree of impact of the various factors should they occur. The nearer the value of importance index is to unity (1), the more higher the degree of impact of the various factors, should they occur and hence attention needs to be directed towards the effects of such factors. A ranking of impact indices were done to ascertain the degree of impact of the factors.

$$\text{Impact index (I.I.)} = \frac{5n_1 + 4n_2 + 3n_3 + 2n_4 + n_5}{5(n_1 + n_2 + n_3 + n_4 + n_5)}$$

Where:  $n_1$  –number of respondent answered 'very high'

$n_2$  –number of respondent answered 'high'

$n_3$  –number of respondent answered 'medium'

$n_4$  –number of respondent answered ‘low’

$n_5$  –number of respondent answered ‘very low’

A product of the frequency index and the impact index indicates the overall effect of the various factors. This was calculated using the formula below:

$$\text{Overall Effect Index (O.E.I.)} = \text{Impact Index} \times \text{Frequency Index.}$$



## CHAPTER FOUR

### ANALYSIS AND INTERPRETATION OF DATA

#### 4.0 INTRODUCTION:

This chapter is dedicated to the presentation and analysis of the data collected. The presentation and analysis is under four main sections, namely; Demographic Characteristics, Risk Management, Performance Security and Frequency-Impact Matrix.

#### 4.1 DEMOGRAPHIC CHARACTERISTICS

##### 4.1.1 Educational Level

The level of qualification of respondents was sought by the author because the ability of respondents to appreciate the contents of the questionnaire is of paramount importance.

*Table 4.1 Qualification of Respondents:*

Professionals	Qualification			Total
	H.N.D	BSc	Others	
Quantity Surveying Firms/Employers	14%	60%	26%	100%
Banks	13%	60%	27%	100%
Insurance Firms	22%	67%	11%	100%

*Source: Field survey, November – December, 2009*

From their qualifications in Table 4.1, all the respondents were capable of appreciating the questions posed to them in the questionnaire and therefore their responses were reliable. The level of qualification for a respondent in studies such as this is important to extract reliable information that can be used in decision making.

#### 4.1.2 Position Occupied

The position occupied by respondents was sought by the author because, again, the ability of respondents to appreciate the contents of the questionnaire is of paramount importance. Furthermore, in the case of the financial institutions, who have Risk Management Departments, answers from the head or senior staffs of the department were desirable.

**Table 4.2** *Positions Occupied by Respondents:*

Professionals	Position			Total
	Quantity Surveyor	Project Manager	Others	
Quantity Surveying Firms/Employers	60%	11%	29%	100%
Banks	-	-	100%	100%
Insurance Firms	-	-	100%	100%

*Source: Field survey, November – December, 2009*

Table 4.2 above, indicates clearly that, all the respondents were capable of appreciating the questions posed to them in the questionnaire and therefore their responses were reliable.

## 4.2: RISK MANAGEMENT

### 4.2.1 Risk Management Practice

Respondents were asked whether risk management was practice in their outfits.

**Table 4.3** *Risk Management Practice:*

Professionals	Response	
	Yes	No
Quantity Surveying Firms/Employers	34%	66%
Banks	100%	-
Insurance Firms	100%	-

*Source: Field survey, November – December, 2009*

Table 4.3 depicts clearly the fact that whilst the financial institutions incorporate Risk Management in their operations, most of the Quantity Surveying firms and Employers do not. This can be attributed to the fact that Risk Management practice is a new concept that in this part of the world. In the case of the financial institutions, Risk Management is core part of their operations.

#### 4.2.2. Steps Employed for Risk Management

As sequel to the question on the practice of Risk Management, the author, by this question, sought to ascertain the respondents' grasp of identified steps for effective risk management.

**Table 4.4 Steps Employed for Risk Management:**

Professionals	Risk Identification			Risk Analysis		Risk Response				Others
	HD	CH	BS	QRA	QuRA	RR	RiR	RT	RA	
Quantity Surveying Firms/Employers	12	12	12	12	12	12	12	12	12	-
Banks	15	15	15	15	15	15	15	15	15	-
Insurance Firms	9	9	9	9	9	9	9	9	9	-

Source: Field survey, November – December, 2009

**Key:**

- HD: Historical data
- CH: Checklist
- BS: Brainstorming
- QRA: Quantitative Risk Analysis
- QuRa: Qualitative Risk Analysis
- RR: Risk Reduction
- RiR: Risk Retention
- RT: Risk Transfer
- RA: Risk Avoidance

Table 4.4 above further confirms that unlike Quantity Surveying firms and Employers, the financial institutions practice risk management. Furthermore, the identified steps for effective risk management, as identified in literature, are employed by all the institutions.

### 4.3: PERFORMANCE SECURITY

#### 4.3.1.: Quantity Surveying Firms/Employers

##### 4.3.1.1: Usage of Performance Security

The figure below presents the findings on the usage of Performance Security by Quantity Surveying Firms and Employers. The indication, as per the table, is that the demand of Performance Security by clients from contractors has been adopted as a means of guaranteeing performance. Respondents who responded “No” indicated that they work mostly for Private institutions and individuals.

**Fig. 4.1 Usage of Performance Securities**



Source: Field survey, November – December, 2009

#### 4.3.1.2: Amount of Performance Security Specified

Table 4.5 Amount of Performance Security Specified:

Amount as a Percentage of Contract Sum	Response	
	Performance Guarantee	Performance Bond
1-10%	100%	0
11-20%	0	0
21-30%	0	100%
31-40%	0	0
41-50%	0	0
51-60%	0	0
61-70%	0	0
71-80%	0	0
81-90%	0	0
91-100%	0	0

Source: Field survey, November – December, 2009

From Table 4.5, all the respondents requested for 1-10% and 21-30% of Contract Sums as Performance Security and Performance Bond respectively. This goes to buttress the point that the World Bank recommendation as alluded to in the Problem Statement has been adopted by industry practitioners. The traditional responsibility of consultants, among other things, includes the provision of designs, bills of quantities and specifications for the implementation of projects.

However, consultants must incorporate risk management practices into their work, so that they can adequately counsel their clients on, for example on, the amount of performance security they should demand and the appropriate risk response options for risk factors that can affect a project, negatively or positively, throughout the project life-cycle.

#### 4.3.1.3: Basis for the Amount of Performance Security Specified

**Table 4.6** *Basis for the Amount of Performance Security Specified:*

Basis for Amount Specified	Response
Codes, Standards	-
Standard Conditions of Contract	-
Based on Risk Analysis	-
Existing Tender Documents	100%

As depicted in Table 4.6 all the respondents specified the amount of Performance Security as a percentage of the Contract Sum based on the tender documents. The inference that can be drawn from this response is that the amount is not based on scientific analysis of current happenings. It is in the light of this that, this study, as part of its objective, sought to develop a basis for determining the security amount for construction projects vis-à-vis the risk anticipated.

#### 4.3.1.4: Number of Projects Executed against the Number Revoked in the Last Five Years (2004-2008)

**Table 4.7** *Number of Projects Executed against the Number Revoked in the Last Five Years (2004-2008):*

Year	Number of Projects Executed	Number of Companies	Number Revoked
2008	Above 100		-
	50-100		-
	20-49		-
	10-19	2	-
	Below 10	33	1
2007	Above 100		-
	50-100		-
	20-49		-
	10-19	5	-

	Below 10	30	-
2006	Above 100		-
	50-100		-
	20-49		-
	10-19	4	-
	Below 10	31	1
2005	Above 100		-
	50-100		-
	20-49	1	-
	10-19	11	-
	Below 10	23	-
<b>Year</b>	<b>Number of Projects Executed</b>	<b>Number of Companies</b>	<b>Number Revoked</b>
2004	Above 100		-
	50-100		-
	20-49	2	-
	10-19	13	2
	Below 10	20	-

Source: Field survey, November – December, 2009

Table 4.7 indicates that infinitesimal numbers of Performance Securities are invoked vis-à-vis projects executed. This goes to buttress the assertion that Performance Securities are less “risky securities” in relation to Advance Payment Bond, for example (Fugar and Odei, 1999). Furthermore, employers are unable to invoke Performance Securities because, consistently, they default in, among other things, honouring Interim Payment Certificates and other payments due the contractors. The point need to made that in the few cases of revocations, the surety companies provided the financial support to the defaulting contractors to complete the project.

#### 4.3.1.6: Provision for the Recovery of the Cost of Securing Securities

The premium for Bonds are paid in advance and the contractor will have either covered the cost in his prices for the contract or will be reimbursed the actual cost if the contract so provides.

Figure 4.9 below indicates that 74% of the respondents interviewed make provision for the recovery of the cost of securing securities by inserting an item, for that purpose, in the preliminary sections of the Bill of Quantities; 26% however treated it as General Office Overhead.

#### 4.3.1.7: Release of Securities by Employers

The period for the release of Securities are specified in most Tender or Contract Documents. However, this study revealed that 76% of Employers do not release Securities to contractors who have adequately and successfully executed their part of the contract; 24% however do so, if requested for, by the contractor.

#### 4.3.2.: Security-Issuing Organizations

##### 4.3.2.1: Number of Performance Securities Issued against the Number Revoked in the Last Five Years (2004-2008)

**Table 4.8** *Number of Performance Securities Issued against the Number Revoked in the Last Five Years (2004-2008):*

Year	Number of Securities Issued	Number of Companies	Number Revoked
2008	Above 100	7	1
	50-100	2	1
	20-49	0	-
	10-19	1	-
	Below 10	14	-
2007	Above 100	5	1
	50-100	2	-
	20-49	0	-
	10-19	2	-
	Below 10	15	-

2006	Above 100	3	-
	50-100	5	-
	20-49	1	-
	10-19	1	-
	Below 10	14	-
<b>Year</b>	<b>Number of Projects Executed</b>	<b>Number of Companies</b>	<b>Number Revoked</b>
2005	Above 100	0	-
	50-100	9	1
	20-49	0	-
	10-19	0	-
	Below 10	15	-
2004	Above 100	6	-
	50-100	2	-
	20-49	1	-
	10-19	1	-
	Below 10	14	-

Source: Field survey, November – December, 2009

As indicated in Table 4.8, an infinitesimal numbers of Performance Securities are invoked vis-à-vis the number issued. Enforcing the point that Performance Securities are less “risky securities” in relation to Advance Payment Bond, for example (Fugar and Odei, 1999). Furthermore, most of the organizations that had issued less than Ten (10) Securities were Banks. This can be attributed to the fact that Bank Guarantees are on-demand bonds and are expensive, therefore contractors prefer Bonds from Insurance Companies. The few contractors that opted for Bank Guarantees might have done so because some clients demand that specifically. The Community-Based Rural Development Project (a poverty reduction intervention, funded by the World Bank) for instance demands Bank Guarantees as Performance Security.

#### 4.3.2.2: Documents Demanded by Performance Security- issuing Organizations

**Table 4.9 Documents Demanded by Performance Security- issuing Organization:**

Documents	Percentage of Organizations (%)
Copy of the award	100
Copy of certificate of incorporation	100
Copy of current certificate of classification from Ministry of Works and Housing/Ministry of Roads and Highways	100
Details of shareholders/directors of the company	100
Details of technical personnel of the company	25
Details of equipment holding of the company	25
Details of work in-hand and stages of completion	25
Details of projects executed within the last two years	25
Copy of programme of work	25
Copy of bills of quantities	25
Details of material prices	25
Details of property to be used to be used as security for the facility (collateral)	100
Company's current financial statement and for the last three years.	50

These findings go to confirm Asare's (2005) assertion that sureties grant securities without any critical underwriting. The findings signify that, important documents like details of work in-hand and stages of completion, details of projects executed within the last two years and copy of programme of work, which underwriters can scrutinize to ascertain the technical capacities of contractors are not requirements for issuing securities.

#### 4.3.2.3: Period for the Issuance of Performance Securities

**Table 4.10 Periods for the Issuance of Performance Securities:**

	>14days	14-28days	<28days
Organisations	66%	32%	2%

Table 4.10 shows clearly that 66% of organisations issue securities within 14 days of requesting them, 32% from 14- 28 days and 2% after 28 days and of course with all the necessary documents. Employers, in any case, demand the submission of securities within 14 days and in some cases 28 days.

#### 4.3.2.4: Premium Charge for the Issuance of Performance Securities

Table 4.11 Premium Charge for the Issuance of Performance Securities:

	>1% of the value	1-2% of the value	<2 of the value	Other
Organisations	-	62%	-	38%

Table 4.11 depicts that 62% of organisations charge 1% of the value of the security value as premium and these are the insurance companies who issue bonds. However, the 38% take the value of the performance security, through bank draft and they are the banks.

#### 4.4: RISK RESPONSE OPTIONS FOR RISK FACTORS ASSOCIATED WITH THE CONSTRUCTION INDUSTRY

Table 4.12 presents respondents preference of the risk response options, namely; risk reduction, risk transfer, risk avoidance and risk retention, available to deal with the risk factors associated with the construction industry. Respondents indicated the best risk response option for each of the risk factors identified in the literature.

Table 4.12: Risk Response Options for Risk Factors

Code	RISK FACTORS	RISK AVOIDANCE	RISK REDUCTION	RISK TRANSFER	RISK RETENTION	TOTAL
<b>A</b>	<b>Personnel Risk</b>					
<b>AI</b>	<b>Technician and Labour</b>					
1	Frequent job change by skilled labour	12	42	5	0	59
2	Lack of skilled labour	10	44	4	0	58
3	Lack of labour	21	29	9	0	59
4	Strikes and labour disputes	23	26	4	6	59
5	Lack of experience supervisors	32	20	0	0	52
<b>B</b>	<b>Technical Risk</b>					
<b>BI</b>	<b>Materials</b>					
6	Materials shortage	13	44	2	0	59
7	Late material delivery	6	50	2	1	59
8	Increase in the cost of materials	13	12	32	1	58
9	Damage during storage	14	13	29	2	58
10	Damage during transportation	10	44	4	1	59
<b>BII</b>	<b>Equipment</b>					
11	Frequently out of order or damaged	22	24	12	0	58
12	Unavailability of equipment	8	32	19	0	59
13	Unavailability or high cost of spare parts	23	8	28	0	59
14	High maintenance cost.	18	12	27	1	58
<b>BIII</b>	<b>Construction Process</b>					
15	Low productivity due to severe climate	9	12	3	34	58
16	Errors or omissions in BOQ	14	44	0	0	58
17	Insufficient time to prepare bids	16	42	0	1	59
18	Delay of information from designers	8	44	4	1	57
<b>BIV</b>	<b>Construction Site</b>					
19	Access problems	10	39	9	0	58
20	Work hours limited	10	12	34	1	57
21	Traffic congestion	15	35	6	2	58
22	Local regulations	34	8	17	0	59
23	Theft	9	48	0	0	57

Code	RISK FACTORS	RISK AVOIDANCE	RISK REDUCTION	RISK TRANSFER	RISK RETENTION	TOTAL
<b>BV</b>	<b>Ground Conditions</b>					
24	Lack or inadequate site investigation	10	44	4	1	59
25	Errors in information on site investigation	9	43	6	0	58
<b>C</b>	<b>Construction Design Risk</b>					
26	Inadequate or ambiguous specifications	10	47	2	0	59
27	Errors in drawings	12	44	2	0	58
28	Incomplete design scope	10	45	3	1	59
29	Innovative construction method	38	15	2	1	56
30	New materials and equipment	32	19	4	3	58
31	Non-standard details of drawings	37	17	4	1	59
32	Errors in estimate	9	43	4	1	57
33	Incompatibility between drawing and method	10	44	4	1	59
<b>D</b>	<b>Political and Regulation Risk</b>					
34	Frequent changes in law	10	12	24	12	58
35	War, revolution or civil disorder	10	1	23	1	35
36	Requirements to use local labour	9	21	4	23	57
37	Customs and import restrictions	10	8	23	18	59
38	Unstable politics	10	13	1	34	58
39	Embargo	3	5	14	36	58
40	Long procedure for approval and permits	9	32	17	1	59
<b>E</b>	<b>Financial Risk</b>					
41	Slow payment by clients	3	23	34	0	60
42	Inadequate payment for variations	2	32	24	0	58
43	Financial problems due to errors in estimate	8	47	3	1	59
44	Inflation	17	4	38	0	59
45	Exchange rate fluctuation	15	6	37	1	59
46	High local and national taxes	10	5	38	6	59
47	High interest rate	9	5	36	8	58

Code	RISK FACTORS	RISK AVOIDANCE	RISK REDUCTION	RISK TRANSFER	RISK RETENTION	TOTAL
F	<b>Environmental Risk</b>					
48	Pollution due to construction process	7	47	4	0	58
49	Waste treatment regulations and laws	12	2	43	1	58
50	Preservation of historical findings	34	12	12	1	59
	<b>TOTAL</b>	705	1320	660	203	2888
	<b>PERCENTAGE</b>	17	75	7	2	100

The table above indicates, clearly, that 75% of the respondents prefer Risk Reduction as the best Risk Response tool, followed by 17% for Risk Avoidance, 7% for Risk Transfer and 2% for Risk Retention. A thorough Risk Management process as recommended in the Literature Review (see Fig 2.1) with risk reduction as the risk response for every project will reduce the probability and/or impact of risk. Furthermore, Performance Securities, a risk transfer option, can be made less use of if, as mentioned above, a thorough Risk Management exercise is carried out by all the players (i.e. Employers, Consultants, Contractors and Security-issuing Financial Institutions) for every project.

#### 4.5: FREQUENCY- IMPACT GRID

Risk Grid/Matrix is a simple way to map risk. A typical risk matrix is indicated in the Literature Review (see fig. 2.2). Depending on which "box" on the grid each risk is placed in, based on probability and impact, it can be prioritized as having low, medium or high priority for further investigation and consideration.

Table 4.13 is a ranking of the risks factors based on likelihood of occurrence, impact and likelihood/impact. The ranking of the risk factors where done using the frequency index which has been explained in chapter three.

Code	Risk Factors	Respondents on Frequency					Frequency Index (F.I.)	Rank (F.I.)	Respondents on Impact					Impact Index (I.I.)	Rank (I.I.)	Overall Effect Index (OE.I.)	Rank (OE.I.)		
		Frequency							Impact										
		1	2	3	4	5			Total	1	2	3	4					5	Total
<b>A</b>	<b>Personnel Risk</b>																		
<b>AI</b>	<b>Technician and Labour</b>																		
1	Frequent job change by skilled labour	6	12	22	13	5	58	0.597	31	12	10	14	12	10	58	0.593	40	0.354	37
2	Lack of skilled labour	2	2	12	31	12	59	0.766	16	2	6	13	20	18	59	0.756	28	0.579	20
3	Lack of labour	4	10	17	20	8	59	0.661	23	4	8	15	14	18	59	0.715	30	0.473	26
4	Strikes and labour disputes	16	17	17	8	1	59	0.468	45	12	11	15	12	9	59	0.583	41	0.273	43
5	Lack of experience supervisors	2	6	20	21	9	58	0.700	21	1	3	3	22	29	58	0.859	20	0.601	18
<b>B</b>	<b>Technical Risk</b>																		
<b>BI</b>	<b>Materials</b>																		
6	Materials shortage	3	12	22	14	7	58	0.634	25	1	0	1	17	40	59	0.922	8	0.585	19
7	Late material delivery	0	2	3	12	42	59	0.919	3	0	0	1	13	45	59	0.949	1	0.872	3
8	Increase in the cost of materials	0	3	4	24	20	51	0.839	11	0	1	2	10	38	51	0.933	5	0.783	9
9	Damage during storage	12	10	20	10	4	56	0.543	37	4	10	20	10	12	56	0.657	33	0.357	36
10	Damage during transportation	12	15	20	9	2	58	0.510	39	9	9	18	13	9	58	0.614	36	0.313	40
<b>BII</b>	<b>Equipment</b>																		
11	Frequently out of order or damaged	0	0	11	20	28	59	0.858	10	0	1	2	15	41	59	0.925	7	0.794	7
12	Unavailability of equipment	7	12	25	10	4	58	0.572	34	2	2	2	14	36	56	0.886	15	0.507	23
13	Unavailability or high cost of spare parts	5	12	25	12	4	58	0.593	32	2	6	5	23	22	58	0.797	23	0.472	27
14	High maintenance cost.	2	3	17	26	11	59	0.739	17	1	3	10	22	23	59	0.814	22	0.601	17
<b>BIII</b>	<b>Construction Process</b>																		
15	Low productivity due to severe climate	20	23	6	4	0	53	0.377	50	6	15	14	10	8	53	0.596	38	0.225	47
16	Errors or omissions in BOQ	4	15	22	13	5	59	0.600	30	2	3	5	21	28	59	0.837	21	0.502	24
17	Insufficient time to prepare bids	2	5	5	29	18	59	0.790	14	1	2	3	13	36	55	0.895	14	0.707	12
18	Delay of information from designers	0	2	5	13	39	59	0.902	5	0	1	3	12	43	59	0.929	6	0.838	5

Code	Risk Factors	Respondents on Frequency					Frequency Index (F.I.)	Rank (F.I.)	Respondents on Impact					Impact Index (I.I.)	Rank (I.I.)	Overall Effect Index (OE.I.)	Rank (OE.I.)		
		Frequency							Impact										
		1	2	3	4	5			1	2	3	4	5						
<b>BIV</b>	<b>Construction Site</b>																		
19	Access problems	6	10	25	11	4	56	0.589	33	1	3	12	21	19	56	0.793	25	0.467	28
20	Work hours limited	4	11	12	22	9	58	0.672	22	2	3	11	22	20	58	0.790	26	0.531	22
21	Traffic congestion	1	1	3	34	19	58	0.838	12	2	4	13	20	19	58	0.772	27	0.647	14
22	Local regulations	10	13	22	10	4	59	0.549	35	12	12	15	13	7	59	0.569	43	0.313	41
23	Theft	0	2	6	17	32	57	0.877	8	13	10	14	12	8	57	0.572	42	0.502	25
<b>BV</b>	<b>Ground Conditions</b>																		
24	Lack or inadequate site investigation	15	12	22	10	0	59	0.492	42	6	10	10	17	16	59	0.692	31	0.340	38
25	Errors in information on site investigation	18	15	14	11	1	59	0.471	44	2	3	3	16	35	59	0.868	18	0.409	32
<b>C</b>	<b>Construction Design Risk</b>																		
26	Inadequate or ambiguous specifications	2	1	5	19	30	57	0.860	9	0	2	2	14	39	57	0.916	9	0.787	8
27	Errors in drawings	1	1	7	3	36	48	0.900	6	0	0	1	12	35	48	0.942	3	0.848	4
28	Incomplete design scope	0	0	5	9	42	56	0.932	2	0	1	2	11	42	56	0.936	4	0.872	2
29	Innovative construction method	1	1	1	22	33	58	0.893	7	1	2	3	22	30	58	0.869	17	0.776	10
30	New materials and equipment	3	10	28	10	5	56	0.614	28	8	12	17	10	9	56	0.600	37	0.369	34
31	Non-standard details of drawings	3	5	19	22	10	59	0.705	19	1	2	3	15	38	59	0.895	13	0.631	15
32	Errors in estimate	1	2	3	12	41	59	0.905	4	1	1	3	14	40	59	0.908	10	0.822	6
33	Incompatibility between drawing and method	1	3	4	32	19	59	0.820	13	2	2	3	17	35	59	0.875	16	0.717	11

Code	Risk Factors	Respondents on Frequency					Frequency Index (F.I.)	Rank (F.I.)	Respondents on Impact					Impact Index (I.I.)	Rank (I.I.)	Overall Effect Index (OE.I.)	Rank (OE.I.)	
		Frequency							Impact									
		1	2	3	4	5			1	2	3	4	5					
<b>D</b>	<b>Political and Regulation Risk</b>																	
34	Frequent changes in law	13	16	16	13	1	59	40	10	13	14	13	9	59	0.593	39	0.302	42
35	War, revolution or civil disorder	18	20	14	6	0	58	47	4	6	13	17	18	58	0.734	29	0.314	39
36	Requirements to use local labour	14	10	22	10	3	59	38	15	14	15	11	4	59	0.515	48	0.271	45
37	Customs and import restrictions	19	19	13	7	1	59	46	15	17	11	12	4	59	0.508	49	0.222	48
38	Unstable politics	11	10	25	10	3	59	36	2	3	10	24	20	59	0.793	24	0.433	30
39	Embargo	20	26	8	4	0	58	49	14	14	15	10	5	58	0.524	47	0.202	50
40	Long procedure for approval and permits	3	5	14	27	10	59	18	2	2	3	18	32	57	0.867	19	0.626	16
<b>E</b>	<b>Financial Risk</b>																	
41	Slow payment by clients	0	1	3	10	45	59	1	0	1	1	11	46	59	0.946	2	0.885	1
42	Inadequate payment for variations	5	12	25	11	6	59	29	3	8	19	18	11	59	0.688	32	0.415	31
43	Financial problems due to errors in estimate	3	14	22	14	6	59	27	0	2	4	16	37	59	0.898	12	0.557	21
44	Inflation	3	10	25	14	7	59	24	14	10	14	14	7	59	0.566	44	0.363	35
45	Exchange rate fluctuation	2	6	20	22	9	59	20	3	11	23	13	9	59	0.647	35	0.454	29
46	High local and national taxes	5	10	21	15	6	57	26	4	9	22	12	10	57	0.653	34	0.408	33
47	High interest rate	2	3	13	24	17	59	15	0	2	2	18	37	59	0.905	11	0.700	13
<b>F</b>	<b>Environmental Risk</b>																	
48	Pollution due to construction process	14	10	25	10	0	59	41	12	15	17	9	6	59	0.539	46	0.272	44
49	Waste treatment regulations and laws	14	16	19	9	1	59	43	12	14	17	11	5	59	0.542	45	0.265	46
50	Preservation of historical findings	19	25	9	5	1	59	48	14	19	12	11	3	59	0.498	50	0.204	49

The Matrix (Fig. 4.2) as explained earlier, points out risk factors, based on the "box" they are placed, can be prioritized as having low, medium or high priority for further investigation and consideration.

The table below gives further explanation to the indicators used in producing the matrix:

**Table 4.14 Frequency Classification**

No.	Likelihood title	Likelihood Score
1	Rare	0.1
2	Unlikely	0.3
3	Possible	0.5
4	Likely	0.7
5	Almost Certain	0.9

**Table 4.15 Impact Classification**

No.	Impact title	Impact Score
1	Low	0.1
2	Minor	0.3
3	Medium	0.5
4	High	0.7
5	Extreme	0.9

The risk factors, as coded, in Table 4.13, were placed appropriately in the matrix depending on their ranking based on likelihood of occurrence and impact, if it occurs. For example, code *E41(1)*: where **E** - Financial Risk category, **41** - slow payment by clients (i.e. the risk factor) and **(1)** - the overall ranking was placed in *box 09/09* because *E41* had a frequency index of *0.936* and an impact index of *0.946*. The colour red was used to indicate the most severe box a risk factor can fall into and green being the less severe based on the likelihood/impact score.

Fig 4.2: Frequency Impact Matrix

		Impact				
		Negligible (0.1)	Low (0.3)	Medium (0.5)	High (0.7)	Extreme (0.9)
Frequency	Almost Certain (0.9)			BIV23(25)		E41(1), C28 (2), B17(3), C27(4), BIII18(5), C32(6), BIII1(7), C26(8), B18(9), C29(10), C33(11)
	Likely (0.7)			E44(35)	A12(20), BIV20(22), A13(26), E45(29), E42(31), E46(33), C30(34)	BIII7(12), E47(13), BIV21(14), C31(15), D40(16), BIII4(17), A15(18), B16(19), E43(21)
	Possible (0.5)			B19(36), A11(37), BIV22(41), D34(42), A14(43), F48(44), D37(45), F49(46), D37(48), F50(49)	BIII3(27), BIV19(28), D38(30), BIV24(38), D35(39), B110(40)	BIII2(23), BIII16(24), BIV25(32)
	Unlikely (0.3)			BIII15(47), D39(50)		
	Rare (0.1)					

**Table 4.16 Ten Highest-ranked Risk Factors in terms of Frequency, Impact and Overall**

Rank	Frequent Risk Factor	Risk Category	Important Risk Factor	Risk Category	Overall Risk Factor	Risk Category
1	Slow payment by clients	Financial	Late material delivery	Technical: Material	Slow payment by clients	Financial
2	Incomplete design scope	Construction Design	Slow payment by clients	Financial	Incomplete design scope	Construction Design
3	Late material delivery	Technical: Material	Errors in drawings	Construction Design	Late material delivery	Technical: Material
4	Errors in estimate	Construction Design	Incomplete design scope	Construction Design	Errors in drawings	Construction Design
5	Delay of information from designers	Technical: Construction Process	Increase in the cost of materials	Technical: Material	Delay of information from designers	Technical: Construction Process
6	Errors in drawings	Construction Design	Delay of information from designers	Technical: Construction Process	Errors in estimate	Construction Design
7	Innovative construction method	Construction Design	Frequently out of order or damaged	Technical: Equipment	Frequently out of order or damaged	Technical: Equipment
8	Theft	Technical: Construction Site	Materials shortage	Technical: Material	Inadequate or ambiguous specifications	Construction Design
9	Inadequate or ambiguous specifications	Construction Design	Inadequate or ambiguous specifications	Construction Design	Increase in the cost of materials	Technical: Material
10	Frequently out of order or damaged	Technical: Equipment	Errors in estimate	Construction Design	Innovative construction method	Construction Design

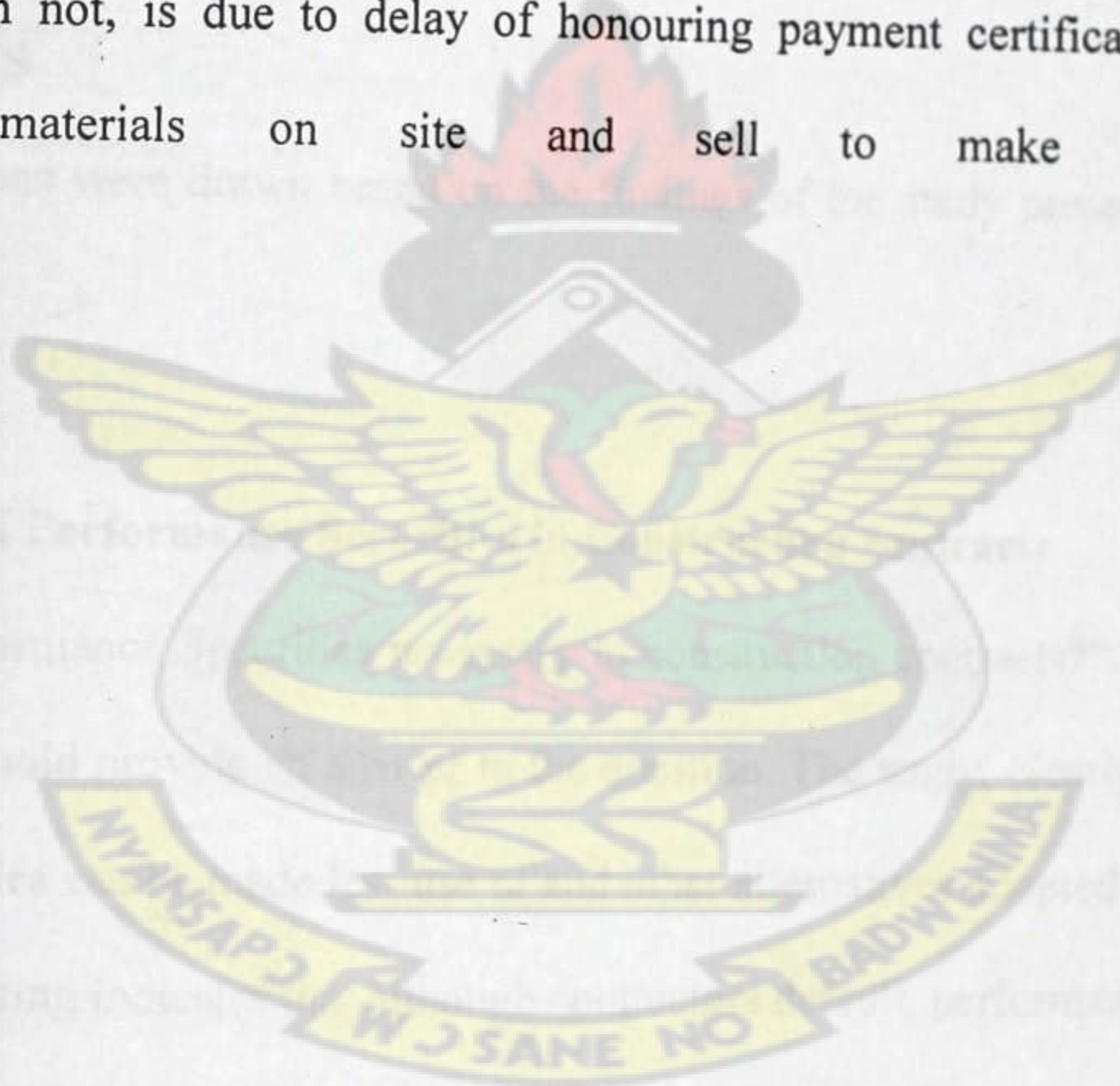
The details in Table 4.16 reveal that *Late Payment by Clients* emerged as the highest ranked risk factor. Late Payment by Clients is indeed a common phenomenon in the Ghanaian construction industry, especially Government of Ghana projects. In Ghana, the Government is the biggest employer, but more often than not, government departments and agencies, due to improper planning and budgeting fail to honour invoices and payment certificates, submitted by contractors. This affects contractors' cashflow and they consequently fail to deliver projects; on time, within budget and according to specification.

*Incomplete design scope, errors in drawings, delay of information from designers, errors in estimate, inadequate or ambiguous specification and innovative construction method* were ranked 2<sup>nd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> respectively. Notably, these risk factors, as indicated in the table above, are categorized under construction design. In effect, these risk factors emanates from the client and/or the consultants. A careful perusal of the table above depicts that, among the ten (10) highest-ranked risk factors, only two, i.e. *late material delivery*, ranked 3<sup>rd</sup> and *frequently out of order equipments*, ranked 7<sup>th</sup> that can be attributed to the contractor. This is an indication that contractors, generally, default if the client/consultant fail to plan.

The 9<sup>th</sup> ranked risk factor is *increase in the cost of materials*. This risk can be classified as uncontrollable risk because industry practitioners are not directly the suppliers of materials. However, materials cost constitutes, on average 70%, of projects cost, therefore, increases in cost of materials within the project cycle, without safeguards like, contingency sums and payment for fluctuations, can lead to default by any of the parties.

Linked to this factor is *shortage of materials*, although out of the top 10 risk factors on the overall ranking, it is ranked 8<sup>th</sup> on the impact ranking.

Finally, *theft*, ranked 8<sup>th</sup> on the frequency factors, is prevalent on our construction sites. Therefore, it does not come as a surprise that industry practitioners placed this factor on that rank in terms of frequency, although, it fell out of the top ten overall because the impact score, ironically is low. Petty thievery by site workers and outsiders are a common occurrence on construction sites. Site workers, sometimes, because of non-payment of wages and salaries, which, more often than not, is due to delay of honouring payment certificates/invoices of contractors, steal materials on site and sell to make ends meet.



## CHAPTER FIVE

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.0 INTRODUCTION

This chapter presents a summary of the findings that the analysis produced. The study is then concluded with a summary of recommendations for further research work and the possible implementation of the recommendations to industry.

#### 5.1 CONCLUSIONS

The following conclusions were drawn based on the findings of the study presented in chapter four:

##### 5.1.1 The Necessity of Performance Securities in Construction contracts

The study had “are Performance Securities necessary in construction contracts?” as a research question, therefore, it should provide an answer to the question. The study, clearly, establishes that Performance Securities can be made less use of and other alternatives adopted as guarantee for performance. The finding indicates that although contractors default, performance securities are rarely invoked because clients also default by way of honouring payment certificates and invoices. Again the study establishes that risk reduction as a risk response is the best because risk transfer does not eradicate risk. It must be noted that performance security is a risk transfer option.

### 5.1.2 Realistic Amount of Performance Security

The study established that the amount of security requested by clients and consultants was based on the World Bank's recommendation and not on careful assessment of individual projects.

### 5.1.3 Relationship between Security Amount and Anticipated Risk

The study established that, indeed, a relationship can be developed between the amount of performance security employers request from contractors and anticipated risk. That is "*less risk, less security amount*" and vice versa. The study therefore produced a risk frequency/impact matrix that can be used by employers to assess the prevailing risks associated with projects.

The ten highest risk factors identified by respondents were:

1. Slow payment by clients
2. Incomplete design scope
3. Late material delivery
4. Errors in drawings
5. Delay of information from designers
6. Errors in estimate
7. Frequently out of order or damaged
8. Inadequate or ambiguous specifications
9. Increase in the cost of materials
10. Innovative construction method

## 5.2 RECOMMENDATION

Based on the findings of this study, it is recommended that;

- Employers and their agents adopt the risk management process as a management tool for the execution of construction projects since the study established that the highest ranked risk factors emanates from the client.
- Performance Security as a risk transfer option should be adopted, however, in situations when the client has exhausted opportunities to use options like risk reduction.
- As practice in the United State of America, projects, with estimated cost less than One Hundred Thousand Ghana Cedis (GHs 100,000.00) can be exempted from the demand for Performance Security. This will enable small scale contractors, without the wherewithal to secure Performance Securities, to bid for contracts.
- The amount of the security requested for, should be realistic to reflect the risk anticipated and environmental circumstances. A risk matrix, in the form above, should be produced for each project by clients and their agents/consultants so that the more identified risk factors fall into the red-coloured boxes the more the security value and vice versa.
- Security-issuing institutions should conduct an in-depth pre-qualification of contractors before issuing securities. A complete review of contractors' financial statement, capacity to perform, organizational structure, credit history etc to ascertain the contractor runs a well-managed and profitable enterprise should be thoroughly conducted. More so, when they have ~~the capacity to do so~~ in comparison with most construction industry clients/employers.

- Finally, security-issuing organizations monitor on-going projects and offer assistance in the form of financial support and otherwise to ensure that bonded contractors succeed. Avoiding a default is, almost invariably; better than cleaning up after one.

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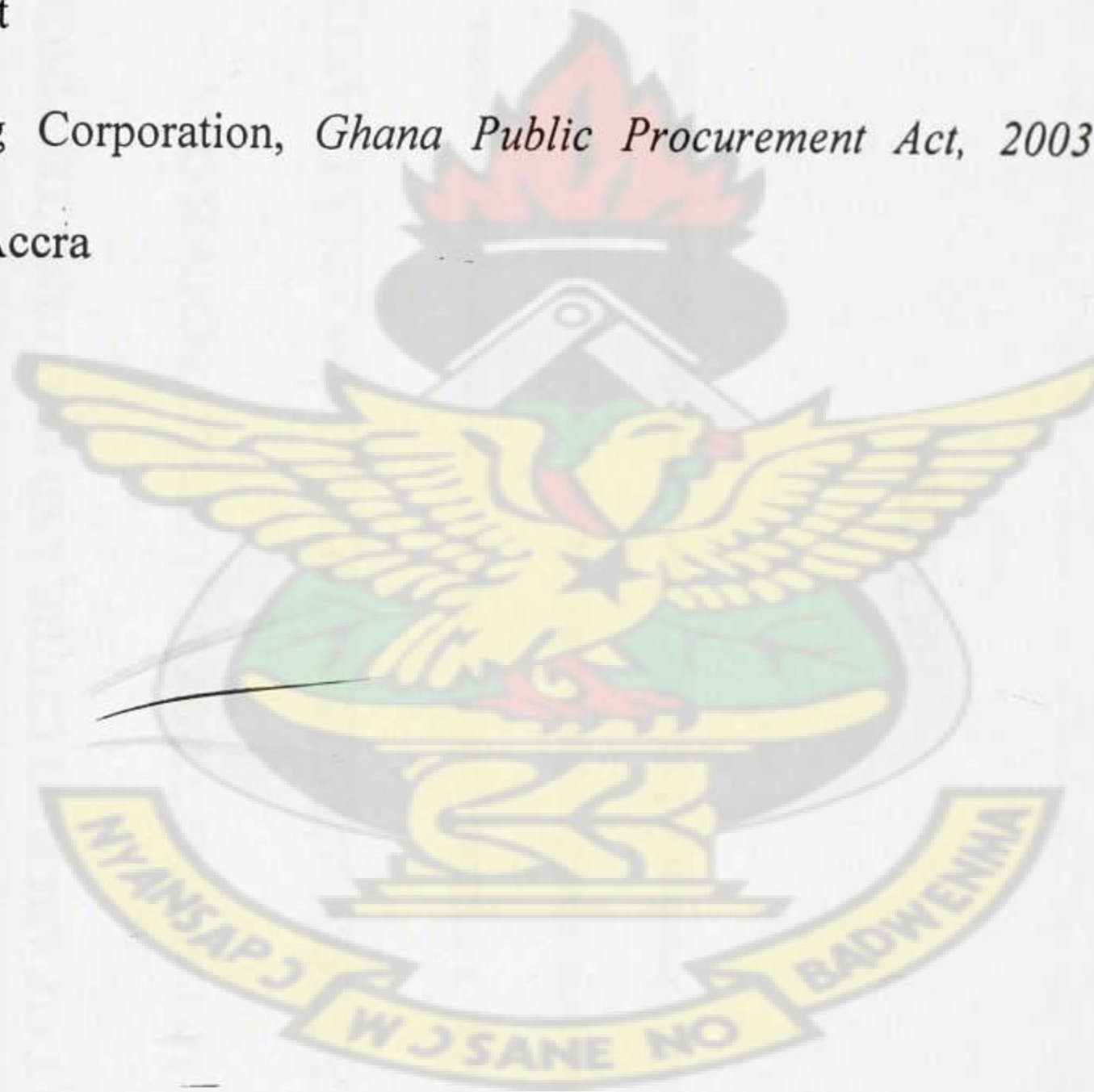
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**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**COLLEGE OF ARCHITECTURE AND PLANNING**

**FACULTY OF ARCHITECTURE AND BUILDING TECHNOLOGY**

**DEPARTMENT OF BUILDING TECHNOLOGY**

**QUESTIONNAIRE FOR EMPLOYERS/CONSULTANTS**

The study is being conducted by George Osei, a student pursuing MSc. Construction Management. The aim of the study is to ascertain the relevance of Performance Security in Ghanaian construction contracts. The study also, seeks to ascertain the basis for the amount of Performance Securities demanded by employers and finally, develop a basis for determining the security amount for construction projects vis-à-vis the risk anticipated.

**SECTION A**

1. Name of Firm/Organisation: .....
2. Address: .....

**SECTION B**

3. Education level:

H.N.D.

University

Others (state).....

4. Position

Quantity Surveyor

Project Manager

Others (State).....



**SECTION C**

5. Do you conduct risk management on the projects you execute?

Yes

No

6. If yes, literature on risk management has identified the following steps for effective risk management, which of these steps do you employ or has ever employed?

**Risk identification**

- Historical data
- Checklist
- Brainstorming

**Risk analysis**

- Quantitative risk analysis
- Qualitative risk analysis



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**SECTION D**

9. Performance bonds/guarantees are risk transfer options often adopted by employers in the construction industry. Do you make use of them?

Yes

No

10. If No why?

Specify.....

11. If Yes, what amount do you specify.....

12. On what basis do you specify the amount mentioned above?

Codes, standards

Standard Conditions of Contract

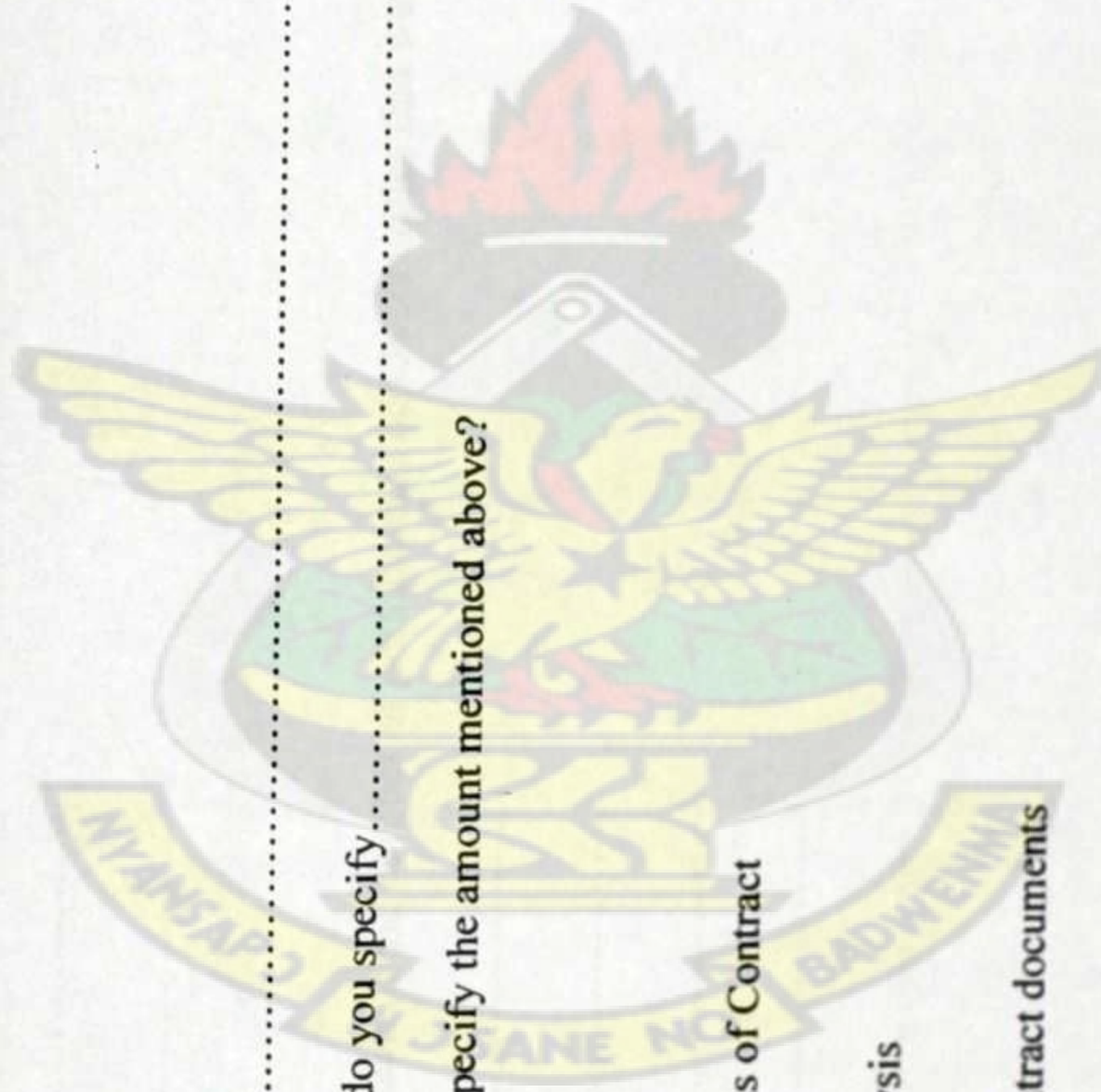
Based on risk analysis

Existing tender/contract documents

Other(s) Please

specify.....

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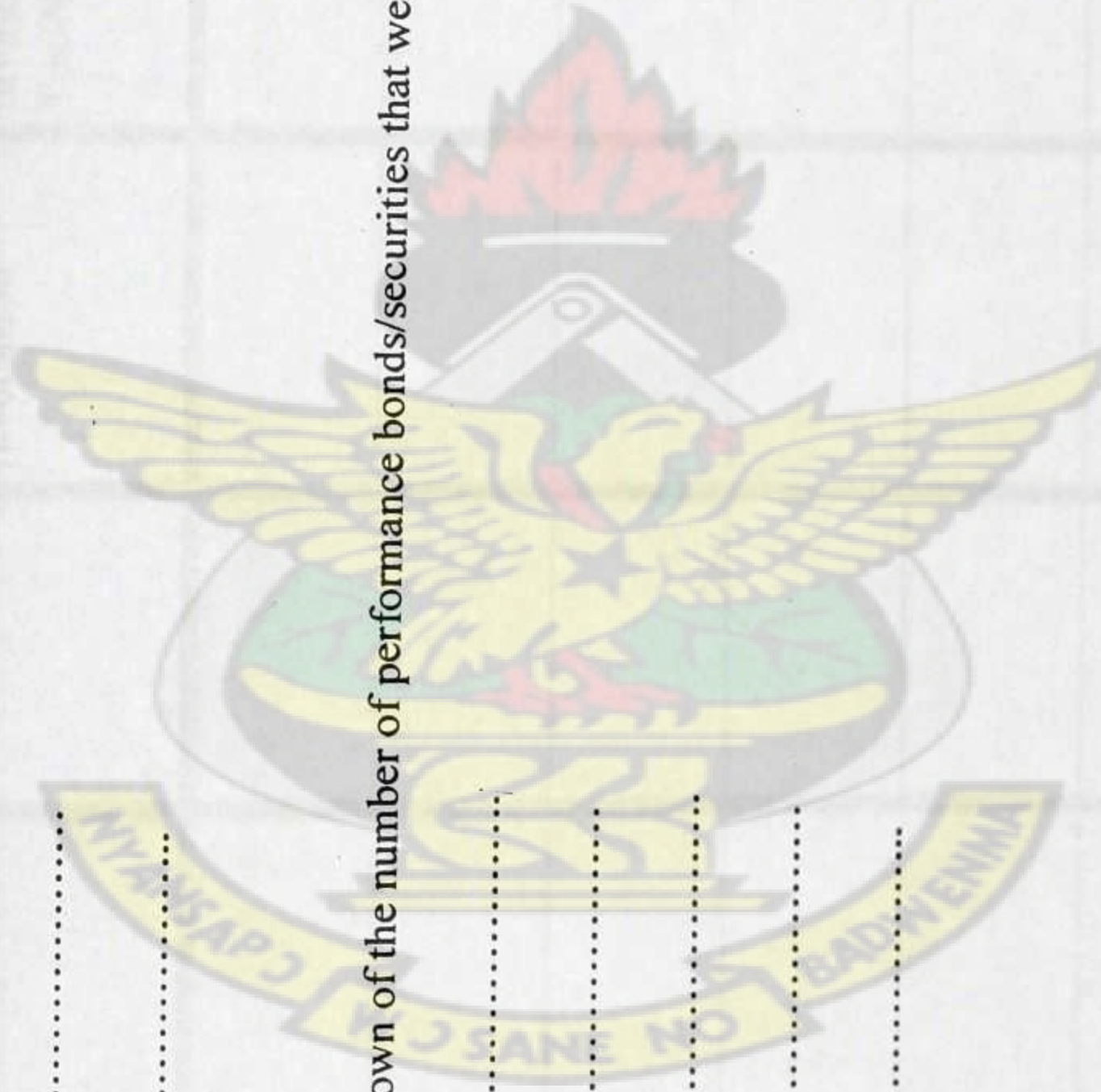


13. Kindly give a breakdown of the number of projects you have undertaken in the last five (5) years in which performance security was demanded.

- 2008.....
- 2007.....
- 2006.....
- 2005.....
- 2004.....

14. Kindly give a breakdown of the number of performance bonds/securities that were invoked in the last five (5) years by your outfit

- 2008.....
- 2007.....
- 2006.....
- 2005.....
- 2004.....



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15. Kindly complete this table to indicate more specifically projects your outfit has undertaken in which contractors defaulted and whether the Performance bond/guarantee was invoked or not and also identify the remedy after the invocation.

Item	Project	Contractor Classification	Reasons that necessitated the invocation	Was the Bond or Guarantee invoked? Yes/No	If Yes which of the following options was adopted to complete the project*	If No why?
1						
2						
3						
4						
5						
7						

*\*Insert;*

- A. Surety gave financial support to the prime contractor to complete the project under the supervision of a consultant employed by the surety.
- B. Surety selected a new contractor through a competitive bidding to complete the works
- C. Surety selected a new contractor to complete the works on a cost-reimbursement basis.
- D. A new contractor entered into a contract with the surety or the owner for the completion of the remaining work.

16. Do you make provisions for the recovery of the cost of acquiring performance securities by contractors?

- Yes, please specify.....
- No, please state reasons(s).....

17. Do you discharge contractors of their obligations after they have successfully executed the contract?

- Yes, please specify.....
- No, please state why.....

## SECTION E

18. Below are risk factors associated with construction contracts that necessitate the demand for performance securities by clients from contractors in the construction industry. From your experience please rate the likelihood of occurrence and degree of impact of the risk factors on projects. Tick once (✓) as appropriate the following:

- i. Likelihood of occurrence.
  - occurrence : 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high
  - impact: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high
- ii. Degree of impact

19. Risk response options often adopted by risk management professionals to deal with risk factors associated with construction projects includes; **risk reduction** (i.e. find ways to reduce the probability and/or impact of risk), **risk transfer** (i.e. transfer risks to other parties by contractual shifting, performance incentives, insurance, warranties, bonds), **risk avoidance** (i.e. change in project plans in a way that an identified risk is no longer relevant) and **risk retention** (i.e. take a conscious risk and deal with negative consequences as they occur, but take no action beforehand).

From your experience in the construction industry, kindly select, by ticking (✓), the most appropriate option to be adopted by clients for each of the risk factors below.

Kindly select the risk response option at the shaded portion of the table.













**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**COLLEGE OF ARCHITECTURE AND PLANNING**

**FACULTY OF ARCHITECTURE AND BUILDING TECHNOLOGY**

**DEPARTMENT OF BUILDING TECHNOLOGY**

**QUESTIONNAIRE FOR SECURITY ISSUING ORGANIZATIONS**

The study is being conducted by George Osei, a student pursuing MSc. Construction Management. The aim of the study is to ascertain the relevance of Performance Security in Ghanaian construction contracts. The study also, seeks to ascertain the basis for the amount of Performance Securities demanded by employers and finally, develop a basis for determining the security amount for construction projects vis-à-vis the risk anticipated.

**SECTION A**

16. Name of Firm/Organisation: .....

17. Address: .....

**SECTION B**

18. Education level:

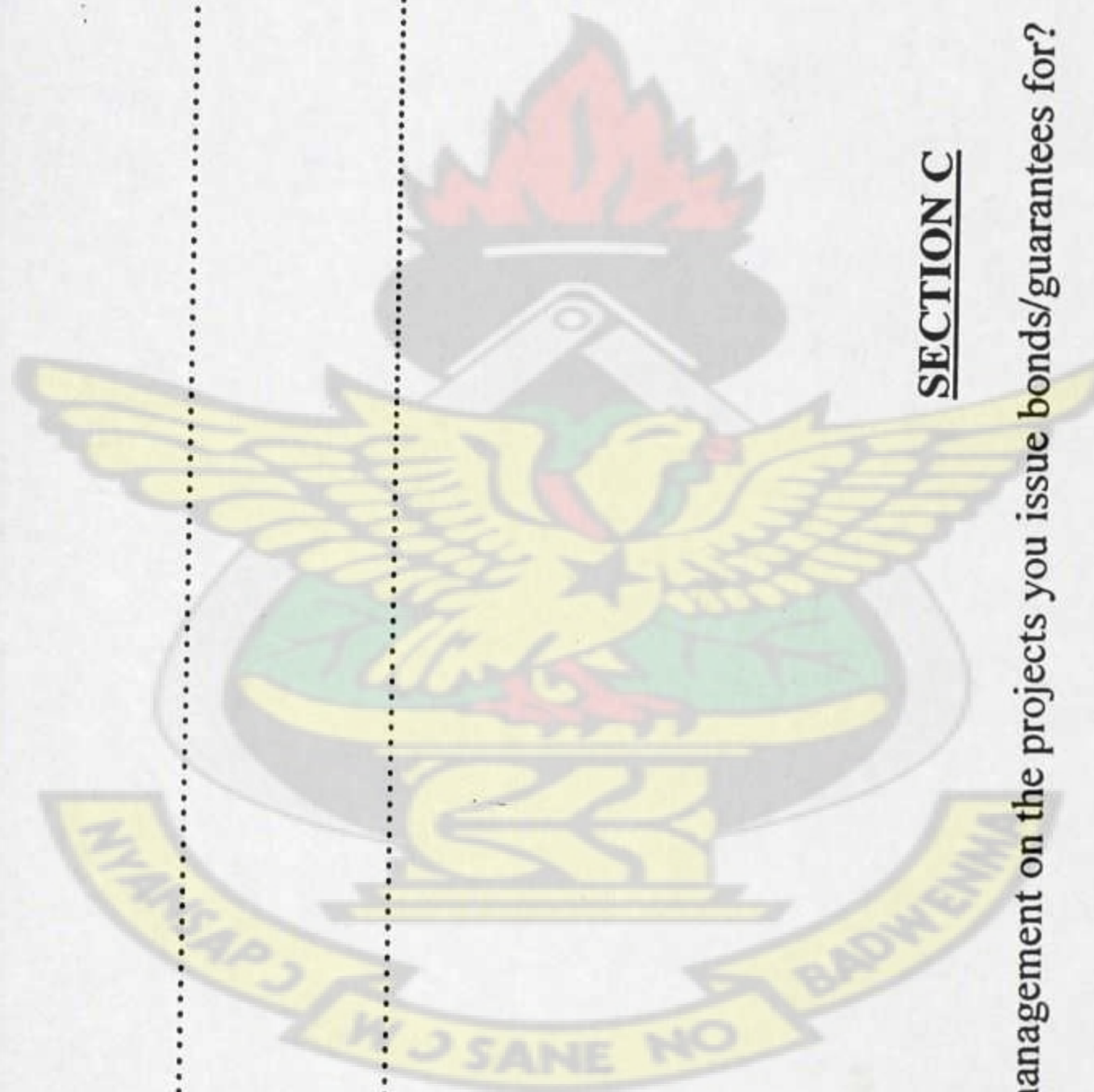
H.N.D.

University

Others (state).....

19. Position.....

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**SECTION C**

20. Do you conduct risk management on the projects you issue bonds/guarantees for?

Yes

No

21. If yes, literature on risk management has identified the following steps for effective risk management, which of these steps do you employ or has ever employed?

**Risk identification**

- Historical data
- Checklist
- Brainstorming

**Risk analysis**

- Quantitative risk analysis
- Qualitative risk analysis



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**Risk response**

Risk reduction

Risk retention

Risk transfer

Risk avoidance

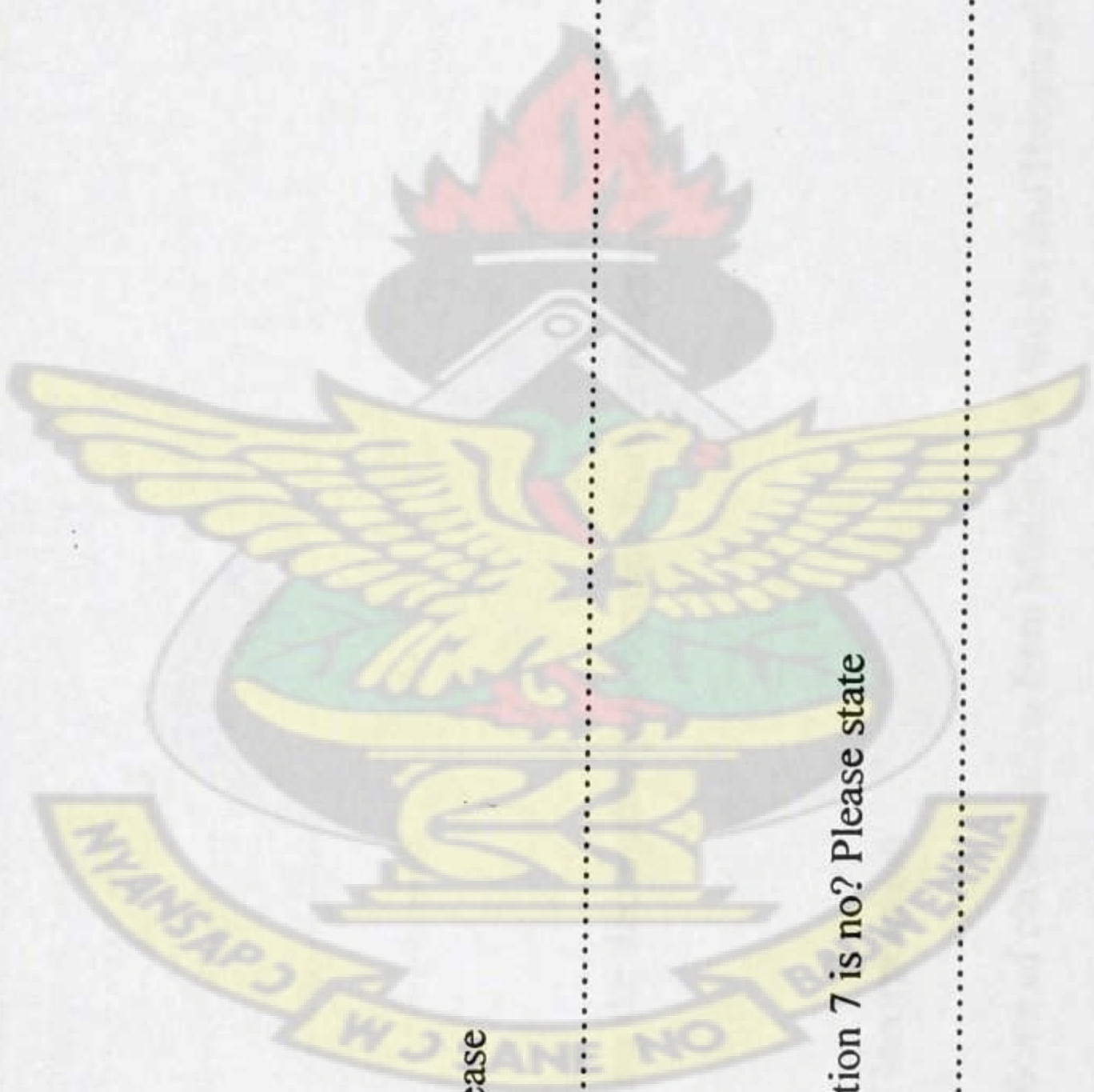
22. Any other method? Please

specify.....

23. If your answer to question 7 is no? Please state

reasons.....

.....



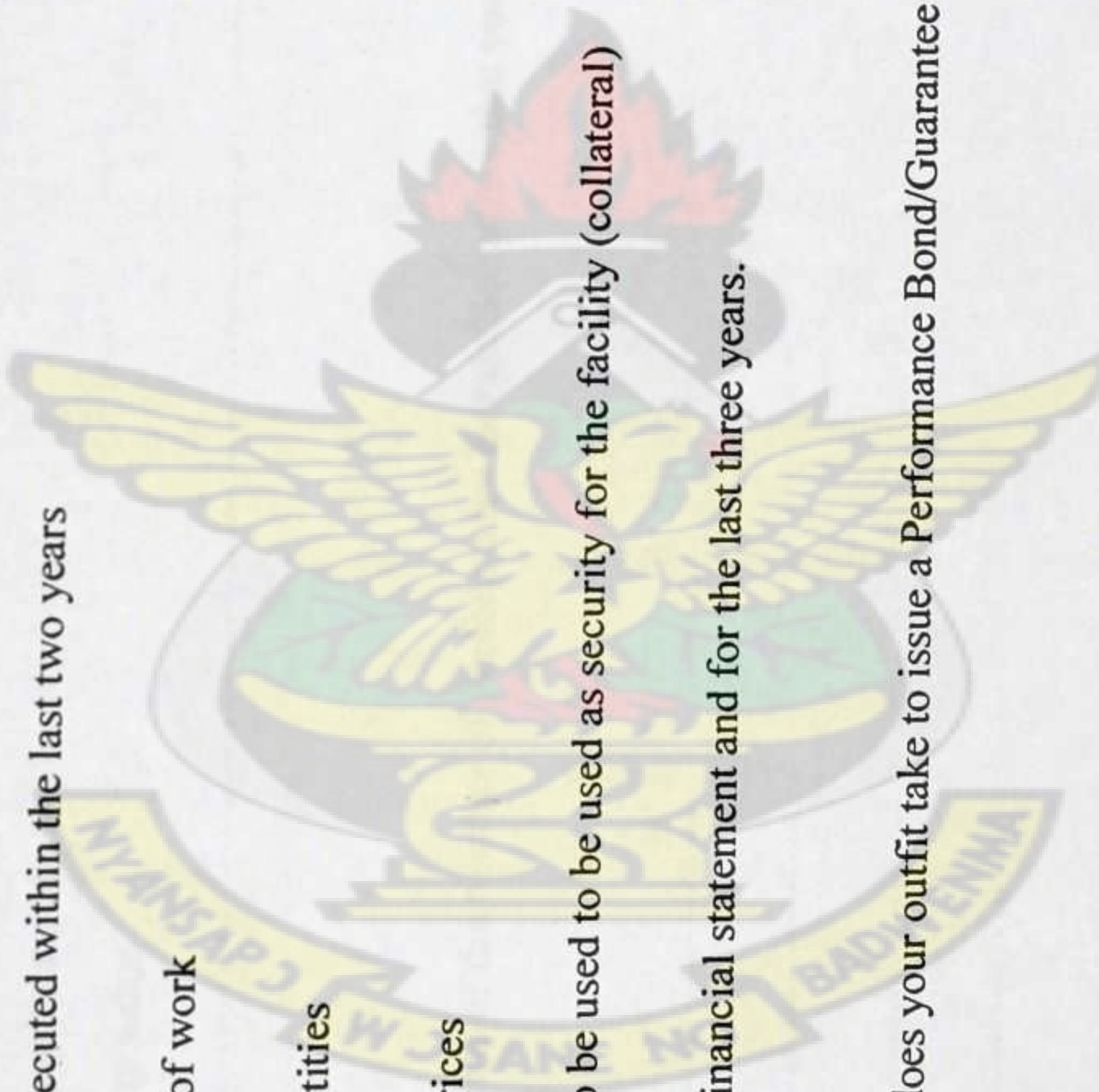
**SECTION D**

24. Kindly give a breakdown of the number of projects your outfit has issued Performance Bond/Guarantee for in the last five (5) years.

- 2008.....
- 2007.....
- 2006.....
- 2005.....
- 2004.....

25. Kindly indicate by ticking the documents you demand from contractors before a Performance Bond/Guarantee is issued to them

- Copy of the award
- Copy of certificate of incorporation
- Copy of current certificate of classification from Ministry of Works and Housing/Ministry of Roads and Highways
- Details of shareholders/directors of the company



- Details of technical personnel of the company
- Details of equipment holding of the company
- Details of work in-hand and stages of completion
- Details of projects executed within the last two years
- Copy of programme of work
- Copy of bills of quantities
- Details of material prices
- Details of property to be used to be used as security for the facility (collateral)
- Company's current financial statement and for the last three years.

26. On average, how long does your outfit take to issue a Performance Bond/Guarantee

- <14 days
- 14 – 28 days
- >28 days

27. Indicate below the premium charge by your outfit for the issuance of Performance Bond/Guarantee

- <1% of the Bond/Security value
- 1% - 2% of the Bond/Security value
- >2% of the Bond/Security value
- Other(s), Please state.....

28. Kindly give a breakdown of the number of Performance Bonds/Securities that your outfit issued that were invoked, by the employer, in

the last five (5)

2008.....

2007.....

2006.....

2005.....

2004.....

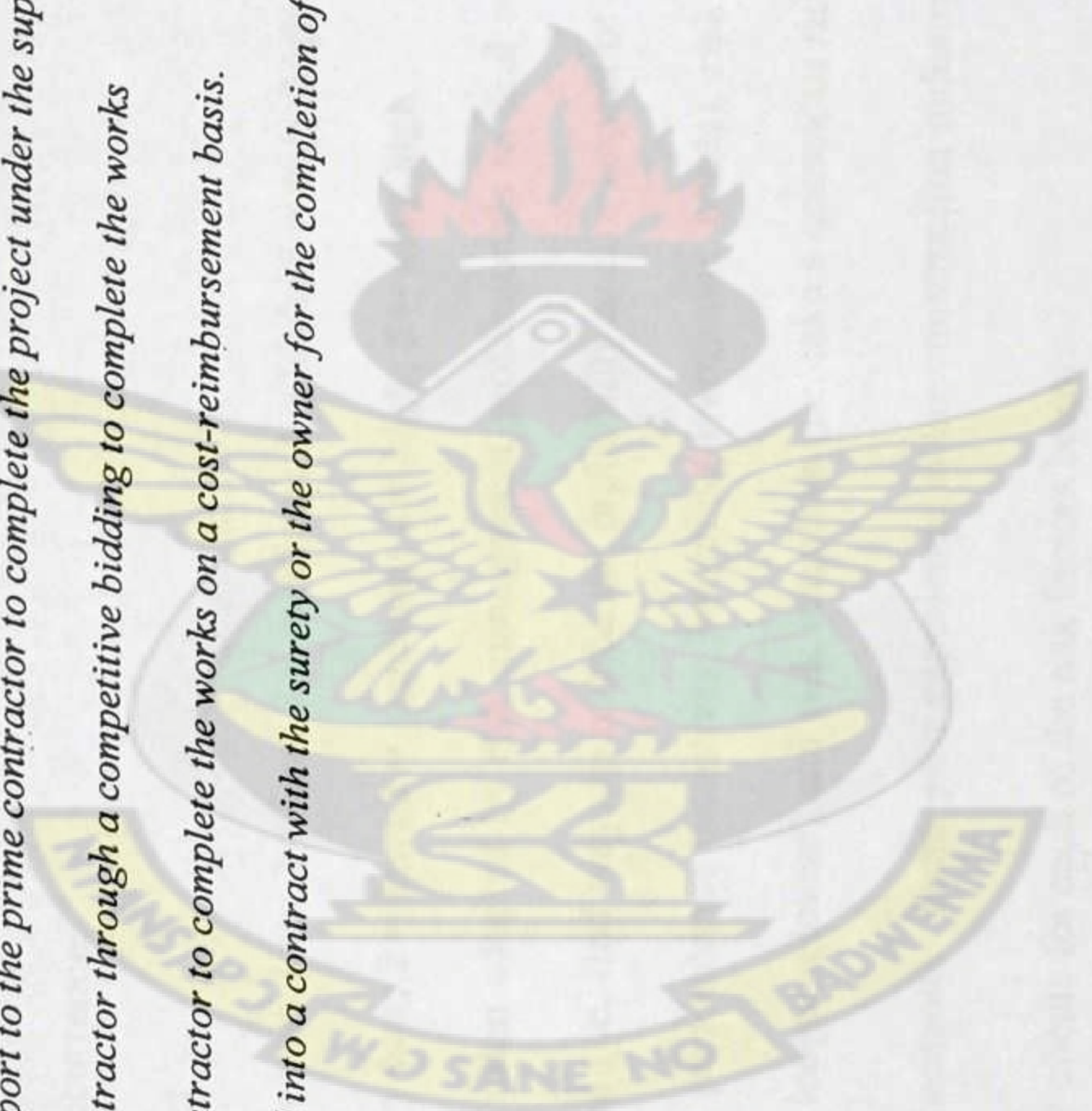
29. Kindly complete this table to indicate more specifically projects your outfit has undertaken in which contractors defaulted and whether the Performance bond/guarantee was invoked or not and also identify the remedy after the invocation.

Item	Project	Contractor Classification	Reasons that necessitated the invocation	Was the Bond or Guarantee invoked? Yes/No	If Yes which of the following options was adopted to complete the project*	If No why?
1						
2						
3						
4						
5						
7						

*\*Insert;*

- E. Surety gave financial support to the prime contractor to complete the project under the supervision of a consultant employed by the surety.*
- F. Surety selected a new contractor through a competitive bidding to complete the works*
- G. Surety selected a new contractor to complete the works on a cost-reimbursement basis.*
- H. A new contractor entered into a contract with the surety or the owner for the completion of the remaining work.*

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## SECTION E

30. Below are risk factors associated with construction contracts that necessitate the demand for performance securities by clients from contractors in the construction industry. From your experience please rate the likelihood of occurrence and degree of impact of the risk factors on projects. Tick once (✓) as appropriate the following:

- iii. Likelihood of occurrence.
- iv. Degree of impact
  - **occurrence : 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high**
  - **impact: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high**

31. Risk response options often adopted by risk management professionals to deal with risk factors associated with construction projects includes; **risk reduction** (i.e. find ways to reduce the probability and/or impact of risk), **risk transfer** (i.e. transfer risks to other parties by contractual shifting, performance incentives, insurance, warranties, bonds), **risk avoidance** (i.e. change in project plans in a way that an identified risk is no longer relevant) and **risk retention** (i.e. take a conscious risk and deal with negative consequences as they occur, but take no action beforehand). From your experience in the construction industry, kindly select, by ticking (✓), the most appropriate option to be adopted by clients for each of the risk factors below.

Kindly select the risk response option at the shaded portion of the table.

Item	Risk factors that affects construction projects	Occurrence					Impact					Risk avoidance	Risk reduction	Risk transfer	Risk retention	
		1	2	3	4	5	1	2	3	4	5					
<b>A</b>	<u>Personnel risk</u>															
<b>AI</b>	<b>Technician and labour</b>															
1	Frequent job change by skilled labour															
2	Lack of skilled labour															
3	Lack of labour															
4	Strikes and labour disputes															
5	Lack of experience supervisors															
<b>B</b>	<u>Technical risk</u>															
<b>BI</b>	<b>Materials</b>															
6	Materials shortage															









