

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

ASSESSING DELAY IN CONSTRUCTION PROJECTS IN JASIKAN
DISTRICT OF GHANA



THOMAS SEDZRO

AUGUST, 2016

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

ASSESSING DELAY IN CONSTRUCTION PROJECTS IN JASIKAN
DISTRICT OF GHANA



**A Dissertation in the Department of CONSTRUCTION AND WOOD Faculty of
TECHNICAL AND VOCATIONAL EDUCATION submitted to the School of
Graduate Studies, University of Education, Winneba in partial fulfillment of
requirement for the award of Master of Technology Education (Construction)
degree**

AUGUST, 2016

DECLARATION

STUDENT'S DECLARATION

I, THOMAS SEDZRO, declare that this Dissertation, with exception of quotations and references contained in published works which have all been identified and dully acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE

DATE.....

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this Dissertation was supervised in accordance with the guidelines for supervision of Dissertation as laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: MR. MICHAEL K. TSORGALI

SIGNATURE:.....

DATE:.....

ACKNOWLEDGMENT

I thank all who in one way or another contributed in the completion of this Dissertation.

First, I give thanks to God for His protection and ability to carry out this study.

My special and heartily thanks go to my supervisor, Mr. M. K. Tsorgali, who encouraged and directed me for the success of this study. His guidance helped me in all the time of research and writing of this dissertation. I could not have imagined having a better advisor and mentor dissertation.

My thanks also go to all the lecturers in the department of Construction and Wood of University of Education, Winneba Kumasi campus for the support and encouragement.

I acknowledge all the personnel in the construction industry who helped me collected meaningful data for the realization of this report, they deserve thanks for their assistance.

I also thank my wife, Paulina Dokosi and my son, Samuel Sedzro and my mother, Da Yaa for their support, encouragement and prayers.

DEDICATION

I dedicate this dissertation to my wife, Paulina and son, Samuel.



TABLE OF CONTENTS

Content	Page
DECLARATION	ii
ACKNOWLEDGMENT.....	iii
DEDICATION.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES	ix
LIST OF FIGURES	x
ABSTRACT.....	xi
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of Study	1
1.2 Statement of the Problem.....	4
1.3 Purpose of the Study.....	7
1.4 Objectives of the Study.....	7
1.5 Research Questions.....	7
1.6 Significance of the Study	7
1.7 Scope of the Study	8
CHAPTER TWO	9
LITERATURE REVIEW	9
2.1 Introduction.....	9
2.2 Definition of Delay in Construction Projects.....	9
2.3 Issues/effects of Construction Projects Delays.....	10
2.4 Causes of Delay in Construction Projects.....	15

2.4.1 Delay caused by Client	17
2.4.2 Delay caused by Contractor	17
2.4.3 Causes of Delay by Consultant	19
2.4.4 Delay caused by Materials	20
2.4.5 Causes of Delay by Equipment/plants	21
2.4.6 Delay caused by Labor.....	22
2.4.7 Delay caused by External factors.....	22
2.4.8 Types or Classifications of Delay in Construction Projects	24
2.4.8.1 Critical and Noncritical delays.....	25
2.4.8.2 Excusable and Non-Excusable delays	26
2.4.8.3 Compensable and Non-compensable Delays.....	27
2.4.8.4 Concurrent and Non-concurrent Delays	28
2.5 Strategies of Minimizing or Preventing Delays in Construction Projects	29
CHAPTER THREE	32
RESEARCH METHODOLOGY.....	32
3.1 Introduction.....	32
3.2 Research Design.....	32
3.3 Population	32
3.4 Sampling Techniques and Sample Size	32
3.5 Data Collection Techniques.....	33
3. 5.1 Questionnaires.....	33
3.5.2 Interview	33
3.5.3 Visits and Observations	34

CHAPTER FOUR	35
RESULTS AND DISCUSSIONS.....	35
4.1 Introduction.....	35
4.2 Results and Discussion of questionnaires.....	35
4.2.1 Results of questionnaire from Project Managers.....	36
4.2.2 Results of questionnaire from Artisans.....	40
4.2.3 Results of questionnaire from Foremen.....	52
4.3 Results and Discussion of Interview.....	58
4.3.1 Results and Discussion of Interview from Site Engineers on Issues of Construction Projects.....	58
4.3.2 Results and Discussion of Interview from contractors (managing director) on Causes of delays in construction projects.....	59
4.3.3 Results and Discussion of Interview from Project managers on Strategies of minimizing Construction Delay.....	61
4.4 Results of Observations.....	62
4.4.1 School projects.....	62
4.4.2 Housing projects.....	63
CHAPTER FIVE	65
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS.....	65
5.1 Introduction.....	65
5.2 Summary of Findings.....	65
5.3 Conclusion.....	67
5.4 Recommendations.....	68
REFERENCES.....	70

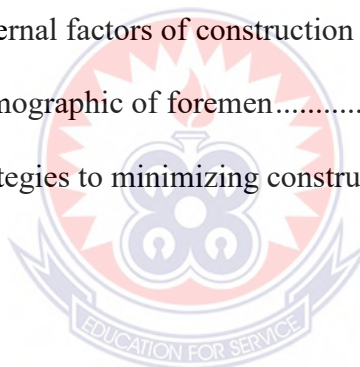
APPENDICES

Appendix A- Questionnaire for project managers.....	75
Appendix B- Questionnaire for artisans.....	78
Appendix C- Questionnaire for foremen.....	83
Appendix D- An interview guide for site Engineers.....	87
Appendix E- An interview guide for contractors.....	88
Appendix F- An interview guide for project managers.....	89



LIST OF TABLES

Table 4.1: Statistics of questionnaire	36
Table 4.2: Demographic of project managers.....	37
Table 4.3: Effects of construction delays.....	38
Table 4.4: Results of client factors of delay from Artisans	41
Table 4.5: Results of contractors delay factors	42
Table 4.6: Results of consultant's related delays.....	44
Table 4.7: Results of materials factors of delay.....	46
Table 4.8: Results of equipment related delays in construction	47
Table 4.9: Results of labor related delays in construction.	49
Table 4.10: Results of External factors of construction delay	50
Table 4.11: Results of Demographic of foremen.....	55
Table 4.12: Results of strategies to minimizing construction delay	56



LIST OF FIGURES

Figure 2.1: The six main effects of construction delay (Aibinu and Jagboro, 2002),	11
Figure 2.2: Delay Categories (Theodore, 2009)	25
Figure 4.1: Six unit classrooms for Okagyakrom SHTS, since 2010 due to change of government.....	62
Figure 4.2: Assembly hall complex for Jasikan College of education has delayed for almost 10 years due to lack of funds	63
Figure 4.3: A private home abandoned for over 20 years due to death of owner.....	63
Figure 4.4: A private home delayed for so many years due to lack of permit.....	64



ABSTRACT

Construction Industry in Ghana is facing a serious issue of construction delay causing a significant amount of time over run and cost overrun. Various studies have addressed the issue of construction delay, however, most of studies focused on identifying causes of delay. Less attention has been paid to addressing the issue of construction delay. Hence this study aimed to assess the strategies to minimize delays in construction projects in Jasikan District of Ghana. A comprehensive literature review from various sources through books, the internet, and civil engineering journals were made to carry out the study. Investigative approach for the study was qualitative research. Purposeful sampling technique was used in this study. Population sample of 115 was used in this study among experts in the construction industry. The population included project managers, foremen, and artisans. It is important to note that most Construction projects in Jasikan District of Ghana were experiencing delay (time overrun). Notably, the study showed that, there were six issues that affects delays in construction projects. These are time overrun, cost overrun, abandonment, litigation, arbitration and claims. The research also revealed that there were forty-seven (47) factors that cause construction projects delay. A total of seven groups of these factors were identified that contributed to the cause of construction delays. The research also showed seventeen strategies or methods of minimizing construction delays based on literature review and questionnaire survey and interview. Data collection for the study were in two broad areas. The primary sources such as structured interviews and visits and observations while the secondary source was questionnaires. Data was analyzed using Statistical Package for Social Sciences (SPSS Version 16.0) with simple table analysis and descriptive statistics, calculation of mean score to rank the various causes, effects and methods of minimizing construction projects delays. The study concluded with eleven (11) recommendations that were made to address the findings of the study.

CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The construction industry has a great impact on the economy of all countries and it is one of the sectors that provides essential or crucial ingredients for the development of an economy; construction delays considered as common problem in industry (Anaman & Osei-Amponsah, 2007).

In the study of Assaf & Al-Hejji (2006), delay could be defined as the time over run either beyond completion date specified in a contract or beyond the date that the parties agree upon for delivery of a project. It is a project slipping over its planned schedule and is considered as common problem in construction projects. In the global world, many researches and articles have been carried out on causes of delay in construction projects for instance, Bassioni & El-Razek (2008), identified that delay in construction project is considered one of the most common problems causing a multitude a negative effect on the project and its participating parties. Therefore, it is essential to identify the actual causes of delay in order to minimize and avoid the delays and their corresponding expenses. The findings of such studies have been reviewed for this research. Chan and Kumaraswamy (1997), did a survey to assess the relative importance of 20 potential delay factors in Hong Kong construction projects and five key factors were found, such as poor risk management and supervision, unforeseen site conditions, slow decision making, client-initiated variations, and work variations. However, Al-Momani (2000), in a research on construction delays in 130 public projects in Jordan found that weather, site conditions, late deliveries, economic conditions and increase in

quantity are the critical factors which cause construction delays in Jordan construction industry. Assaf & Al-Hejji (2006), studied the causes of delay in large building construction projects in Saudi Arabia. They found 73 factors that cause construction delays. They categorized these factors into 9 groups. Some of the most important causes of delay included approval of shop drawings, delays in contractors' payment by owners, design changes by owners, cash problems during construction, the slowness of the owners' decision-making process, design errors, excessive bureaucracy in project-owner organization, labor shortages and inadequate labor skills.

In Africa, for example, in Nigeria Ojo (2011), recently there have been indications that the master plan implementation is behind schedule. The Minister of Niger Delta Affairs has claimed that, developmental programs in the Niger Delta region have been challenged by delays in execution of construction projects.

Vanguard Newspaper, July 6, 2011. Also, despite, the Niger Delta region being severely deprived by a lack of basic social amenities most of the social amenities projects where construction works began over the past years have had their completion time pushed back beyond the stipulated completion durations.

Construction delay is a major problem facing the Ghanaian construction industry. It is endemic and its economic and social impact is often discussed. However, studies on the causes could not be found in the published literature except the study by Frimpong & Oluwoye (2003), which investigated the significant factors that cause delay and cost overruns in the construction of public projects in Ghana. They reported that to a large extent, consultants, owners, and contractors agreed that project financing, economic and

natural conditions and material supply were the four major categories of causes of delay and cost overrun factors.

The construction industry is an important sector of the Ghanaian economy. It contributes an average of 8.5% of the Gross Domestic Product (Ghana Statistical Service, 2007).

It employed about 2.3 % of the economically active population in 2002 (Amankwa, 2003). The industry provides means of production for other industries or commodities to be consumed. As Ghana aspires to become a middle income nation by 2015, and with the recent discovery of oil in commercial quantities, the role of the construction industry is absolutely important.

This important research leaves a gap. Most of the researches cited from all over the world concentrated on only one aspect, for example, causes of delay only and others too talked about effects of delay only but this current study sought to fill, namely to find the causes, effects and the method of minimizing delay in construction projects (buildings) in **Jasikan** district of **Ghana**.

Opong (2003), says in Ghana it is common for a construction project to encounter delays. The effects of delays are quite remarkable and it is an effort in the right direction if an attempt is made to find solutions to the causes of delays of construction projects in Ghana.

Somebody may ask, why Jasikan District? “The district is one of the oldest districts in Ghana where a lot of backward developments can be found. These include: bad and poor road networks, so many uncompleted or delayed construction projects (structures), on the part of Education, the district always records low percentages in

Junior and High schools every year why, all in the name of delay of projects all over. These developments have retarded the progress of the district. There are so many schools today in the district where classes are held under trees due to delay factors facing the district. The inconveniences and untold hardships confronting the pupils and students who study under trees are well known. Since they are not enclosed in a building, distractions and lack of concentration are the major problems facing them”, G.E.S. Directorate Jasikan (2011). It is against this backdrop that this research is conducted to investigate the issues, factors and effects responsible for delays in construction projects in the Jasikan district and recommending strategies to eradicate or minimize them assume tremendous importance.

1.2 Statement of the Problem

Construction delay is a major phenomenon in Ghana as in other emerging countries. It is endemic and its economic and social impact is becoming an issue to be concerned with by all, and Jasikan as a District is no exception.

Regardless of the consequences associated with stalled projects in Ghana, many projects still continue to delay, and it has become so worrisome that there is an urgent need to find a way to reduce its occurrence, even if it cannot be eliminated completely. It is evidently clear, looking at the state of most construction projects today, that construction projects in Ghana have been bedeviled by construction delay and subsequent cost overrun which have resulted in litigations and the payment of huge judgment debts that has a serious effect on the construction industry and the nation's economy at large (Bolton, 1990).

In the Jasikan District for example, the story of construction delay is the same with all the necessary efforts of governments, the private sector and individuals to uplift the face of Jasikan District. My own personal tour in most part of the District showed that, there were so many public institutions projects which have delayed for number of reasons. For example, (Kadjebi, Nov. 21, Ghanadot/GNA) Work on the rehabilitation of some roads in the Volta Region have been stalled for alleged non-payment of work done to contractors.

Some contractors working on the projects speaking to Ghana News Agency alleged that they abandoned the projects because they had not been paid for work done. They contended that the projects estimated at about 20 million Ghana Cedis were to be financed from the Ghana Road Fund and other sources (Ghana News Agency, 2009). Some of the abandoned projects are, the 7.3 kilometers Kadjebi-Dzindzinso road financed under the fund at 1.8 million Ghana cedis, the six-kilometer Jasikan-Bodada road estimated at 590,000 Ghana cedis being financed by the International Development Agency.

The rest are the three-kilometer Hohoe town roads estimated at 1.7 million Ghana cedis, while the contractor working on an additional five kilometers Hohoe town roads could not be traced. Mr Kofi Adjei Ntim, Kadjebi District Chief Executive told GNA that Mustek Construction company engaged on the Kadjebi-Dzindzinso link road christened 'missing link', Messrs Pakwell Company Limited, working on Kadjebi town roads and Messrs Core, responsible for the Kadjebi-Asato road network had abandoned their projects.

Again, recent examples in the district includes Okagyakrom Senior High Technical School six unit classroom block, six unit classroom at Agormeyor, a proposed market complex in the Jasikan market are all delayed at various stages under construction abandoned, a library complex started at Bodada also stopped on the way. There are some basic schools who are still learning under uncompleted buildings and under trees. These developments have retarded the progress of the district. There are so many schools today in the district where classes are held under trees due to delay factors facing the district. The inconveniences and untold hardships confronting the pupils and students who study under trees are well known. Since they are not enclosed in a building, distractions and lack of concentration are the major problems facing them”, GES Directorate Jasikan, (2011).

Landlords of the district are using this phenomenon as an advantage to charge high fees as rents because local contractors continue to abandon the various projects. This situation has compelled the researcher to see this as an important area of investigation to the economy. This important research was also identified as a gap in the reviews of literature of most publishers of articles on the same topic. Most of the research articles read from all over the world concentrated on causes of delay only and others too talked about effects of delay. In Ghana, similar research was conducted but concentration was on most of Ghana’s capital-intensive projects such as Roads, Ports and Dams (Donkor, 2011). It is against this backdrop that this research is conducted to investigate the factors and effects responsible for construction projects delays in the Jasikan district and recommending strategies to minimize them assume tremendous importance.

1.3 Purpose of the Study

The purpose of the study is to minimize delays in construction projects in Ghana.

1.4 Objectives of the Study

To achieve the purpose of this study, objectives have been identified as follows:

- Examine the issues of delay in construction projects in Ghana.
- Identify the causes of delay of construction projects in Jasikan District.
- Devise strategies to minimize delays in the construction industry in Ghana.

1.5 Research Questions

The research was guided by the following questions:

- What are the issues of delay in construction projects?
- What are the main causes of delay in construction projects?
- What are the success factors or methods to minimize delay in construction projects?

1.6 Significance of the Study

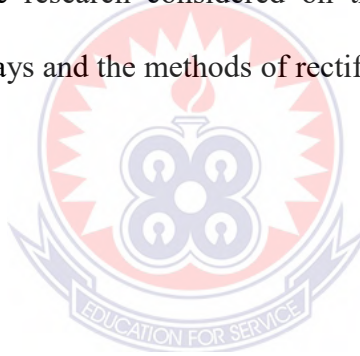
The findings of this study would help address the following:

- The most important issues of delay in construction projects in Ghana.
- It would broaden knowledge with issues related to most important causes of delay in construction.

- Also, the study would help devise strategies of minimizing delay in construction projects. The factors can be studied for the parties that involved in construction to reduce the risk of delay in construction projects.
- Finally, the outcome that is, results and recommendations derived from this study would serve as points of reference in further studies on this subject matter.

1.7 Scope of the Study

The scope of the study covered the construction projects in Jasikan District of Ghana. This study was needed to assess the understanding of delay concepts in construction projects. The research considered on the causes of construction delays, effects of construction delays and the methods of rectification of the construction delays.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Several researchers have investigated the causes and effects of project delays in the construction industry across the globe. Hence, this chapter presents the issues about delays in construction projects as viewed by scholars in the area. Among the issues discussed in this chapter are definitions of delay in construction projects, issues of construction delays, types or Classifications of Delays in Construction Projects and strategies of minimizing delay in construction projects.

2.2 Definition of Delay in Construction Projects

In general, delays are among the most common problem will happen in the building construction industry which may occur in a simple or a complex projects. Delays in building construction project can be defined as over time completion of building work compared from the schedule which state in contract schedule before Aibinu & Jagboro (2002). Many researchers have defined construction delays in their own word but it also brings the similar meaning.

According to Sanders and Eagles (2001), delay will causes extended time to complete all or part of a project and Bramble & Callahan (1987), also have defined that; “a delay is the time during which some part of the construction project has been extended or not performed due to an unanticipated circumstance.”

Assaf, et al. (1995), study that construction delay was defined as the time overrun compare to completion date as specified in a contract, or beyond the date that the parties agreed upon for delivery of a project. On the other hand Abd. Majid (1997) defined delays as the time overrun beyond the contract date or the date that the critical activities have been delayed.

Delays will slow down the work without stopping it entirely is defined by Bartholomew (1998). It does not mean that suspension of work but it means that stoppage of work directed to the contractor by a formal form from client. Delay, from the view of Aibinu & Jagboro (2002), is when the parties of the project are contributing to the non-completion of the project within the original contract period.

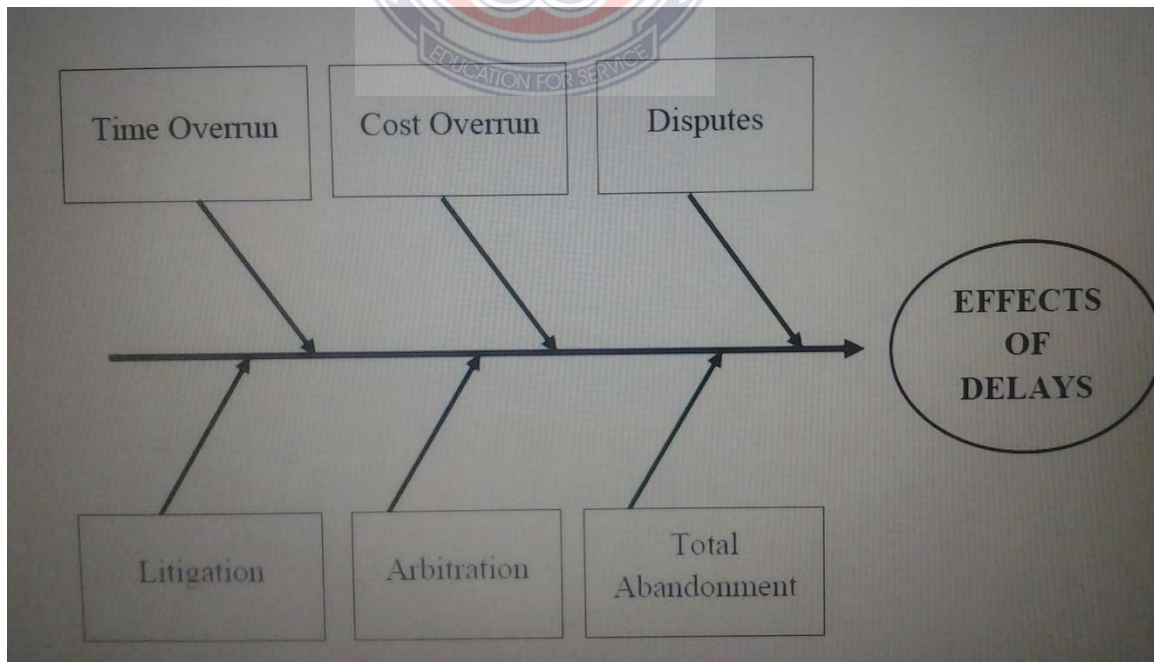
2.3 Issues/Effects of Construction Projects Delays

Project success is basically to gain the project objectives that are classically defined by the need to complete a project on time, within the budget, and with appropriate quality. Hence any disruptions to the project objectives will certainly contribute to project delays with its specified adverse effects on project objectives. Delays can give rise to disruption of work and loss of productivity, late completion of project, increased time related costs and third party claims and abandonment or termination of contract. Delays are costly and often result in disputes and claims. Furthermore, delays affect the feasibility for project owner and retard the development in construction industry (Lim Chong Fong, 2004).

Aibinu & Jagboro (2002), studied the effects of construction delays on project delivery in Nigerian construction industry. The six effects of delay identified were: time overrun, cost overrun, dispute, arbitration, total abandonment and litigation.

Koushki & Kartam (2004), concluded that time and cost overrun were the impact of the material selection time, their availability in the local market and the presence of the supervising engineer. It is important to improve the estimated activity duration according to the actual skills levels, unexpected events, efficiency of work time, mistakes and misunderstanding (Lock, 1996).

Delays influence negatively on the contractors performance and contribute to adverse impacts in construction. Effect of Delays projects such as contract disputes, low productivity and increase in construction costs that will also influence on the pre-determined of construction project objectives. From the comprehensive literature review, six major effects of delay in the construction projects were identified as follows:



Source: Aibinu & Jagboro, (2002)

Figure 2.1: The six main effects of construction delay.

2.3.1 Time Overrun: Time overrun means that the contractor could not carry their work within the time of completions specified in the contract. In generally, time overrun can be divided into two group which include excusable delays and non-excusable. Once the project counter time overrun, it will affect the progress of the work. Besides that, the fault party will take the full responsibility to compensate other parties for damages because of the projects delay. For instance, when the project almost completed, but suddenly because of bad weather the construction has to be stop. Therefore the contractor is entitle to claim the extension time and needed to reimburse liquated damages. Murali et al., (2007), argued that contractor related factors and client related factors such as inadequate contractor experience and owner interference have impact on time overrun.

2.3.2 Cost Overrun: When a project is completed at a cost higher than what was budgeted, it is said to experience a budget overrun. Cost overrun is linked to time overrun, if a project cannot be done in the specified time, it will also affect the financial cost of the projects. Regarding cost overrun Koushki et al., (2005), identified three main causes that were contractor related problems, material-related problems, and owners financial constraints, whereas Wiguna & Scott (2005), identified the most critical factors included: high inflation/increased material price; design change by client; defective design; weather conditions; delayed payment on contracts and defective construction work.

2.3.3 Disputes and claims: Theodore et al., (2009), Disputes and claims arise against for the losses incurred through delays. In private housing construction industry, some of project delays happen because of dispute between contractual parties such as client,

contractor, consultants and other relevant parties/ those disputes because of client failure to make payment to the contractor. Once dispute is happened, the relevant parties will consult through mediation. The mediator later will make a conclusion to solve the problem, but if the other party does not accept the decision made by mediator they can appeal the decision with an arbitrator. If both parties accept the decision making and the wrong parties will take full responsibility to compensate the damages for the projects interruption. Disputes are the effects of major causes of delays in construction projects such as causes of client related, contractor related, and consultant related and external related that may be arisen during the construction projects among the project parties. Lack of communication may also leads to misunderstandings, conflicts and disputes. Hence it necessitates the project managers to have effective communication skills which are one of the significant soft skills (People skills) with the project parties involving in construction projects. Based on Murali et al., (2007), the factors such as lack of communication between the various parties, problem with neighbors, unforeseen site conditions, delay in payments for completed work, improper construction method, delay caused by the subcontractor and discrepancies in contract documents will give rise to disputes between the various parties. Furthermore, if the disputes cannot be solved amicably or easily it can lead to arbitration or litigation.

2.3.4 Arbitration: Assaf & Al-Hejji (2006), in current delay project, some of the contractual parties do not acknowledge the mediator decision and they can appeal in arbitration. Arbitrator will also make the decision to resolve the crisis, but if one of the parties does not accept the judgment made by the arbitrator, they still can appeal the decision through the litigation. According to Murali et al., (2007), the delays which is

caused by the client related factors and contractor related factors such as change in order, mistakes or discrepancies in contract document and lack of communication between various parties which may rise the disputes will be settled through arbitration process. For these circumstances, it is necessitate having a competent third party that can settle the disputes amicably or easily without going to court.

2.3.5 Litigation. Trauner et al., (2009), in some private housing delay project, the relevant parties still do not agree with the arbitrator judgment. They appeal the result in litigation which is dispute resolution in the court. In litigation, the parties than will have to involve in trial either by a court alone or by the juries. If those parties are not pleased with the judgment again, then they can appeal a new trial again if they have by new evidence to proof their right, but once the parties accept with the judgment, the faulty parties need to take responsibility to pay the penalty Disputes can lead to court cases for resolution especially when large penalties are at stake. Based on Murali et al., (2007), when the delays caused by client related, contract related, labor related, external related factors and contract relationship related factors such as delay in payment for completed works, problems with site conditions and less of labor supply where eventually rise the disputes to be settled by the litigation process. The parties involved in the construction projects use litigation as a last alternative to settle the disputes.

2.3.6 Total Abandonment. Trauner, et al., (2009), Total abandonment means that the whole project stop immediately because of client facing difficulties. Some of the current project delays are totally abandoned because of client or contractor problem which include poor marketing and sales strategies, contractor run away, clients“ bankruptcy, and

etc. The effect of project totally abandoned will affect many parties such as contractual parties which include client, consultant, contractor, sub-contractor, supplier and other related parties. Besides those parties, the purchaser will also suffer in cost damages due to project abandoned. The major causes of client related, consultant related, contractor related and external related may lead to project abandonment that will lead to delays in construction projects. Aibinu and Jagboro (2002), studied the effects of construction delays on project delivery in Nigerian construction industry. They identified total abandonment as one of the major effects of delay.

2.4 Causes of Delay in Construction Projects

The literature review was done through books, conference proceedings, the internet, and engineering journals. The group are includes the contractor, client, consultant, material, labour, equipment, external and financial.

Chileshe & Yirenkyi-Fianko (2011), examined perceptions of the likelihood of occurrence and severity of risk in construction projects in Ghana. This study explored 25 risk elements by using an opinion survey approach to collect data from professionals (clients, consultants and contractors) in the Ghanaian construction industry. They identified construction method; price inflation; exceptional weather; ground conditions and site contamination; and poor communication among the project team as critical risks to construction project.

Assaf et al. (1995), identified 56 main causes of delay (and their relative importance) in large building construction projects in Saudi Arabia. Based on the contractors surveyed, the most important delay factors were: preparation and approval of

shop drawings, delays in contractors' progress of work, payment by owners and design changes. From the views of the architects and engineers, the cash flow problems during construction, the relationship between subcontractors and the slow decision-making process of the owners were the main causes of delay. However, the owners agreed that the design errors, labor shortages and inadequate labor skills were important delay factors.

Mansfield (1994), identified 16 major factors that cause delays and cost overruns in Nigeria. He found that, the causes of delay and cost overruns in the Nigerian construction projects were mainly attributable to finance and payment arrangements, poor contract management, shortages in materials, inaccurate estimation and overall price fluctuations. El-Razek et al. (2008), determined the most important causes of delay in building construction projects in Egypt from the view of the main project parties; namely, contractors, consultants and clients.

In the USA, a study by Ahmed et al. (2002), identified some critical causes of delay in Florida as building permits approval, change order, changes in drawings, incomplete documents, inspections, changes in specifications, decision during development stage and shop drawings and approval.

There are many factors that contributed to causes of delays in construction projects. These range from factors inherent in the technology and its management, to those resulting from the physical, social, and financial environment. There are in total of seven groups of causes for delay in construction projects (Theodore, 2009).

- Causes of delay by client
- Causes of delay by contractor

- Causes of delay by consultant
- Causes of delay by materials
- Causes of delay by equipment/plants
- Causes of delay by labor
- Delay caused by external factors

2.4.1 Delay caused by Client

A study by Assaf et al. (1995), funds are not adequately released during relevant phases of projects' execution. Milestones payments are not made on time due to organizational lapses or bureaucracy. Inadequate cash flow leads to delay in delivery of materials and equipment to the site and delay in payment of workers' salaries. Slow decision making. When they do not make decisions on time regarding project matters, they slow down activities at the project sites. Slow decision making could be caused by an organization's internal bureaucracy or wrong channels of communication. Impractical allocation of resources. Funds, manpower, materials, equipment are inadequate to complete the project because project owners or clients have not properly assessed whether they have the required resources to complete such projects.

2.4.2 Delay caused by Contractor

There are several studies by numerous researchers identified the factors of contractor related delays. Studies by Murali et al (2007), identified the improper planning contractor, poor site management and inadequate contractor experience problems with subcontractors contribute to causes of delays. Fong et al (2006), noted that delay in

interior finishes (tiles, painting, ceiling), delay in handover of plant room/plinth/water tank, improper electrical and mechanical coordination and management contribute to causes of delays. Essam (2006), identified the subcontracting problems, contractor is not well organized, contractor financial problems and bad quality of contractor's work contribute to causes of delays.

Contractors appoint Project Managers who are expected to draw up workable project plans and modalities for their implementation. A faulty plan will lead to delay in project completion. Most Local Contractors rarely have practicable work programs at the initial stage of project planning. Lack of appropriate work programs impairs monitoring of project progress against the stipulated time.

Sadi et al (2006), identified the conflicts in subcontractors schedule in execution of project, rework due to errors during construction, conflicts between contractor and other parties (consultant and owner), poor site management and supervision by contractor, poor communication and coordination by contractor with other parties, ineffective planning and scheduling of project by contractor, improper construction methods implemented by contractor, delays in subcontractors work, inadequate contractor's work, frequent change of subcontractors because of their inefficient work, poor qualification of the contractor technical staff, delay in site mobilization contribute to causes of delays.

Again, mistakes during construction stage. Inexperienced contractors usually make errors during construction. Sometimes contractors employ low skilled staff in order to make more profit by paying them lower salaries. Tendencies of errors are, thus, higher.

Rework of an already executed aspect of a scope slows down project progress. This has serious impact if it involves execution of critical tasks.

2.4.3 Causes of Delay by Consultant

Inappropriate design. Improper design stalls project execution because of the time it takes for such design to be reviewed, amended and accepted for construction works. When errors are observed in the design, works are temporary suspended until such errors are removed. This is predominant in organizations where selection processes of vendors are compromised.

Poor contract management. Most projects have consultants as the contract managers. They liaise between the client and the contractor. Projects get delayed when the required management principles are not utilized during projects' execution

Late identification & resolution of drawings & specification errors & omissions. Projects are required to be completed on schedule, within budget and according to specification. If consultants do not identify errors and omissions in the working drawings early enough, already completed activities may require alterations when such errors and omissions are discovered after project commencement.

Late preparation of drawings and other contract documents. Drawings and other contract documents such as Bill of Engineering

Measurement and Evaluation are required for a smooth execution of any project. Therefore, delay in their release stalls project activities.

Long waiting time for inspection & testing. Certain aspects of projects require inspection and testing before further activities could be carried out. Usually, Consultants

and Clients' staff are tasked with the responsibility of coordinating such exercises. Delays in these impede project progress.

Inappropriate coordination of information. If projects issues or contractor's requests are not addressed timeously and information is not effectively managed, project activities can be negatively affected. There must be a good communication management plan in place so that site information is properly channeled and coordinated. Lack of coordination of information fosters misunderstanding, potentially causing conflicts that require resolution time.

2.4.4 Delay caused by Materials

According to Hyunjoo et al (2007), identify the material delivery were identified as factors to causes of delays in construction project. Murali et al (2006), identify the quality of material and shortage in material contributed the cause. Koushki et al (2004), revealed that the material selection duration contribute to causes of delays. Sweis et al (2007), identify the shortage of materials, delay in materials delivery contribute to causes of delays. Aibinu et al (2002), identify the material management problems that contribute to causes of delays. Abdalla et al (2002), identify the poor quality of material and shortage having high influence to causes of delays. Sadi et al (2005), identify the shortage of construction materials in market, changes in material types and specifications during construction, delay in material delivery, damage of sorted material while they are needed urgently, delay in manufacturing special building materials, late procurement of materials and late in selection of finishing materials due to availability of many types in market that

contributes to causes of delays. Murali et al (2007), identify the shortage in material and quality of material that contributes to causes of delays.

There are a lot of factor that were get from previous study about the factors that cause the delay in construction project. Most of the researchers agree that these are the factors that always happen in relation to the material:

- Shortage of construction materials in market.
- Unpunctually material delivery.
- Poor quality of material in construction.
- Damage of sorted material while they are needed urgently
- Late procurement of materials
- Material shortages. This results in slowed activities and sometimes temporary abandonment of sites.

2.4.5 Causes of Delay by Equipment/plants

Kang Sik Wei (2010), identified the following as potential delay factors that are associated with equipment/plants in construction projects.

- Equipment breakdowns. There is possibility that equipment for construction may breakdown and this can prolong the project completion.
- Improper equipment selection & Faulty equipment. For example, the use of the incorrect equipment extends tasks while faulty equipment leads to delay due to the time spent to repair.
- Low level of equipment-operator's skill. There has been a trend over the years for heavy equipment operators to specialize in one piece of machinery. For example, a

bulldozer operator will only ever operate bulldozers and excavator operators only operate excavators. This is fine to some extent, you do become an expert in that piece of machinery. However, when it comes to heavy equipment careers, you are also limiting your options.

- Low productivity and efficiency of equipment
- Lack of high-technology mechanical equipment

2.4.6 Delay caused by Labor

Several studies identified the factors of labour related delays. According to Murali et al (2006), identify the labour supply and labour productivity that contribute to causes of delays. Abdalla et al (2002), identify the labour supply and labour productivity that contributes to causes of delays. Yaw et al (2003), identify the labour shortages that contribute to causes of delays. Sadi et al (2006), identify the shortage of labors and low productivity level of labors that contribute to causes of delays. Sweis et al (2007), identify the shortage of manpower (skilled, semi-skilled, unskilled labour) and presence of unskilled labour that contribute to causes of delays.

2.4.7 Delay caused by External factors

Abdul-Rahman et al., (2006), the causes of delay on external factors is the security of the site, the warlords influence, corruption, natural disasters like flood and landslides, effect of subsurface condition(soil, high water table and etc), inclement of weather, unavailability of utilities in site, traffic control and restriction at job site, accident during construction, permit for foreign, building codes, bureaucracy in government agencies, changes in government regulations and laws and market inflation.

Kikwasi (2012), there are some factors are considered as external causes of delays in projects. This is primarily consists of poor, bad or unusual weather circumstances. These include rainy days and windy days. Other external factors are unforeseen site condition, equipment availability, quality of the material on site, shortage in material on site, supply of the labor, labor productivity, weather condition, unforeseen site condition, disputes and negotiation

There are a number of factors that constitute external issues in construction delays. They included the following:

Weather conditions. In areas where there is frequent rainfall, inexperienced contractor/consultants do not account for weather projections in their project implementation plan.

Natural disasters (e.g. floods, lightning strikes, earth quakes,). There are areas that usually experience natural disasters such as floods. These disasters are generally unpredictable. However, well established project management organizations possess requisite skills to manage natural disasters.

Change in government's leadership & policies. Certain projects are stalled and abandoned when political leadership that initiated them change. Sometimes, change in government policies such as monetary and fiscal policies could lead to an increase in the cost of construction materials and equipment. Contractors will not be able to continue with the project as scheduled because of the time they need to spend on approvals for price fluctuations and contract revision.

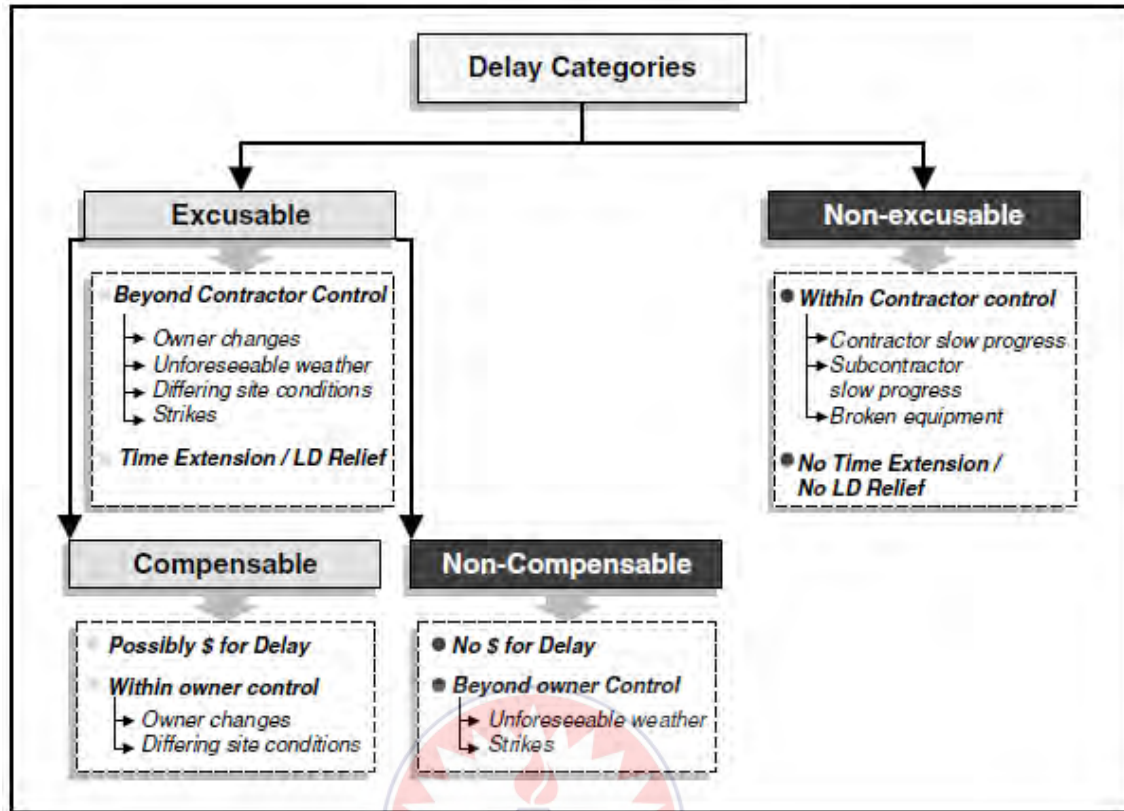
Interference by political leaders. This is usually experienced in Public sector projects. Some political leaders have vested interest in particular projects. They interfere by

requesting additional scope requirements not captured in the original design or by imposing unqualified contractors/ subcontractors on the client. The above action leads to poor project performance especially in terms of time.

2.4.8 Types or Classifications of Delay in Construction Projects

All contract parties have goals to complete a project according to the planned schedule, under the planned budget, with the highest quality and in a safe manner. However, delay has become a common problem occurred in construction industry nowadays. Delay lead to many negative effects such as disputes between clients and contractors, increased costs, loss of productivity and revenue, and termination of contract. (Kasimu, 2012). The project factors and the cause of delay should be identified by construction parties in order to control and minimize construction project delays. Theodore (2009), mentioned that there are four basic ways to categorize type of delays in construction projects:

- Critical and noncritical
- Excusable and non-excusable
- Compensable and non-compensable
- Concurrent and non-concurrent



Source: Theodore, (2009)

Figure 2.2: Delay Categories

2.4.8.1 Critical and Noncritical delays

In the process of determining the effect of a delay on the project, the analyst must determine whether the delay is critical or noncritical. Delays that affect the project completion, or in some cases a milestone date, are considered as critical delays, and delays that do not affect the project completion, or a milestone date, are noncritical delays. If these activities are delayed, the project completion date or a milestone later will be delayed. These activities truly control the project completion date depends on the following:

- The physical constraint of the project, i.e. how to build the job from practical perspective

- The requirement of the contract for sequence and phasing
- The contractor's plan and schedule
- The project itself

2.4.8.2 Excusable and Non-Excusable delays

All delays are either excusable or non-excusable. An excusable delay is a delay that is due to an unforeseeable event beyond the contractor's or the subcontractor's control. Excusable with compensation are caused by the client's actions or inactions. When contractors encounter this type of delay, they are entitled to time extension as well as monetary compensation due to the delays. An example of an excusable delay with compensation would be when an owner denies access to the site once the notice to proceed is given.

Normally, based on common general provisions in public agency specifications, delays resulting from the following events would be considered excusable:

- General labor strikes. Strikes and labor unrest are frequent causes of delay on construction projects. However, that not all strikes are considered excusable delays. Generally, a contract clause listing strikes as an excusable delay also carries a qualification that the cause for the delay must have been unforeseen and beyond the control of the contractor. Strikes that are foreseeable at the time of signing the contract are not considered excusable causes of delay.
- Fires
- Floods

- Natural occurrence (Act of God). An act of God is a natural occurrence caused directly and exclusively by natural forces without any human intervention, which could not have been reasonably foreseen, nor could have been prevented. Earthquakes, landslides, tornados, hurricanes, lightning, floods, etc., are all examples of acts of God. Note, however, that mere bad weather does not qualify as an act of God, (Aditi, 2014).

- Owner-directed changes
- Errors and omissions in the plans and specifications
- Differing site conditions or concealed conditions
- Unusually severe weather
- Intervention by outside agencies
- Lack of action by government bodies, such as building inspection

Non-excusable delays are events that are within the contractor's control or that are foreseeable. These are some examples of non-excusable delays:

- A project-specific labor strike caused by either the contractor's unwillingness to meet with labor representative or by unfair labor practices
- Faulty workmanship by the contractor or sub-contractors
- Late performance of sub-contractors
- Untimely performance by suppliers

2.4.8.3 Compensable and Non-compensable Delays

A compensable delay is a delay where the contractor is entitled to a time extension and to additional compensation. Relating back to the excusable and non-excusable delays, only excusable delays can be compensable. Non-compensable delays mean that although an excusable delay may have occurred, the contractor is not entitled

to any added compensation resulting from the excusable delay. Additionally, a non-excusable delay warrants neither additional compensation nor a time extension.

Whether or not a delay is compensable depends primarily on the terms of the contract. In the most cases, a contract specifically notes the kinds of delays that are non-compensable, for which the contractor does not receive any additional money but may be allowed a time extension.

2.4.8.4 Concurrent and Non-concurrent Delays

Mubarak (2005), states that a concurrent delay includes a combination of two or more independent causes of delay occurring within the same time frame. According to the author, a concurrent delay often includes an excusable delay and a non-excusable delay. Another definition made by Callahan et al. (1992), is that “more than one delay contributed to the project delay, not that the delays necessarily occurred at the same time”. Although this type of delays seems like a simple issue, still there is no clear definition of concurrent delays. According to Trauner et al. (2009), concurrent delays are simply defined as “separate delays to the critical path that occur at the same time”. Levy (2006), names this type of delays as overlapping delays. Nguyen (2007), also points out that simultaneous delays, commingled delays, and intertwined delays are other names used for concurrent delays. Levy (2006), further indicates that concurrent delays may be generated by the contractor or by the owner, but if it happens that both parties are responsible, and these delays overlap then neither party can be able to retrieve damages.

In analyzed concurrent delays, each delay is assessed separately and its impact on other activities and the project duration is calculated. There are some guidelines for concurrent delays classification.

Firstly, if excusable and non-excusable delays occur concurrently, only a time extension is granted to the contractor. Next, if excusable with compensation and excusable without compensation delays occur concurrently, the contractor is entitled to time extension, but not to damages. Lastly, if two excusable with compensation delays occur concurrently, the contractor is entitled to both time extension and damages.

Concurrent delay analysis brings about many issues, since both owners and contractors view concurrent delays as a strong defense tool against each other. For example, owners use them to preserve their interest in order to get liquidated damages, however contractors use them to neutralize their inexcusable delays and avoid damage entitlement. Courts, practitioners, researchers are generally inconsistent in the subjects of definition and apportionment of concurrent delays.

2.5 Strategies of Minimizing or Preventing Delays in Construction Projects

When a construction delay occurs, there is no question that the Owner suffers financially. But the extent to which an Owner can recover its loss of income from the Contractor, and more importantly minimize the risk that such delays will occur, depends largely on how the construction contract was drawn up. Alaghbari & Razali (2007), the methods to minimizing the construction delays are divided into 3 groups that is method for the client, contractor and consultant. The client should give more concentration to pay progress payment to the contractors on time as it weakens the contractors ability to

finance the work, the client also have to minimize changes in order during construction so as to avoid delays and need to speed up reviewing and approving of design document. For contractor method of minimizing delay, they should improve the knowledge and skills of technical staff and try to manage the financial resources and plan cash flow by utilizing progress payment, the contractor also have to plan and scheduling the works form start of project and during the work to match with the resources and time to develop the work to avoid delays. To improve the delays cause by the consultant, they should avoid delays in reviewing and approving design documents, build up the knowledge and skills of technical staff and try to improve the coordination among the parties. For reducing interruption in project contractor must have knowledge about his resources strength and obtain up-to-date machinery, and try to obtain new equipment for construction. It is contractor liability that he must manage the capital resources throughout the project and use it appropriately because he doesn't countenance economic and cash flow problems. For reducing delay managerial and technical staff should be acquired for site management and supervision. It is necessary to include skilled and experienced workers in staff because of them the performance of work is improved. For completion of project it is necessary that client must be fait on contractor and consultant.

Based on several studies of project success factors and rectification of delays in construction projects, a total of other 15 methods have been identified as follows: According to (Majid, 2006), Frequent progress meeting, Use up-to-date technology utilization, Use proper and modern construction equipment, Use appropriate construction methods, Effective strategic planning, Proper material procurement, Accurate initial cost estimates, Clear information and communication channels, Frequent coordination

between the parties involved, Proper emphasis on past experience, Proper project planning and scheduling, Complete and proper design at the right time (Assaf, 2006), Site management and supervision (Long, 2008). Collaborative working in construction (Kumaraswamy, 1997), Compressing construction durations (Long, 2008).



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

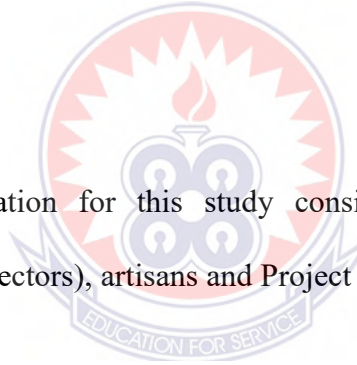
This chapter discussed the instruments and the methods used to gather information for the study.

3.2 Research Design

The study was fact-finding in nature which used qualitative and quantitative research approach for data gathering to obtain the needed information for the study.

3.3 Population

The target population for this study considered, Site Engineers, Foremen, Contractors (managing directors), artisans and Project Managers.



3.4 Sampling Techniques and Sample Size

A purposive sampling approach was used in determining the sample for the study. This is used primarily because these numbers of people have expertise in the area being researched. From four weeks survey of construction firms and sites, it was possible for the researcher to identify the populations that would assist in addressing the issues regarding construction delays. The sample comprised experts working in the Construction industry sector in Jasikan District of Ghana. The Sample size comprised a total of 115 personnel from the population being sample by personal field work visit.

3.5 Data Collection Techniques

Data collection for the study were in broad areas. The sources such as structured interviews and visits and observations and questionnaires.

3.5.1 Questionnaires

Questionnaires were administered to contractors (managing directors), site engineers, project managers, foremen and artisans. In all a total of 115 respondents who were distributed with the questionnaires. These experts were selected based on their functions and roles in construction so far as delay in construction projects are concerned.

The issues in the questionnaires referred to obtain:

- Demographic data of respondents
- Information on effects of construction delay
- Information on the causes of construction projects delay
- Information on strategies for minimizing construction delay.

These questionnaires were developed to allow the respondents to select the responses from options.

3.5.2 Interview

Structured interviews were personally conducted face to face with interviewees. The structured interview was designed to gather specific information from site Engineers, contractors (managing directors) and project managers. The interviews conducted were based on issues or effects of construction delays, causes of construction delays and strategies to minimizing them.

3.5.3 Visits and Observations

The personal visits and observations were made to various constructions sites and towns across Jasikan District of Ghana. In the first place, visits were made across various construction sites and institutions to see projects that were affected with delays.



CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results and discussions of the various methods used to collect data for the study in chapter three. The results or the outcomes reflect the issues of construction delays and the discussions explained the meaning of the issues that came out of the various methods.

4.2 Results and Discussion of questionnaires

Questionnaires were obtained from the foremen, project managers and artisans. A total of one hundred and fifteen (115), out of this number ninety seven (97) representing 84.3% were retrieved and the remaining 15.7% could not be obtained due to some reasons such as lost of questionnaire or the respondents had travelled. Also, there were thirty (30) questionnaire items distributed to the foremen and only twenty two (22) were received representing 73.3%, artisans were given sixty five questionnaires items but sixty (60) representing 92.3% were obtained while twenty (20) items for projects managers and fifteen (15) representing 75% retrieved. Table 4.1 showed the statistics.

Table 4.1: Statistics of questionnaire

Description	Number of Respondent	Number of Items Distributed	Number Received	Percentage Received
Foremen	30	30	22	73.3
Artisans	65	65	60	92.3
Project Managers	20	20	15	75
Total	115	115	97	

Source: Researcher's Field, 2016

4.2.1 Results of questionnaire from Project Managers

Demographic of managers

Table 4.1 summarized the demographics of projects managers and it was clearly revealed that men are dominating in the construction sector representing 73.3%, this is because men are seen to be physically stronger than the women who had minority percentage of 26.7%. The table 4.1 also revealed that, most of the projects managers sampled were between the ages of 40-49 years representing the highest percentage of 40.0%. They were seen to be middle aged people managing the construction firms. The second highest was 26.7% between the age 50-59 years. This year group is seen as becoming weaker and therefore cannot do too much of hard work.

The table 4.1 revealed that high profile of experience managers were ideal to handle managerial level so far as construction is concerned. Table 4.1 revealed that nine (9) out of fifteen (15) managers representing 60% were managing most of the construction firms because they were experts who have knowledge about management while the rest 40% of the managers also possessed High National Diploma certificates as managers.

In the same table 4.2, it was revealed that eight out of fifteen representing a percentage of 53.3% fall in 21 years and above have a lot of experiences so for as management is concerned. The rest fall between 5 and 20 years.

Table 4.2: Demographic of project managers

Description	Frequency	Percentage
Gender		
Male	11	73.3
Female	4	26.7
Total	15	100
Age group		
20-29	1	6.7
30-39	2	13.3
40-49	6	40.0
50-59	4	26.7
60 and above	2	13.3
Total	15	100
Level of Education		
Polytechnic	6	40
University	9	60
Total	15	100
Number of Experience		
5-10	2	13.3
11-15	3	20.0
16-20	2	13.3
21 and above	8	53.3
Total	15	100
Buildings with most delay		
Schools	4	26.7
Hospitals	3	20
Housing	6	40
Public	2	13
Total	15	100

Source: Researcher's Field, 2016

Issues of construction projects delay

The questionnaire surveyed on the effects of delays in construction project from the viewpoint of construction experts such as projects managers was analyzed as shown in Table 4.3 .In order to identify the effect of delays in construction projects, calculation on the rank of effects of construction delays was done, data was analyzed by calculating mean and standard deviation. The Table shows the ranking of issues of construction delays on project managers.

Table 4.3: Effects of construction delays

Issues of delays	N	Mean	Std. Deviation
Time overrun	15	3.93	1.335
Cost overrun	15	3.80	1.424
Total abandonment	15	3.67	1.718
Arbitration	15	3.60	1.454
Disputes and claims	15	3.53	.915
Litigation	15	3.27	1.751
Total	15		

Source: Researcher's Field, 2016

Table 4.3 shows that time overrun and cost overrun were the two most common effects of delays in construction project from the view of point of respondents. Based on the analysis in Table 4.3, time overrun and cost overrun are rated extremely high by all respondents. Time overrun is very significant effect of delay while cost overrun is significant effect of delay. However, total abandonment, Arbitration, Disputes and litigation are 3rd, 4th, 5th and 6th rank scoring as reported by the construction experts.

Time Overrun: Time overrun is ranked extremely high by all respondents recording a mean value of 3.93. No doubt it is the most significant effect of the construction delay in construction projects. It is observed that the time overrun is closely associated with cost

overrun. Most of the time, as the delay involves the extension of time to the project life and this may lead to cost overrun, as expenditure increases due to increase of time.

Cost Overrun: Cost overrun is ranked second with mean value of 3.80 to time overrun. It is highly rated by all respondents and eventually become one of significant effect of the construction delay. Time overrun is closely related to cost overrun and most of the time leads to cost overrun. The severity of cost overrun is depended on the length of the time overrun. During projects study, it was observed that payment for salaries, utility bills and fluctuation of material prices are some of expenditure that have to be borne that may contribute to cost overrun. The situation will be worsening if the contractors were terminated; new contractors were hired with significant increase in prices. The cost overrun can be due to contractor's poor site management, escalation of material prices and ineffective planning and scheduling by contractors.

Dispute: Dispute is moderately rated by all respondents as its score is quite moderate compared to time overrun and cost overrun. This moderate score shows that respondents apparently view disputes are quite frequent to a certain extent. Most of the time, the dispute or disagreement is between contractor and client where the dispute may involves claims for compensation, liquidated damages and extension of time. The classification into types of delay significantly diffuses the disputes as it is spelt out in the agreement. Most of the time, other parties such as consultants' opinion are taken into account to solve the dispute. Project studies showed that low speed of decision making by client, escalation of material prices, changes in scope of projects during construction work, frequent design changes and client interference may contribute to dispute.

Arbitration: Arbitration is also moderately rated by all respondents with mean value of 3.60. It is used if both parties fail to solve the disputes amicably. Certainly, a third party or an arbitrator which is highly respected by both parties is appointed be the middle man to facilitate the disputes. Most of the time, arbitration is used when the client is terminating the contractor's contract where the completed work by the contractor is to be evaluated and compensated. Mean score indicates that the degree of frequency of arbitration is quite moderate compared to time overrun and cost overrun.

Litigation: Litigation is one of the lowly rated by all respondents. This indicates that all parties use litigation as their last choice. This litigation is also very rare in the district of the study, management procurement construction project as all parties try to avoid the high cost and the long length of time during the litigation. Client's interference and termination of the project may lead to litigation.

Total Abandonment: The results show that the degree of frequency of total abandonment is quite moderate. Apparently, contractors try very hard to avoid the total abandonment in their projects as this effect hurts the reputation of the contractors and subsequently will be blacklisted.

4.2.2 Results of questionnaire from Artisans.

Most important causes of construction delays

There are in total of seven groups of causes for delay in construction projects.

A ranking method, calculation of mean and standard deviation were used to achieve this objective and the significant of using these methods is it can reveal the most influential

The results of these categories factors can be seen from tables 4.4to 4.10.7

Table 4.4: Results of client factors of delay from Artisans

Client Related Factors	N	Mean	Std. Deviation
Client's Inadequate Financial Resources	60	4.32	1.049
Delay In Material Delivery	60	4.27	.841
Changes Orders By Owner	60	4.23	.945
Funds Not Adequately Released	60	3.95	.964
Slow In Decision Making	60	3.92	.424
Supervision Of Work By Owner	60	3.85	.777
Delay In Progress Payment	60	3.85	1.117
Poor Communication And Coordination	60	3.83	1.196
Delay In Payment Of Workers	60	3.10	.858
Valid N (Listwise)	60		

Source: Researcher's Field, 2016

Table 4.4 shows the results of survey analysis of factors of client related delays that were produced from the various Artisans. Factors to causes of delays were ranked based on important value of mean among the group of respondent. The table revealed that client's inadequate financial resources with mean value of **4.32** contributed the most for client related delays by respondents. Besides that, Delay in material delivery of mean value of **4.27** by owner during construction was ranked second in overall while changes order by owner with mean value of **4.23** during construction ranked third. Client's inadequate financial resources was ranked first as the most important factor that cause construction delay, in this case since the owner do not have enough resources progress of work is halted, prices of items do escalate so the next time he or she has the resources to continue, additional cost is incurred thereby extending the time of the project. Next, delay in material delivery was ranked second highest among the client's delay group. Materials are the items or logistics that are used for the construction of any construction projects and if these are not provided on time, work cannot progress. It will let the workers leave for other projects that are on-going. It will also extend the time of work schedule and cost overrun. Next, the change orders by owner during construction was

ranked third highest among the client related delays group. Change orders in frequent might extend the site activity and affect the whole project scheduling which comes to unable to complete the project on time.

Contractor's related construction delays

This brings the results that was obtained from the various Artisans on contractor's delay factors. Table 4.5 brings the results of contractor's related causes of delay.

Table 4.5: Results of contractors delay factors

Contractor's Delay Factors	N	Mean	Std. Deviation
Ineffective Planning And Scheduling	60	3.90	.896
Underestimation Of Project Duration	60	3.78	.585
Rework Due To Errors	60	3.78	.922
Improper Electrical And Mech. Coordination	60	3.77	1.125
Contractor Financial Problems	60	3.08	1.030
Contractors Poor Site Management	60	2.47	.747
Poor Qualification Of Contractor's Staff	60	2.35	.577
Valid N (Listwise)	60		

Source: Researcher's Field, 2016

The results from the table clearly revealed that ineffective planning and scheduling (mean mark of 3.90) was the most frequent and ranked first among top causes of delay, secondly, underestimation of projects duration with a mean mark of 3.78. The third highest is rework due to errors (mean = 3.78). The least among the contractor's related factors is improper construction methods (mean = 1.85).

Ineffective planning and scheduling. Contractors appoint Project Managers who are expected to draw up workable project plans and modalities for their implementation. A faulty plan will lead to delay in project completion. Most Local Contractors rarely have practicable work programs at the initial stage of project planning. Lack of appropriate

work programs impairs monitoring of project progress against the stipulated time. The second highest is **underestimation of projects duration**. Estimation, as you might imagine, is the process by which we determine how long a project will take and how much it will cost. Most at times, estimations are prepared very badly. Most of our estimates are more like wishes than realistic targets. To make matters worse, it seems most people have no ideas how to improve on those very bad practices. And the result is, as everyone tries to meet an impossible estimation target, shortcuts are taken, good practices are skipped, and the inevitable schedule runaway becomes a technology runaway as well. The third item from the respondents' point of view so far as contractor's related delays in construction is rework due to errors. Inexperienced contractors usually make errors during construction. Sometimes contractors employ low skilled staff in order to make more profit by paying them lower salaries. Tendencies of errors are, thus, higher. Rework of an already executed aspect of a scope slows down project progress. This has serious impact if it involves execution of critical tasks. For example, inferior work done during execution slows work progress.

Improper construction methods by contractor was the least among the delay factors. Construction activities are required to be carried out using best practices and tools. When the procedures are not followed, errors occur, leading to rework and delays.

Consultant's related construction delays

Consultants in construction industry also have some related issues so far as construction delay is concerned.

In Table 4.6 shows the results of survey analysis of factors of consultant related delays. Factors of causes of delays were ranked based on relative importance mean among respondents' point of views.

Table 4.6: Results of consultant's related delays

Consultant's Factors	N	Mean	Std. Deviation
Building Approval Delays By Authorities	60	4.37	1.402
Late Preparation Of Drawings	60	4.30	.646
Inappropriate Design	60	3.88	1.451
Late Identification Drawing, Errors Etc.	60	3.65	1.071
Poor Contract Management	60	3.58	1.078
Unclear And Inadequate Details In Draw.	60	1.82	1.049
Valid N (Listwise)	60		

Source: Researcher's Field, 2016

Results from table 4.6 revealed that, approval of buildings by authorities (mean = 4.37) tops the consultant's related issues of construction delay. The second factor that followed was late preparations of drawings with mean value of 4.30, the next was inappropriate design of mean value 3.88. The table also showed last two items, poor contract management with 3.58 mean value and Unclear and Inadequate (mean value = 1.82) respectively.

Building approval delayed by authorities. It is time-consuming and complex process for consultant to get approval of documents submitted. (E.g. method statement or specifications). Any person or organization which intends to commence with the construction of a building whether for residential or for other purposed in an area of jurisdiction must obtain a building permit. This is to ensure, among other things, that the proposed project conforms to the building regulations and development control guidelines. If this procedure is not followed, it results in project delay.

The second factor of consultant's delay in construction, is late preparation of various drawings. Drawings and other contract documents such as Bill of Engineering. Measurement and Evaluation are required for a smooth execution of any project. Therefore, delay in their release stalls project activities.

Improper design stalls project execution because of the time it takes for such design to be reviewed, amended and accepted for construction works. When errors are observed in the design, works are temporary suspended until such errors are removed. This is predominant in organizations where selection processes of vendors are compromised.

Last but not least, poor contract management is also seen as a major factors so far as consultant's delay factors is concerned. Most projects have consultants as the contract managers. They liaise between the client and the contractor. Projects get delayed when the required management principles are **not** utilized during projects' execution.

Delay factors caused by materials

Delivery of materials deviations result in many consequences, which cause additional costs. Some costs can direct be measured and priced, while others are "invisible" and can have a greater impact on a company's performance in the longer run. Table 4.7 showed the various views of the respondents in construction industry.

Table 4.7: Results of materials factors of delay

Materials Factors of Delay	N	Mean	Std. Deviation
Shortage Of Materials	60	4.08	1.555
Changes In Material Types	60	3.97	.956
Delay In Material Delivery	60	3.75	.541
Damage Of Material When Needed	60	3.70	1.124
Poor Quality Of Material	60	3.47	.623
Late Procurement Of Materials	60	3.37	.688
Valid N (Listwise)	60		

Source: Researcher's Field, 2016

The table showed shortage of construction materials (mean = 4.08) tops the ranking of the respondents viewpoints. With this factor, it slowed activities and sometimes temporary abandonment of sites. Problem of shortage of construction material at local market, generally, related to material transportation problems to the local market from the place of material production or material distribution center. Changes in material type was ranked second with a mean mark of 3.92. This always affects the whole project completion on schedule because changes and corrections have to be made due to the fact that new and approved materials have arrived and must be used during construction.

There was the third item, delay in material delivery (mean = 3.75). When materials for construction are delayed, the whole progress of work is halted, it also extends the time schedules of work to far completion date of projects. Delays in material delivery will affect the cash flow and scheduling.

Poor quality of materials (mean = 3.47) is last but not least on the ranking of the respondents views. Poor quality materials lead to poor quality workmanship, thus an unacceptable product. Most often, the project owners insist that correction be made or that parts of work be completely redone.

Late procurement of materials with mean value of 3.37 was the least among the ranking the experts in the construction industry have realize from the table above. The

current strategies used for procurement do not live up to the market requirements and rather is stifling the growth of this particular industry. Understanding these various models are being implemented throughout the industry which will have a significant impact on the growth as well as improve productivity to help this industry sustain the drastic economic changes. When improper procurements of materials are not followed, the flow of project progress can be halted.

Equipment related delay in construction

The selection of the appropriate type and size of construction equipment often affects the required amount of time and effort and cost thus the job-site productivity of a project. It is therefore important for site managers and construction planners to be familiar with the characteristics of the major types of equipment most commonly used in construction.

In Table 4.10.5 shows the results of survey analysis of factors of equipment related delays. Factors of causes of delays were ranked based on relative importance mean value from the viewpoint of contractor and consultant and all other construction experts in the construction industry.

Table 4.8: Results of equipment related delays in construction

equipment related delays	n	mean	std. deviation
stealing of materials	60	3.75	.816
material prices escalations	60	3.48	.676
low level of operator's skills	60	3.40	.827
improper equipment selection	60	3.12	1.010
equipment breakdowns	60	2.95	.699
low productivity of equipment	60	2.72	.640
shortage of equipment	60	1.80	.755

Source: Researcher's Field, 2016

Results from table 4.7 showed the most frequent factor in equipment related delays in construction projects so far as the district in which the research was carried out is concerned. The ranking of this factors was as a result of the hardworking of the various experts in the construction industry. In fact stealing (mean value of 3.75) was ranked first and this was followed by prices escalation (3.48 = mean) and the third was low level of operators „skills (mean value = 3.40). The least among the factors was shortage of equipment (1.80).

This factor of equipment related delays have some different view point among contractors and consultants. Although contractors thought the low level of equipment operator’s skill would be the most factors that affect the construction delays but consultants have ranked lack of high technology mechanical equipment as their first choice. By the way, both contractors and consultants still have the same point of view.

Construction equipment theft has been recognized as a significant problem in the construction sites in Jasikan and elsewhere in the Ghana. Theft has caused most projects to stopped or abandoned. The thieves sometimes remove some vital parts from machines which render them not to work again especially when work is to be done at a height and some also steal and disguise those equipment for personal use. So when this happens, progress of work delay, thus cost overrun sets in.

The second item ranked was prices of equipment continue to go up and so if the necessary equipment are not secured on time, projects suffer in terms of cost and time are also extended due to lack of funds. Low level of operators „skills was a big factor. Employment of unskilled personnel at the project sites impedes execution of work to

specification and leads to error or mistakes during construction. Time is then spent on alterations and corrections.

Shortage of equipment on the market was rated the lowest because it seldom happen which has not much influence on project delays. This is modern system with a lot of equipment for construction.

Labour related delay problems

One of the main factors that had influence in the construction industry growth is productivity which mainly associated with the labor performance. Labor in construction industry could be defined as all workforces involve in the process that had to carry out to accomplish and to achieve goal. The labor productivity insufficiency will affect the performance of the overall project. Table 4.10.6 would show the analyzed results of labor factors of construction delay.

Table 4.9: Results of labor related delays in construction.

Labor related delays	n	mean	std. deviation
low productivity of labors	60	3.65	1.071
shortage of labors	60	2.02	.701
personal conflicts among labors	60	1.85	.633

Source: Researcher's Field, 2016

The results so far collected about labor related factors of construction delay were based on three factors showed that low productivity of laborers was ranked number one with mean value of 3.65 followed by shortage of laborers also mean value of 2.02 and lastly personal conflict among laborers on sites.

Labor productivity is typically measured as a ratio of output per labor-hour, an input. If the low quality of labors is being occupied, therefore it might affect the project

schedule and cause the project to delay. In fact, this factor was a menace due to the fact that some laborers are lazy enough to give out their best for progress of work.

The shortage of labor will slow down the project progress due to low productive of site activity because the required skilled labor were not available. Labor disputes such as strikes slow down construction as time is spent on negotiation and settlement of grievances. Also, there were a lot quarrels among the laborers thereby making some being sacked, replacement is a difficult thing to come by and if this happens, delay in project construction happens.

External factors of delay in construction projects

A number of variables influencing the success of project implementation were identified following a thorough review of these articles. The construction industry is dynamic in nature due to the increasing uncertainties in technology, budgets, and development processes. There are eight factors of external related delays that contributed to the causes of delays were ranked based on relative important mean index among all the construction team as shown in Table 4.10

Table 4.10: Results of External factors of construction delay

External factors of delay	n	mean	std. deviation
change in government leadership	60	4.40	.669
delay in obtaining permits	60	4.12	1.354
interference by political leaders	60	4.02	1.033
weather conditions	60	3.40	.669
accident during construction	60	3.38	.691
delay in providing utilities, like water	60	3.35	.820
natural disasters	60	1.67	.752

Source: Researcher's Field, 2016

Results from Table 4.10 shows that change in government leadership ranked the highest with mean index score value of 4.40, while delay on obtaining permit was ranked second with mean index score value of 4.12 and interference by political leaders was third.

Change in government leadership is causing a lot projects to be slower this is affecting various institutions. Certain projects are stalled and abandoned when political leadership that initiated them change. Sometimes, change in government policies such as monetary and fiscal policies could lead to an increase in the cost of construction materials and equipment. Contractors will not be able to continue with the project as scheduled because of the time they need to spend on approvals for price fluctuations and contract revision.

Interference by political leaders. This is usually experienced in Public sector projects. Some political leaders have vested interest in particular projects. They interfere by requesting additional scope requirements not captured in the original design or by imposing unqualified contractors/ subcontractors on the client. The above action leads to poor project performance especially in terms of time.

Weather conditions of mean value of 3.40. In areas where there is frequent rainfall, inexperienced contractor/consultants do not account for weather projections in their project implementation plan. Moreover, weather effect such as thunder storm, heavy down pour might affect the construction activity due to safety consideration.

The least on the ranking was natural disasters, mean value of 1.6. There are areas that usually experience natural disasters such as floods. These disasters are generally

unpredictable. In Ghana generally, natural disasters are not common and therefore, in Jasikan district construction works flow well in terms of these disasters.

4.2.3 Results of questionnaire from Foremen.

Demographic of respondents

Table 4.11 below showed that, men are predominantly dominating the construction industry with as high as 81.0% while the females with only 19.0%. This means that the women do not have much interest in the field of construction.

Construction industry involves able people who are strong and energetic so as to carry out and come out with non-failing structures in society, therefore, the researcher wanted to find out which category of age group is found in this sector.

Table 4.11 revealed that the more man grows in age the more weaker he or she becomes. The age group 50-59 years representing 9.1% of the total percentage showed that they were becoming weaker and therefore cannot do any hard work in construction. Again, you would realized that the age group, 20-29 years represented by 40.9% were very young and energetic. In fact, 40-49 years and 50-59 with 18.2% and 9.1% respectively were also approaching their old age and therefore cannot involve so much energy in construction, the numbers started reducing from that age group.

On the part of Educational level, at this level, education is important because it gives the experts baseline skills to survive as adults in the construction industry. These skills include basic literacy and numeracy, as well as the ability to communicate, complete tasks and work with others. Table 4. Revealed that the majority of the foremen representing 50% from the various construction firms possessed H.N.D. certificates from

the various Polytechnics. From the same table, out of experience you could realized that there were experts in the construction industry who possess basic certificates still working as foremen and this was the second highest representing 18.2%. There were few who also possessed high level certificates from the university representing 13.6%.

There is a saying that “Experience is the best teacher”. Actually in the industry, there were experts who have more experience so far as construction is concerned. The table below revealed the result from the survey by respondents. Construction sites are known to be a dangerous place to be – it is where we get the popular notion of putting on a hard hat. Table 4.11 revealed that experts with 16-20 years in construction representing 59.1% really have much experience on the field of construction, having the right work experience can make a big difference. These old experts in construction have enough practical and managerial skills to be able to train young people under them. 11-15 years representing 18.2% of experts working in construction industry as foremen were also with some level of experience but that tells you that no matter what kind of construction work experience you do, you'll be learning. Less than 4 years (18.2%) in construction showed that their experience in terms of practical knowledge, and managerial skills would not be enough and therefore, continue to learn from other colleague experts in another constructions firms.

Construction delay is a major problem facing the Ghanaian construction industry. The researcher conducted this study to ascertain from over 22 respondents which category of buildings mostly affected by delay. The results of survey from the questionnaires distributed throughout the study from the various foremen in the construction industry were clearly shown in table 4.11. Table 4.11 revealed that housing

projects have suffered the highest delays over the years recording as high as 54.5%. Number of housing projects are left uncompleted at the mercy of the weather and most of these buildings are found in the villages so far as the study is concerned in the Jasikan District of Ghana This is as a result of mostly individuals who go into these projects run out of money, deaths or materials prices escalations.

Again, the second highest delay factor on buildings is the school projects recording 18.2%. This was also realized from the table as a result of change in government, with political issues. The rest of the building categories recording 13.6% do experience delay factors but were not as rampant as the first two categories discussed above.



Table 4.11: Results of Demographic of foremen

Description	Frequency	Percentage
Gender		
Male	17	81.0
Female	5	19.0
Total	22	100
Age group		
20-29	9	40.9
30-39	6	27.3
40-49	4	18.2
50-59	2	9.1
60 and above	1	4.5
Total	22	100
Level of Education		
Meddle school/junior high		18.2
Senior high school	4	9.1
Polytechnic	2	50.0
University	11	13.6
Not educated	3	9.1
Total	22	100
Number of Experience		
Less than 4 years		4.5
5-10	1	9.1
11-15	2	18.2
16-20	4	59.1
21 and above	13	9.1
Total	22	100
Buildings with most delay		
Schools		18.2
Hospitals	4	13.6
Housing	3	54.5
Public	12	13.6
Total	3	100
	22	

Source: Researcher's Field, 2016

Strategies to Minimizing Construction Delays

Table 4.12 shows the results of the foremen on methods of minimizing construction delays. These methods were ranked based on the mean value which is the calculation of the average indexes of methods identified.

Table 4.12: Results of strategies to minimizing construction delay

Strategies of minimizing delay	N	Mean	Std. Deviation
Proper Project Planning And Scheduling	22	4.55	.739
Mobilization Of Resources For Permit	22	4.23	.752
Effective Strategic Planning	22	4.23	1.110
Site management and supervision	22	4.23	1.066
Estimation Of Activity Duration	22	4.18	.958
Consultant Monitors Progress Of Work	22	4.18	1.006
Good Site Managers For Smooth Execution	22	4.14	.774
Client Should Not Interfere During Work	22	4.09	1.342
Contractors With Sound Financial Backing	22	4.05	1.046
Estimation of activity duration	22	4.05	1.362
Client Makes Quick Decisions To Solve Problem	22	3.91	.526
Contractors Provide Sufficient Expertise	22	3.82	.958
Frequent Progress Meeting	22	3.59	.908
Consultants Prepare Drawings On Time	22	3.55	.963
Proper Material Procurement	22	3.23	1.602
Accurate Initial Cost Estimates	22	3.09	.921
Compressing Construction Durations	22	2.27	.985
Valid N (Listwise)	22		

Source: Researcher's Field, 2016

The results of the research from table 4.11 revealed that proper project planning and scheduling (mean = 4.55), mobilization of resources for permit (mean of 4.23), effective strategic planning (mean value of 4.23), Site management and supervision (4.23 mean value) and Estimation Of Activity Duration have made the top five effective for overall ranked by the respondents in construction industry.

Proper project planning and scheduling was the most important factor among the sixteen factors. According to the respondents, it helps them to be on course because since

every activity they carried out were planned and therefore they don't deviate from plan schedule. We need to ensure the coordination among the various professionals, supervise construction quality and standard compliance, and will ensure that the contractors meets the required timetables, without attempting to take shortcuts or deviate from budgetary restraints. Besides that, the project manager also needs to ensure that the material used are those agreed to the contract and that they meet the standards.

Mobilization for resources for permit is one of the keys to projects success. After the contractor is selected, a number of activities must be completed before installation work can begin at the project site. Various bonds, licenses and insurances must be secured. A detailed program for the construction activities must be prepared. The cost estimate must be converted to a project budget and the system for tracking actual project costs must be established. The site must be organized, with provisions for temporary buildings and services, access and delivery, storage areas and site security. The process of obtaining materials and equipment to be incorporated into the project must be initiated and arrangements for labor, the other essential resource, must be organized. With the completion of this phase, it is finally time to begin the actual field construction.

Moreover, the strategic planning is important for Construction Company as it will give you the direction and measurement tools you need to be competitive in the industry. Among various type of construction, the influence of market pressure on the timing of initiating a facility is most obvious in industrial construction. In order to gain time, effective strategic planning is needed to precede the project without any major mistakes.

Site management and supervision was the most second important factor among the sixteen. Effective management and supervision has a positive effect on workers. On

the contrary, a lack of supervision can have a negative effect on workforce stability, capacity, confidence, competence and morale. It is the job of the supervisor to ensure strict control over the activities of subordinates, check on workers who may waste resources and give feedback regarding complaints, grievances and problems of subordinates to superiors.

4.3 Results and Discussion of Interview

In an attempt to find out the most effects, causes and strategies of minimizing delays in construction projects, the researcher conducted face to face interview with site engineers, contractors (managing directors), and projects managers. The various responses from the interview are summarized below.

4.3.1 Results and Discussion of Interview from Site Engineers on Issues of Construction Projects

The interviews with the site engineers revealed that there are so many issues that they face so far as construction projects are concerned. All the site engineers revealed that construction projects delay bring about cost overrun, time extension, abandonment of projects, court issues, litigation and so many more. From the interview, it was revealed that Time extension in projects always happen due to the various causes of delay in construction projects. So until these problems that cause time overrun are taken care of, projects extension will not end. The discussion continued to explain that time extension or time overrun and cost overrun happen alternatively. When there is an extension of time, there is automatically cost overrun. More money is spent when preliminary phases,

project planning or design poor estimation of quantities, design variations or errors, project schedule changes, scope changes, unexpected site conditions, rising costs of materials and labor (largely due to inflation), and or unforeseen events change orders, mistakes in the contract, changes in drawings, all these things happen to increase the cost of projects.

An Engineer from Kenzy Construction Company Limited said *“Disputes and claims arise because of the losses incurred through schedule overruns.*

Disputes normally come down in assessing three aspects of overruns: whose fault was it or who caused the overrun, how much delay occurred and, consequently, what monetary awards should be made. The main causes of disputes are slow or late payments for completed or ongoing work, client interference, neighbor issues, change in requirements, distribution of work, less communication within parties, subcontractor issues”

The discussion also revealed that litigation is another effect. They said this happen when court cases for resolution especially when large penalties are at stake. One of the site engineers said *“litigation is negotiations and going to court to solve the problems and it takes a long time to solve the problems. The main causes are late or no payments for completed work or on-going work and change orders”*.

4.3.2 Results and Discussion of Interview from contractors (managing director) on Causes of delays in construction projects

Interview with a contractor (managing director), Kenzy Construction Company Limited said *“construction delay is a problem in this district and Ghana as whole. Construction delay is very broad and it affects almost every construction. The causes cut*

across many sources such as the owner or the client of the project, contractors, materials, consultants, external factors.” The discussion also revealed that owners of many projects come to say that they want some changes to be done and for that matter demolishing or breaking of some portions of the construction for that change to be effected. Mostly too, they (owners) run out of cash and when this happens, the project must be halted until money comes again. This normally affects mobilization of skill labor because most of the workers do go to look for other jobs.

The result also showed that *“when owners of projects run out of money, automatically material delivery is affected, workers are sometimes not paid on time or not paid at all”*.

Again, it was asserted that *“contractors have a lot of problems. For example, most of them do not follow proper planning and scheduling so it makes the work not to follow in certain order of delivery. Some have the plan and schedule but do not use them at all, what I do on site is to distribute the various activities to the workers on everyday bases”*.

The discussion continued to reveal detailed explanations that, one of the consultants’ problems is late identification and resolution of drawings and specification errors and omissions. This brings a lot of changes during the execution stage of the projects so this normally draw the progress of work back.

Furthermore, the interview revealed that *“sometimes severe weather conditions such as heavy rain fall and wind storm do cause harm to the projects. Sometimes portions of the structure can be destroyed and reconstruction work need to be done and therefore, delay can occur”*

The discussion still revealed that *“it is all about money issues. Delay is part of construction and cannot be avoided because all things will never go on well at the same*

time for the completion of projects. We only manage these problems as they emanate. In fact, we face financial problems especially when change in Government's leadership and policies or interference of political leaders. Monies are not released on time for the completion of projects. When these happen, work cannot continue".

4.3.3 Results and Discussion of Interview from Project managers on Strategies of minimizing Construction Delay

The interview and discussion with the project manager revealed so many suggested solutions that can be followed in order to minimize construction delay and among them are the following:

- Proper planning and scheduling should be followed
- Effective strategic planning
- Proper material management
- Site management and supervision
- Accurate initial cost estimates
- Consultants should prepare and approve drawings on time
- The owners should mobilize all resources and get the necessary permissions before signing the contract.
- Clients should not interfere frequently during the executions and keep major changes in the design.
- Contractors must make sure they have a sound financial backing.

4.4 Results of Observations

This section presents results of various places visited in the Jasikan District about various construction projects delays.

4.4.1 School projects.

Results of observation revealed that about 45% of school projects in the Jasikan District have delayed due to some delay factors. Meanwhile the towns and villages affected by this delay issues complained for assistance to enable the various projects be completed. This delay factors have caused most schools in the villages to suffer studying under trees. These are some examples of schools affected by delay.



Source: Researcher Field Observation (2016)

Figure 4.3 Six unit classrooms for Okagyakrom SHTS, since 2010 due to change of government.



Source: Researcher Field Observation (2016)

Figure 4.4 assembly hall complex for Jasikan College of education has delayed for almost 10 years due to lack of funds

4.4.2 Housing projects

Results from observation revealed that almost 80% of housing projects that belong to private owners have suffered delay due to certain factors. Some of these factors include death of owner, financial problems, permit issues, natural disasters, and court issues and so on. Examples of some pictures can be seen the figures.



Source: Researcher Field Observation (2016)

Figure 4.5 A private home abandoned for over 20 years due to death of owner



Source: Researcher Field Observation (2016)

Figure 4.6 A private home delayed for so many years due to lack of permit



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusion and recommendations of the study.

5.2 Summary of Findings

The following are the summary of findings:

- The study revealed that time overrun tops the issues of construction delays in construction projects.
- The study also showed that, cost overrun (over budget) has caused greater number of construction projects completed at a cost higher than what were budgeted.
- It was revealed that, disputes and claims also have advert effects on construction projects.
- The study revealed that delay in construction projects have caused total abandonment of most construction projects execution in Jasikan District of Ghana.
- The study revealed that litigation in court over legal proceeding is one of the main causes of construction delays.
- The findings from the study revealed that groups of factors that caused construction delays are: Client related factors, Contractor related factors,

Consultant problems, Materials related factors, Equipment related factors, Labour related factors and External related factors.

- From the study, it was revealed that, Proper project planning and scheduling have minimized greater number of construction projects delays because they helped the construction team to be on course because every activity carried out were planned and scheduled.
- The study also revealed that correct Mobilization of resources for permit for approval has helped minimized construction projects delays as a number of activities be completed before installation work can begin at the project sites.
- The study also showed that strategic planning in construction has helped solve the issue of construction projects delays because it gives construction experts the direction and measurement tools they need to precede projects without any major mistakes.
- From the study, it was revealed that Site management and supervision was one of the greatest tools used to minimize construction delays because it was used to control over the activities of subordinates, check on workers who may waste resources.
- The study revealed that contractors with sound financial backing complete their contract projects on time as scheduled.

5.3 Conclusion

Indeed, groups of factors of causes of projects delay have emanated issues on construction projects such as projects over time, cost overrun, disputes abandonment, litigation and arbitration and claims in the construction industry. It was evident through the study findings that, delay in construction projects is real and a worrying issue. It is also a fact that, the main causes of delay in construction projects are as a results of a number of factors. These factors are grouped into seven categories. These groups of causes of construction delay are: Client related factors, Contractor related factors Consultant problems Materials related factors Equipment related factors Labor related factors External related factors.

Through the method of the study, good strategic methods of minimizing construction delays of projects have been adequately explored. These strategies explored would serve as basis for solutions for minimizing delays in construction projects.

The results and discussions uncovered the real fact of the causes of delay in construction projects. The findings of the study therefore accentuated or highlighted the concerns that should be talked, to avoid delay in construction projects.

The recommendations that were established to meet the findings are expected to encourage to preventing delay in construction projects in Jasikan District of Ghana.

5.4 Recommendations

The following Recommendations are made to address the findings of the study:

- Construction experts, companies and individuals should put proper modalities in place in terms of proper budgets and resources to avoid time overrun in construction projects.
- Good budget procedures should be followed and prepared to avoid high cost of construction projects.
- Proper documentations should be followed in order to avoid disputes and claims in construction projects.
- Issues and procedures in construction should be followed and resolved and proper preparations for construction projects should be done to minimize or avoid total abandonment of projects.
- Disputes and claims in construction should be resolved to stop litigations in court.
- The various bodies or groups of factors that cause construction projects delays should be observant in their duties and responsibilities in order to avoid delays in construction projects
- Planning and scheduling in construction should be prepared and followed strictly with all assumptions on the projects, must be carried out at the planning stage in order to avoid delays in construction projects.
- Good and Correct mobilization of resources for permit should be done for approval to stop the issue of delay in construction projects.
- Strategic planning should be observed in construction to avoid delay in construction projects since it serves as direction and measurement.

- Site management and planning with administrative and technical staff should be assigned as soon as project is awarded to make arrangements to achieve completion within specified time with the required quality, and estimated cost.
- Contractors with sound financial backing should be the best to be honored construction projects because they also speed up construction activities.



REFERENCES

- Abdullah, A. A., Mukmin, M. N. & Samad, Z. A., (2011). Application of project management methods in the construction of bungalow house project: A case study in Kuala Terengganu, Malaysia. *International Journal of Economics and Management Sciences*, 1, (2), 42-58.
- Ade-Ojo, C. O. & Babalola, A. A. (2013). Cost and Time performance of construction projects under the due process reform in Nigeria. Research Inventory: *International Journal of Engineering and Science*: 3, (6).
- Aibinu, A. & Odeyinka, H., (2006). Construction delays and their causative factors in Nigeria. *Journal of construction and engineering management*, 132, (7), July 2006. Pp667-677 .Available at: <http://www.informaworld.com>. [Accessed on 26 October 2010].
- Aibinu, A. A. & Jagboro, G.O., (2002). The effects of construction delays on project delivery in Nigerian construction industry. *International Journal of Project Management*, 20, 593-9.
- Aiyetan, A. O., (2010). *Influences on Construction Project Delivery Time*. Ph.D. Port Elizabeth, South Africa: Nelson Mandela Metropolitan University.
- Al-Momani, A. H. (2000). Construction delay: a quantitative analysis, *Journal of Project Management*.
- Anaman, K. A. & Osei-Amponsah, C., (2007). Analysis of the causality links between The growth of the construction industry and the growth of the macro-economy in Ghana. *Construction Engineering*.
- Assaf, et al. (1995). *Causes of delay in Nigeria construction industry*.

- Assaf, S. A. & Al-Heiji (2006). Causes of Delays in Large Construction Projects. *International Journal of Project Management*, 24.
- Ayman, H. (Al-Momani) (2000). „Construction delay: a quantitative analysis“, *International Journal of Project Management*, 18 (1), 51-59.
- Bartholomew, S. H. (1998). *Construction contracting/ Business and legal principles*, N.J.
- Bassioni, H. A. & El-Razak (2008). Causes of Delays in Building Construction. Projects in Egypt. *Journal of Construction Engineering and Management*.
- Bolton, J. (1990). „Type of claims“, *Construction and disruption claims, Course Manual*, Portman Inter-Continental, London
- Bramble, B. B., & Callahan, M. T. (1987). *Construction Delay Claims*. USA: John Wiley & Sons, Inc.
- Carnell, N., (2008). *Causation and delay in construction disputes*. (2nd Ed.) [E-book] Available at: www.onlinelibrary.wiley.com [Accessed on 26 October 2010]
- Chalabi, F. A., & Camp, D. (1984). „Causes of delays and overruns of construction projects in developing countries“, *CIB Proc.*, W-65, Vol. 2, 723-734
- Chan, D. W., & Kumaraswamy, M. M. (1997). A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of Project Management*, 15(1), 55-63.
- Faradi, A.S. & El-Sayegh, S. M. (2006). „Significant factors causing delay in the UAE construction industry“, *Construction Management and Economics*, 24 (11), 1167-1176.
- Frimpong & Oluwoye (2003). Which investigated the significant factors that cause delay and cost overruns in the construction of underground projects in Ghana.

- Frimpong, Y. & Oluwoye, J. (2003). „Significant factors causing delay and cost. overruns in construction of groundwater projects in Ghana“, *Journal of Construction Research*,
- Frimpong, Y. & Oluwoye, J. (2003). „Significant factors causing delay and cost overruns in construction of groundwater projects in Ghana“, *Journal of Construction Research*, 1 (2), 175-87
- Frimpong, Y., Oluwoye, J., & Crawford, I. (2003). *Statistical methods*, (2nd ed.), Academic, New York.
- Frimpong, Y., Oluwoye, J., & Crawford, L. (2003). „Causes of delay and cost overruns in construction of ground water projects in developing countries: Ghana as a case study“, *International Journal of Project Management*, 21, 321-326
- Frimpong, Y., Oluwoye, J., Crawford, L. (2003). „Causes of delay and cost overruns in construction of ground water projects in developing countries: Ghana as a case study“, *International Journal of Project Management*, 21, 321-326.
- Kaming P. F., Olomolaiye O. P., Holt D. G. & Harris C. F. (1997). Factors influencing construction time and cost overruns on high-rise projects in Indonesia. *Construction Management and Economics*, 15,83-94.
- Koushki & Kartam (2004). Delays and cost increases in the construction of private Residential projects in Kuwait.
- Koushki et al., (2005). *Construction Management and Economics* 23, 285–294
- Kumaraswamy, M. M. (1997). Conflict, Claims and Disputes in Construction. *International Journal of Project Management*, 4, (2).

- Lim, C. F. (2004). *The Malaysian PWD Form of Construction Contract*, Sweet & Maxwell Asia.
- Lock, D. (1996). *Project Management*, (6th ed.), Gower, Aldershot.
- Mansfield, N. R. Ugwu, O. O. & Doran, T. (1994). Causes of delay and cost overruns in Nigerian construction projects. *International Journal of Project Management* 12(4), 254-260.
- McMillan, J. H., & Schumacher, S. (1972). *Research in education: Conceptual Framework*. New Jersey: Spandex Print.
- Memon, H. A., Rahman, I. A, Abdullah, M. R., & Azis, A. A. A., (2011). Assessing the Effects of Construction Delays on MARA Large Projects. *International Conference on Advanced Science, Engineering and Information Technology*.
- Murali, S. & Yau, W. S. (2007). Causes and effects of delays in Malaysian Construction industry. *International Journal of Project Management*, **25** (5), 517-526.
- Odeh, A.M. & Battaineh H. (2002). „Causes of construction delay: traditional contracts“, *International Journal of project Management*, 20 (1), 67-73.
- Odeyinka, H. A. & Yusuf, A., (1997). The causes and effects of construction Delays on cost of housing project in Nigeria. *Journal of Financial Management and Property and Construction*. 2, 31-41.
- Okumbe, J. & Verster, J., (2008). *Construction industry's perspective on causes and effects of delays in South Africa*. Available at: www.rics.org. [Accessed on 26 October 2010].

- Pourroostam, T., Ismail, A., & Mansounejad, M., (2011). Identification of Success Factors in Minimizing Delays on Construction in IAU-Shoushtar-Iran. *Applied Mechanics and Materials*, 94-96, 2189-2193.
- Sambasivan, M. & Soon, Y. W. (2007). „Causes and effects of delays in Malaysian construction industry“, *International Journal of Project Management*, 25 (5), 517-526
- Sanders & Eagles (2001: 3). *Delay classification and claims for acceleration costs*.
- Sanders, D. & Eagles, W. D. (2001). *Delay, disruption and acceleration claims*. Borden Ladner Gervais LLP, May, 3.
- Sweis, G., Sweis, R., Abu Hammad, A. & Shboul, A. (2008). „Delays in construction projects: The case of Jordan“, *International Journal of Project Management*, 26 (6) 665-74.
- Theodore J. & Trauner Jr. et al. (2009). *Types of Construction Delays*. *Construction Delays*, (2nd ed.).
- Toor, S. U. & Ogunlana, S. O., (2008). Problems causing delays in major construction projects in Thailand. *Journal of Construction Management and Economics*. 26, (4), 395-408.
- Trauner, J. T., Manginelli, W.A., Lowe, J.S., Nagata, M. F. & Furniss, B.J. (2009) *Construction Delays: understanding them clearly and Delay Analysis in Construction Analyzing them correctly*. London: Elsevier Inc.

APPENDIX A

QUESTIONNAIRE FOR PROJECT MANAGERS

UNIVERSITY OF EDUCATION WINNEBA – KUMASI CAMPUS

DEPARTMENT OF CONSTRUCTION AND WOOD

SCHOOL OF GRADUATE STUDIES

**TOPIC: ASSESSING DELAY IN CONSTRUCTION PROJECTS IN JASIKAN
DISTRICT OF GHANA.**

I wish to seek your views on the above mentioned subject to enable me carry out a successful research. This questionnaire is designed to sample views from **Personnel or experts in the construction industry**. The information provided would be treated confidential and therefore, anonymity and non- traceability are assured. The information would be vital for identifying the issues of delay in construction projects.

Section A-Respondents Profile

Please underline, tick or fill in the blanks if you select others.

1. Please, state your gender

Male

Female

2. Age group in years

20-29

30-39

40-49

50-59

60 and above

3. Level of education

Meddle school certificate/Junior High School

Senior High School

Polytechnic

University

4. Number of years of experience in construction industry

5-10

11-15

16-20

21 years and above

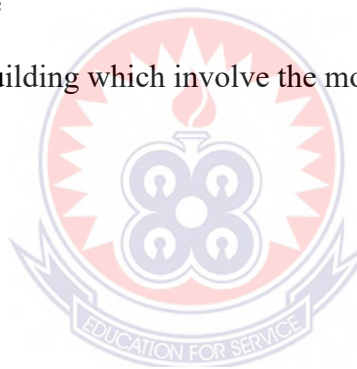
5. State the type of building which involve the most frequent for delays.

Schools

Hospitals

Housing facilities

Public



SECTION B

Issues of construction projects delay.

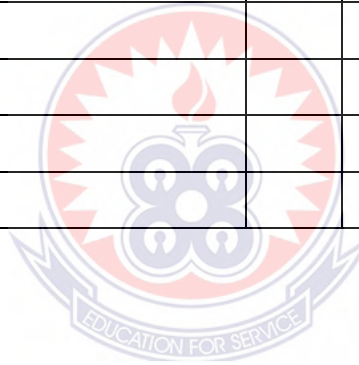
Please tick and fill in the blanks if you select others.

Rank the following factors with respect to the heading for section B. Use a Likert scale of 1-5 where one (1) = Never; two (2) =Seldom; three (3) =Sometimes; four (4) = Mostly; and five (5) = Always.

6. Questions: What is the effect of construction delays?

Effect of construction delays	1	2	3	4	5
Time Extension					
Cost Overrun					
Disputes and claims					
Arbitration					
Litigation					
Total Abandonment					

Thank you.



APPENDIX B

QUESTIONNAIRE FOR ARTISANS

UNIVERSITY OF EDUCATION WINNEBA – KUMASI CAMPUS

DEPARTMENT OF CONSTRUCTION AND WOOD

SCHOOL OF GRADUATE STUDIES

TOPIC: ASSESSING DELAY IN CONSTRUCTION PROJECTS IN JASIKAN DISTRICT OF GHANA.

I wish to seek your views on the above mentioned subject to enable me carry out a successful research. This questionnaire is designed to sample views from **Personnel or experts in the construction industry**. The information provided would be treated confidential and therefore, anonymity and non- traceability are assured. The information would be vital for identifying the issues of delay in construction projects, most important causes of delays in construction projects and methods to minimize delay in construction projects.

Thank you for your corporation.

Section A-Respondents Profile

Please underline, tick or fill in the blanks if you select others.

7. Please, state your gender

Male

Female

8. Age group in years

20-29

30-39

40-49

50-59

60 and above

9. Level of education

Meddle school certificate/Junior High School

Senior High School

Polytechnic

University

10. Number of years of experience in construction industry

5-10

11-15

16-20

21 years and above

11. State the type of building which involve the most frequent for delays.

Schools

Hospitals

Housing facilities

Public



SECTION B**Most important causes of delays.**

Please tick and fill in the blanks if you select others.

Rank the following factors with respect to the heading for section C. Use a Likert scale of 1-5 where one (1) = **Very low**; two (2) = **Low**; three (3) = **Medium**; four (4) = **High**; and five (5) = **Very high**.

12. Question:

Which of the following related factors stated below contribute to causes of delays in construction projects?

Category		Causes of delay	1	2	3	4	5
Client		Funds are not adequately released during relevant phases of projects' execution					
		Delay in progress payments					
		delay in delivery of materials and equipment to the site					
		delay in payment of workers					
		Slow decision making					
		Change orders by owner during construction					
		Suspension of work by owner					
		Poor communication and coordination					
		Client's inadequate financial resources					
contractor							
		Ineffective planning and scheduling of project					
		Rework due to errors during construction					
		Contractors poor site management					
		Underestimation of the project duration					

		improper electrical and mechanical coordination and management					
		contractor financial problems					
		Poor qualification of the contractor's technical staff					
		conflicts in subcontractors schedule in execution of project					
		improper construction methods implemented by contractor					
Consultant							
		Inappropriate design					
		Poor contract management					
		Late identification & resolution of drawings & specification errors & omissions					
		Late preparation of drawings and other contract documents					
		Unclear and inadequate details in drawings	1	2	3	4	5
		Building approval delays by statutory authorities					
Materials							
		Shortage of construction materials in market					
		Poor quality of material in construction					
		Damage of sorted material while they are needed urgently					
		Late procurement of materials					
		Delay in material delivery					
		Changes in material types during construction					

Equipment							
	Equipment breakdowns						
	Improper equipment selection & Faulty equipment						
	Low level of equipment-operator's skill						
	Low productivity and efficiency of equipment						
	Shortage of equipment						
	Material price escalations						
	Stealing of materials						
Labour							
	Shortage of labors						
	Low productivity level of labors						
	Personal conflicts among labors						
External factors							
	Weather conditions						
	Natural disasters						
	Change in government's leadership & policies						
	Interference by political leaders						
	Accident during construction						
	Delay in providing services from utilities such as water, electricity etc.						
	Delay in obtaining permits from municipality						

Thank you.

APPENDIX C

QUESTIONNAIRE FOR PROJECT FOREMEN

UNIVERSITY OF EDUCATION WINNEBA – KUMASI CAMPUS

DEPARTMENT OF CONSTRUCTION AND WOOD

SCHOOL OF GRADUATE STUDIES

TOPIC: ASSESSING DELAY IN CONSTRUCTION PROJECTS IN JASIKAN DISTRICT OF GHANA.

I wish to seek your views on the above mentioned subject to enable me carry out a successful research. This questionnaire is designed to sample views from **Personnel or experts in the construction industry**. The information provided would be treated confidential and therefore, anonymity and non- traceability are assured. The information would be vital for identifying the methods to minimize delay in construction projects.

Thank you for your corporation.

SECTION A-RESPONDENTS PROFILE

Please underline, tick or fill in the blanks if you select others.

13. Please, state your gender

Male

Female

14. Age group in years

20-29

30-39

40-49

50-59

60 and above

15. Level of education

Meddle school certificate/Junior High School

Senior High School

Polytechnic

University

16. Number of years of experience in construction industry

5-10

11-15

16-20

21 years and above

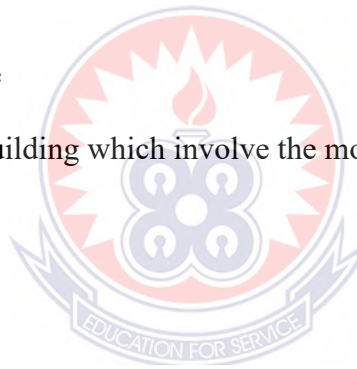
17. State the type of building which involve the most frequent for delays.

Schools

Hospitals

Housing facilities

Public



SECTION B**Strategies to Minimizing Construction Delays**

Please tick and fill in the blanks if you select others.

Rank the following factors with respect to the heading for section B. Use a Likert scale of

1-5 where one (1) = **Very Low Effective**; two (2) = **Low Effective**; three (3) = **Medium**

Effective; four (4) = **High Effective**; and five (5) = **Very high Effective**.

18. **Questions:** Which of the following methods will minimize construction delays?

Methods of construction delay.	1	2	3	4	5
Proper project planning and scheduling					
Frequent progress meeting					
Use appropriate construction methods					
Effective strategic planning					
Proper material procurement					
Accurate initial cost estimates					
Compressing construction durations					
The owners should mobilize all resources and get the necessary permissions before signing the contract					
Estimate activity duration according to the actual skills levels, unexpected events, efficiency of work time, and avoid mistakes					
Clients should not interfere frequently during the execution and keep making major changes in the design.					
Clients must make quick decisions to solve any problem that arises during the execution.					

	Contractors should have able site-managers for the smooth execution of work	1	2	3	4	5
	Consultants should monitor the work closely by making inspections and correction at appropriate times					
	Contractors should not take up the job, in which they do not have sufficient expertise					
	Consultants should prepare and approve drawings on time					
	Contractors must make sure they have a sound financial backing					
	Site management and supervision					



APPENDIX D –

AN INTERVIEW GUIDED FOR SITE ENGINEERS

Structured interview guide for site engineers on the issues or effects of Construction projects delay in the Jasikan District of Ghana.

1. As a construction Engineer, can you briefly give me a talk concerning issues or effects of Construction projects delays in your district?

Thank you.



APPENDIX E

AN INTERVIEW GUIDED FOR CONTRACTORS

Structured interview guide for Contractors on the causes of construction projects delays.

1. As an expert in construction, give me a lecture on the various causes of construction projects delays.

Thank you.



APPENDIX F –
AN INTERVIEW GUIDED FOR PROJECT MANAGERS

Structured interview guide for Project managers on the strategies of minimizing construction projects delays.

1. To what extent as a construction project manager, can delays in construction projects be minimized in your district?

Thank you.

