



FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES ENGINEERING

FINAL YEAR RESEARCH REPORT

**ASSESSING THE EFFECTIVENESS OF CONSTRUCTION METHODS
WITH TIME AND COST**

**CASE: FOUR CONSTRUCTION METHODS USED FOR A SINGLE STOREY
RESIDENTIAL HOUSE.**

By

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This final year research report has been submitted to the Department of Water Resources Engineering, Faculty of Engineering, Busitema University as a partial fulfillment of the requirements for the award of a Bachelor of Science in Water Resources Engineering.

ABSTRACT

The construction industry is continually evolving to meet the demands of modern infrastructure and building projects, emphasizing the importance of efficient construction methods that optimize both time and cost. This report presents a comprehensive assessment of four distinct construction methods which are prefabricated construction, brick masonry construction, concrete block masonry construction and the utilization of interlocking bricks. The primary objective of this study was to evaluate the effectiveness of these methods in terms of their impact on project timelines and cost efficiency. Through an extensive analysis, including data collection, cost tracking, experimental tests and time monitoring, this report provides valuable insights into the strengths and weaknesses of each construction method. The study explores the suitability of these methods across construction of single stored residential houses. Key findings highlight the advantages of prefabricated construction in significantly reducing project timelines, albeit with unique considerations for cost implications. Brick masonry and concrete masonry exhibit durability and versatility, while the use of interlocking bricks showcases potential for less cement need. Recommendations derived from this assessment aim to guide construction stakeholders in making informed decisions when selecting construction methods for future residential projects.

DECLARATION

I do solemnly declare that this is my original final year research report and it has never been submitted for award of a degree in Bachelor of science in Water Resources Engineering or any other academic qualification to Busitema University or any other University or academic institution of higher learning.


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APPROVAL

This report has been submitted to the Department of Water Resources Engineering, Faculty of Engineering and Technology, Busitema University with the approval of my supervisor.

DR. DANIEL OTIM
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With a lot of thanks, I appreciate the works of my dearly loved parents, Hajjati Hajarah Boonabaana and Hajji Abdul Majid Mpeke Ssubi. Furthermore, I dedicate it to all my friends that are with me in the race for the course and are doing so as we succeed together, thank you so much.

LIST OF EQUATIONS

<u>$f_c = P / A$..... (21)</u>	6
<u>..... (22)</u>	7
<u>$DL = \rho V$..... (23)</u>	8
<u>Total cost of prefabrication construction = (cost of materials + cost of labour + overhead costs) x number of components.....(31)</u>	11
<u>Total cost of using brick masonry = (cost of bricks + cost of mortar + labor costs)..... (32)</u>	12
<u>Total cost of using concrete block masonry = (cost of blocks + cost of mortar + labor costs + transport costs) (33)</u>	12
<u>Total cost of using this method. = (cost of bricks + transportation + labor costs)..... (34)</u>	12
<u>Density =(41)</u>	17
<u>The volume =(42)</u>	17

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LIST OF ACRONYMS

AHP	ANALYTICAL HIERACHY PROCESS
BIM	BUILDING INFORMATION MODELLING
CAD	COMPUTER AIDED DESIGN
ICSEB	INTERCONNECTED STABILIZED EARTH BLOCKS
MMCs	MODERN METHODS OF CONSTRUCTION
MoWT	MINISTRY OF WORKS AND TRANSPORT
RC	REINFORCED CONCRETE
SDG	SUSTAINABLE DEVELOPMENT GOALS
STAAD	STRUCTURAL ANALYSIS AND DESIGN

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter includes back ground to the study, problem statement, objectives of the study, significance and finally the scope of study.

1.2 Background

The construction industry plays a vital role in the development of infrastructure and the economy. The successful completion of construction projects within predetermined timelines and budgets is crucial for ensuring client satisfaction, minimizing financial risks, and maintaining the overall efficiency of the industry (Pilsitz, 2018). The history of construction dates back thousands of years and is closely tied to the development of human civilization where humans have been constructing shelters, buildings, and infrastructure using a wide range of materials and methods (Scott and Showalter, 1986). Construction and its methods have evolved from the ancient construction, medieval, renaissance, industrial and finally the modern construction. From the prehistoric times, when people first began to use locally available materials to construct basic structures, construction has been one of the oldest and most significant human undertakings (Ahmed and El-Sayegh, 2021). Alterations in building materials, advancements in building procedures and technology advancements have all contributed to the evolution of construction practices over time. In Uganda particularly, traditional methods are still being used in mostly but not limited to the rural areas however some of the modern methods have been used for construction of high end architectural and building designs in the urban centers such as The Pearl of Africa Hotel, Kampala Boulevard and Kingdom Kampala all of which were constructed using precast concrete and steel framing and The Acacia Mall in Kisementi that was constructed using reinforced concrete and steel framing with glass and aluminium cladding (Lawrence, Andrew and Joel, 2021).

Despite all the technological advancements however, the construction industry is still faced with numerous challenges, including delays, cost overruns, and quality issues (Ahmed and El-Sayegh, 2021). These challenges impact the successful delivery of projects, and stakeholders are continually seeking ways to mitigate these issues. Although other considerations like quality and safety are also crucial, time and cost are currently the two

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APPENDICES.

Appendix 1. Photo gallery.