

**BUSITEMA
UNIVERSITY**
Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES ENGINEERING

FINAL YEAR PROJECT

**EXPERIMENTAL ANALYSIS ON EFFECT OF REPLACING COARSE
AGGREGATES WITH RECYCLED CONCRETE AGGREGATES
BLENDED WITH WOOD ASH ON PROPERTIES OF CONCRETE**

BY

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This final year project report is submitted to the Department of Water Resources Engineering as a partial fulfillment for the ward of the degree of Bachelor of Science in Water Resources Engineering of Busitema University.

(June, 2024)

ABSTRACT

This research was carried out to investigate the effect of using recycled concrete aggregate as a partial replacement for coarse aggregate blended with wood ash on the properties of concrete. Different studies have conducted research on improving the quality of recycled aggregate with purpose to diminish cost and implement friendly environment. Concrete waste products when crushed to the required nominal sizes such as 10mm, 14mm, 20mm, etc. provide a rough and irregular surface which aids in blending cement paste and the aggregate.

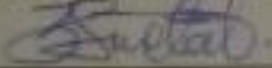
Response Surface Methodology with central composite design (CCD) was used in the experimental design to obtain the possible different percentage partial replacement of WA and RCA for cement and NA respectively to observe careful accuracy requirement for experiment. Flexural strength and compressive strength of concrete were evaluated by conducting laboratory experimentation. RSM-CCD was also used in the analysis of results obtained from the laboratory test for flexural and compressive strengths.

It was observed that flexural strength 2.9 MPa at 28 days yielded better results from the mix of 10% WA and 20% RCA increased from 2.2 MPa at 7 days to 2.9 MPa at 28 days. Compressive strength had highest value of 33.2 MPa at 28 days indicating good results with other result values ranging from 26.4 MPa to 33.2 MPa at 28 days showing better increased in the compressive strength of concrete. For both flexural strength and compressive strength, there was increased in water absorption with the increased in percentage replacement of WA and RCA. The optimized values for flexural strength and compressive strength were 2.9MPa and 30.8MPa at 28 days of curing and setting.

This project encourages the recovery and utilization of waste products from concrete and wood ash to be used in the production of concrete hence conserving the environment from quarrying and pollution arising from dumping. This will in turn reduce the overconsumption of natural aggregate from quarrying as well as reduce for landfills where the demolished concrete waste products are deposited.

DECLARATION

I OKWANY CHRIS declare to the best of my knowledge that this final project report is as a result of my research and efforts. It contains no material previously published, except where due acknowledgment has been made in the text and reference list.

Student's signature: 

Date: 07/10/2024

APPROVAL

This project report is recommended for submission/examination to the Department of Water Resources Engineering with my approval as the university supervisor.

SUPERVISOR: MR. TIGALANA DAN

Signature: _____

Date: _____

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DEDICATION

I dedicate this project to my beloved parents (Rev. Martin and mother), my university supervisor, brothers and sisters. May the almighty God guide you and bless you all abundantly.

ACKNOWLEDGMENT

Praise to the Almighty and wonderful God, the author and the finisher of my faith, the owner of my life and to whom I belong for leading me to this path of experience.

I am grateful to my supervisor, Mr. Tigelana Dan for his time and guidance. I would like to thank the lecturers at the department of Water Resources Engineering for knowledge imparted in me, the guidance to reach this level.

Above all, Almighty God, you are the owner of everything, may you continue blessing us.

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LIST OF ACRONYMS

BS	British Standard
RCA	Recycled Concrete Aggregate
CA	Coarse Aggregate
NA	Natural Aggregate
WA	Wood Ash
PC	Portland cement
ACV	Aggregate Crushing Value
Kg	Kilograms
mm	millimeters
RSM	Response Surface Methodology
CCD	Central Composite Design

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