

THE MECHANICAL PROPERTIES OF  
EGGSHELL CONCRETE USING QUARRY  
ROCK DUST AS SAND SUBSTITUTE

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THE MECHANICAL PROPERTIES OF EGGSHELL CONCRETE USING QUARRY  
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## **SUPERVISOR'S DECLARATION**

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Engineering (Hons) Civil Engineering

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## **STUDENT'S DECLARATION**

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

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**Dedicated to my parents  
for their caring and support  
throughout my life**

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## LIST OF SYMBOLS

%	Percentage
mm	Millimeter
N/mm <sup>2</sup>	Newton per millimeter square
kg	Kilogram
N	Newton
°C	Degree Celsius
M <sup>2</sup> /kg	Meter square per kilogram
w/c	Water to cement ratio
mm <sup>2</sup>	Millimeter square
min	Minute
µm	Micrometer
MPa	Mega Pascal
±	Plus-Minus

## LIST OF ABBREVIATIONS

ACI	American Concrete Institute
Al <sub>2</sub> O <sub>3</sub>	Aluminum Oxide
ASTM	American Society for Testing and Materials
BS	British Standard
CaO	Calcium Oxide
Ca(OH) <sub>2</sub>	Calcium Hydroxide
C <sub>3</sub> A	Tricalcium aluminate
CSH	Calcium Silicate Hydrate
C <sub>3</sub> S	Tricalcium Silicate
EN	European Standards
Fe <sub>2</sub> O <sub>3</sub>	Ferric Oxide
IS	Indian Standards
K <sub>2</sub> O	Potassium Oxide
MgO	Magnesium Oxide
MS	Malaysia Standard
Na <sub>2</sub> O	Sodium Oxide
OPC	Ordinary Portland Cement
PA <sub>0</sub>	0% of Quarry Rock Dust Aggregate
PA <sub>1</sub>	25% of Quarry Rock Dust Aggregate
PA <sub>2</sub>	50% of Quarry Rock Dust Aggregate
PA <sub>3</sub>	75% of Quarry Rock Dust Aggregate
PA <sub>4</sub>	100% of Quarry Rock Dust Aggregate
RCA	Recycle Concrete Aggregate

TiO<sub>2</sub>            Titanium Dioxide

USBR            United States Bureau of Reclamation