

**THE INFLUENCE OF AGGREGATE  
GRADATION CONTENT ON  
CONSTRUCTION MATERIAL USING  
FRESH AND HARDENED CONCRETE  
PROPERTIES**

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By  
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## **AUTHOR'S DECLARATION**

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## ABSTRACT

Aggregate are the main important constituent in concrete. They give body to the concrete, reduce shrinkage and effect economy and also have it a significant effect on the fresh concrete based on aggregate characteristic such as aggregate's shape, size, texture especially aggregate gradation. Moreover, the mere fact that aggregate occupy 70-80% of the volume concrete, their impact on various characteristics of concrete is undoubtedly considerable along its gradation. This paper investigates the effect of varying percentage of aggregate gradation of fine to course aggregate of 40%:60%, 25%:75% and 50%:50% of aggregate mix and influence on properties of concrete such as compressive strength, workability, hardness and integrity of the concrete. These experimental studies will used Ultrasonic Pulse Velocity (UPV) and Rebound Hammer as Non-Destructive Test (NDT) and compression test as Destructive Test (DT). Based on the experiment, a correlation equation is established between the NDT and DT with the age of concrete at 7, 14 and 28 days and the percentage of aggregate gradation. These two tests of NDT and DT have been used to determine the concrete quality by applying regression analysis models between the age of concrete with both type of test. 27-cylinder specimen with the size of 150 x 300mm are used to be tested. The production of relationship between the age of concrete, percentage of aggregate gradation and the results of NDT and DT can be used to estimate the value of UPV, rebound number and the cylinder strength of concrete without need to cast the concrete and can save the time as we acknowledge that concrete is the main and most material used in structure and also infrastructure industry. The findings of this study indicate that mix design 50%:50% have highest workability of 42mm and mix design 25%:75% have the highest value of strength of 37.35MPa, 4.39km/s for pulse velocity and 32.9N for hardness. This study also can help in the civil engineering scope especially in infrastructure elements. The proposed of suitable aggregate gradation can help in maintaining the best strength of concrete and help the infrastructure industry such as bridge construction, dam construction and many others infrastructure.

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