

**EFFECT OF MARBLE NANOPARTICLES AS ADDITIVE ON THE PHYSICAL  
AND MECHANICAL PROPERTIES OF CONCRETE MIXES**

**A Thesis Presented to the  
Faculty of College of Engineering and Technology  
Romblon State University  
Odlongan, Romblon**

**In Partial Fulfilment of the Requirements for the Degree of  
BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

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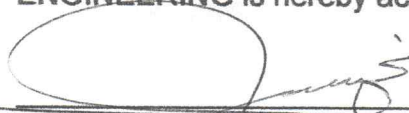
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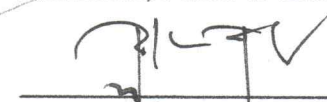


## APPROVAL SHEET

The thesis entitled, EFFECT OF MARBLE NANOPARTICLES AS ADDITIVE ON THE PHYSICAL AND MECHANICAL PROPERTIES OF CONCRETE MIXES, prepared and submitted by FAJANILAN, M.A.K. U., FETALVER, J. G., FORCADAS, C. F., GACU, J. G., GONZALES, J. R., in partial fulfilment of the requirements for the degree of BACHELOR OF SCIENCE IN CIVIL ENGINEERING is hereby accepted for oral examination.

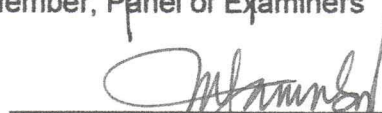
  
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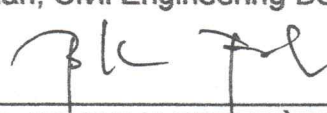
  
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### **ABSTRACT**

This study aimed to determine the effect of marble nanoparticles as additive on the physical and mechanical properties of concrete mixes. Specifically, this study aimed to: a) determine the mechanical properties of concrete using different amount of marble nanoparticles in concrete mixes in terms of the following: compressive strength, flexural strength, shearing strength and deflection; b) determine the physical properties of concrete using different amount of marble nanoparticles in concrete mixes in terms of the following: water absorption and bulk density; c) determine if there was a significant difference in mechanical properties of concrete with the addition of marble nanoparticles; d) determine if there was a significant difference in physical properties of concrete with different amount of marble nanoparticles. This study was conducted at Romblon State University, Odiongan, Romblon from October to March 2019.

Generally, the result of this study showed that the greater amount of marble nanoparticles added in the concrete mixes the greater the strength. In terms of



water absorption and bulk density, concrete mixes with 5% marble nanoparticles added had the highest rate. For compressive strength, flexural strength, shear strength and deflection, it was found out that concrete mixes with 5% marble nanoparticles got the highest rate. Based on the result of the physical and mechanical properties examined, the researchers concluded: a) in terms of physical properties, increasing the amount of marble nanoparticles as additives in cement increased the bulk density and water absorption, b) increasing the amount of marble nanoparticles as additives increased the compressive strength, flexural strength, and shear strength c) there were no significant differences on the treatment means for bulk density, water absorption and compressive strength d) there were significant differences between the treatment means of samples for flexural strength and derived calculations for shear strength and deflection and e) the results for deflection passed the allowable maximum deflection of 1.4583 mm from the formula  $L/360$  (NSCP 2010).

**Keywords:** marble nanoparticles, concrete, bulk density, water absorption, compressive strength, flexural strength, shear strength, deflection.