

Development of Artificial Mortar for Cultural Heritage Buildings as Material Innovation Renewal Refurbishment

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ABSTRACT

This study aims to determine the value of the test on various variants of the mortar tested and the correlation between compressive strength, porosity, and ultrasonic pulse velocity with the non-destructive test on mortar. The research was carried out at the Yogyakarta State University Building Materials Laboratory. The study used experiments, mortar was made with a ratio of cement and fine aggregate with variances 1:3, 1:4, 1:5, 1:6, and 1:7 with a phase of 0.48. Manufacture refers to SNI 03-6825-2002. The mortar specimens were in the form of cubes measuring 5x5x5 cm and tested for compressive strength, porosity, and Ultrasonic Pulse Velocity, tested at the age of 3, 7, 14, 21, and 28 days with three samples per test age. The data was processed by quantitative descriptive method to determine the connection between the variables, especially the connection between Ultrasonic Pulse Velocity and compressive strength, as well as its connection with the porosity value. The results of compressive strength and ultrasonic pulse velocity are directly proportional to the age of the test. With the results of the compressive strength at 1:3, 1:4, 1:5, 1:6, and 1:7 variants, respectively 31.12 MPa, 19.83 MPa, 12.25 MPa, 5.38 MPa, and 3.89 MPa and ultrasonic pulse velocity of 3827.67 m/s, 3641.7 m/s, 3561.3 m/s, 2019,0 m/s, and 1691.0 m/s. Then the porosity values are 11.12%, 12.88%, 16.36%, 17.60%, and 22.06%. Compressive strength has a correlation that is directly logarithmic with the ultrasonic pulse velocity, the higher the value of the compressive strength, the higher the ultrasonic pulse velocity value, and exponential inversely proportional to the porosity value as well as the ultrasonic pulse velocity which is exponential inversely proportional to the porosity value. The higher the porosity value causes the compressive strength and ultrasonic pulse velocity values to decrease.

Kata Kunci: *compressive strength, mortar, mortar composition, porosity, ultrasonic pulse velocity*