

THE EFFECT OF USING COFFEE AND SUPERPLASTICIZER ON THE COMPRESSIVE STRENGTH OF CONCRETE

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ABSTRACT

Cement is a binding material for aggregate in a concrete. Cement that reacts with water will produce Calcium Silicate Hydrate (CSH) and produce Calcium Hydroxide (Ca(OH)₂) by-compounds. These side compounds have a negative impact on the quality of concrete, so to reduce the impact added pozzolan (pozzolanic material) containing Silica (SiO₂), this substance will react with Ca (OH) ₂ to produce secondary CSH. Organic pozzolan material can be in the form of food industry waste, one of which is coffee grounds whose utilization is still lacking. This study used coffee grounds as a substitute for cement with a ratio of 0.5%, 1%, 2%, and 2.5% of the weight of cement. Coffee grounds are dried using an oven for 24 hours with a temperature of 200o C. In addition, this study also used a superplasticizer branded Sikament LN as a substitute for cement as much as 2,63% of the weight of cement. The use of superplasticizers aims to facilitate workability and reduce water volume by up to 10% from the initial design. The dimensions of the specimen used are cylinders measuring 150 mm x 300 mm with a concrete life of 7, 14, 21, and 28 days and a slump value of 120 mm. Planning concrete mixture in this study using SNI 03-2834-2000 method. The normal concrete compressive strength plan is 20 MPa. The test carried out is a concrete compressive strength test. Each variation made 3 specimens, so that the total number is 60 specimens. The results of normal concrete research obtained compressive strength of 22.06 MPa, concrete with variations of 0.5%, 1%, 2%, and 2.5% produced compressive strength of 23.38 MPa, 24.79 MPa, 25.27 MPa, and 26.02 MPa respectively. The highest compressive strength value is obtained from samples with the highest mixture content, which is due to the reduction of corrosion factors due to the reaction between water and cement and the use of superplasticizers that can increase the compressive strength of concrete.

Keywords: *Compressive Strength, Concrete, Coffee grounds, Superplasticizer*

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