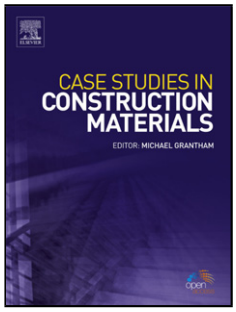

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Case study

Characteristic of compressive and tensile strength using the organic cement compare with portland cement

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A R T I C L E I N F O

Keywords:

Organic Cement, Portland Cement, Organic Waste, Compressive Strength, Tensile Strength

A B S T R A C T

The waste problem is a problem faced throughout the world. This research aims to save the environment with on the utilization of recycling waste materials that do not contribute much in people's lives over the years. Organic cement is an alternative cement besides portland cement made from organic waste recyled and substitution of mediteran soil. The research is oriented to chemical compounds, compressive strength, and tensile strength testings of concrete by using organic and portland cements. Age of concrete in the research are 3, 4, 14, 21, and 28 days old. Result for compressive test of cylinder concrete with organic cement, it obtained 6.10 MPa while the cylincer concrete with portland cement, it obtained 20.22 MPa. For tensile strength test of cylinder concrete with organic cement on 28-days-old concrete reached 1.09 MPa and those with portland cement reached 2.01 MPa. From the physical test result, it obtained the density of organic cement is 3.01 gr / ml, while for the density of portland cement is 3.16 gr / ml. From the analysis of organic cement chemical compounds through laboratory testing methods result, it found indications that resemble portland cement chemical compounds that are CaO;65,36%, SiO_2; 18,84%, Al_2O_3; 6,33%, Fe_2O_3; 2,29%, SO_3 ; 3,64%, MgO; 1,35%, C_3S; 66,72%, C_2S; 3,98%, C_3A; 12,9%, and C4Af; 6,97%.
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1. Introduction

Currently, the waste problem is a problem faced throughout the world. Gradually, the high volume of waste has a negative impact on the environment. Handling of waste management is necessary because of the huge negative impact that can be generated. The waste problem seems not a simple matter, as long as there is human life then the problem will always arise. Urban waste management in Indonesia is a real problem as population growth has an impact on increasing the amount of waste and the occurrence of aesthetic degradation problems around landfills that have potential to cause social conflict with surrounding communities. [1].

Along with economic growth, per capita garbage production will continue to increase so it can be predicted in 2030 will reach 1,2 kg / capita / day for urban areas and 0,55 kg / person / day for rural areas. In Indonesia, organic waste is a major component of waste. The proportion of organic waste is between 34-70% which is 20-30% higher than most countries in Europe [2].

The high growth of waste volume coincides with high population growth rate. Therefore, the current waste problem can be said to be a world problem. In addition, with good handling and good waste management, environmental savings have been made.Handling of organic waste through the combustion process with the furnace at 700° C to ashes will contain elements of 69.7% CaCo3, 12.1% KCl; 3% SiO2, 8.1% Fe and 3% Al2, while shellfish ash contains 100% CaCo3 [3].

Therefore, in dealing with it, it is deemed necessary to find the best solution to resolve current waste problems. This research aims to save the environment with emphasis on the utilization-oriented form of recycling waste materials that do not contribute much in people's lives over the years.This research is a renewable research to obtain alternative building materials, especially alternative cement in addition to portland cement which has been used in public life.

The increase in cement growth is still influenced by the high level of private sector development and the high demand for housing for the community [4]. The increasing demand for housing and infrastructure automatically demands the need for building materials that are also increasing.The need for building materials must be overcome with the use and discovery of building materials that can provide an alternative [5]. Organic cement is the newest alternative cement in addition to portland cement made through organic waste recycling systems and by substitution of mediteran soil [6].

The development of the use of alternative sources for the manufacture of cement has also been developed by Japan which has been producing eco-cement made from city ash waste through combustion in lieu of some of the main raw materials containing 50% of cement raw materials such as sewage sludge [7]. To create Eco-Cement CSA Clinker,the appropriate starting raw material needs to be burned at a maximum temperature of 1200-1300 ° C. Reuse of waste materials in the form of phosphogypsum will reduce the temperature and time of the combustion process. Large scale eco-cement making can be done in conventional furnace used for portland cement and produce chemical cement mineralization of C = CaO, A = Al2O3, S = SiO2, s = SO3, F = Fe2O3, M = MgO, Ye'elimite 4CaO, 3Al2O3, SO3 and C4A3s [8].

Mediteran soil is a soil formed from weathering of sedimentary rock and limestone. This type of soil contains a considerable amount of carbonate and other compounds of iron, water, aluminum, and some other organic materials [9].