ABSTRACT

Wentri Asri Suryandari, *Department of Civil Engineering, Faculty of Engineering, University of Brawijaya, February 2018, The Effect of Onyx Stone Waste as Substitute of Coarse Aggregate of Concrete Against Reinforced Concrete Beam Cracks Width, Academic Supervisor:* Dr. Ir. Wisnumurti, MT and Dr. Ir. Edhi Wahyuni S, MT

Gravel is one of the concrete-forming materials with the largest volume requirement in the mixture of about 60% to 80% by volume of aggregate. The process of getting gravel and crushed rocks with the mining of the river causes erosion. Waste onyx fractions generated from large companies onyx craftsmen each day to reach 500 kg. Gamping residents to date have not processed onyx stone waste optimally, one alternative is to utilize waste onyx stone as a concrete aggregate. Structures of reinforced concrete are designed to meet safety and serviceability criteria. To meet these criteria need to know the behavior of reinforced concrete one of them is the pattern of cracks. When Onyx stone is used as a coarse aggregate in the manufacture of concrete applied to beams, it is necessary to examine the behavior of the beam crack pattern to determine the collapse of the beam.

In this research, two types of specimens beams are Reinforced Concrete Normal and Reinforced Concrete Onyx. Research conducted with the manufacture of cylindrical test objects and reinforced concrete beams with dimensions of 0.15 x 0.25 x 2 meters. Testing compressive strength using compression machine. As well as bending tests with burdened gradually hinnga achieve a maskimum load. Next observation of crack width use microscope detector on beam Reinforced Concrete Normal and Reinforced Concrete Onyx. From result of observation a comparison with theoritical result.

The result of the test that was done by compressive strength of Reinforced Concrete Normal average concrete was bigger than the average compressive strength of Reinforced Concrete Onyx that is equal to 7.8398%. The crack width of both Reinforced Concrete Normal and Reinforced Concrete Onyx beams have a difference the first cracks of both Reinforced Concrete Normal beams are 1200-2200 kg and Reinforced Concrete Onyx beams are 1600-2600 kg. The result of the test of crack width mean maximum load of Normal Beam equal to 6285kg with crack width 1,52mm and mean maximum load of Onyx Beam equal to 6234kg with crack width 1,66mm. The result of comparison of theoretical comparison with observation get the average load result which is allowed to be divided when the maximum load (Pijin / Pmax) on the reinforced concrete beam is 52.593% and then for the bigger reinforced concrete beam is 59.22%. While the average yield of permissible crack width divided by crack width when maximum load (wijin / w) on normal reinforced concrete beam is 11,693% then for reinforced reinforced concrete beam is 10,765%.

*Keywords**:** construction material, concrete, onyx stone waste, compressive strength, crack width.*