BETON RINGAN *POLYSTYRENE* UNTUK PANEL DINDING TEBAL 9 CM DENGAN METODE PENGEMPAAN TERUKUR DAN PERKUATAN KAWAT LOKET

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INTISARI

Material yang sering digunakan untuk dinding pada umumnya berupa batako atau batu bata yang mempunyai kelemahan karena berat dan getas. Bahan baku pembuatan batu bata konvensional adalah tanah liat yang diambil dari tanah persawahan produktif sehingga menimbulkan permasalahan lingkungan yang karena berdampak pada berkurangnya kesuburan dan luas lahan produktif. Pemakaian bahan alternatif sebagai bahan campuran beton telah banyak dikembangkan saat ini. Menurut Tjokrodimuljo (2007), beberapa metode dapat dilakukan untuk mengurangi berat beton yaitu dengan pemakaian agregat ringan. Agregat ringan tersebut antara lain *polystyrene*, yang merupakan material insulator yang ringan, *rigid*, dan terbuat dari bahan baku plastik.

Penelitian panel dinding beton *polystyrene* ini menggunakan 12 benda uji panel berukuran panjang 900 mm, lebar 300 mm, tebal 90 mm, dengan perkuatan kawat loket grid 10x10 mm, grid 20x20 mm dan pengempaan terukur. Komposisi 1 m^3 beton *polystyrene* terdiri dari semen:*polystyrene*+pasir = 35%:65%, dengan fas 0,4. Benda uji panel terdiri atas 3 buah panel dengan perkuatan kawat loket grid 10x10 mm variasi kandungan *polystyrene* 100%, pasir 0%, 3 buah panel dengan perkuatan kawat loket grid 10x10 mm variasi kandungan *polystyrene* 90%, pasir 10%, 3 buah panel dengan perkuatan kawat loket grid 20x20 mm variasi kandungan *polystyrene* 100%, pasir 0%, dan 3 buah panel dengan perkuatan kawat loket grid 20x20 mm variasi kandungan *polystyrene* 90%, pasir 10%. Pengujian yang dilakukan adalah uji lentur horisontal dan uji tekan.

Hasil penelitian menunjukkan nilai kuat tekan rata-rata beton *polystyrene* tanpa pasir sebesar 0,377 MPa, sedangkan beton *polystyrene* pasir 10% sebesar 0,533 MPa. Modulus elastisitas beton *polystyrene* tanpa pasir sebesar 48,09 MPa, sedangkan beton *polystyrene* pasir 10% sebesar 124,24 MPa. Berat rata-rata per m^3 beton *polystyrene* tanpa pasir sebesar 538,46 kg/m^3, sedangkan beton *polystyrene* pasir 10% sebesar 800,48 kg/m^3. Nilai serapan air rata-rata beton *polystyrene* tanpa pasir sebesar 33,39%, sedangkan beton *polystyrene* pasir 10% sebesar 32,48%. Kuat tekan paling besar didapat dari benda uji panel dinding dengan kandungan *polystyrene* 100%, pasir 0% kawat loket grid 20x20 mm $TB_2PS_0ST_{100}$ yaitu 1,0652 MPa. Kuat lentur terbesar didapat dari benda uji panel dinding dengan kandungan *polystyrene* 90%, pasir 10% kawat loket grid 20x20 mm $TB_3PS_{10}ST_{90}$ yaitu sebesar 0,68 MPa. Secara umum besarnya pengempaan dan penambahan pasir berpengaruh pada kekuatan panel dinding, tetapi pengaruh perkuatan kawat loket belum begitu kelihatan secara signifikan karena beton *polystyrene* sebagai bahan penyusun panel dinding mengalami kerusakan sebelum kawat loket bekerja secara maksimal.

Kata kunci : Pengempaan, limbah *polystyrene*, kawat loket, panel dinding.

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POLYSTYRENE LIGHT WEIGHT CONCRETE FOR WALL PANEL WITH 9 CM THICKNESS UNDER THE METHOD OF CONTROLLED COMPRESSION AND WIREMESH REINFORCEMENT

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ABSTRACT

The weakness of most commonly used materials for wall, which are blocks or clay bricks, is their weight and brittle characteristic. The raw material of conventional clay brick is clay taken from productive wet fields. This causes environmental problem due to its impacts such as decreasing fertility and productive area width. The use of alternative material for concrete mixture has been widely developed. According to Tjokrodimuljo (2007), various methods can be used to reduce the concrete weight, such as the use of light aggregate. One of the examples of light aggregate is polystyrene,which is a light-weight and rigid insulator made from plastic.

This research studied the polystyrene concrete wall by using 12 specimens of panels in 900 mm length, 300 mm width, and 90 mm thickness with wiremesh of 10x10 mm grid, 20x20 mm grid and controlled compression. The composition of 1 m^3 polystyrene concrete consisted of cement:polystyrene+sand =35%:65%, with water-cement ratio of 0,4. The panel specimens consisted of three panels with locket wire reinforcement of 10x10 mm grid and variation of 100%, polystyrene, 0% sand, three panels with wiremesh reinforcement of 10x10 mm grid and variation of 90% polystyrene and 10% sand, three panels with wiremesh reinforcement of 20x20 mm grid and variation of 100% polystyrene, 0% sand, and three panels with wiremesh reinforcement of 20x20 mm grid and variation of 90% polystyrene and 10% sand. The horizontal flexural and compressive tests were taken in this study.

Results of this study indicated that the average compressive strength of polystyrene concrete without sand is 0,377 MPa and with 10% sand is 0,533 MPa. The elasticity modulus of polystyrene concrete without sand is 48,09 MPa and with 10% sand is 124,24 MPa. The average weight per m^3 of polystyrene concrete without sand is 538,46 kg/m^3, and with 10% sand is 800,48 kg/m^3. Water absorbency value for polystyrene concrete without sand is 33,39%, and for polystyrene concrete with 10% sand is 32,48%. The largest compressive strength of 1,0652 MPa is obtained by the specimen with 100% polystyrene, 0% sand and wiremesh of 20x20 mm grid $TB_2PS_0ST_{100}$. The largest flexural strength of 0,68 MPa, is obtained by the specimen with 90% polystyrene, 10% sand and wiremesh of grid 20x20 mm $TB_3PS_{10}ST_{90}$. In general, the compression and addition of sand influence the wall panel strength. However, the influence of the wiremesh is insignificant because the polystyrene concrete as the composing material of the wall is damaged before the wiremesh works in maximal performance.

Keywords : Compression, polystyrene waste, wiremesh, wall panel.

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