



INTISARI

Pencarian material alternatif terus dilakukan untuk pembuatan beton bermutu dan berkinerja tinggi, termasuk dalam pembuatan panel beton ringan berserat yang memanfaatkan limbah dan serat. Dalam Penelitian ini limbah yang digunakan adalah limbah *styrofoam* atau *polystyrene* dan serat yang digunakan adalah serat dari tali tampar plastik atau tali tambang plastik yang termasuk *polyethylene*.

Pada penelitian ini menggunakan semen 250 kg dengan persentase 100% *polystyrene* sebagai pengganti agregat halus dan kasar dan fas 0,4 dengan pengempaan 2 MPa. Benda uji untuk pengujian awal direncanakan untuk mengetahui kuat tekan, modulus elastisitas, serapan air, dan berat jenis, benda uji dibuat berupa silinder dengan ukuran tinggi 10 cm dan diameter 5 cm. Pengujian selanjutnya dibuat berupa panel berukuran panjang 80 cm, lebar 30 cm dan tebal setelah dikempa adalah 1 cm. Variasi dilakukan berdasarkan panjang dan jumlah *polyethylene fibers* yaitu 3 cm 1%, 3 cm 2%, 3 cm 3 %, 4 cm 1%, 4 cm 2% dan 4 cm 3%. Masing-masing variasi berjumlah 3 buah benda uji, total silinder berjumlah 42, panel 21, dan total keseluruhan 63 benda uji. Pengujian pada panel dibatasi hanya pada uji lentur horisontal.

Hasil penelitian silinder beton *polystyrene polyethylene fibers* menghasilkan kuat tekan rerata tertinggi sebesar 8,947 MPa pada *polyethylene fibers* 3 cm 2%, berat isi rerata tertinggi sebesar 1.365,794 kg/m³ pada *polyethylene fibers* 3 cm 2% dan terendah sebesar 1.269,930 kg/m³ pada *polyethylene fibers* 3 cm 3%, modulus elastisitas rerata tertinggi sebesar 179,400 MPa pada *polyethylene fibers* 4 cm 3% dan serapan air rerata tertinggi sebesar 12,133% pada *polyethylene fibers* 3 cm 3%. Hasil penelitian panel beton *polystyrene polyethylene fibers* menghasilkan berat satuan rerata terbesar sebesar 1.260,346 kg/m³ pada *polyethylene fibers* 3 cm 2% dan berat satuan rerata terkecil sebesar 1.023,491 kg/m³ pada *polyethylene fibers* 3 cm 3%, beban lentur maksimum tertinggi yang mampu dipikul sebesar 127,333 N pada *polyethylene fibers* 3 cm 1% dan terkecil sebesar 82 N pada *polyethylene fibers* 3 cm 3%, lendutan saat Pmax terbesar sebesar 90,067 mm pada *polyethylene fibers* 3 cm 3%, kekakuan terbesar sebesar 8,689 N/mm pada *polyethylene fibers* 4 cm 2%, dan kuat lentur tertinggi sebesar 2,05 MPa pada 3 cm 1%. Hasil pengujian pada panel dinding beton *polystyrene polyethylene fibers* menunjukkan, bahwa penambahan *polyethylene fibers* pada panel dinding *polystyrene polyethylene fibers* menurunkan nilai tegangan lentur, menghasilkan nilai kekakuan yang rendah pada panel dinding beton *polystyrene*, dan panel dinding beton *polystyrene* menjadi sangat daktail dengan pola retak yang tampak berkurang.

Kata Kunci : Panel dinding, Limbah *polystyrene*, Serat *polyethylene*



ABSTRACT

Searching for alternative materials used to make high strength and high performance concrete was proceed, including lightweight concrete panels using fiber and fiber waste. In this study it used waste styrofoam or polystyrene and the fiber that used is polyethylene plastic rope or rope slap plastics.

In this research used 250 kg cementinous with 100% polystyrene as a replacement for fine and coarse agregate and fas 0.4 with 2 MPa compression. Initial specimen testing used for investigating compressive strength, modulus of elasticity, density and water absorption. Speciments were made in a cylinder with a height of 10 cm and a diameter of 5 cm. Next test used panels with 80 cm long, 30 cm wide, and thick after felted is 1 cm. Variations of specimen based on the length and number of polyethylene fibers, i.e 3 cm for 1%, 3 cm for 2%, 3 cm for 3%, 4 cm for 1%, 4 cm for 2%, and 4 cm for 3%. Each variation consists 3 speciments, so, total cylinder was made 42 unit. 21 of panel and 63 speciments test. Panel test is restricted to the horizontal bending test.

The results of polystyrene and polyethylene fibers concrete cylinder produced the highest rate compressive strength of 8.947 MPa at 3 cm of 2% polyethylene fibers, the highest rate of unit weight of 1365.794 kg /m³ in poyethylene fibers 3 cm 2% and the lowest was 1269.930 kg/m³ the polyethylene fibers 3 cm 3%, the modulus of elasticity of the highest rates of 179.400 MPa at 4 cm polyethylene fibers 3% and the highest rate of water uptake by 12.133% at 3 cm polyethylene fibers 3%. The results of the study of concrete panels polystyrene polyethylene fibers produce the largest average unit weight of 1260.346 kg/m³ at polyethylene fibers 3 cm 2% and the average weight of the smallest unit of 1023.491 kg/m³ in polyethylene fibers 3 cm 3%, the highgest maximum bending load which is able to bear at 127.333 N at 3 cm polyethylene fibers 1% and the smallest was 82 N at 3 cm polye3thylene fibers 3 cm, largest deflection would get on Pmax of 90.067 mm in polyethylene fibers 3cm 3%, the largest stiffness of 8.689 N/mm in polyethylene fibers 4 cm 2%, and the highest flexural strength of 2.050 MPa at 3 cm polyethylene fibers 1 cm. Test results on concrete wall panels polystyrene polyethylene fibers showed that addition of polyethylene fibers in the wall panels polystyrene polyethylene fibers lowers value of the bending stress, produces a low stiffness values on polystyrene concrete wall panels and concrete wall panels become very ductile with less of crack pattern.

Keyword : Wall panels, Polystyrene waste, Polyethylene fibers