

INTISARI

Kebutuhan akan percepatan penyediaan rumah tempat tinggal mengharuskan pemerintah mencoba sistem konstruksi inovatif menggunakan *sandwich* beton *expanded polystyrene* (panel beton ringan EPS) yang digunakan sebagai konstruksi dinding. Panel beton ringan EPS memiliki berat relatif ringan yang merupakan salah satu syarat rumah tahan gempa. Untuk meningkatkan daya dukung dinding panel beton ringan EPS agar menjadi dinding struktural atau *bearing wall* maka alternatifnya digunakan bahan tambah lapisan perkuatan. Tujuan dari penelitian ini adalah untuk mengetahui kuat lentur horizontal, kuat tekan vertikal, dan ketahanan pukul (*impact*) panel beton ringan EPS dengan variasi perkuatan lapisan kalsium silikat maupun tanpa perkuatan lapisan kalsium silikat.

Bahan dinding panel didapatkan dari pabrikasi *precast*. Dimensi dari panel beton ringan EPS ialah 1800 mm x 610 mm x 75 mm, dimana pengujian ini mengacu pada SNI 03-3122-1992. Terdapat 3 variasi panel beton ringan EPS, yaitu panel beton ringan EPS tanpa perkuatan (PPL), panel beton ringan EPS dengan perkuatan lapis kalsium silikat (PPK), dan panel beton ringan EPS dengan perkuatan lapis kalsium silikat dan penyambung geser baut (PBK). Jenis kalsium silikat yang digunakan adalah papan Kalsiboard.

Hasil penelitian menunjukkan berat jenis rerata panel beton *polystyrene* sebesar 612,57 kg/m³, modulus elastisitas rerata sebesar 942,37 MPa, dan daya serap air rerata sebesar 12,11%. Hasil kuat lentur horizontal panel beton ringan EPS tanpa perkuatan (PPL) sebesar 0,83 MPa. Hasil kuat lentur horizontal panel beton ringan EPS dengan perkuatan kalsiboard (PPK) sebesar 1,60 MPa. Hasil kuat lentur horizontal panel beton ringan EPS dengan perkuatan kalsiboard dan penyambung geser baut (PBK) sebesar 1,54 MPa. Menurut syarat SNI 03-3122-1992 hanya panel beton ringan EPS variasi PPK dan PBK yang memenuhi syarat mutu B. Pola retak panel beton ringan EPS variasi PPL terletak pada setengah bentang sedangkan panel beton ringan EPS variasi PPK dan PBK terletak pada seperempat bentang. Hasil kuat tekan vertikal panel beton ringan EPS tanpa perkuatan (PPT) sebesar 0,70 MPa. Hasil kuat tekan vertikal panel beton ringan EPS dengan perkuatan kalsiboard (PPK) sebesar 1,18 MPa. Hasil kuat tekan vertikal panel beton ringan EPS dengan perkuatan kalsiboard dan penyambung geser baut (PBK) sebesar 1,12 MPa. Menurut syarat SNI 03-3122-1992 pada pengujian kuat tekan vertikal panel beton ringan EPS baik menggunakan perkuatan maupun tidak menggunakan perkuatan tidak lolos syarat mutu. Hasil pengujian ketahanan pukul (*impact*) tidak dapat mempertahankan kekakuannya ketika mendapatkan beban kejut sebesar 27 kg sehingga secara keseluruhan benda uji tidak lolos pada syarat.

Kata kunci: Panel beton ringan EPS, Kuat tekan, Kuat lentur, *Impact*, Kalsiboard

ABSTRACT

The need for accelerated residential homes requires the government tried innovative construction system using concrete sandwiches expanded polystyrene (EPS lightweight concrete panels) are used as construction walls. EPS lightweight concrete panels have a relatively light weight, which is one of the requirements for earthquake resistant houses. To increase the bearing capacity of the wall panel EPS lightweight concrete to be a structural wall or bearing wall, the alternative is to use reinforced layer material. The purpose of this study is to know horizontal flexural strength, vertical compressive strength, and blow durability (impact) EPS lightweight concrete panels with variations in strengthening the calcium silicate or without strengthening the calcium silicate layer.

Wall panel material obtained from precast manufacturing. Dimensions of EPS lightweight concrete panels are 1800 mm x 610 mm x 75 mm, where the test refers to SNI 03-3122-1992. There are 3 variations of EPS lightweight concrete panels, there are lightweight non-reinforced concrete panels, EPS lightweight concrete panels with calcium silicate reinforcement, and EPS lightweight concrete panels with calcium silicate reinforcement and bolt shear connectors. The type of calcium silicate used is the Kalsiboard.

The results showed that the average density of polystyrene concrete was 612.57 kg/m³, the average modulus of elasticity is 942.37 MPa, and the average water absorption was 12.11%. The results of the horizontal flexural strength of EPS lightweight reinforced concrete panels were 0.83 MPa. The results of the horizontal flexural strength of EPS lightweight concrete panels with kalsiboard reinforcement are 1.60 MPa. The results of the horizontal flexural strength of the EPS lightweight concrete panels with reinforcement of the Kalsiboard and bolt shear connectors are 1.54 MPa. According to SNI 03-3122-1992 only PPK and PBK qualified quality B. The crack pattern of EPS lightweight concrete panels of PPL variations is located in half the span while EPS lightweight concrete panels of PPK and PBK variations are located in a quarter span. The results of the vertical compressive strength of reinforced concrete panels were 0.70 MPa. The results of the vertical compressive strength of EPS lightweight concrete panels with kalsiboard reinforcement of 1.18 MPa. The results of the vertical compressive strength of the EPS lightweight concrete panels with reinforcement of the kalsiboard and bolt shear connector are 1.12 MPa. According to SNI 03-3122-1992 there are no EPS lightweight concrete panels that pass the quality requirements. The test results of the impact resistance cannot maintain its stiffness when get a shock load of 27 kg so that the whole test object is not qualify.

Keyword: *EPS Lightweight concrete panels, flexural strength, compressive strength, Impact, Kalsiboard*