ABSTRACT

Progress of sciences, especially civil engineering, demands a better concrete technology. To minimize self-weight of concrete, I tried to replace coarse aggregate by **styrofoam**. The self-weight of structure highly affected a planning of structure, especially if earthquake effect is considered. When the self-weight of structure is lower, it will produce lower quake force. In this thesis, use of lower structure weight was **precast wall panel**. Test of flexural capacity was done to understand the amount of face load value and examination of precast wall panel weight with length of 3 m, width of 7.5 cm, and height of 25 cm and also examine ease to establish time and way to install field precast wall panel.

Phases of tests covered: tests of compression strength of concrete cylinders, tests of tensile strength of steel bars, tests of bond strength, modulus of rupture, and flexural tests of precast wall panel. The precast wall panel test made test thing with length of 3 m, width of 7.5 cm, and height of 25 cm, using one reinforce for non deformed with diameter 5.14 mm at center. The precast wall panel was tested by net extend of 2800 mm from support of joint to joint by using static load.

Results of test consisted of styrofoam weight as much as 0.0142 t/m^3, specific gravity of light styrofoam concrete as much as 0.718 t/m^3, modulus of elasticity as much as 339.897 MPa, the compression strength of concrete cylinders at 28 days old as much as 1.519 MPa, the yield stress of steel bars non deformed with diameter 5.14 mm as much as 379.246 MPa, bond strength for non deformed steel bars with diameter 5.14 mm as much as 2.824 MPa, modulus of rupture produced 0.623 MPa. Unfinished precast wall panel at 28 days old with vertical position produced ultimate load as much as 1110.013 N, ultimate deformation as much as 17.500 mm, ultimate flexural capacity as much as 911595.767 Nmm, and unfinished precast wall panel at 28 days old with horizontal position produced ultimate load as much as 404690 N, ultimate deformation as much as 50.00 mm, ultimate flexural capacity as much as 283283.000 Nmm. Comparison of flexural capacity for experiment and theory with vertical position as much as 104.717%, whereas flexural capacity comparison for experiment and theory with horizontal position as much as 120.206%.

Precast wall panel could be lifted after 1 days old with vertical position, while horizontal position had failed due to self weight, but better for precast wall panel lifted after 7 days old due to better usable for vertical and horizontal position.

Keywords: styrofoam, wall panel, amount of dimension, move force.

INTISARI

Perkembangan ilmu pengetahuan, khususnya bidang teknik sipil menuntut teknologi beton yang lebih baik. Untuk mengurangi berat sendiri beton, dicoba mengganti agregat kasar dengan ***styrofoam***. Berat sendiri struktur sangat berpengaruh dalam perancangan suatu struktur terutama apabila pengaruh gempa juga diperhitungkan. Apabila berat struktur semakin kecil maka akan menghasilkan gaya gempa yang kecil pula. Dalam tesis ini, pemanfaatan berat struktur yang kecil adalah **panel dinding pracetak**. Pengujian kapasitas lentur dilakukan untuk mengetahui besarnya nilai beban muka (*face load*) dan pemeriksaan berat panel dinding pracetak dengan ukuran panjang 3 m, lebar 7.5 cm, dan tinggi 25 cm dan juga untuk mengetahui kemudahan dalam menetapkan waktu dan cara pelaksanaan pemasangan panel dinding pracetak di lapangan.

Tahap pengujian meliputi: pengujian kuat tekan silinder beton, pengujian kuat tarik tulangan baja, pengujian kuat lekat tulangan, pengujian *modulus of rupture*, dan pengujian panel dinding pracetak. Pengujian panel dinding pracetak dibuat benda uji dengan panjang 3 m, lebar 7.5 cm, dan tinggi 25 cm, dengan menggunakan tulangan polos satu buah dengan diameter 5.14 mm. Pengujian Panel dinding pracetak diuji dengan bentang bersih 2800 mm dari tumpuan sendi ke sendi dengan menggunakan beban statik.

Hasil pengujian diperoleh berat jenis *styrofoam* 0.0142 t/m^3, berat jenis beton *styrofoam* ringan 0.718 t/m^3, modulus elastisitas 339.897 MPa, kuat tekan silinder beton pada umur 28 hari 1.519 MPa, tegangan leleh dengan tulangan polos diameter 5.14 mm sebesar 379.246 MPa, kuat lekat tulangan 2.824 Mpa, *modulus of rupture* diperoleh 0.623 MPa. Panel dinding pracetak *unfinishing* pada umur 28 hari dengan posisi vertikal diperoleh beban ultimit 1110.013 N, lendutan ultimit 17.500 mm, kapasitas lentur ultimit 911595.767 Nmm dan panel dinding pracetak *unfinishing* pada umur 28 hari dengan posisi horisontal diperoleh beban ultimit 404.690 N, lendutan ultimit 50.000 mm, kapasitas lentur ultimit 283283.000 Nmm. Perbandingan kapasitas lentur eksperimen dan teori dengan posisi vertikal sebesar 104.717%, sedangkan perbandingan kapasitas lentur eksperimen dan teori dengan posisi horisontal sebesar 120.206%.
Panel dinding pracetak bisa diangkat setelah berumur 1 hari dengan posisi vertikal sedangkan dengan posisi horisontal sudah runtuh akibat berat sendiri, tetapi lebih baik panel dinding pracetak diangkat setelah berumur 7 hari karena bisa dilakukan baik dengan posisi vertikal ataupun posisi horisontal.

Kata kunci : *styrofoam*, panel dinding, besarnya dimensi, gaya dorong.