

ABSTRACT

One of the requirements for earthquake resistant buildings is to use lightweight materials. This is because the magnitude of the earthquake inertia load is proportional to the weight of the building material. The use of brick as a wall in Indonesia is considered still not light because it has a weight of 2200 kg/m³ and 1700 kg/m³. The installation of both materials also requires a long time and a lot of labor. The development of construction technology provides a solution in the form of using foam to reduce the density of wall, and pre-cast technology to reduce the time and labor needed. However, the use of foam adds brittle properties to the walls, so it is necessary to strengthened with wire mesh. Therefore, research on the use of foam as a wall panel strengthened with wire mesh needs to be done to determine the best material composition and strength of the wall panel.

Wall panel is a composite wall with a thickness of 12 cm, consisting of a layer of skin in the form of mortar and core layer in the form of foam concrete, strengthened with wire mesh with a diameter of 5 mm on the skin layer. The material composition of each layer was obtained through a compressive test using a cylindrical specimen with a diameter of 10 cm and a height of 20 cm. The mortar composition tested was 1PC:2PS, 1PC:3PS, and 1PC:4PS. The composition of foam concrete tested was 1PC:3PS with variations of foam additions as much as 40%, 50%, and 60%. The wall panel specimens amounted to 3 pieces for each test, with a size of 50x50x12 cm³ for compressive test, 100x50x12 cm³ for flexural test, and 120x120x12 cm³ for diagonal shear test.

The compressive strength of the wall panels obtained were 15,414 MPa, 13,040 MPa and 14,394 MPa, respectively. The wall panel flexural strength obtained was 2,855 MPa, 2,925 MPa and 3,372 MPa, respectively. The diagonal shear strength of wall panels obtained were 1,464 MPa, 1,271 MPa, and 1,671 MPa, respectively. The initial damage mode for all wall panels is cracks between layers. In the flexural test, the subsequent damage is in the form of fracture of each layer, while in the shear test, the next damage is damage to the angle of the wall panel in the support area.

Keywords : *Wall panels, mortar, foam concrete, wire mesh, foam, compressive strength, flexural strength, diagonal shear strength.*