

MECHANICAL STRENGTH OF CONCRETE MIX USING EXPANDED POLYSTYRENE (EPS) ENHANCE WITH STEEL FIBRES

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DECLARATION

I Nur Athirah binti Kamaluddin, 2010457116 confirm that the work in this report is my own work and the appropriate credit has been given where references have been made to the work of other researchers.

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ABSTRACT

Recently, lightweight concrete produced as concrete panel have gained greater acceptance from many countries in conjunction with Industrialized Building System (IBS). Using lightweight concrete in construction will reduce the dead weight of the structural element, lighter loads during construction and increased thermal resistance. LWC is light in weight and low in mechanical strength. Usually, LWC applied as non-load bearing wall. The challenge of making lightweight concrete as load bearing requires it to be high strength. Steel fibres are introduced in concrete mix together with EPS beads to create lightweight concrete but strong in its carrying capacity. This research paper evaluates the relationship between mechanical strengths and density of lightweight concrete mix after the determination of the optimum mix proportion from expanded polystyrene (EPS) beads with steel fibres as LWC mix. Three different series was made, label as Series A, Series B and Series C which defined as Series A is control sample, Series B is concrete mix containing EPS and Series C is mixture containing EPS and steel fibres. Percentage of EPS used along this research is 10 %, 20 %, 30 % and 40 % with steel fibre of 0.5 %. Additional of steel fibres to LWC not only results in increase in flexural strength, but also a compressive strength, tensile strength and reduces crack propagation. Three different tests with different shape and size of specimen were carried out which is compression test for cube of size 150 mm x 150 mm x 150 mm, splitting-tensile test for cylinder of size 150 mm x 150 mm and flexural test for prism of size 100 mm x 100 mm x 500 mm and all testing methods are in accordance to British Standard (BS). Optimum mix proportion is 30 % EPS with 0.5 % steel fibre, resulting 19.51 MPa compressive strength and 1933 kg/m³ density and this can be applied as load bearing wall.

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