

KAJIAN EKSPERIMENTAL SIFAT MEKANIK BETON RINGAN DENGAN PENGGUNAAN POLYSTYRENE SEBAGAI BAHAN SUBSTITUSI AGREGAT HALUS

Slamet Widodo

Jurusan Pendidikan Teknik Sipil dan Perencanaan,
Fakultas Teknik UNY
Kampus Karangmalang, Yogyakarta 55281.

ABSTRACT

Lightweight concrete offers some advantages in reinforced concrete construction. It can be produced by replacing the normal aggregate (sand and gravel) with lightweight aggregate, either partially or fully, depending upon the requirements of density and strength. The present study covers the use of expanded polystyrene as fine lightweight aggregate in order to produce structural lightweight aggregate.

These mixes were designed by using several variances of polystyrene volume percentage by total fine aggregate. The substitution was done with 0%, 25%, 50%, 75% and 100% by total volume of fine aggregate, with 0,50 water cement ratio. The Properties of hardened concrete namely compressive strength, splitting tensile strength and flexural strength were tested in 28 days of curing period.

It is observed that polystyrene lightweight concrete has sufficient strength to be accepted as structural lightweight concrete in 25% substitution by total volume of fine aggregate, with 17,35 MPa of compressive strength, but the compressive strength will always decrease depending on the increasing of polystyrene percentage. The splitting tensile strength of polystyrene lightweight aggregate approximately 14%-18% of its compressive strength, for the normal concrete it is nearly 10% of 28 days compressive strength. The flexural strength was ranging between 20%-30% of its compressive strength, higher than normal concrete that nearly 15% of its compressive strength.

Keywords : Lightweight Concrete, Mechanical Properties, Polystyrene