

Fine Cementless Ash Slag Concrete

A new technology and composition of a fine cementless concrete has been developed. It uses only industrial waste products from thermal power plants and contains aggregates that are neither natural (rubble, gravel, sand) nor artificial (claydite, agglomerite, foam polystyrol). This concrete can be used both for load bearing structures and exposed concrete elements.

Concrete of a 10 to 30 MPa strength class for load bearing structures (Patent Ru No 2065420 C1-1996) has the following mix proportions:

High calcium fly ash 30-40%

Slag sand from thermal power plants 30-40%

Silica fume 3-4%

Mixing water of 60 to 80% as needed

Concrete of a 3.5 to 10 MPa strength class for exposed elements, has the same mixture proportions plus an air entraining admixture (secondary sodium alkyl sulfate) of 0.5 to 1% by weight of fly ash. This cementless concrete contributes to environmental protection because it uses power plant waste. The introduction of 3 to 4 percent silica fume along with mixing water at 60-80° C permits binding of the free lime of the high calcium ash into a cementless concrete. A three dimensional scheme for the proportioning of the optimum mixture of cementless concrete has been developed as well as a computer program for proportioning mixtures that depend on the mineralogical composition of the high calcium ash.

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