PROJECT REPORT ON

"SOME STUDIES ON DEVELOPMENT OF PERVIOUS CONCRETE"

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ABSTRACT

Pervious concrete is a special type of concrete with excellent permeability and moderate range of compressive strength which can be used for non structural applications. The major step that is yet to be developed for the production of pervious concrete is designing a rational mix proportion incorporating the two most important properties namely permeability and compressive strength. The utilization of pervious concrete is gaining importance of late and there is a need to develop this material with a systematic approach. Volume of fine aggregate, paste, dosage of superplasticizer and viscosity modifying admixtures, mixing and compaction methods plays an important role in the development of pervious concrete.

An attempt is made in this study to develop a relationship between compressive strength verses water cement ratio and permeability verses grading of aggregate and then develop a rational mix design guidelines for the development of pervious concrete. The study is carried out using 53grade cement, commercially available polycarboxylic based super plasticizer, a viscosity modifying admixture, natural river sand and crushed angular aggregates of maximum size 20mm. The cement content was fixed at 375 kg/m^3 with water to cement ratio ranging from 0.24 to 0.35 with water content varying from 90 to 130 lt/m^3. The percentage of fine aggregate was varied from 5 to 15% in increment of 5%. Cubes and Cylinders of 150mm were cast and tested at the age of 7 and 28days for compressive strength and co-efficient of permeability and beams of 150×150×700mm for Flexural strength at 28days.

Results of the study indicate that as the water cement ratio increases the compressive strength increases. This is because of the availability of more paste at higher w/c ratio with better cohesion of the mix and reduction in the inter particle friction between the aggregates. Also for the same w/c ratio the compressive strength increased with higher percentage of sand. In addition as the volume of paste increases the compressive strength also increases. It can also be noted that the compressive strength increased even for the same Vp for different sand percentages even though the water content and chemical admixture contents are the same. This indicates that at higher V_p a better coating of the surface of the coarse aggregate results in better lubricating effect and also probably due to better packing. Also as the percentage of fine aggregates increases the co-efficient of permeability decreases. Based on the test results a rational mix design procedure is proposed.