

ABSTRACT

River sand is generally used as filler for gaps of coarse aggregates in concrete. At present, river sand is becoming expensive due to higher cost of transportation from river beds. Judiciary and Governments have therefore imposed ban on extraction of river sand from the river bed beyond a certain depth causing a shortage of fine aggregates. Consequently, concrete industry has been forced to look for alternative materials of river sand as fine aggregate. It is therefore desirable to investigate the use of cheaper, easily available and sustainable alternative materials to natural sand. Large quantities of waste rubber tyres are produced every year and accumulation of these tyres is a major problem. Waste rubber tyres can be used as in the concrete as replacement of fine aggregate (FA). This would not only solve the problem of accumulation of tyres but will also save natural resources.

Though, a number of studies have been undertaken on the properties of rubberised concrete; most of the studies are limited to a single w/c ratio and very few studies are available on use of rubber ash and rubber fibers in concrete, combined use of rubber ash and rubber fibers, waste rubber aggregate with silica fume, ductility properties of waste rubber concrete, and various properties of waste rubber concrete at elevated temperature (different exposure duration).

Therefore, the present study has been carried out for three different w/c ratios for strength, durability and ductility studies of concrete containing rubber fiber and rubber ash as partial replacement of fine aggregate and silica fume as partial replacement of cement. Study has also been carried out for strength, durability and ductility of rubber fiber concrete subjected to elevated temperatures.

It is concluded from the studies carried out that rubber ash and rubber fiber enhance the ductility properties of concrete. The compressive strength is adversely affected and the other strength and durability properties are marginally affected. The partial replacement of cement by silica fume is found to enhance the strength, durability and ductility properties of rubberized concrete.

To sum up, the rubberized concrete can be utilized where ductility is a major concern rather than strength and the rubberized concrete with silica fume can be used where strength is a concern along with ductility.