ENHANCING THE STRENGTH PROPERTIES OF RECYCLED AGGREGATE CONCRETE THROUGH THE USE OF SUPPLIMENTARY CEMENTING MATERIALS

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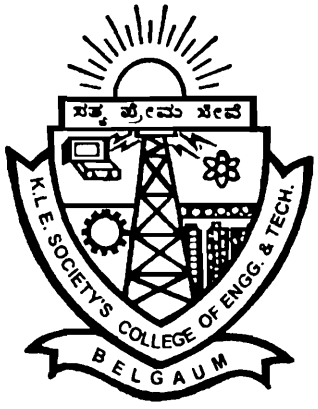

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ABSTRACT

The use of recycled aggregates in concrete opens a whole new range of possibilities in the reuse of materials in the building industry. This could be an important breakthrough for our society in our endeavors towards sustainable development.

The use of recycled aggregate in concrete is gaining momentum these days. In the years to come, the recycled aggregate concrete may become the need of the day. With an increase in our environmental consciousness, the concrete industry is coming under intense scrutiny and criticism. Many practices within the concrete industry that pose a potential threat to our environment are becoming matters of serious consideration and with increased consumption, there is also an increase in the amount of waste that concrete societies have to deal with. Waste concrete can be produced from a number of different sources. The most common are demolition projects. Many concrete structures like buildings, bridges, sidewalks and roads are razed after a period of time into their service life for purpose of replacement or landscape changes. Other sources of waste include natural disasters like earthquakes, avalanches, and tornadoes; human causes like war and bombing; and structural failures. All these contribute to vast quantities of waste concrete that must be managed in some way.

The trend of the utilization of recycled aggregates is the solution to the problem of an excess of waste material, not forgetting the parallel trend of improvement of final product quality. The utilization of waste construction materials has to be related to the application of quality guarantee systems in order to achieve suitable product properties. Therefore the complete understanding of the characteristics of -new material becomes so important in order to point out its real possibilities.

The studies on the use of recycled aggregates have been going on for 50 years. In fact, none of the results showed that recycled aggregates are unsuitable for structural use. Only having inadequate number of studies in durability aspects, made recycled aggregates to be preferred just as stuffing material for road construction.

In this project an attempt is made to find out the effect of sustained elevated temperature on the properties of RAC produced by different supplementary cementitious

materials. The effect of replacement of cement by 25% fly ash and 10% silica fume and replacement of natural aggregates by recycled aggregates in different percentages.

PREAMBLE

1. General Introduction

With an increase in our environmental consciousness, the concrete industry is coming under intense scrutiny and criticism. Many practices within the concrete industry that pose a potential threat to our environment are becoming matters of serious consideration and, along with increased consumption there is also an increase in the amount of waste that concrete societies have to deal with. Waste concrete are commonly from demolition projects i.e. concrete structures like buildings, bridges, sidewalks and roads, which are razed after a period of time into there service life for purposes of replacement or landscape changes. These contribute to vast quantities of waste that has been managed mainly through its land filling and recycling. Now a days, recycling is gaining wider attention as a viable option for the handling of waste concrete.

One of the main environmental benefits is the conservation of natural resources, especially in regions where aggregates are scare. The use of recycled aggregate could lead to reductions in the use of cement whose manufacture bears large environmental hazards due to the emissions of CO_X and NO_X gases and dust.

The concrete industry places a heavy demand on primary resources. It is estimated that 165 million tones of aggregate are used for concrete each year. This is considered unsustainable due to environmental impact and resource depletion. Thus, it has become necessary towards the turn of the century to establish technology for a self recycling system for concrete whereby materials for concrete are regrouped from demolished concrete.

Construction materials are increasingly judged by their ecological characteristics. Concrete recycling gains importance because it protects natural resources and eliminates the need for disposal by using the readily available concrete as an aggregate source for new concrete or pavement sub base layers. According to a FHWA study, 38 states recycle concrete as an aggregate base; 11 recycle it into new Portland cement concrete. The states that do use recycled concrete aggregate in new concrete report that concrete with recycled concrete aggregate performs equal to concrete with natural aggregates. Most agencies specify using the material directly in the project that is being reconstructed.