

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELGAUM 590 018



A Dissertation Report On

**“A STUDY ON BEHAVIOUR OF BLOCK MASONRY WITH
ALTERNATIVE MATERIALS AS FINE AGGREGATE IN
MORTAR”**

Submitted in Partial Fulfillment of the requirements for the Award of the Degree of

**MASTER OF TECHNOLOGY
IN
CONSTRUCTION TECHNOLOGY**

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ABSTRACT

Natural sand is the most preferred choice as a fine aggregate material in its various applications. Due to illegal and uncontrollable mining, river sand is becoming a scarce commodity. Hence there is a need for an urgent and sustainable solution to protect the affected rivers and communities. This dissertation work puts forward the application of different alternative materials to river sand as an attempt towards sustainable development. It will help to find solution to the declining availability of natural sand to strike an eco-balance.

In the present study different alternatives to river sand were identified namely M sand, C and D waste and Slag sand. These alternatives were tested as per IS codes to determine their suitability as fine aggregates. The study investigated on 25%, 50%, 75% and 100% replacement of alternative materials to river sand for a design mortar mix of 1:6 proportion with different water cement ratios by keeping a constant mortar flow of 110-115%. The compressive, tensile and flexural strengths of the mortar mix have been determined as per the relevant standard codes. The study revealed the various percentage replacements suitable for a mortar mix of 1:6. Mortar mix of M sand with 100% replacement, slag sand with 50% replacement and C and D waste with 75% replacement to natural sand exhibited good 28days compressive strength.

Further the behavior of hollow concrete block masonry with mortar made of alternative materials with optimum percentage of replacement has been investigated. Hollow concrete block prisms were cast and tested for compressive strength, efficiency, flexural and shear strength. The compressive strength of HCB prisms made with alternatives have exhibited good compressive strengths close to that of prisms made with natural sand. The masonry efficiency shown in all the prisms are high as expected in block masonry. The MOE exhibited are remarkably high. It was also found that the block masonry made with alternatives have good bond strengths both in flexure and shear. This study clearly indicates the suitability of using the alternatives in block masonry construction.