VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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Project Report

on

"PERFORMANCE EVALUATION OF WORN OUT TYRE AND TUBE RUBBER AS A PARTIAL REPLACEMENT FOR FINE AND COARSE AGGREGATES IN CEMENT CONCRETE"

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CHAPTER 1:

INTRODUCTION

1.1: GENERAL

Concrete is one of the most widely used construction materials in the world. Cement and aggregate, which are the most important constituents used in concrete production, are the vital materials needed for the construction industry. This inevitably led to a continuous and increasing demand of natural materials used for their production. Parallel to the need for the utilization of the natural resources emerges a growing concern for protecting the environment and a need to preserve natural resources (such as aggregate) by using alternative materials which are recycled or waste materials.

Building construction has caused great impact on the environment, but it can bring benefits to the population in general, and can also take measures to repair environment. Waste tire disposal is a worldwide problem and has caused worry for public administrators, researchers and environmentalists. Due to the increasingly serious environmental problems presented by waste tires, the feasibility of using elastic and flexible tire–rubber particles as aggregate in concrete is investigated in this study. The use of the crumb rubber tire remaining from the retreading process can minimize the environmental impact and help the conservation of natural resources. The component production in building is viable, as well as contributing to sustainable development.

Tire–rubber particles were obtained by shredding the disposed tyres into fine size of about 4.75mm in case of fine aggregates and to about 20 mm in case of coarse aggregate replacement. Tire–rubber particles composed of tire chips, crumb rubber, and a combination of tire chips and crumb rubber, were used to replace mineral aggregates in concrete. These particles were used to replace 5% and 10% of the aggregate's (both fine and coarse aggregate replaced separately) volume in concrete. Cylindrical shape concrete specimens 150 mm in diameter and 300 mm in height were fabricated and cured. Along with cylindrical specimen, cubical specimens of size 150 mm × 150 mm × 150 mm were also fabricated and cured. The fresh rubberized concrete exhibited lower unit weight and acceptable workability compared to plain concrete. Unlike plain concrete, the failure state in rubberized concrete occurs gently and uniformly, and does not cause any separation in the specimen. Crack width in rubberized concrete are lower than those of plain concrete.