



“MITIGATION FOR FIRE-INDUCED SPALLING IN CONCRETE BY REUSED TYRE POLYMER FIBRES”

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ABSTRACT: Traditional concrete is primarily made up of four fundamental ingredients, i.e. coarse aggregate, fine aggregate (i.e. sand), cement and water. Nowadays, large quantities of scrap tires are generated each year globally. With the increased incidents of major fires in buildings; assessment, repairs and rehabilitation of fire damaged structures has become a topical interest. In the last 20 years, a lot of work by using these waste materials has been done in various civil engineering projects. By using waste tire rubber as a coarse aggregate as well as fine aggregate in concrete the natural resources can be saved and environmental pollution can be minimize. Partially replacing the coarse or fine aggregate of concrete with some quantity of small waste tire cubes can improve qualities such as low unit weight, high resistance to abrasion, absorbing the shocks and vibrations, high ductility and brittleness and so on to the concrete. It has been observed that the use of waste tire as aggregate replacement improves the toughness and sound insulation properties of concrete. Rubberized concrete is specially recommended for concrete structures located in areas of severe earthquakes risk and also for applications submitted to severe dynamic actions like railway sleepers. The rubberized concrete is reasonable, cost effective and withstand for more pressure, impact and temperature when compare it with conventional concrete. It is observed that the Rubber Modified Concrete (RMC) is very weak in compressive and tensile strength. But they have good water resistance with low absorption, improved acid resistance, low shrinkage, high impact resistance, and excellent sound and thermal insulation. Rubberized Concrete improves the mechanical and dynamic properties such as energy absorption, ductility and resistance. This thesis, generally, aims to explore the potential utilization of waste crumb tires in various Portland cement Concrete categories for the production of Portland cement concrete to study the structural behavior of concrete, and to help partially solving environmental problem produced from disposing waste tires. Coarse and fine aggregates are replaced using volumetric method by waste crumb tires replacements for the various PCC categories of model. This topic also gives a Comprehensive knowledge on the overall strategy for the return of fire damaged buildings and also presents a critical appraisal of the assessment procedures by different non destructive techniques, specifications and execution of repair techniques. The experimentation has been done to find out the impact of the fire on concrete by heating. The heated samples are cooled under standard room temperatures for 24 hours. The changes in the mechanical properties are studied using universal testing machine (UTM), CTM, and two point flexural test.

Keywords: Portland cement concrete, waste crumb tire, universal testing machine (UTM), CTM, two point flexural test, Rubber Modified Concrete (RMC).

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1. INTRODUCTION

1.1 Background

Modifications of construction materials have an important bearing on the building sector. Several attempts have been therefore made in the building material industry to put to use waste material products, e.g., worn-out tires, into useful and cost effective items. Success in this regard will contribute to the reduction of waste material dumping problems by utilizing the waste materials as raw material for other products. The waste problem considered as one of the most crucial problems facing the world as a source of the environmental pollution. It is contributing as a direct form in pollution that includes the negative effects on the health by increasing the diseases, diseases vector, percentage of mortality and lowering the standard of living. The waste usually defined as the all remains things resulted from production, transfer and uses processes, and in general all transmitted things and resources that the owner or the producer wants to dispose. During last recent years, many improvements in India have occurred in all parts of life such as social, industrial, economical etc. Like all countries in the world, this will lead to generate new ways of living and increase the human requirements, and will also increase types and quantities of the waste in the India, without any active processes to provide solution to this problem. One of the important types of remains is waste tires which have been classified as a part of municipal solid waste (MSW), resulted from the increase of vehicle ownership and traffic volume within the Palestinian territories. Natural coarse aggregate are extracted from quarries and a result this quarries will soon