



## **Experimental Study on Effects on Properties of Concrete with Partially Replacement of Natural Sand by Crumb Rubber**

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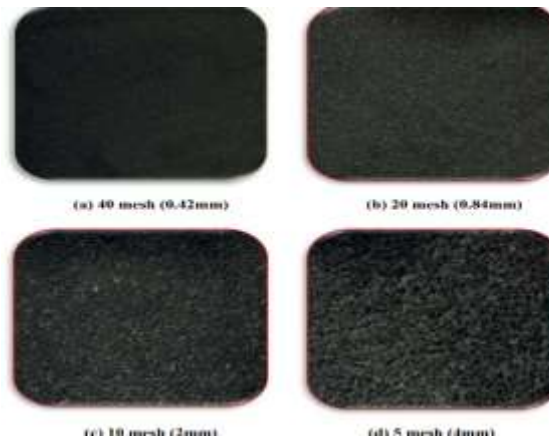
### **ABSTRACT**

Concrete is the most often utilised construction material in civil engineering. The main components used in concrete are cement, aggregates, and other cementitious additives. The findings of the experiment were compared to the corresponding controlled specimens, and they revealed that the addition of crumb rubber particles reduced compressive strength (by more than 6%). Although their compression may be reduced, they still have a high energy absorption capacity in an impact, less density, a slight increase in flexibility, and superior performance in terms of durability qualities. According to the findings, recycled rubber tyres can be used in construction to replace penalties. This study supports the use of crumb rubber aggregate in concrete as a means of reducing the effects of rubber waste disposal and resource depletion.

**Keywords:** Waste tyre rubber, glass fiber, workability, mechanical properties etc

### **I. INTRODUCTION**

Rubber tyre waste, also known as scrap tyres, is one of the hazardous wastes when it comes to solid wastes. The production and accumulation of these rubber tyre waste are rising annually all over the world. Tire trash production has been steadily rising, and combined with its non-biodegradable nature, this makes disposal particularly challenging. There are two ways to manufacture crumb rubber: cryogenic grinding and ambient mechanical grinding. Since the cryogenic technique is more expensive but results in softer and smaller crumb rubber, ambient mechanical grinding is favoured over it.



### **II. LITERATURE SURVEY**

K. Gunasekaran, R. Annadurai, and P.S. Kumar from the Faculty of Engineering and Technology's Department of Civil Engineering: Through the use of a scanning electron microscope (SEM), they investigated the pore structure of coconut shell and discovered that it functions like a reservoir. The findings demonstrated that intermittent curing, full water, and air-dry curing all produced concrete with the maximum coconut shell aggregate strength. The concrete cubes continued to get stronger even after 365 days, indicating that there was no biological deterioration.

Mr. Prashant A. Charan and Professor M. R. Wakchaura: In this study, the fine aggregate was partially replaced with crumb rubber at levels of 0.5%, 1%, 1.5%, and 2% in M25 grade concrete, and the effects on the concrete's compressive strength and flexural strength were examined. Glass fibre is added to this mixture at a ratio of 0.4% and 0.5% addition to the weight of cement in order to make up for the lost strength caused by the use of used tyre crumb

rubber particles. Results indicate that replacement of waste tyre crumb rubber particle to the fine aggregate in concrete at ratio 0.5% and 1% there is no effect on the concrete properties would occur, but there was a considerable change for 1.5% and 2% replacement ratio.

### III. OBJECTIVE

- To study the influence of partial replacement of crumb rubber with fine aggregate in Ordinary Portland Cement Concrete.
- To determine the variation in the properties of crumb rubber aggregate concrete with the partial replacement of fine aggregate by crumb rubber.

### IV. RESULTS AND DISCUSSIONS

#### WORKABILITY

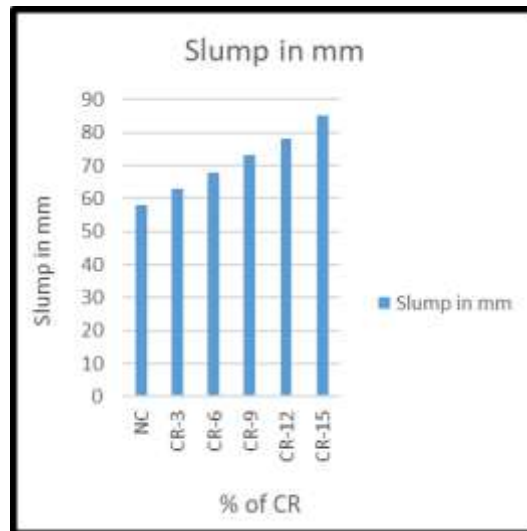


Figure 1 Slump value at different % of CR

From the experimental result it was found that slump value increase when add the crumb rubber ,

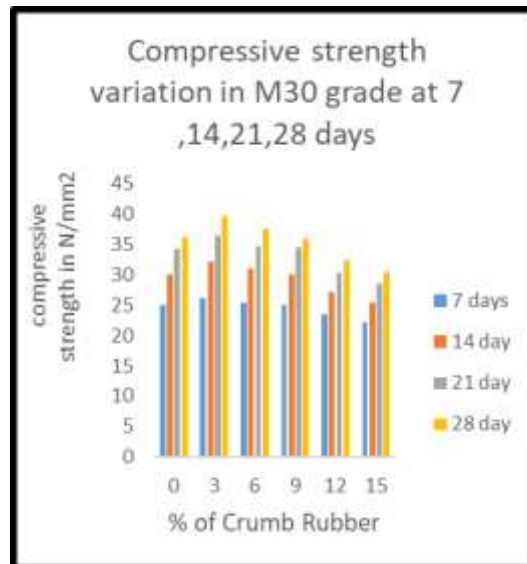


Figure 2 At 7,14,21,28 days, Concrete's compressive strength varies when fine aggregate is replaced with crumb rubber.

The compressive strength of concrete (M30) is increased 9.4% with the addition of 3% crumb rubber and further addition of rubber crumb up to 6% shows same compression as controlled concrete, maximum value of compressive strength is 39.67Mpa in M30 grades, there is a strength reduction in crumb rubber concrete it may be due to the contribution of entrapped air, which rises on rise in rubber crumb

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## V. CONCLUSION

- From the experimental result it was found that slump values is increase when increase the percentage of crumb reubber for M30 grade of concrete.
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