

Experimental Investigation on compressive strength of concrete by replacing concrete waste as coarse aggregate in concrete

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Abstract

Concrete is the main constituent material for the construction purpose. Concrete contain cement, sand, aggregate and admixtures in different cases. Since there is vast use of concrete, the ingredients present in concrete are led to scarcity. Due to this reason, the demolished construction waste and solid waste from manufacturing units are used to reduce the need of natural aggregate. In first part of the study deals with the compressive strength of concrete by partial replacement of fine aggregate and coarse aggregate with waste concrete coarse aggregate with various percentages such as 25%, 50% and 100%. Huge quantities of construction and demolition wastes are generated every year in developing countries like India. The disposal of this waste is a very serious problem because it requires huge space for its disposal and very little demolished waste is recycled or reused. This study is a part of comprehensive program wherein experimental investigations have been carried out to assess the effect of partial replacement of coarse aggregate by demolished waste on workability and compressive strength of recycled concrete for the study at 7, 14 and 28 days. The compressive strength thus, observed was compared with strength of conventional concrete. Test results showed that the compressive strength of recycled concrete up to 50% coarse aggregate replacement by demolished waste at the end of 28 days has been found to be comparable to the conventional concrete.

Keywords: Concrete, Demolished waste, Compressive strength, Recycled

I. INTRODUCTION

Recycling as part of environmental considerations has become a common feature in the construction industry. Construction and demolition debris is the waste material that results from the construction, renovation, or demolition of any structure, including buildings, roads, and bridges. Typical waste components include Portland cement concrete waste concrete. This waste material has only recently gained attention as concerns about its environmental impact have developed. One of the things builders, developers and contractors must consider during construction, renovation or demolition is where to put all the debris.

Huge quantities of construction materials are required in developing countries due to continued infrastructural growth and also huge quantities of construction and demolition wastes are generated every year in developing countries like India. The disposal of this waste is a very serious problem because on one side it requires huge space for its disposal while on the other side it pollutes the environment. It is also necessary to protect and preserve the natural resources like stone, sand etc. Continuous use of natural resources, like river and sand is another major problem and this increases the depth of river bed resulting in drafts and also changing the climatic conditions. So, the sustainable concept was introduced in construction industry due to growing concern about the future of our planet, because it is a huge consumer of natural resources as well as waste producer.

The result of this study will give the scholars and readers a new knowledge and the will to keep on learning and discovering new ways to make solutions to problems especially in the construction industry, particularly, on how to manage concrete debris, and at the same time promote hard work and perseverance in the pursuance of this career.

This will also provide knowledge to the contractors and developers on how to improve the construction industry methods and services by using recycled concrete debris alternate fine aggregate in a mortar mix where they can achieve good product performance and meet recycling. Moreover, the government will be able to find solutions to the problem regarding the disposal to landfills of these wastes materials and save the environment. They will visualize the potential of the recycled concrete debris as alternate fine aggregate to a mortar mix.