



Evaluation of the compressive strength of concrete resulting from recycled aggregates in IRAN construction projects

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ABSTRACT

Given the decreasing trend of natural resources, demands for recycled materials is rising in the near future, making concrete recycling as a significant and environmental alternative than leaving concrete wastes unused, especially in places where costs for supplying natural materials are high or in places where concrete waste disposal has problems. Recycled aggregate concrete construction methods need to be seriously reviewed. In many cases, recycled materials are used as applicable aggregates in foundation sand sub grades, road construction, and also are used in precast concrete parts, which greatly reduce the transportation cost. Obviously, by taking advantage of experiences of managing concrete recycling in other countries, some issues and problems in the area of concrete recycling in Iran could be overcome. The results of this research showed that, if the recycled aggregates are used in the construction of new concrete, the compressive strength of the resulting concrete is less than that of the concrete made of natural materials, but it would not be dramatically reduced. Hence these recycled aggregates would not be useless, but will have a high potential in many structural applications such as foundations and precast parts.

Keywords: Recycled aggregates, Concrete, Compressive strength, Iran construction projects

1. INTRODUCTION

Dramatic growth of the construction industry in the world, and especially the increasing growth of this industry in our country, as well as the need to reconstruct worn out buildings, has reduced the natural aggregates and sand resources. In addition, reconstruction and destruction of worn out buildings produces large amounts of construction debris, so that the city of Tehran alone produced 12 million tons of construction debris in 1380. Studies show that construction debris accounts for 50% of the total waste materials in the world, and in the European Union, 500 kg of construction wastes is produced per person annually (Oikonomou, 2005).

Researches have been undertaken in related industries, universities, technology park centers etc. to achieve a scientific and operational approach for recycling residues and how to turn them into new and proposed materials. It should be noted that this is more important in the development of recycled products to be transformed into new products. This is currently being implemented in many advanced countries, such as Germany, Australia, the United States, Canada, due to severe resources and landfills constraints. (MajediArdakani, 2012).

Training people involved: Nowadays, in many developed countries, courses are being held by respective organizations for training people involved in construction field [authorities]. These courses are based on the use of more recyclable materials, how to recycle, and the steps they must carry out such as separation, etc., as well as the use of a variety of recycled materials in design, construction and demolition sectors. This can greatly facilitate the implementation of the process.

Formulating quality control standards and implementation of residues recycling to produce applicable building materials and concrete: Currently, in many countries of the world, standards and guidelines for recycling construction debris have been formulated and made available to relevant authorities. (MajediArdakani, 2012).

Designing and developing systems for collecting, separating and transporting construction debris by the use and participation of private industries and municipalities and related material producing factories: Currently, some of these equipment, such as equipment and recycling line of aggregates resulting from demolition has been designed and used in many advanced countries. Therefore it also is worthy to realize recycling of other building materials and wastes through researches and investment by domestic researchers. However, this is currently being done, very limited, and just in the