Sample Translation

Civil Engineering

- See below for the original Chinese manuscript.
- **A native-speaker of English who has studied civil engineering** proofreads the translated English.
- The quality of the translated manuscript is suitable for publication in an international journal.

The Effect of High Temperature on Recycled Concrete

1. Introduction

Most of the buildings in Taiwan are constructed of concrete. Even so, lives and assets are lost to fires. Apart from blemishing the outer appearance of buildings, fire chemically and physically compromises concrete structures. It is important, therefore, to perform a safety assessment of concrete structures after fire and to understand the behavior of concrete at high temperature.

There is a vast body of literature about the fire resistivity of concrete. In recent years, especially in the aftermath of the “921 Earthquake”, an enormous amount of scrap from demolished buildings, most of which is waste concrete, has been generated. Increasing levels of awareness about environmental protection have meant that recycling is now favored over disposal to landfill and accordingly, the effective recycle of waste concrete would be of great help to the environment.

Previous studies show that recycled concrete tends to have lower elastic modulus, higher porosity, lower strength and lower durability than new concrete. Recycled concrete also differs from natural aggregate concrete in terms of fire resistivity and mechanical behavior after fire. There is little current literature on the fire resistivity of recycled concrete, which makes this study necessary.

2. Experimental Materials and Program

2.1 Experimental Materials

Here is a list of materials adopted by this study:

1. Conventional cement: Portland cement type I from Taiwan Cement Corporation with a density of 3.15;
2. Natural coarse aggregates: broken stone provided by Concrete Mixing Plant located in Lujou, Taipei.
3. Waste concrete from laboratory: waste concrete that was derived from the Concrete Laboratory, Department of Construction Engineering of National Taiwan University of Science and Technology with its original crushing strength of 3000 ~5000 psi.
4. Demolition waste from construction sites: provided by a construction materials resource disposal unit in Linkou, Taipei.

再生混凝土高温性能研究

一． 前言

在台湾，建筑物大多由钢筋混凝土建造。由于天灾或者人为疏忽而发生的火灾，除了造成个人生命及财产损失之外，对社会安定也会有相当大的影响。对于建筑物本身而言，混凝土结构的建筑在经受火灾之后，除外观会遭受破坏之外，其结构整体性能也会被严重损坏。因此对火灾后的混凝土结构建筑进行安全评估和混凝土受高温之后的性能分析已经显得十分重要。

国内外已有很多关于混凝土耐火性能的研究成果。但是近年来，随着大家环保意识的提高，以及921 大地震发生之后，产生了大量的建筑拆除废料，其中废弃的混凝土占绝大多数。如果对于这些任意抛弃的混凝土废料处置不当将会导致严重的环境污染。因此，有效地回收废弃混凝土用于再生混凝土的搅拌，则有助于解决环保问题。

以往研究结果显示，用建筑拆除废料或者回收的混凝土废料搅拌的混凝土（以下简称再生混凝土）的工程性能较差。比如，相同的配合比下，再生混凝土的弹性模数较小，孔隙率较大，尤其是强度及耐久性较差，在耐火性能以及经受火灾后的力学性能上也与天然配料的混凝土存在差异。目前有关再生混凝土性能的研究仍然很缺乏，当今时日，火灾依旧是无法避免发生的，因此有必要开始进行再生混凝土耐火性能的研究。

二． 试验材料与试验过程

2.1 试验材料

本研究中所使用的材料如下：

1. 普通水泥：采用台湾水泥公司生产的波特兰水泥第一型水泥，比重为 3.15。
2. 中（粗）砂：采用台北县芦洲市某混凝土拌合场提供的碎石。
3. 试验室废弃混凝土：采取自台湾科技大学建筑工程系混凝土试验室，其原始抗压强度在3000~5000psi 之间。
4. 工地拆除废料：由台北县林口乡某建筑工程土石方资源处理所提供。