

Standardization for Environmental Management of Concrete and Concrete Structures



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1. INTRODUCTION

The environmental issue has now become a most crucial and serious problem for the continued existence of humankind. The earth's resources and energy have been consumed in great quantities by the rapid industrialization and population growth over a span of more than two hundred years since the industrial revolution, resulting in global environment changes that humankind have never experienced. Fortunately, the humankind has clearly recognized the nature of the problem, creating a concept of "sustainable development," which may be regarded as an environmental revolution. This concept means development that meets the needs of not only the present but also future generations while radically renouncing the conventional economic values--mass production, mass consumption, and mass disposal. In the 21st Century, incorporation of the concept of sustainability will be required for all social, economic, and cultural activities. Concrete is used in abundance for buildings and civil structures. Among the 10 billion ton annual concrete production worldwide, the cement production accounts for 2 billion tons (this amount is expected to multiply two to three times in the future). The cement production generates massive amounts of CO₂ generation. The massiveness of the quantity of resources used for concrete is understood in consideration of the fact that the world's current annual material flow is approximately 26 billion tons. The resulting massive stock is ultimately demolished, and the disposal of the huge amount of concrete lumps places a heavy burden on the environment.

Therefore, we need to find a way to reduce environmental burdens in concrete/construction sector. One direction is to develop an international system for coping with such circumstances. In this seminar, the existing ISO environmental standards and a new activity of ISO/TC71/SC8 for developing ISO environmental standards for concrete and concrete structures are described.

2. EXISTING ISO ENVIRONMENTAL STANDARDS

ISO has already published environmental standards, ISO 14000 series, which provide general rules related to methods of assessing environmental loads and the environmental declaration based on such assessment. Since these ISO standards primarily cover industrial products and services, ISO 15686-6 and ISO 21930 were developed to cover buildings, which have strong impacts on the environment. The former deals with the basic framework of the procedure for considering the environmental aspects of buildings, whereas the latter deals with that for issuing

environmental declaration regarding building products. ISO 15686-6 and ISO 21930 standards can be regarded as a family of ISO 14000 series but with special attention to buildings.

3. ISO ENVIRONMENTAL STANDARDS FOR CONCRETE AND CONCRETE STRUCTURES

It is obvious that there are no other materials than concrete as the substitutes. Therefore, there is an urgent need to develop the system and technology for the reduction of environmental impacts as the concrete and construction sector. Based on the background, in the 14th ISO/TC71 Plenary Meeting in Brazil, ISO/TC71 agreed to establish a new subcommittee ISO/TC71/SC8 with the purpose to develop the standards on “Environmental Management for Concrete and Concrete structures.” The aim is to take the existing ISO framework environmental standards and provides concrete specific standards and information. The consistence with the existing ISO environmental standards, such as ISO 14000 family, ISO 15686-6 and ISO 21930 is thoroughly kept in the same way that the standards developed in ISO/TC71 aligned with those developed in ISO/TC59 and ISO/TC98. In other words, ISO/TC71/SC8 will develop the standards from the point of view on how the existing ISO environmental standards are specialized to concrete and concrete structures, how to consider the concrete-related environmental aspects in selection of raw materials, concrete production, execution, maintenance and demolition of concrete structures, reuse and recycling of concrete and also how to incorporate the environmental design into concrete industry.

Currently, the following standards are considered to be developed in ISO/TC71/SC8.

ISO XXXXX: Environmental management for concrete and concrete structures

Part 1 – General principles for environmental considerations

Part 2 – Preparation of inventory unit data and system boundaries

Part 3 – Materials and concrete production

Part 4 – Execution of concrete structures

Part 5 – Maintenance of concrete structures

Part 6 – Demolition and reuse of concrete structures

Part 7 – Recycling of concrete

Part 8 – Environmental labels and declarations of concrete and concrete structures

Part 9 – Environmental design of concrete structures

4. CONCLUDING REMARKS

The world’s cement production will reach 4 to 6 billion tons within the next few decades. It means that 3.5 to 5.2 billion tons of CO₂ will be generated in addition to CO₂ and other environmental impacts from construction activities. The G8 Hokkaido Toyako Summit will be held in Japan on July 7-9, 2008, in which the framework of global warming gases reduction approaches after the Kyoto Protocol will be discussed. It is predicted that at this meeting, numerical targets will be established for the reduction of CO₂. Concrete/construction sector will not be exempted from the obligation. Therefore, it is very important and urgent to reduce concrete/construction-related environmental impacts by developing appropriate standards under the existing framework of ISO Standards on the environment. The purpose of imitating work on the development of ISO standards for the concrete industry is the “the promotion of environment-conscious activities in concrete industry” and this is likely to lead to all industries. In order to initiate and accelerate sustainable development in the concrete/construction sector, there is an urgent need to imitate this effort on a global platform such as ISO/TC71/SC8.