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Environmental management for concrete and concrete structures —

Part 6: Use of concrete structures

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Foreword

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Introduction

With their extremely long period of use and large size compared with other industrial products, concrete structures undergo damage and deterioration during this period due to a variety of mechanical and environmental actions. Maintenance/remedial activities are therefore carried out during this period of use to maintain their functions and performances. Remedial activities can also be carried out to enhance their functions and performances to adapt to changes in the social circumstances. These activities cause environmental impacts, such as input of resources including repair materials and fuels, greenhouse gas emissions including CO_2, and waste disposal including construction wastewater and concrete rubble. Therefore, environmental management related to maintenance/remedial activities during the period of use of concrete structures is necessary.

For a concrete building, the energy consumed during the period of its use is known to be greater than the energy consumed for activities such as the production of raw materials, production/transportation of concrete, and construction/demolition of the building. Energy consumption for air conditioning, lighting, etc., and the concomitant emission of greenhouse gas are particularly enormous. Though the ISO 13315 series does not directly cover energy efficiency of air conditioning and lighting equipment, it covers the case where reduction in the environmental impacts, such as reduction of energy consumption, is achieved by utilizing the properties of concrete. This include, for instance, mitigation of room temperature changes by the thermal mass property of concrete. It also includes the use of pervious concrete to suppress the heat island phenomenon, which reduces the energy consumption for air conditioning, with the concomitant reduction in the emission of greenhouse gas. On the other hand, hazardous substances can leach or radiate from concrete during the period of use of concrete structures. Therefore, appropriate management of such various environmental influences generated during the period of use of concrete structures is also necessary.