Committee Report: JCI-TC191A Technical Committee on Inspection and Assessment of Concrete by Neutron Beam

委員会報告：JCI-TC191A 中性子線を用いたコンクリートの検査・診断に関する研究委員会

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Abstract
In recent years, studies have been conducted to apply neutron beams to concrete, as they have stronger permeability than X-rays. They enable to obtain important information related to the soundness of concrete structures, as (1) observation of water transport over time, (2) detection of internal defects (penetrated water and voids), and (3) non-destructive measurement of chloride, etc., can be conducted quantitatively with them. The purpose of the activity of this committee was to utilize neutron beams as (1) a screening technique of deformed parts of concrete structures, (2) an assessment technique of quality, deterioration, and damage state of concrete, and (3) to prepare scenarios of maintenance systems of concrete structures based on the results.

1. Introduction
Concrete structures constitute numerous infrastructures and are so important for people living on them. A reason for the extensive use of concrete structures is their high durability when properly designed and constructed. However, there are several cases of rapid deterioration, a large number of the structures constructed in the high growth period are aging all at once, and the importance of maintenance of structures has been recognized. The situation is similar in the buildings, and considering that reinforced concrete (RC) and steel reinforced concrete structures have a long service life, they are expected to compose a large share of the housing stock in the future.
Technological improvement of the inspection and assessment for maintaining these enormous social capital stock and buildings, and efficiency improvement and upgrading of the inspection technique, have become critical issues. To prevent accidents, minimize the life cycle cost of structures through preventive maintenance, and prevent the deterioration of asset values under severe financial conditions and the decrease in the number of skilled engineers, the efficiency and sophistication of detailed investigations is expected to be improved through technical support using new technologies such as non-destructive investigations and the development of technologies for detailed investigations.
Under such circumstances, attempts have been made to investigate the condition of concrete using neutron beams. Neutron beams have stronger permeability.....

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