Committee Report: JCI-TC192A
Technical Committee on Construction of Concrete Structures Based on 3D Printing Technologies with Cementitious Materials

委員会報告：JCI-TC192A
3Dプリンティングによるコンクリート構造物構築に関する研究委員会

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Abstract
The technical committee has deployed a wide range of activities focusing on three-dimensional (3D) printing technology for construction, which has been remarkably developed in recent years, with the aim of improving the technological base for development and propagation in Japan and providing information transmission and motivation as a next-generation concrete technology. Specifically, the following aspects were addressed: collection of the latest technical information and utilization cases in Japan and overseas, identification of required performance and research subjects, execution of common tests using 3D printers by various organizations, examinations oriented on the unification of related terminology, holding of workshops and exchanges of opinions, and preparation of a detailed technology development roadmap, etc. This report outlines the results of these activities and describes the prospects of this technology.

1. Introduction
Technological developments to innovate in the construction and production systems of concrete structures have been vigorously promoted in foreign countries. In this regard, the three-dimensional (3D) printing technology, which has been applied in the construction field, does not require formworks, can directly manufacture various shapes, has the potential to improve productivity with labor saving and shortening of construction periods, rationalize the design and reduce weight through structural optimization, as well as provide high value-added technologies and services to meet diverse needs.

In foreign countries, research and development has been promoted, mainly on RILEM, ACI, etc., and some examples of applications to actual structures have already been reported. However, there are still many technical problems to be solved for full-scale practical application, such as identification of workable material properties, materials development for realizing required performance, and methods for ensuring durability and structural safety.

In response to this situation, there have been concerns about delays in our efforts in Japan. Therefore, to integrate knowledge in the fields of architecture,.....

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