

Subcommittee 263

Structural Intervention of Existing Structures using Cement-based Materials

Background

New guidelines, “Guidelines for Structural Intervention of Existing Concrete Structures Using Cement-Based Materials,” were published by the Japan Society of Civil Engineers (JSCE) in June 2018. They are the revised edition of previous JSCE guidelines for the intervention of existing concrete structures issued in 1999, which were the first strengthening-related guidelines. They have been selling well since its publication, in part because there were no similar guidelines. As technology advanced, however, the need arose to update the content.

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Subcommittee 263 (Chairman: Prof. Tamon Ueda, Hokkaido University.) on Structural Intervention of Existing Structures using Cement-based Materials was set up in the JSCE Concrete Committee in December 2016 at the request of a group of 27 construction companies and associations utilizing the overlaying method. The purpose was to create guidelines covering the latest knowledge. The subcommittee consists of experts from the private sector, government, and academia. It has 47 members and executive members from the entrusting companies. The subcommittee has three internal working groups that are in charge of top-surface overlaying (**Fig.1**), bottom-surface overlaying (**Fig.2**) and jacketing (**Fig.3**) which are covered in the guidelines, as well as a common working group that deals with items common to all three of these methods.



Fig. 1. Top-surface overlaying method



Fig. 2. Bottom-surface overlaying method

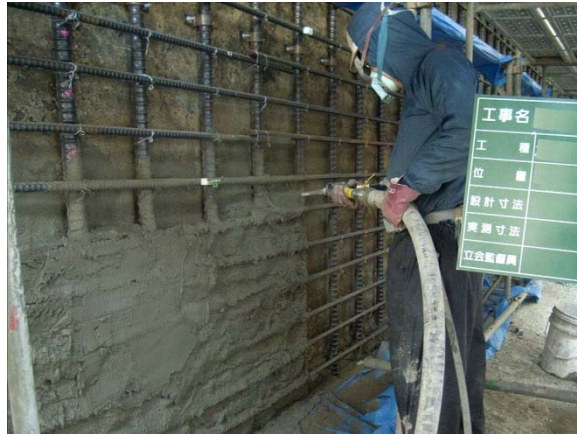


Fig. 3. Concrete jacketing method

Outline of the Guidelines

Fig. 4 is a general flowchart of the maintenance of existing concrete structures and the positioning of the guidelines for structural intervention. If it is decided to conduct intervention work for the target existing concrete structure, the guidelines are used. The guidelines are composed of the part that states the principle of structural intervention and the manual of intervention methods. In the Principles part of the guideline, the basic principles of intervention that are common with any intervention methods are presented in accordance with the general flow of intervention. Following the Principles is the manual for specific intervention methods using cementitious materials. The guidelines cover the overlaying and jacketing methods using mortar, including polymer cementitious mortar (PCM), and concrete, and consists of the Common, Top-Surface Overlaying, Bottom-Surface Overlaying and Jacketing sections. In addition, the “Standard for Intervention of Structures” has been established. This standard document is expected to serve as a common standard for other intervention methods for concrete structures. Furthermore, the appendices describe the state-of-the-art of the three construction methods covered by the guidelines, typical examples of construction work, and design examples, including specific methods of verifying performance.

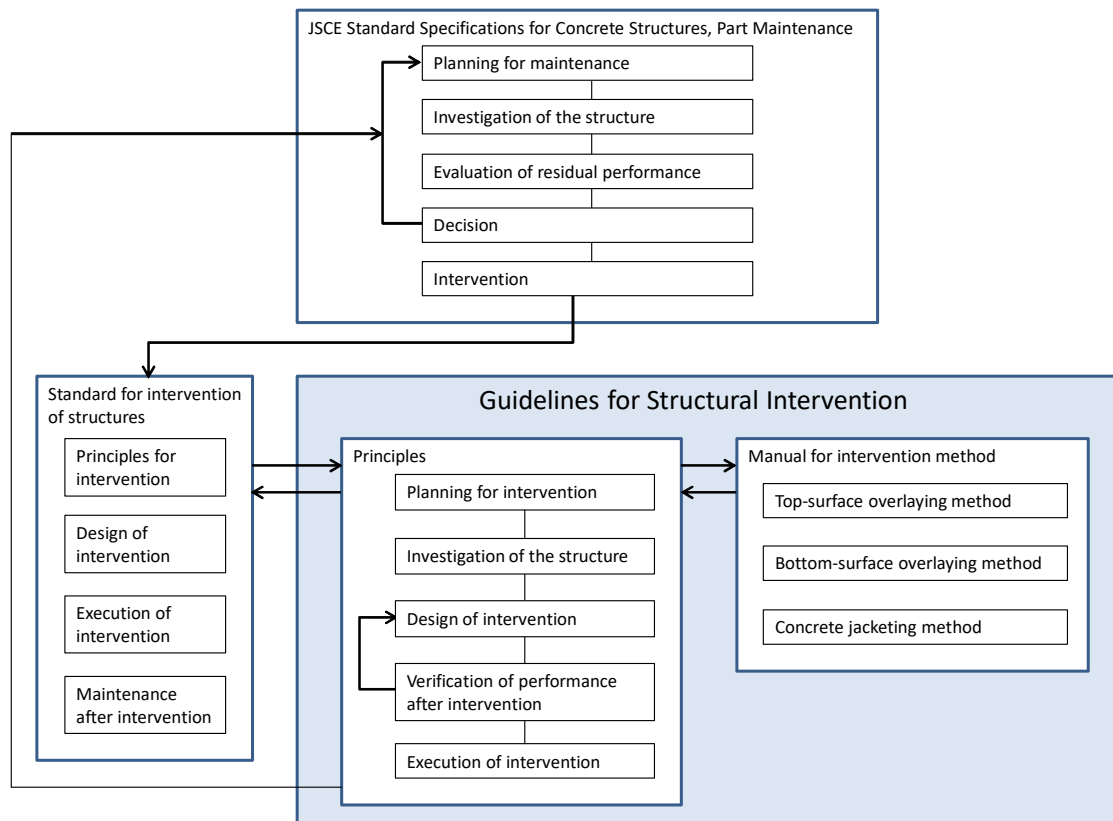


Fig. 4. Flowchart of the maintenance of concrete structures and the positioning of the guidelines for structural intervention

Characteristics of the Guidelines

The features of the guidelines can be summarized as follows: 1) Support for new materials (e.g., PCM); 2) improvement of content based on the track record of the application (e.g., specifications for ensuring integrity in top-surface overlaying); 3) introduction of new verification methods (e.g., verification of crack width and peeling in bottom-surface overlaying); and 4) response to the revision of higher-level standard specifications for concrete structures. The intervention methods using cement-based materials that are covered herein basically are intended to restore or improve mechanical performance. Since these methods are also expected to improve durability, however, the guidelines take this into consideration as well. The new guidelines include recent advances in structural intervention as well as provide a unified methodology for verifying the performance of new structures.