Committee Report: JCI-TC161A Technical Committee on The Calculation Method for The Flexural Strength of Reinforced Concrete Shear Walls

委員会報告：JCI-TC161A 鉄筋コンクリート造壁部材の曲げ終局強度算定法に関する研究委員会

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Abstract
This report is a summary of the activities of the “Technical Committee on The Calculation Method for The Flexural Strength of Reinforced Concrete Shear Walls” established by the Japan Concrete Institute from 2016 to 2017. There are certain cases in which it is not possible to properly calculate the ultimate flexural strength of a reinforced concrete wall with the current simplified formulas, owing to the effects of shear force acting on the wall. Furthermore, we have found that the ultimate flexural strength decreases significantly in a perforated wall compared to an imperforate wall owing to the effects of the openings. The purpose of this technical committee is to identify the factors by which the real strength cannot be handled with the present calculation formulas, investigate methods by which they may be addressed, and propose an estimation method accounting for openings. To achieve this purpose, the committee surveyed the present state of design methods for wall members, particularly their bending behavior, and conducted an FEM analysis of selected test specimens. The committee then proposed an estimation method based upon the results of this analysis. This report summarizes the committee’s investigative results.

1. Introduction
Methods to evaluate the ultimate strength of members, including their flexural strength, shear strength, and bond strength, are indispensable in designing reinforced concrete (hereinafter, RC) structures. Of these, a theoretical approach is applicable to the flexural strength. It is believed that by using a flexural analysis of a plane cross-section or approximate calculation techniques based on it, it may be possible to achieve a more accurate evaluation than before. However, in recent years, there has been an emerging recognition of the fact that the flexural strength can occasionally not be adequately evaluated with these techniques. This tendency is particularly noted in the case of wall members. In addition, wall members sometimes have openings, in which case evaluating the flexural strength is difficult.

The purpose of this technical committee (Chairman: Professor Daisuke Kato, Niigata University) is to use RC wall members to identify problems in the present estimation methods for the ultimate flexural strength as noted above, and propose a simplified evaluation formula that can resolve these problems. Table 1 shows the members of this technical committee.

In the case of an imperforate wall member, the following three points are thought to be reasons why adequately accurate evaluation is not possible.....

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