

Committee Report: JCI-TC143A

Technical Committee on Comprehensive Verification Methods for Shear Action in Concrete Structures

委員会報告：JCI-TC143A コンクリート構造のせん断力に対する包括的照査技術研究委員会

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Abstract

The shear failure of reinforced concrete structures is a failure mode of great significance for designing safe and rational structures, and the investigation of the shear carrying mechanism and the accuracy increase of the shear strength calculation methods have been considered as major themes of research in the concrete structure field. This technical committee reviewed the results of researches conducted on the shear issues in recent years, and carried out a research study aiming to provide information that will contribute to the enhancement of the methods for verifying shear of reinforced concrete structures. Particularly, the committee organized the design/verification formulas for the shear force, and explored the possibility of establishing a new verification formula in civil and building engineering, and attempted to evaluate the shear failure behavior of concrete structures using nonlinear numerical analysis techniques.

1. Introduction

After the proposal of Truss theory by Ritter in 1899, active researches have been performed on the shear failure of the reinforced concrete structure both inside and outside of Japan, accompanied by proposals of numerous experimental formulas and semi-theoretical formulas, and numerical analytical studies have been carried out. In Japan, the “JCI Colloquium on Shear Analysis of RC Structures” held by the Japan Concrete Institute in June, 1982 activated the researches in both construction and civil engineering fields. In October, 1983, the “2nd JCI Colloquium on Shear Analysis of RC Structures” was held, and in December, 1984,

the “Colloquium on Finite Element Analysis of RC Structures” was held. Japan Society of Civil Engineers established the “Standard Specifications for Concrete Structures, Design” as a compilation of these efforts in October, 1986, to propose a shear strength calculation method for beam members where the impact of the size effect has been incorporated based on experiments. On the other hand, the Architectural Institute of Japan compiled “Design Guidelines for Earthquake Resistant Reinforced Concrete Buildings Based on Ultimate Strength Concept (Draft)” in November, 1988, to propose a shear design method that divides.....