Developing a Method for Evaluating the Seismic Performance of CES Structural Buildings

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1. Objective

This project is aimed at:

the development of Concrete Encased Steel (CES) structures with high seismic performance and excellent construction performance. CES composite structural systems are a new structural type composed of steel and fiber-reinforced concrete. We have continued to research and develop CES columns, beams, beam-column joints and shear walls. For the structural design of CES buildings, the response and limit strength will be calculated by applying the static incremental analysis and the equivalent linearization methods that are based on the latest research results of CES members. In this project, we will develop a modeling method for CES buildings that is required for static incremental analysis. In addition, we will verify the accuracy of the equivalent linearization method and develop a structural performance evaluation method for CES buildings.

2. Project Outline

To that end, the project will consist of the following phases:

(a) Structural design of medium-rise and high-rise CES building.
(b) Proposal of a structural analysis model for CES members.
(c) Comparison of response evaluation for CES building by static analysis and dynamic analysis.
(d) Proposal of a method to calculate response and limit strength.
(e) If possible, presentation of analysis method for CES building including foundations.

3. Expected Performance

In this project, the successful candidate would be expected to:

(a) Perform the most important analysis for CES building in this research project.
(b) Take the initiative in the structural testing of CES members.

4. Required Skills and Knowledge

The successful candidate for this project will have the following knowledge and skills:

(a) Basic knowledge of structural mechanics, reinforced concrete structures and vibrations.

References

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4. Suguru Suzuki, et al.: Restoring Force Characteristics Model of CES Shear Walls, Proceedings of 11th Canadian Conference on Earthquake Engineering, Paper ID 93798, 2015.7

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