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An experimental and analysis study on vibration control devices called as hybrid scaling-frame

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The innovated vibration control device called as "Scaling Frame" (SF) structure is proposed by the author. SF structure consists of beam-column frame, diagonal bracing, and SF device (SFD) made of Aluminum or Steel. Vibration energy is absorbed by plastic behavior of diagonal deformation of SFD. SF structure has been already adopted for low-rise wooden buildings in Japan. In this study, SF structure is assumed to apply on multi-story steel frames, that is, in which high strength and rigidity are required. So then, a hybrid SFD (HSFD) which consist of various shapes of SFD is developed herein. Also, to clarify the fundamental restoring force characteristics of HSFD, horizontal static cyclic loading test is conducted. From tests results, it is confirmed that the rigidity and strength of devices is expressed in the sum of each SFD which constitutes HSFD, and the stable hysteresis behavior is presented. It means that the strength and rigidity can be adjusted easily by combination of SFD. Furthermore, the analytical study is done by use of restoring force characteristics model of each shapes of SFD. From the comparison between test results and analysis results, it is observed that the proposed analytical model of HSFD can pursue the test result during cyclic loading well. Also, by use of various types of SFD in substitution for normal type of SFD, it is possible to decreas the number of necessary device more.

Biography

Hideaki Azu took the Bachelor's degree at Department of Architect in Tokyo University of Science, Tokyo, in 2015. He is now a Master's course student of Tokyo University of Science. His research interest includes vibration control structure called as scaling-frame structure proposed by the author, Donghang Wu.

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