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種別(和文)	論文要旨
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（博士課程）
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論 文 要 旨

THESIS SUMMARY

系・コース： Department of, Graduate major in	建築学 都市・環境学	系 コース	申請学位（専攻分野）： Academic Degree Requested	博士 Doctor of	（ 工 学 ）
学生氏名： Student's Name	鄭 皓文		指導教員（主）： Academic Supervisor(main)	吉敷 祥一	
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要旨（英文 800 語程度）
Thesis Summary（approx.800 English Words ）

U-shaped steel damper is a type of energy dissipation device that is widely applied in the design practice of base-isolated structures in Japan. Owing to excessive reliance on numerical simulations, the lack of a precision verification approach significantly restricts the use of the previously reported cumulative damage evaluation method. A precision verification approach of the previously discussed cumulative damage evaluation method and a quick inspection method of U-shaped steel dampers are discussed in the present study.

Chapter 1 is a brief introduction to the history of seismic isolation technology and the development of energy dissipation devices. Previous studies on the cumulative damage evaluation are summarized in this chapter as well. A deformation behavior evaluation method of U-shaped steel dampers under in-plane excitation is composed in chapter 2 based on the experimental results of a series of dynamic cyclic loading tests. Cumulative damage of U-shaped steel dampers is indicated to be tightly correlated to the residual plastic deformation caused by cyclic loading. In chapter 3, an evaluation method residual plastic deformation-cumulative damage relationship of U-shaped steel dampers loaded under complicated loading histories is proposed and the previously reported method is complemented with a simple and feasible precision verification approach. Rearranging the loading cycles in ascending order of deformation amplitudes is proven to be an effective approach for predicting the deformation behavior of the dampers loaded under complicated loading histories. The process of investigating the effect of the dynamic properties of structures and seismic excitations on the residual plastic deformation-cumulative damage evaluation is significantly simplified by introducing an indicator named equivalent deformation amplitude in chapter 4. It is indicated in time-history analysis that the value of equivalent deformation amplitude tightly correlates to the maximum displacement experienced by the dampers and the signification duration of ground motion. Consequently, a quick inspection of U-shaped steel dampers is achieved through the measured value of residual plastic deformation and simulating that the damper is loaded under constant deformation amplitude with γ_t equals equivalent deformation amplitude.

The main conclusions were summarized in chapter 5. A quick inspection method of U-shaped steel dampers and a precision verification approach of the previously discussed cumulative damage evaluation method are developed in the present study.

備考 ： 論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。
Note : Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1copy of 800 Words (English).

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