論文 / 著書情報
Article / Book Information

題目(和文)	
Title(English)	Equivalent SDOF model for estimating wind-induced energy dissipation and responses of base-isolated tall buildings
著者(和文)	銭暁鑫
Author(English)	Xiaoxin Qian
出典(和文)	学位:博士(学術), 学位授与機関:東京工業大学, 報告番号:甲第12939号, 授与年月日:2024年9月20日, 学位の種別:課程博士, 審査員:佐藤 大樹,山中 浩明,盛川 仁,石原 直,吉敷 祥一
Citation(English)	Degree:Doctor (Academic), Conferring organization: Tokyo Institute of Technology, Report number:甲第12939号, Conferred date:2024/9/20, Degree Type:Course doctor, Examiner:,,,,
学位種別(和文)	博士論文
Category(English)	Doctoral Thesis
種別(和文)	要約
Type(English)	Outline

This study proposes a novel approach, the equivalent single-degree-of-freedom (ES) model, to accurately and efficiently estimate the wind-induced energy dissipation and responses of base-isolated tall buildings. Validation of the ES model is demonstrated through time history analyses of base-isolated tall buildings, considering several values of structural parameters. Comparative analysis between the newly-proposed ES model and the commonly-used multi-degree-of-freedom (MDOF) model shows that the ES model has accurate estimation of (i) energy input, (ii) energy dissipation (including steel-damper, oil-damper, and upper-structure energy dissipation), and (iii) responses (including standard deviation of the isolation layer deformation, maximum and residual deformation of the isolation layer, and maximum displacement distribution of the upper structure. These findings suggest that structural engineers can practically use the ES model to accurately and efficiently estimate the energy dissipation and responses in the initial stage of wind-resistant design for base-isolated tall buildings.