Dynamic collapse analysis for elasto-plastic behaviors of the steel frame under seismic loads using ASI-Gauss technique

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In this study, a finite element code for the collapse analysis of steel frame under seismic loads using ASI-Gauss technique [1] is produced. The technique is a modified version of the formerly developed Adaptively Shifted Integration (ASI) technique for the linear Timoshenko beam element. Several analyses on the elasto-plastic behaviors of two small steel frames under seismic loads (JMA-Kobe) are conducted. The calculated results certify the validity of the proposed analytical method.
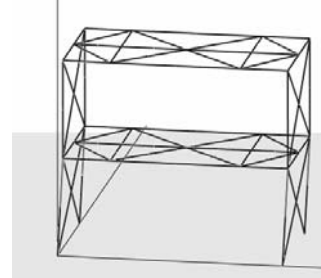
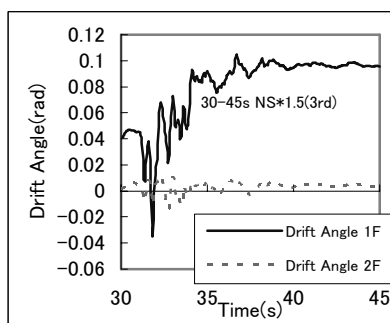*Keywords* :   Timoshenko Beam, Non-linear FEM, ASI-Gauss Technique, Steel Frame
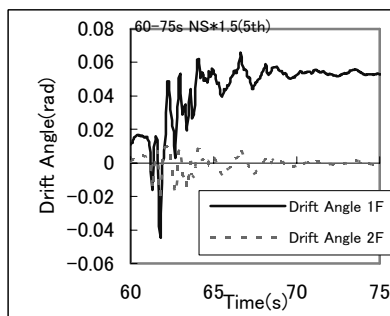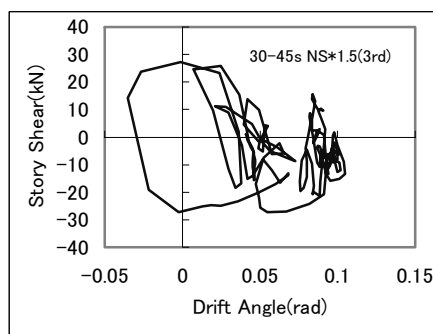
(a) model(1)
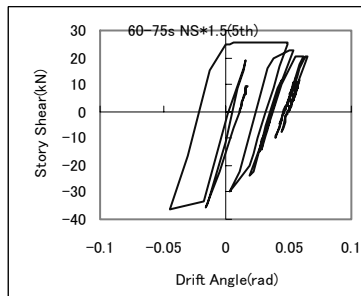
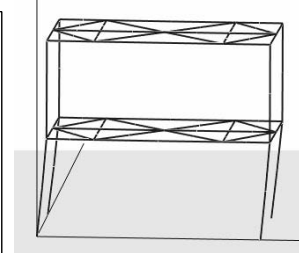(a) model(1)

(a) model(1) with vertical brace

(b)model(2)

Fig.1 Dynamic response of drift angle

(b)model(2)

Fig.2 Story shear and 1F drift angle relation

(b)model(2) without vertical brace

Fig.3 Deformed steel fame model

Reference

[1] D. Isobe and K.M. Lynn, A Finite Element Code for Structural Collapse Analyses of Framed Structures under Impact Loads, *Proc. 4th European Congress on Computational Methods in Applied Sciences and Engineering ECCOMAS 2004*, Jyvaskyla, Finland, 2004.