Ain Shams University
Faculty of Engineering
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Nonlinear analysis of shear wall converted to braced frame under earthquake loading

A Thesis Submitted in partial fulfillment for the requirements of
The degree of
Master of Science in Civil Engineering

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Civil Engineering (Structural).

The work included in this thesis was carried out by the author in the Department of structural engineering, Faculty of engineer, Ain Shams University.

No part of this thesis has been submitted for a degree or qualification at other university or institution.

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ABSTRACT

The objective of this research work is to study the shear wall converted to steel braced frame under seismic loads. The behavior of shear walls and braced frames was analyzed using nonlinear static analysis by nonlinear finite element analysis. A parametric study was performed to assess the effect of building height, location of the system, amount of reinforcement, and the fundamental time of the structure on the structural elements capacity.

Shear walls converted to braced frame in top stories were studied by nonlinear static analysis, which uses displacement based design method which depends on element nonlinear behavior to calculate the effective stress and strain which effect on total displacement of the building. The results are presented and show that shear walls can be replaced with braced frame until reaching the buckling load for the steel member. A comparison is created for story drift values with various structural codes.

Key Words: Pushover analysis; Nonlinear static analysis; Shear walls; Earthquake loading; Capacity curve; Braced frame; Base shear; Displacement.

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