

Study on applicability of OpenSees for Structural Analysis

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Abstract

Objectives

There are various commercial softwares for seismic analysis of structures using finite element analysis. Most of them are costly and does not provide flexible environment for the researchers. OpenSees is an object-oriented framework for finite element analysis. This research is done to study the use of OpenSees and to find out the merits of OpenSees over the commercial software.

Method

Seismic analysis of various truss, beam, column, frame and 3D structure are done using OpenSees. Various element and algorithms of various researchers are used and results are compared. Simple truss structure is modeled and static analysis is done using OpenSees and Ansys. Similarly, beam structure is modeled using various quad element and results are compared. In the same way, simple 2D and 3D frame structure are modeled and both static pushover and dynamic seismic analysis is conducted.

Conclusion

OpenSees is found to be very useful object-oriented framework for finite element analysis. There is a wide range of solution procedures and algorithms that the user can adapt to solve difficult nonlinear problems for static and dynamic loads. Results of the analysis of truss using OpenSees and Ansys are found to be same. Similarly, the result of the analysis of beam structure using various quad elements is found to vary to some extent. In the same way, the result of pushover analysis and dynamic seismic analysis are found to be as expected. Compared to other software, OpenSees does not have good GUI (Graphic User Interface), but new applications of OpenSees are under development which would make analysis easier in future. OpenSees provides platform for the researchers from around the world to work together for the development of earthquake engineering.

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