

## Evaluation and Comparison of Seismic Performance of Structural Trusses under Cyclic Loading with Finite Element Method

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**Abstract :** The structure is made using different members and combining them with each other. These members are basically based on technical and engineering principles and are combined in different ways and have their own unique effects on the building. Trusses are one of the most common and important members of the structure, accounting for a large percentage of the power transmission structure in the building. Different types of trusses are based on structural needs and evaluating and making complete comparisons between them is one of the most important engineering analyses. In the present study, four types of trusses have been studied; 1) Howe truss, 2) Pratt truss, 3) k truss, and 4) warren truss, under cyclic loading for 80 seconds. The trusses are modeled in 3d using  $A36$  steel. The results showed that Howe trusses had higher values than all other trusses (k, Pratt and Warren) in all the studied indicators. Indicators examined in the study include; 1) von Mises stresses, 2) displacement, 3) support force, 4) velocity, 5) acceleration, 6) capacity (hysteresis curve) and 7) energy diagram. Pratt truss in indicators; Mises stress, displacement, energy have the least amount compared to other trusses. K truss in indicators; support force, speed and acceleration are the lowest compared to other trusses.

**Keywords :** hawe truss, pratt truss, K truss, warren truss, cyclic loading, finite element method

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