BEHAVIOR OF STEEL SHEATHED CFS SHEAR WALL PANEL INFILLED STEEL FRAMES

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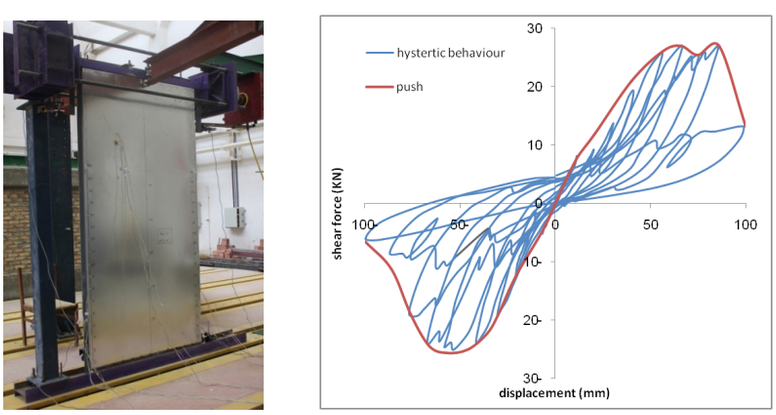
Decreasing the weight of the building is one of the important issues that must be considered in the seismic design of a building. Therefore the use of appropriate materials with low mass in construction is very useful.

In a general survey can be said that reducing the weight of the structural and non-structural elements of the building, reduces the dead load of the building. Reduction the weight of lateral force resisting systems such as shear walls, directly reduces the weight of the frame main members ie beam and column, which ultimately reduces the overall weight of building and the earthquake forces entered to the building be low.

The purpose of this paper is to introduce a lateral load resisting shear wall panel system using lightweight materials to improve seismic design of new buildings or rehabilitation of existing buildings. Light steel frame system (LSF), is one of the new building systems that have developed in recent years in the world. Cold-formed steel shear wall panel with steel sheathing is one of the lateral load-resisting systems in LSF structures. Among the advantages of this panel is lightweight and possibility of pre-fabrication.

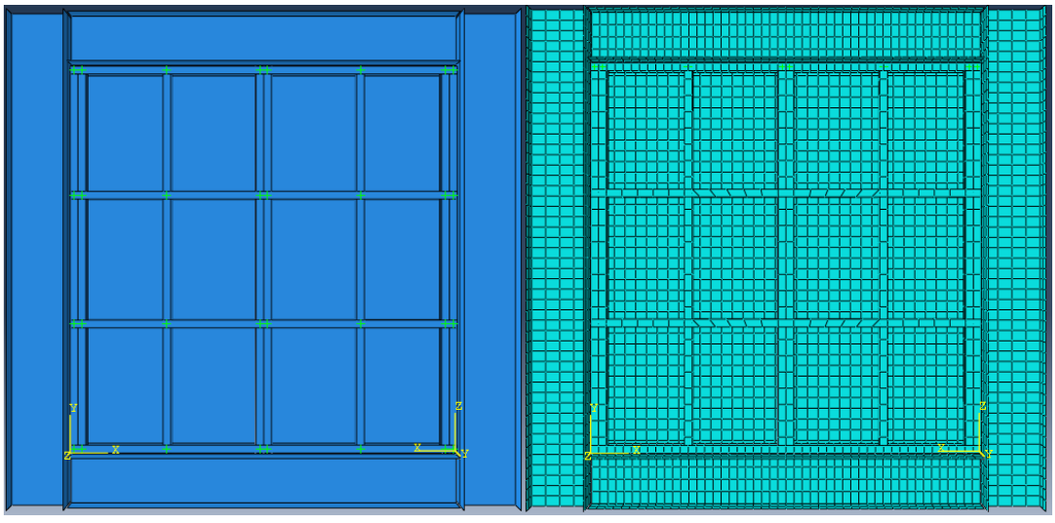
The objective of this paper is to use this type of CFS shear wall panels with steel sheathing as seismic force resisting system of the steel frame building. For this purpose to assess the performance of CFS shear wall panels with steel Sheathing, three samples of CFS shear wall panels were tested under cyclic loading. Shear strength of test specimens and the failure modes of them were examined carefully. A sample of steel sheathed CFS shear wall panels is shown in Figure 1(a). Hysteretic load-displacement curves for a sample of CFS shear wall panel is given in Figure 1(b).



(a) (b)

Figure 1. Steel-sheathed CFS shear wall, a) Panel set up, b) Hysteretic load-displacement behaviour

After laboratory examination of steel sheathed CFS shear wall panel behaviour in the following the numerical study of steel frame-steel sheathed CFS shear wall panel interaction will be discussed. A one story-one bay steel frame with steel sheathed CFS shear wall panel, has been modelled in finite element software ABAQUS. The Finite element model has been shown in Figure 2. The effect of steel sheathed CFS shear wall panel in shear strength and failure modes of steel frame will be examined using numerical analysis.



(a) (b)

Figure 2. Steel sheathed CFS shear wall panel infilled steel frame; a) Finite element model; b) Meshing

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