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# Numerical Investigation of Steel Sheathed Cold Formed Steel Shear Wall Under Cyclic Loading Using Abaqus

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## Abstract

Cold formed steel (CFS) is a general name for steel products that are treated at near room temperatures using cold-working methods. Wood, Gypsum board or OSB (Oriented Standard Board) sheathed shear walls, Strap braced walls, and steel sheathed shear walls are the most common CFS lateral framing systems used. There is limited research available on the seismic response of CFS shear walls. It is required to record and assess its lateral behavior at both the sub-system/member and system levels. The current study focuses on its behavior at system level subject to Monotonic and Cyclic Push. Commercially available Finite Element (FE) software, ABAQUS, is employed for numerical analysis of steel sheathed CFS shear wall. Structural members such as studs, tracks and sheathing are modeled using the shell elements. The effect of inelastic behavior of the screw connections modeled using Coupling constraint, MPC beam connector elements and SPRING2 elements on the overall numerical analysis has been compared. It has been observed that the Coupling Constraints underestimates the lateral strength vis-à-vis other modeling techniques. The lateral strength of the Steel sheathed CFS panel has also been compared for varying solution technique, screw spacing and material nonlinearity modelling techniques for CFS.

**Keywords:** Steel sheathed shear wall, Cold formed steel, Connection modeling, Loading protocols, ABAQUS