

عنوان مقاله:

Comparative Study on Shear Strength of Corrugated Steel Plate Shear Walls

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خلاصه مقاله:

Utilizing corrugated web plates in steel shear walls (CSPSWs) has led to the introduction of a novel lateral load bearing system in recent years. Greater shear buckling strength compared with flat plates, considerable in-plan and out-of-plane stiffnesses, enhancement of ductility and energy dissipation capacity of the system and turning up a smooth hysteresis behavior without any pinching are some the merits that come up with using corrugated plates in steel shear walls. Despite conducting thorough investigations upon the shear strength of corrugated steel plates utilized in the web of girders regarding theoretical and dimensional conditions of such a structural element, accuracy and reliability of these formulas have been unclear when used for CSPSWs. This paper presents an exhaustive study on formulas employed for determining the shear strength of corrugated steel plate girders if implemented for CSPSWs. To this end, following experimental verification of two finite element models of vertical and horizontal CSPSWs (V-CSPSW and H-CSPSW) subjected to a complete cyclic loading protocol, a comparison among H-CSPSW's shear buckling stress values acquired by previously developed formulas that are suitable for corrugated web plate girders, with the numerical and experimental shear buckling stress results will be drawn, so as to study the correctness and applicability of these formulas when utilized for shear walls. Obtained results reveal that due to fundamental differences in theoretical assumptions, dimensional and boundary conditions of girders with shear walls, these formulas underestimate the shear strength of H-CSPSWs. Consequently, developing new shear strength formulas for CSPSWs, regarding their theoretical and dimensional characteristics, should be sought in the future for the cost-effective design of shear walls.

کلمات کلیدی:

Steel plate shear wall, Corrugated web plate, Shear strength, Cyclic loading

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