International Journal of Engineering and Technology Innovation, vol. 9, no. 3, 2019, pp. 228-239

Performance of Steel-Concrete Shear Walls with Two-Sided Reinforced Concrete

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Received 03 November 2018; received in revised form 03 December 2018; accepted 02 January 2019

Abstract

This paper deals with the performance of Steel-Concrete Shear Walls (SCSWs) which have reinforced concrete on both sides of the steel plate subjected to cyclic loads. Finite element software ABAQUS is applied to analyze the SCSWs. Accuracy of the finite element modeling is verified by comparison of the theoretical results with those obtained experimentally. Then, various variables are studied in order to evaluate their effects on the performance of the SCSWs. These variables include thickness of concrete, steel plate thickness, number of bolts, gap size between reinforced concrete and steel frame, the percentage of reinforcement in reinforced concrete, and beam and column profiles of the steel frame. It is concluded that the change of the variables influences the ultimate load capacity, ductility, and energy dissipation of the SCSWs. Moreover, buckling of the walls is discussed.

Keywords: steel-concrete shear wall, cyclic load, finite element method, concrete thickness

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