

Effect of Wind Braces to Earthquake Resistance of Steel Structures

Authors : H. Gokdemir

Abstract : All structures are subject to vertical and lateral loads. Under these loads, structures make deformations and deformation values of structural elements mustn't exceed their capacity for structural stability. Especially, lateral loads cause critical deformations because of their random directions and magnitudes. Wind load is one of the lateral loads which can act in any direction and any magnitude. Although wind has nearly no effect on reinforced concrete structures, it must be considered for steel structures, roof systems and slender structures like minarets. Therefore, every structure must be able to resist wind loads acting parallel and perpendicular to any side. One of the effective methods for resisting lateral loads is assembling cross steel elements between columns which are called as wind bracing. These cross elements increases lateral rigidity of a structure and prevent exceeding of deformation capacity of the structural system. So, this means cross elements are also effective in resisting earthquake loads too. In this paper; Effects of wind bracing to earthquake resistance of structures are studied. Structure models (with and without wind bracing) are generated and these models are solved under both earthquake and wind loads with different seismic zone parameters. It is concluded by the calculations that; in low-seismic risk zones, wind bracing can easily resist earthquake loads and no additional reinforcement for earthquake loads is necessary. Similarly; in high-seismic risk zones, earthquake cross elements resist wind loads too.

Keywords : wind bracings, earthquake, steel structures, vertical and lateral loads

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