

An Experimental Investigation on the Ultimate Strength of Partially Infilled: Braced Steel Frames

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Abstract

Infilled walls are usually, considered as non-structural elements. However, these walls are effective in carrying lateral loads. In this regard, an experimental investigation was planned and conducted to study the effect of braced and partially infilled steel frames with cement mortar and concrete in comparison to the bare frames. All these frames were tested up to collapse and subjected only to horizontal loads to obtain an effective and possible solution for soft storey which are generally not infilled. In comparison to bare steel frames, partially infilled frames have an increase of lateral load capacity by 45–60%. Central bracing is more effective than that of the corner bracing. For the same load partially infilled frames have significantly less deflection than that of the bare frames. A reduced load factor is suggested for the design of soft storey columns with the partial infills. A mathematical model has been proposed to calculate the theoretical ultimate load for the braced, cement mortar and concrete partial infilled frames.