Research Paper

Effect of Steel Bracing on Ultimate Strength and Stiffness of Reinforced Concrete Frames.

Damodar Dubey Sh-k and Kute S.


Abstract
Infilled walls are normally 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 Reinforced Concrete (R.C.) frames in contrast to the bare frames. All these frames were tested up to collapse and subjected to only horizontal loads to obtain an efficient and probable solution for soft storey. In comparison to bare R.C. frames, steel braced R.C. frames have an increase by a notable amount for stiffness and ultimate lateral load capacity. Central braced system is additional effectual than that of corner and diagonal braced system. For the similar load braced R.C. frames have considerable less deflection than that of the bare R.C. frames. The contribution of central and diagonal bracing in comparison to corner bracing is observed to be 20% and 50% correspondingly. The percentage increase in stiffness for braced frames in comparison to bare R.C. frame is 71.1%, 139.6% and 111.4% consonantly.

**Keywords:** Central braced frame, Lateral load, Soft storey, Diagonal bracing, R.C. Frame, Stiffness.
Abstract

The research revealed that three major factors, such as reserved strength, ductility and structural redundancy affect the actual value of response modification factor (R). Those must be taken into consideration while determining appropriate ‘R’ for symmetric and asymmetric structures. The evaluation of ‘R’ is done by static-nonlinear analysis using ETABS. Also, ETABS is used to get the sequence and mechanism of plastic hinge formation. The procedure is validated by comparing results with Indian standard codal provisions for symmetrical structures and then those are evaluated for irregular structures. The ‘R’ calculated for symmetrical structure confirms evaluation procedure. Current Indian seismic design code never mentions about redundancy in structures. While irregularities in structural layout are punished, providing redundancy must be encouraged by the code. The values of ‘R’ for irregular structure varies. Hence a single value of R for all buildings of a given framing type, irrespective of plan and vertical geometry, cannot be justified.

Keywords: Response Modification Factor, Static Nonlinear Pushover Analysis, Regular And Irregular Structure, Plan Irregularity, Elevation Irregularity.
Abstract

Today, the use of helicopter as a fast and relatively safe facility has been expanded compared to other vehicles. To control the helicopter, different parts of it should cooperate well. Deficiency of each part leads to disruption of helicopter operation. Failure of tail rotor as one of the main parts of the helicopter, leads to failure of resistant torque of the helicopter and the helicopter loses normal landing ability. In this situation, running landing is suggested to the pilot. In this maneuver, expanded land is required, which is difficult to select in mountainous areas. In this study, energy absorption bed is used to reduce landing area and the distance traveled during landing. Different materials have been introduced for energy absorption bed, in this study one of the best and newest materials is applied, glass foam (sponge foam) and foamed concrete. Abacus finite element software was used for simulating helicopter landing on energy absorber bed. Helicopters with different weights and various asphalt and concrete landing bands were used to consider real situation. According to software analysis data, it was concluded that helicopters with high weight travel more distance than materials with higher elasticity module; the less the elasticity module of the bed, the more energy absorption power. In the case of lack of energy absorption bed, helicopter will stop after 1000 m, while the energy absorption bed reduces the distance to less than 100 m. Regarding the small dimensions of energy absorption bed, it has ability to be applied in mountainous area to show better performance in stopping the helicopter.

Keywords: Helicopter, Energy Absorption Bed, Glass Foam, Concrete Foam, Abacus, Finite Element