Evaluation of Seismic Performance of Existing RC Frame with Steel Haunch Retrofit

V. Sreevidya[1], S. Dharsana[2], D. Priyadarsini[3]

[1]Professor, Department of Civil Engineering, Sri Krishna college of Technology, Coimbatore, Tamil Nadu.
[2]Assistant Professor, Department of Civil Engineering, Sri Krishna college of Technology, Coimbatore, Tamil Nadu.
[3]Student, Department of Civil Engineering, Sri Krishna college of Technology, Coimbatore, Tamil Nadu.
20tpcv007@skct.edu.in

ABSTRACT

In framed structures, beam-column connections are exposed to lateral and uplift forces under seismic excitation, which create a weak link and cause bond failure. Proper reinforcement detailing in the joint region should be made to prevent this weak link. IS 13920-2016 suggests, ductile detailing should be provided in RC structures to enhance their seismic capabilities. Where in the joint region a high percentage of transverse reinforcement is needed in order to meet the required strength, toughness, stiffness, and ductility which leads to congestion of steel leading to construction difficulties. The recent structural failures in recent earthquakes indicate that the current design procedures are weak, causing the Performance-Based Earthquake Engineering design (PBEE) process to be implemented. PBEE is a method of nonlinear analysis used to determine how the structure will respond to lateral loads. Seismic performance can be greatly enhanced through the proper initial retrofitting method. Providing steel haunches at the joints will be an effective method for the repair and restoration of existing structures. Also, the addition of fibres to seismic joints partially eliminates the necessity of providing transverse reinforcement and its associated construction problems in beam-column joints subjected to earthquakes. Literature review indicates that few studies have been conducted on steel haunch retrofitting. ABAQUS, a Finite Element Software is used to conduct a comparative analysis between a bare frame and that of a retrofitted one. Where it resulted in improved load carrying capacity of retrofitted frame up to 2.25times that of the bare frame.

Keywords*: Pushover analysis, Steel Haunch retrofit, Shake table test, Abaqus simulation, Seismic capacity*