

## **Assessment on Seismic Response of RC Framed Buildings with Scrap Tyre as the Base Isolator Using Nonlinear Static Push Over Analysis**

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### **ABSTRACT**

The investigation evaluates the seismic performance of scrap tyre rubber pad (STRP) bearings manufactured from used hazardous automobile tyres using Nonlinear static procedures. In this study, the four-story regular building and irregular-shaped buildings such as plan irregularity (H shape, square core type, and plus type) and vertical geometry irregularity (two types) of fixed and STRP base were analyzed using the SAP 2000 software package. The concept of Nonlinear static pushover analysis (NSP) is implemented which is reliable in its outcomes. For instance, the buildings are designed as per the design principles of the Uniform Building Code (UBC) suitable for Indian conditions. NSP is applied using two popular methods such as ATC-40 Capacity Spectrum Method and the FEMA-356 Displacement coefficient Method. The performance points such as spectral acceleration, spectral displacements, Base shear, and roof displacements are obtained and compared for the fixed base and STRP base. Moreover, the possible formation of hinges pertaining to life safety, immediate occupancy, and collapse prevention stages are significantly dealt with and reported for the buildings considered. From the investigation, it is evident that in the case of irregularly shaped buildings, the seismic response such as base shear and its corresponding roof displacements of plan irregular buildings is prodigious compared to vertical geometry irregular buildings. Nevertheless, the analysis reports that the response of regular-shaped buildings is prominent compared to irregularly shaped buildings with STRP as the base isolator.

**Keywords:** *STRP, SAP 2000, Nonlinear Static Push over Analysis, UBC-97, Capacity Spectrum Method, Displacement coefficient Method, Hinge formation.*