Cost assessment of the RC framed buildings with Scrap Tyres as the base isolators for the buildings situated in high seismic risk zone

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ABSTRACT

The future occurrence of earthquakes is unpredictable. The ceaseless increase in capacity of the buildings to meet the seismic demand is difficult and costlier. The base isolators give a way to reduce the capacity rather to increase the seismic demand exclusively for developing countries. This study evaluates the practical application and feasibility of Scrap Tyre Rubber Pad (STRP) bearings for real buildings. The investigation is made translucent with the aid of buildings situated in North-Eastern India which is prone to high seismic risk zone and falls under Seismic Zone V as per IS 1893:2016 code. The buildings considered for the analysis are three and five story RC framed buildings varying in its beam and column dimensions. The study reveals the authentic cost of the buildings with and without STRP bearings. Literally, the installation of base isolation system increases the cost of the construction (only in sub-structure). These STRP’s are obtained from used automobile tyres, are readily and easily available and the need for skilled laborers is not mandatory. The seismic response of the STRP bearings is satisfactory for medium rise buildings, preferably regular shaped buildings with heights not more than 19.8 m, as reported by researchers. Substantially, it is reported that though there is a moderate increase in cost with the implementation of STRP bearings for about 4% to 10% for low to medium rise buildings (3 storey and 5 storey buildings). This cost increase could be effectively counter-balanced by the utilization of hazardous tyre scraps as the base isolation element as each and every life is precious and it is our duty to protect our society from environmental and social distress.

Keywords: Seismic demand, RC framed buildings, Scrap Tyre Rubber Pad high seismic risk zone, Cost-Analysis.