

## ABSTRACT

Base isolated systems are required to reduce the lateral forces; drift and internal actions developed do to earthquake excitation. Conventional design may cause very high floor acceleration in stiff building and large interstorey drift in flexible structures. These two factors cause difficulties in ensuring the safety of the building components and contents along with the human life.

The thesis involves the study of base-isolation, seismic isolation, damage control, energy dissipation devices, feasibility of isolation, friction devices, high-damping rubber bearings, lead-rubber bearings, preliminary design, seismic retrofitting, response spectrum analysis, time-history analysis.

There are two major techniques, applied in base-isolation are

- (a) Base-isolation by the use of elastomeric bearings.
- (b) Base-isolation by the use of sliding system like friction pendulum etc.

In this dissertation work of Rectangular Building of 4, 6, 9 storey with 3 x 6 bays in plan, have been modeled in SAP 2000 VER. 11 (Advanced) & analyzed for four different cases.

- 1.) Fixed base frame with no isolators.
- 2.) Isolated frame with all isolators of uniform stiffness.
- 3.) Isolated frame with isolators of randomly different stiffness.
- 4.) Isolated frame with isolators of different stiffness, stiffness being in proportion of the load coming on the individual column (or in proportion to mass ratio).

The frames studied in this thesis have been analyzed using response spectrum method (IS 1893-2002, Part-I) and time history (EL-Centro, NS Component, lac0, lac90) in SAP 2000 and then the results have been compared. From the results it has been observed that one cannot take much advantage by using isolators of different stiffness (i.e. stiffness of isolators provided are in ratio of the load coming on the columns). For other cases results, also have been explained.

For commercial aspects the study suggests that easily availability is, of same stiffness isolators, one should better go for isolators of uniform stiffness rather than going for non-uniform stiffness. Because little advantage is drawn but the practical feasibility of getting manufactures of the isolators of different stiffness is very low and it will not be economical too.

Although considering relative top displacement, stiffness of isolators in mass ratio is a better option, as observed in the study. So keeping in mind the little gain (in terms of storey drifts) & low feasibility, it is advisable to go for uniform stiffness isolators. One can go for different stiffness of isolators to be used for exterior & interior columns, which is a quite common practice. But going for 'n' different values of isolator stiffness will not be feasible & economical.