

The Development of Large Deformation Stability of Elastomeric Bearings

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Abstract : Seismic isolation using multi-layer elastomeric isolators has been used in the United States for more than 20 years. Although isolation bearings normally have a large factor of safety against buckling due to low shear stiffness, this phenomenon has been widely studied. In particular, the linearly elastic theory adopted to study this phenomenon is relatively accurate and adequate for most design purposes. Unfortunately it cannot consider the large deformation response of a bearing when buckling occurs and the unresolved behaviour of the stability of the post-buckled state. The study conducted in this paper may be viewed as a development of the linear theory of multi-layered elastomeric bearing, simply replacing the differential equations by algebraic equations, showing how it is possible to evaluate the post-buckling behaviour and the interactions at large deformations.

Keywords : multi-layer elastomeric isolators, large deformation, compressive load, tensile load, post-buckling behaviour

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