DESIGN OF A BASE ISOLATOR SYSTEM UNDER NEAR FIELD EARTHQUAKE GROUND MOTIONS

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Abstract- Base isolation is a technique to substantially limit the potential damages induced by earthquakes by reducing the seismic demand on structures instead of increasing their seismic-resistant capacity. Among isolation devices, elastomeric bearings, sliding bearings and hybrid systems are the most widely used seismic isolation devices. However, rubber bearings offer one of most effective seismic procedure isolation and are relatively easy to manufacture. The present study illustrates the seismic design procedure as per UBC 97, of Lead Rubber Bearings (L.R.B) isolators to be incorporated in a multistory building assumed to be located close to an active fault. Two typical near and far fault earthquake ground motions recorded during the 1995, 6.9 Mw Kobe earthquake are used for this purpose. The result shows that the main function of the base LRB isolator is to extend the period of structural vibration by increasing lateral flexibility in the frame structure, but the isolator displacement and structural base shear may be reduced. The computed displacement of isolator is less than half the predict design displacement as per UBC97 for both cases of recorded Kobe earthquake, indicating a substantial degree of conservatism in thedesign.The high design displacement value in near-source case affects the geometric design of the isolator, where its stability requires a very large horizontal dimension (diameter).

Index Terms- Base-Isolation, Elastomeric bearing, isolator designs, near-fault.