

ABSTRACT

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The main objective of the present project is the elaboration in the seismic isolation of the right wave of the National Library and the comparison between the response of the seismic-isolated structure and the conventionally fixed-base one, in order useful conclusions to be obtained in accordance with their behavior against earthquake.

In the first part, there is a brief reference to the philosophy of base isolation as a n alternative against seismic actions, to the basic types of existing isolators and to the discrepancies between the fixed-base and the seismic-isolated structure.

In the second part, it is suggested a general description of the building of the National Library and a reference to the basic parameters necessary for the structure analysis.

In the third part, the fixed-base model is analyzed by the method of Response Spectrum Analysis with the use of the program SAP2000 in order the tension condition of the superstructure to be found in the design earthquake and by an Elastic Time-History Analysis based on the real accelerogramm of the earthquake that took place in Egio, so that the results of this analysis combined with the ones obtained by the analysis of the seismic-isolated structure to be used as a indicator for a first assessment of the rigidity of the isolators that are going to be used, in order the stresses of the superstructure not to exceed the cracking limits.

Moreover, the seismic-isolated structure is analyzed initially by a Non-Linear Time-History Analysis by using the real accelerogramm of the Egio earthquake and the isolators that are about to be used are fully described. Furthermore, the same model is subjected to Non-Linear Time-History Analysis by using 5 real accelerogramms scaled in the same spectral intensity as the Design Spectrum of the E.A.K. 2000 Code using the program SAP2000 and adding non linear links at its base. The same structure having real springs at the base is being analysed through the method of Response Spectrum Analysis and with an added damping value equal to that of the isolators according to what the Uniform Building Code suggests. Besides, the isolators are tested for their effectiveness.

In the last part, a comparison among the three types of buildings analyzed in the previous two parts is made. Additionally, overall comparative tables of base shears, stresses, absolute and relative displacements are presented, reaching the conclusion that the base isolation as a measure against earthquake actions is a very effective method in theoretical level having as a result restricted or non-existing destructions in the superstructure, but its application is met with financial mainly difficulties. Finally, a brief description of the assignment method of the isolators is quoted.