ABSTRACT

This post-graduate thesis concerns the design of a 6-floor steel building according to EC-3 and EC-8. The behavior of several vertical static systems taking over the seismic force is also being studied.

The 1st chapter includes the description of the steel building and the assumptions made for its simulation. It is calculated the vertical and horizontal loads of the structure. Also, they are showed her characteristics. Moreover, the elements of the elastic response spectrum are being presented according to the analysis, which are being based on the dynamic spectrum analysis. In addition to this, a presentation of the results of the modal analysis of all the models is taking place. Also, the second-order effects (P-Δ effects) for the limitation of interstorey drift is being examined. At the end, there is a specific parathesis of all geometric elements of all sections which have been used and the category of each section.

The 2nd chapter includes the before earthquake controls and specifically the control of strain, also this of the bending of the beams and at the end, that of the compression of the columns.

At the 3nd chapter is being concerned the Concentrically Braced Frames - CBF. Also, a control of the diagonals of the CBFs, the columns and beams is also being taken place.

The behavior of the Eccentrically Braced Frames - EBF in co-ordination with the control of the link-beams, this of the diagonals of the EBFs and that of the columns can be found at the fourth chapter. At the same chapter there is a control of the rotation angles.

The 5th chapter concerns the Moment Resisting Frames - MRF. Moreover, a control of the beams and the columns is being carried out. At the present chapter the MRFs of the two board frames (1+1) and at the whole height of the building is taking place. The q-factor on the address y-y: $q_Y = 2$ is also being concerned.

At the 6th chapter, as at the 5th chapter, there is a review which includes the behavior of the Moment Resisting Frames – MRFs. Another control of the columns and the beams is also being done. But this time, the MRFs at the four board frames (2+2) and at the whole height of the building is being under control. The q-factor on the address y-y: $q_Y = 4$.

Finally, at the last chapter the models which have been analyzed are compared and the final conclusions which came up of this thesis are being described.