

## *ABSTRACT*

The present thesis is the final part of the postgraduate studies program “Earthquake Resistant Design of Structures”. This thesis deals with the assessment of an old reinforced concrete buildings in the town of Thessaloniki, built before 1930. Structures like this faced up several earthquakes and so have damages of certain degree. Furthermore, the natural deterioration and the absence of appropriate conservation affect the capability of the structure against seismic actions. Consequently, a large amount of buildings need interventions against probable earthquakes.

The increase of the living standards in Greece requires bracing of these old buildings. Besides, today technological knowledge enables to assess of these buildings using new and accurate methods, which can predict their behavior under seismic loads. Thus, the requirement of a new regulation that will incorporate these new methods was necessary; and in these sense Code for Assessments and Interventions composed in Greece could be considered actually an international novel.

It is logical to expect that this new Code that embody all the new achievements in this field may be accepted by the engineers with some hesitance. Nowadays, it is believed that inelastic methods of analysis require great accuracy at the data. The purpose of this project is to overcome these views.

In this thesis we investigate the analysis of the structure considering two different levels of the reliability of the data. First, we accept that we know exactly the characteristics of the building and proceed to the analysis using the elastic conventional methods and the inelastic methods. Then we assume that we do not know exactly the characteristics of the building and follow the same procedure. Comparing the results of the two procedures it is pointed out that the inelastic methods of analysis can predict the collapse mechanism regardless of the accuracy of the data. Consequently, inelastic methods are more reliable than elastic, when a better indication of the response of the structure to seismic loads is required.