# ABSTRACT

The objective of this thesis, submitted in partial fulfillment of the requirements for the MSc degree of the Graduate studies program “Earthquake Resistant Design of Structures” was the assessment of a standard type school building, by applying draft no.2 of the Greek Structural Intervention Code (“ΚΑΝ.ΕΠΕ.”).

The building is made of reinforced concrete, consisting of a ground floor and two stores. The initial study was worked out in 1991 with the then being in effect regulations.

The goal of this assessment was the “life safety” with a 10% probability of exceedance of the seismic action in a period of 50 years” (Β1-β1, as it is provided by the “ΚΑΝ.ΕΠΕ.”), which coincides with the goal of the 2000 Greek Seismic code (ΕΑΚ2000) for new buildings.

For the assessment of the building’s bearing capacity the following two methods were applied, whose general principles, conditions and application rules are defined by the “ΚΑΝ.ΕΠΕ.” :

- The Elastic Static analysis
- The Inelastic Static analysis

The Elastic Static analysis with the q-factor method is implemented using the ETABS v.8.4.9. computer program and the computational tool e-tools, which makes easier the conducting of the required checks. Although the conditions provided by the “ΚΑΝ.ΕΠΕ.” for the application of the Elastic Static analysis are not met, an attempt was made to apply it by deviation in this particular case. The intention of this application is to draw certain conclusions relevant to the bearing capacity of the building as well as to assess the validity of the conditions set by the Code. The results show insufficiencies in the majority of structural elements.

As a second attempt, the Inelastic Static analysis was applied, using the ETABS v.8.4.9. computer program and a 3D-model. The analyses of the building were carried out for two load cases (“modal distribution” – “uniform distribution”) while the seismic loads were applied on the two main directions of the building (100% in the one direction and 30% in the other, successively for the two directions). By conducting the analysis an attempt was made to take into consideration the prevailing form of failure (flexural or shear), during the simulation of the inelastic behaviour of the frame elements, which was conducted according to the method provided by the “ΚΑΝ.ΕΠΕ.”.

The definition of the inelastic behaviour law of the elements was based on the analytical equations of ΚΑΝ.ΕΠΕ. The check of the general safety inequality of the building was done in terms of rotations (based on the developing and available plastic rotations of the frame elements), which are used to examine the flexural failure, and in terms of forces (comparing the developing shear forces with the corresponding resistances of the elements), which are used to check the possibility of shear failure.

During the elaboration of this thesis certain questions ensued concerning certain provisions of the ΚΑΝ.ΕΠΕ. The most important of these questions are pointed out with the purpose of improving the text of the ΚΑΝ.ΕΠΕ which is under formation.

The application of Inelastic Static method reaches more favourable results, that is to say in less insufficiencies (as null in the joists). That shows that for the target-displacements the elements are found mainly in the flexible region.