

ABSTRACT

The present thesis aims at contributing to the assessment and management of the seismic risk of lifelines. The presented methodology is applied to the water and wastewater systems of Thessaloniki for the cases of 3 different scenarios (the ones with a mean return period of 100, 475 and 1000 years).

In chapter 1, the usefulness of lifeline seismic engineering is highlighted and the methodology for the application is described.

In chapter 2, a description of the water and wastewater systems of Thessaloniki takes place and the correspondent G.I.S. databases are presented.

In chapter 3, a description of the estimation of the seismic load is presented. For the centre of Thessaloniki the values of PGA and PGV from the microzonation of the city were used, while for the municipality of Thermaikos the values on the bedrock were multiplied with suitable amplification factors.

In chapter 4, an estimation of the vulnerability of the components of the networks is held and in chapter 5 the importance of all the components is estimated using the methodology of “global value”.

In chapter 6 the restoration priorities of the pipes, pumping stations and tanks of the water system, as well as the pipes of the wastewater system are calculated according to the damage state and the importance of each component.

In chapter 7, restoration curves that correspond to the restoration practice in Greece are proposed. These curves are finally used for the estimation of the time that is required for repairing the calculated damages.