

summary

The following essay refers to the configuration of fragility curves for circular tunnels which are situated underground in small depth. Such curves need to be configured because the existing respective ones have mainly an experiential character and they refer to tunnels out of Greece.

The philosophy of the structure of this essay relies on the supply of data and analysis for the seismic response of tunnels and the presentation of results and of the resultant fragility curves.

In particular:

In the **first chapter**, we present some general information about underground structures and the need for their antiseismic design. There are also presented the structure of lifelines and we analyze the causes of tunnel damage because of seismic load. Furthermore they are mentioned many of the damages to existed underground tunnels because of earthquakes in the past.

In the **second chapter**, most of the definitions are given, which are related to the seismic response of tunnels. It is also pointed out the importance of the configuration of fragility curves and there are indicated the results of respective experiential studies.

In the **third chapter**, they are presented the data which are used in the analysis, these are the ground profiles, the seismic input motion, the cross section of the structure and the combos analysis.

In the **fourth chapter**, we present the software which was used in the analysis, the supposed acknowledgements and the steps for a complete typical analysis.

In the **fifth chapter**, it is analyzed the procedure for the configuration of analytical fragility curves and they are presented the resultant ones.

In the **sixth chapter**, the resultant analytical fragility curves are compared with the respective empiric ones and with those which were configured by the colleague Agoritsa Nteri for rectangular tunnels.