



ACADEMIC YEAR 2014 – 2015

TITLE OF DIPLOMA THESIS:

Risk management of tunneling-induced ground movements in urban tunneling projects

AUTHOR: Mavridi Eleni

ABSTRACT

The objective of this thesis is Risk Management in urban tunneling projects, and in particular Risk Assessment of tunneling-induced ground movements and their effects on buildings. As risks in geotechnical projects is not possible to be completely eliminated, the primary goal is not to eliminate them but to manage them properly in order to achieve a quick and safe outcome in the most economic way and with the lowest impact on the surrounding environment that is possible. Because of this, Risk Management highlights as a Project Management process of major importance. In the framework of this thesis are outlined all Risk Management processes and the process of a comprehensive analysis of estimating and assessing the effects of tunneling-induced ground movements on buildings. Emphasis is given on analysis and comparison of estimating ground movement empirical methods that take account of soil-structure interaction. Two strictly empirical methods, and a method of semi-coupled analysis of soil-structure interaction, for estimating settlements are presented. The comparison of the three abovementioned methods was structured on a case study, in which the same building's damages were estimated and classified with all three methods. Furthermore, additional case studies were performed for variations of the abovementioned building by the recommended method, according to this thesis, aiming at better understanding of the process and drawing conclusions of its appliance. A section of this thesis devoted to the description of the operation of the EPB (Earth Pressure Balance) tunnel boring machine. Finally, a methodology was proposed, in order to improve the recommended method, comprising probabilistic analysis of parameters that include uncertainties.

KEYWORDS

Risk Management, Risk Assessment, urban tunneling project, ground movements, building stiffness.