

Yeditepe University Civil Engineering Department
CE 492 Engineering Project
Proposal Form

Supervisors Name/s	Prof. Dr. Hakkı Oral Özhan
Project Title	<i>Assessment of soil liquefaction risk due to earthquake loading for a site by using Standard Penetration Test (SPT)</i>
Project Reference No*	
Relevant course/s for the project	CE 341: Soil Mechanics CE 441: Foundation Engineering

Project Summary:

Liquefaction of soils is an important problem in Geotechnical Earthquake Engineering. In this project, assessment of soil liquefaction risk due to earthquake loading would be performed. The soil profile involving the necessary geotechnical and soil characterization data would be given to the students, where results of SPT in-situ tests would also be available. In this project, the site will be characterized by Standard Penetration Tests (SPT). The students would investigate and learn the basic principles of liquefaction assessment and then shall go through the new Turkish Building Earthquake Code 2018, which became effective at the beginning of 2019. They would assess the liquefaction risk of their site according to the new Turkish Building Earthquake Code 2018. At the end of the project, students would prepare a detailed report about the liquefaction potential of their site according to the new Turkish Building Earthquake Code 2018.

Project Achievements:

(Please explain how the proposed project helps to achieve the performance criteria listed below)

Identifying specific design objectives based on project requirements:

- 1) Interpretation and application of necessary corrections to raw in-situ test data for design applications.
- 2) Knowledge about the new Turkish Building Earthquake Code 2018
- 3) Knowledge about “soil liquefaction” and how liquefaction analyses are performed in civil engineering projects.

<p>Gathering and using relevant information</p>	<p>In this project, knowledge obtained from all or some of the following courses shall be used by the student: 1)CE 341: Soil Mechanics (core) 2) CE 441: Foundation Engineering (core)</p>
<p>Analyzing alternatives using appropriate engineering knowledge</p>	<p>After the termination of the project, students will be able to see how in-situ tests (SPT) could be used to analyze the liquefaction potential of soils.</p>

<p>Considering the relevant constraints in the design: <i>(Please explain how the proposed project considers one or more limitations listed below)</i></p>	
<p>Economy Environmental Issues/Sustainability Manufacturability</p>	<p>1) Manufacturability (assess the liquefaction risk of a specific site according to the new Turkish Code Building Earthquake Code 2018). 2) Economy (The results would be important from economical point of view as it would influence the foundation system or a potential ground improvement decision for the site)</p>

**Definition of outcomes
linked to the objectives of
projects**

- 1) ability of usage their knowledge in mathematics, science and engineering,
- 2) ability to identify and solve complex engineering problems,
- 3) design experience,
- 4) ability to use modern tools and employ needed information technologies,
- 5) ability to conduct experiments if needed, gather data and analyze results,
- 6) routine of combining their individual creativity with teamwork,
- 7) oral and written presentation experiences in foreign language,
- 8) ability to access information and recognition of the need for following developments in science and technology,
- 9) awareness of professional and ethical responsibility,
- 10) information about business life practices like project management and risk management,
- 11) awareness of effects of their engineering practices on health, environment, and safety,
- 12) awareness of project award mechanisms and tendering procedures,
- 13) awareness of the interaction of designers and constructors.

(Minimum requirements are;

- *project timeline,*
- *abstract,*
- *Türkçe özet,*
- *the definition of the problem,*
- *the scientific information and literature review,*
- *different design alternatives and decision criteria,*
- *selection of optimum alternative*
- *economical, sustainability, ethical issues*
- *engineering drawing and demonstration methods while presenting the solution*
- *appendix including standards, patents, brochures etc.)*