

1.054/1.541 Mechanics and Design of Concrete Structures (3-0-9)

Outline 14

Earthquake Risk Assessment and Hazard Mitigation

Seismic risk assessment and hazard mitigation for urban infrastructures located in seismic regions is a challenge faced by many countries around the world, especially those with infrastructures known for their variability in seismic resistance and quality of construction. Two recent major earthquakes that hit the densely populated urban areas in Northwest Turkey resulted in a large-scale destruction and loss of life. Scientific studies indicate a high probability of occurrence of another severe earthquake along the North Anatolian Fault in this region is quite high in the next thirty years. This situation presents a serious threat to the large building stock and their occupants, lifelines, and critical facilities, which are primarily reinforced concrete structures. Limited time and funds do not allow for a detailed evaluation of the entire inventory of structures according to seismic codes. Thus, there is an urgent need for a systemic strategy that will allow for a reliable assessment of the seismic hazard risk of existing structures through an effective and economical methodology. Prioritization of these structures according to their hazard risk, and implementation of the necessary mitigation measures are required. In this lecture we present seismic resistance issues associated with reinforced concrete structures, and the methodologies and advances in large-scale seismic risk evaluation and hazard reduction are presented.