

# A brief overview of the Seismicity, Earthquake Hazard and Building Codes of Europe and the Middle East

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*Abstract: The presentation is intended to provide seismological background for the seismic design practice in general with a special focus on the referred regions. Our other goal is to show the approaches behind the standards, to illustrate the process by which the earthquake loads can be determined.*

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The goal of seismic design is to protect the man-made environment (so also human life) from earthquakes by limiting the potential damage to acceptable levels. The first step of the whole design process is to estimate the possible loads i.e. the possibility and severity of earthquakes which can hit the site area.

The seismicity is rather variable in the Middle East and Europe, including large areas with high and moderate levels of hazard. The most affected countries of these regions are Turkey and Iran and Greece and Italy respectively. From a scientist's viewpoint the earthquakes have important information: the pattern of severe earthquakes shows the tectonic structure of the region, and help us to know the interior of the Earth. However the price of this knowledge is huge. In the presentation some of the biggest earthquakes and some statistics will be shown.

These statistics help us to calculate the possible loads for a specified time period. Different measures of earthquakes (magnitude, intensity, peak acceleration) may cause some confusion, but all of them have a specific role in earthquake hazard evaluation. The estimates of forces acting on structures make it possible to design earthquake resistant buildings. The know-how of the design is described in corresponding standards. One of them – Eurocode — was accepted some years ago in the EU providing uniform methods and background leaving the task for member states to fill the code with their own specialities.

Building codes like Eurocode 8 follow similar considerations. After determination of seismic action (handled as input data) some modification parameters like ground soil characteristics, importance factor, and a physical model of a structure are involved into design. All of these parameters and models strongly affect the reliability and cost of structures. The proper selection of them is one of the keys of good design.