

ON THE NECESSITY TO ESTABLISH LOCAL SEISMIC HAZARD MAPS FOR URBAN REGIONS

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In order to manage urban developments, it is necessary to define the design basis accurately. In urban regions with high earthquake risk, local seismic hazard maps are necessary to properly plan new developments and to ensure that upgrading of existing buildings and infrastructure be carried out properly.

The local hazard maps will take into account the following information:

- Effects of local faults
- Effects of local soils conditions, including the thickness of the soils layers

The main usages of this information are:

- Definition of design basis for new buildings
- Definition of necessary earthquake strengthening of existing buildings
- Identification of necessary emergency measures like firewater and access by fire equipment and ambulances
- Definition of locations of safe shutdown valves for gas
- Identification of muster points for local population to avoid hazards caused by jet fires etc.

A case study is presented where particulars of a mega city (Tehran) and a smaller densely populated city (Oslo) are compared. The requirements of both cities will be spelled out and suggestions for refinements of the local seismic hazard maps will be presented.

The recent development of the city of Oslo in Norway (640.000 inhabitants) is characterized by major construction of high rise buildings in the waterfront area where piling down to rock is necessary due to construction on landfills. Even though the city is located in an intraplate region with relatively low seismic activity, past earthquakes have been observed (Bungum et al., 2009). The earthquake of 1904 caused some damages and a similar earthquake could potentially cause damages to the new structures being built. Deep clay deposits contribute to amplification of the earthquake signals and a seismic zonation map (Molinas and Lindholm, 2005) identify vulnerable areas and is considered very useful when planning new developments.

The mega city of Tehran (8.3 Million inhabitants) is very vulnerable to seismicity and seismic zonation maps are used extensively for planning purposes. Closeness to faults and underlying soil conditions represent the main parameters when identifying the seismic hazard.

For cities vulnerable to seismic hazard, seismic hazard maps should be developed for planning and re-development purposes. It is of particular importance that the main risks are being mitigated whenever possible and when economically feasible.

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