

Engineering seismology

SEISMIC MICROZONATION OF URBAN AREAS

The Seismology Division took the lead in seismic hazard assessments in Israel.

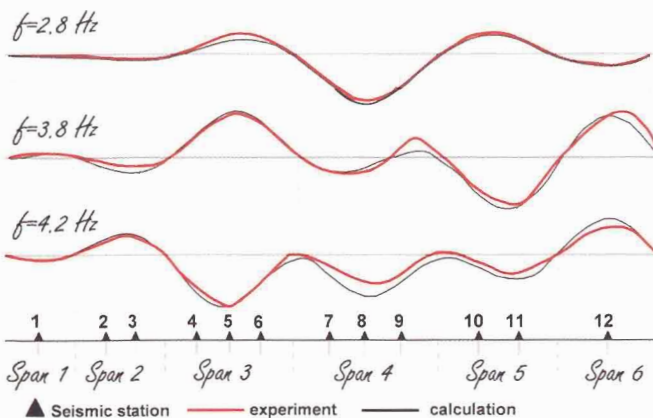
This process involves:

- » detailed mapping of the resonance characteristics of the subsurface soils;
- » development of subsurface model considering geological, geophysical and borehole information;
- » computing the Uniform Hazard Site-Specific Acceleration Response Spectra on the basis of the subsurface model (SEEH method, Shapira & van Eck, 1993)
- » generalizing the hazard by mapping zones that feature similar seismic hazard.

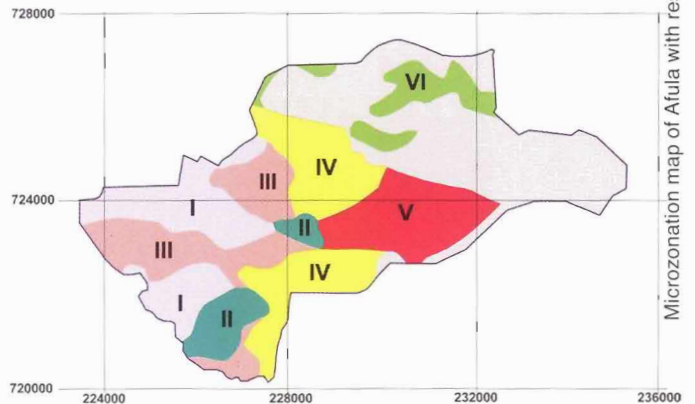
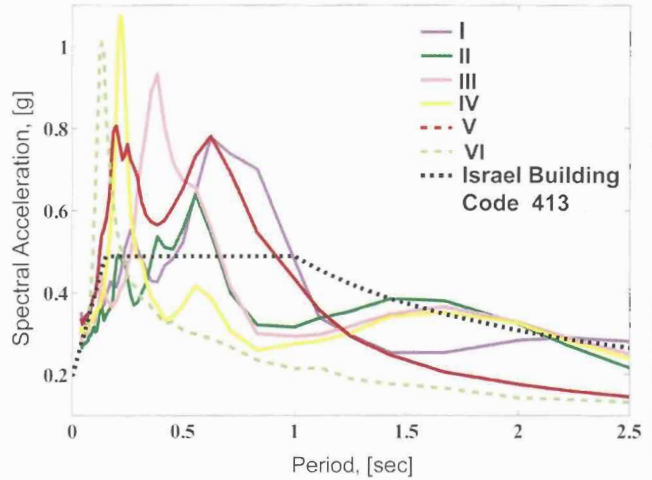
The use of these maps in loss estimation can help the respective authorities to set priorities in enforcing building codes, conducting seismic strengthening programs for existing structures, and in contingency planning for emergency response and long term recovery.

EMPIRICAL ESTIMATION OF THE DYNAMIC CHARACTERISTICS OF FULL SCALE STRUCTURES

Spectral analysis of the construction's response to various excitations, recorded by seismometers, can be used for modeling the structure and to analyze its vulnerability during strong ground shaking. It is a simple and straight forward technique to detect changes in the building that may indicate changes of the structural health condition and potential defects.



The first three vibration mode shapes of the bridge in the vertical direction obtained by different excitations



Microzonation map of Afula with respect to accelerations response spectra

SITE SPECIFIC SEISMIC HAZARD ASSESSMENT, FOR BUILDING DESIGN.

Site specific seismic hazard assessments is a very important issue when considering any construction.

More than 80 studies conducted at building sites throughout Israel suggest that in the frequency range 0.5 – 10.0 Hz, which is the range of natural frequencies of most of the buildings, we expect amplification of the ground motions that may even reach a factor of 8. For many sites the Israeli building code 413 requirements underestimate those inferred from the site specific studies.

