Seismic Building Monitoring of Multistory RC Structures in Turkey – A Contribution to the SERAMAR Project

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Recent damaging earthquakes in Turkey have shown, that not only the Marmara region around the megacity İstanbul is exposed to a high seismic risk. Since most of the international microzonation projects are concentrated on the Marmara region, there is an urgent need to center on alternative high-seismicity regions, such as the South Anatolian province Hatay.

In fall 2004, the Turkish-German-Turkish joint project SERAMAR (Seismic Risk Assessment and Mitigation in the Antakya-Maraş Region) started in the province capital Antakya, an ancient city of 150,000 inhabitants in the southernmost tip of Turkey. Judging by historical precedence, major earthquakes on this branch of the Dead Sea-East Anatolian fault system have a real potential for occurrence in the city.

The main objective of the project, which is partly sponsored by the Swiss Agency for Development and Cooperation (SDC) is the thorough microzonation of an urban area in the forefront of a damaging seismic event. Thereby the assessment of seismic hazard and the identification of the local building stock's vulnerability is conducted in order to propose strategies for risk mitigation.

In this context, the instrumental investigation of buildings being representative for the respective settlement area becomes an essential part of the project. Based on different selection criteria, three multistory RC structures were chosen and equipped with Seismic Building Monitoring Systems (BMS) generously provided by SYSCOM Instruments SA. A BMS consists of four triaxial strong-motion accelerometers (type MR2002+), of which three instruments are installed at different floor levels and one at the outside of the building (free-field station).

The major task of the long-term instrumentation is to obtain realistic data on the structural response due to earthquake shaking, and thus to identify weak points of the structural system, to elaborate the structural vulnerability, and to allow a calibration of the analytical building models as well as nonlinear analysis methods.

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