Istanbul Earthquake Rapid Response System

M. Erdik, H.Alcik, A.Mert, N.Kafadar, A.Korkmaz

Bogazici University, Istanbul, Turkey

Abstract

As part of the preparations for the future earthquake in Istanbul an Earthquake Rapid Response system installed in the metropolitan area is in operation, consisting of one hundred strong motion accelerometers. Instruments are placed in quasi-free field locations (basement of small buildings) in the populated areas of the city, within an area of approximately 50x30km, to constitute a network that will enable early damage assessment and rapid response information after a damaging earthquake. Early response information is achieved through fast acquisition and analysis of processed data obtained from the network. The stations are routinely interrogated on regular basis by the main data center. After triggered by an earthquake, each station processes the streaming strong motion data to yield the spectral accelerations at specific periods, 12Hz filtered PGA and PGV and will send these parameters in the form of SMS messages at every 20s directly to the main data center through a designated GSM network and a microwave system. A shake map and damage distribution map (using aggregate building inventories and fragility curves) will be automatically generated using the algorithm developed for this purpose. Loss assessment studies are complemented by a large citywide digital database on the topography, geology, soil conditions, building, infrastructure and lifeline inventory. The shake and damage maps will be conveyed to the governor's and mayor's offices, fire, police and army headquarters within 3 minutes using radio modem and GPRS communication. Additional sets of strong motion recorders were placed on important structures in several interconnected clusters to monitor the health of these structures after a damaging earthquake. Studies are underway for enlargement of the system and improvement of the shake and loss assessment methodologies.