

# Hazard and Total Risk Analyses of Large Dams under Threat of the North Anatolian Fault Zone in Mid-Anatolia, Turkey

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**Abstract** - Large dams built on the seismically active area have a high-risk potential for downstream life and property. Active faults, which are located close to dam sites, can induce to damaging deformation of the embankment as well as on instability of the embankment and strength loss of foundation materials. Case studies about the seismic performance of dams under major earthquakes are available in the literature. There are so many dams, which are under the threat of near energy sources in Turkey. Most of them has been located in the Northern part of Mid-Anatolia, Turkey. These are Almus, Atakoy, Boztepe, Camlıgöze, Degirmendere, Golova, Kılıçkaya, Koyulhisar, Sureyyabey, Tepekisla, Ulukoy, Vezirkopru, Yassical, Yedikir, and Ziyaret dams having a structural height between 20 and 134 m. These dams are very close to the North Anatolian Fault, which is famous structural feature that produces deathful earthquake. In otherword, these dams are located on or near active faults (less than 10 km). It means that all of them are under near-field motion. The total risk analyses depending on the seismic hazard rating of dam site and risk rating of the structure have concluded that most of them, which are under near source effect of the North Anatolian Fault Zone, generally have high-risk class. The author thinks the fact that these dams must be analyzed with high priority and redesigned to increase the safety of the embankments and their appurtenant structures, if necessary.

**Keywords:** Earthquake, dam, Safety evaluation, Seismic hazard, Total risk,