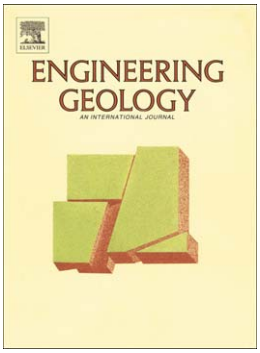

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Seismic damage and behavior analysis of earth dams during the 2008 Wenchuan earthquake, China

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ABSTRACT

The May 12, 2008, Ms8.0 Wenchuan great earthquake, China caused earthquake damages of 2666 earth dams in medium and small scale located in 8 provinces or municipalities, of which 69 dams were at dam-break risk, 331 were at high-risk. There were 1996 damaged dams located in Sichuan Province including all the 69 at dam-break risk and 310 at high-risk. Earthquake damage and emergency data were collected by a detailed scientific investigation, and the isoseismal map of Wenchuan earthquake, with damaged dams marked on it, was given. Also distribution characteristics of the above 69 dams along the fault zones were discussed. Typical damage types of earth dams were analyzed. And the action of rare great earthquake, poor quality of dam construction, adverse running state of earth dams before earthquake, and frequent aftershocks were concluded as four main reasons of dam damages. Taking 147 dams with complete geometric parameters as statistical samples, some empirical graphic formulas were proposed to assess rapidly evaluation of damage degree according to seismic intensity and dam geometry. Finally, some useful practical measures were provided to serve the post-earthquake emergency danger removal and improve the seismic performance of dams. In view of the insufficiency of local geology, site effect and soil property data of damaged dams, using of the qualitative results and proposed empirical relationships to other sites should be very prudent.

Keywords: Wenchuan great earthquake; reservoir; earth dam; earthquake damage; field investigation; dam geometry

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