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## Numerical earthquake response analysis of the Liyutan earth dam in Taiwan

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**Abstract.** The dynamic response of the Liyutan earth dam to the 1999 Chi earthquake ( $M_L=7.3$ ) in Taiwan was numerically analyzed. First staged construction of the dam was simulated. Then, seepage analysis considering a 60-m water level, was performed. After seepage analysis the initial static stress (prior to dynamic loading) was established in the dam. Both the horizontal and vertical acceleration time histories recorded at the base of the dam were used in the numerical simulations. The dynamic responses of the dam were analyzed for 50 s in the time domain. The simulated results were in agreement with the monitored data. Frequency transfer function analysis and Hilbert-Huang Transform (HHT) were used to compare the results and to perceive the response characteristics of the dam. In particular, the time-frequency-energy plots of the HHT can be used to determine the timing and time frame of the dominant frequencies of the dynamic response. The influences of the initial shear modulus and uni-axial earthquake loading were also investigated.

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