World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:9, No:05, 2015

Quantification of Site Nonlinearity Based on HHT Analysis of Seismic Recordings

Authors : Ruichong Zhang

Abstract : This study proposes a recording-based approach to characterize and quantify earthquake-induced site nonlinearity, exemplified as soil nonlinearity and/or liquefaction. Alternative to Fourier spectral analysis (FSA), the paper introduces time-frequency analysis of earthquake ground motion recordings with the aid of so-called Hilbert-Huang transform (HHT), and offers justification for the HHT in addressing the nonlinear features shown in the recordings. With the use of the 2001 Nisqually earthquake recordings, this study shows that the proposed approach is effective in characterizing site nonlinearity and quantifying the influences in seismic ground responses.

Keywords : site nonlinearity, site amplification, site damping, Hilbert-Huang Transform (HHT), liquefaction, 2001 Nisqually Earthquake
Conference Title : ICEGE 2015 : International Conference on Earthquake and Geological Engineering
Conference Location : Tokyo, Japan
Conference Dates : May 28-29, 2015