

A Stochastic Model to Predict Earthquake Ground Motion Duration Recorded in Soft Soils Based on Nonlinear Regression

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Abstract : For seismologists, the characterization of seismic demand should include the amplitude and duration of strong shaking in the system. The duration of ground shaking is one of the key parameters in earthquake resistant design of structures. This paper proposes a nonlinear statistical model to estimate earthquake ground motion duration in soft soils using multiple seismicity indicators. Three definitions of ground motion duration proposed by literature have been applied. With a comparative study, we select the most significant definition to use for predict the duration. A stochastic model is presented for the McCann and Shah Method using nonlinear regression analysis based on a data set for moment magnitude, source to site distance and site conditions. The data set applied is taken from PEER strong motion databank and contains shallow earthquakes from different regions in the world; America, Turkey, London, China, Italy, Chili, Mexico...etc. Main emphasis is placed on soft site condition. The predictive relationship has been developed based on 600 records and three input indicators. Results have been compared with others published models. It has been found that the proposed model can predict earthquake ground motion duration in soft soils for different regions and sites conditions.

Keywords : duration, earthquake, prediction, regression, soft soil

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