# Probabilistic Models to Evaluate Seismic Liquefaction In Gravelly Soil Using Dynamic Penetration Test and Shear Wave Velocity

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**Abstract :** Although gravels and gravelly soils are assumed to be non-liquefiable because of high conductivity and small modulus; however, the occurrence of this phenomenon in some historical earthquakes, especially recently earthquakes during 2008 Wenchuan, Mw= 7.9, 2014 Cephalonia, Greece, Mw= 6.1 and 2016, Kaikoura, New Zealand, Mw = 7.8, has been promoted the essential consideration to evaluate risk assessment and hazard analysis of seismic gravelly soil liquefaction. Due to the limitation in sampling and laboratory testing of this type of soil, in situ tests and site exploration of case histories are the most accepted procedures. Of all in situ tests, dynamic penetration test (DPT), Which is well known as the Chinese dynamic penetration test, and shear wave velocity (Vs) test, have been demonstrated high performance to evaluate seismic gravelly soil liquefaction. However, the lack of a sufficient number of case histories provides an essential limitation for developing new models. This study at first investigates recent earthquakes that caused liquefaction in gravelly soils to collect new data. Then, it adds these data to the available literature's dataset to extend them and finally develops new models to assess seismic gravelly soil liquefaction. To validate the presented models, their results are compared to extra available models. The results show the reasonable performance of the proposed models and the critical effect of gravel content (GC)% on the assessment.

**Keywords :** liquefaction, gravel, dynamic penetration test, shear wave velocity

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