A Study of the CPT-based Liquefaction Potential Index

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Liquefaction Potential Index ($I_L$), was defined by Iwasaki et al. (1982), is calculated based on an integration of the calculated factor of safety ($F_s$) over depth with a weighting function. Iwasaki et al. (1982) provided a set of criteria to interpret the calculated index $I_L$ based on a calibration with his dataset of field performance cases. However, in their method, the factor of safety ($F_s$) is gotten by the SPT-based liquefaction evaluation method. Whether other liquefaction evaluation methods can be used in conjunction with the index $I_L$ or not needs further investigation. In this paper, the Cone Penetration Test (CPT) data from Yuanlin, Taiwan, the area suffered the most severe liquefaction in the 1999 Chi-Chi, Taiwan, earthquake, are analyzed. The Robertson’s CPT-based method is used for the calculation of the factor of safety for these cases derived from the Chi-Chi earthquake. The factors of safety are used to define the liquefaction potential and risk indexes. The study shows that the modified Liquefaction Potential Index ($I_{L(m)}$) defined in conjunction with the Robertson (1998) method yields the reasonable result in interpreting field observations.