EVALUATION OF POST LIQUEFACTION BEHAVIOR OF SOILS (SETTLEMENT) BASED ON STANDARD PENETRATION TEST (SPT) IN TABRIZ METRO LINE 2

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ABSTRACT

The vast extensive damages arriving from the earthquake are related to the soil and its instability. In the different phenomenon related to the soil, the liquefaction of sandy and silty soils, as the result of earthquake, is very important. During this phenomenon, pore water pressure increases as long as it will be equal with confining stresses. Therefore, the effective confining stress is zero and the soil will not have any shear resistance. As the result of occurring of this phenomenon extensive and continuous deformations in soil that causes instability and large settlements in structures and underground construction. Laboratory studies have shown that the rate of volumetric strain (settlement) after initial liquefaction depends on relative density and maximum shear strain. In the last two decades, different practical methods to determine the volumetric strain based on laboratory and field data is presented. In this study, for settlement zoning based on TC-4 manual along Tabriz Metro Line 2 liquefaction potential of soils assessed with using Standard Penetration Test (SPT) with applying modified simplified procedure of Seed and Idriss (1999). Then, Iwasaki (1982) method is used for evaluating the liquefaction potential index. The value of post liquefaction behavior (settlement) by SPT results is evaluated by Tokimatsu and Seed (1987) method. In this study area, 67 boreholes were collected and evaluated. Results show that between liquefaction hazard and liquefaction-induced settlement exist good correlation.

Key Words: Liquefaction, Settlement, SPT, Tabriz Metro line 2.

1 INTRODUCTION

The term liquefaction, originally coined by Mogami and Kubo [1], has historically been used in conjunction with a variety of phenomena that involve soil deformations caused by monotonic, transient, or repeated disturbance of saturated cohesionless soils under undrained conditions. The generation of excess pore water pressure under undrained loading conditions is a hallmark of all liquefaction phenomena. The tendency for dry cohesionless soils to density under both static and cyclic loading is well known. When cohesionless soils are saturated, however, rapid loading occurs under undrained condition, so the tendency for densification causes excess pore pressures to increase and effective stress to decrease. The post earthquake densification of saturated sand is influenced by the density of the sand, the maximum shear strain induced in the sand and the amount of excess pore pressure generated by earthquake and earthquake-induced settlement frequently