

عنوان مقاله:

Haversine Cyclic Loading Rest Period Effect on PVD Cell Radial Flow Consolidation

محل انتشار:

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خلاصه مقاله:

Presented in this paper is an implicit finite difference solution for radial flow consolidation to prefabricated vertical drains (PVDs) under haversine cyclic loading with rest period assuming no smear and a constant coefficient of consolidation. Such long-term cyclic loads are induced by traffic on highways, airports and railway tracks. The effect of duration ratio of rest period to that of loading-unloading phase within a cycle, of 0, 1 and 2, on the time variation of excess pore water pressure and effective stress was studied thoroughly. The effect of PVD spacing expressed by the ratio of radius of influence zone of drain well to that of PVD was studied for three different values of 5, 10 and 40. The findings revealed that for any rest period, the excess pore water pressure oscillates changing sign with time although the imposed loading is always positive. The oscillation comes to almost steady state at a time factor of unity. The effective stress increases with time but with some fluctuation without changing sign. The average curve for the region between the upper bound and lower bound of effective stress curve with time converges to the average of haversine cyclic loading with rest period (having amplitude q_0), namely $q_0/2$, $q_0/4$ and $q_0/6$ for the ratio of rest period to that of loading-unloading phase of 0, 1 and 2 respectively. This is independent of the time factor value at the end of first loading/unloading phase. This indicates that longer rest periods decrease the total primary consolidation settlement due to cyclic loading.

کلمات کلیدی:

Cyclic loading, Prefabricated vertical drains, Radial flow consolidation, Rest period, Wick drains

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