THE USE OF STABILITY INDEX FOR FAILURE PREDICTION OF NORMALLY CONSOLIDATED CLAYS

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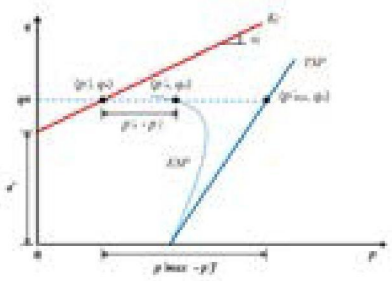
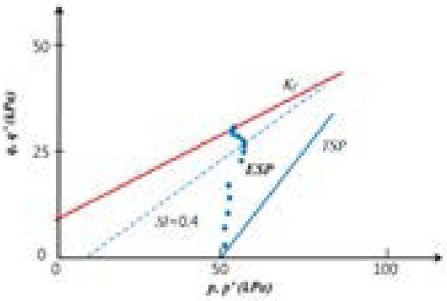
INTRODUCTION.

The new concept of the stability management of soft ground is developed from the laboratory test. The field condition is assumed to be the same as the condition of the CU test because the staged construction is usually used in the field (Fig. 1). The stability index (*SI*) using the stress path is introduced and its application is evaluated in the laboratory tests.





METHODOLOGY.

The stability index (*SI*) can be defined as follows:

$$SI = \frac{p' - p'_f}{p'_{\max} - p'_f},$$

where p'_f = the value of p' at failure, p'_{max} = the maximum value of p'_f (when $\Delta u = 0$, and it is on the *TSP* line). For a given q, p'_f, p' and p'_{max} are on the same line that parallels to the p' axis.

RESULTS AND DISCUSSION.

From the data obtained during the tests (pore water pressure, deviator stress and strain) the value of Skempton's pore water pressure A was calculated. The specimen is at the over-consolidated state when the axial strain is less than 5% and it moves to the normally consolidated state when the axial strain is greater than 5%. [1-3].

The total stress path (*TSP*) and the effective stress path (*ESP*) at σ_c=50 kPa are plotted with the K_f line in Fig. 2. The ESP line approaches to the K_f line gradually along the same direction to a certain point, then the direction changes and approaches to the K_f line rapidly. The similar pattern was observed when samples experienced σ_c=100 kPa, σ_c=150 kPa.

CONCLUSIONS.

- The following conclusions were reached:
- The tested material is at the over-consolidated state when the axial strain is less than 5% and it moves to the normally consolidated state when the axial strain is greater than 5%.
- The ESP line approaches to the K_f line gradually along the same direction to a certain point, then the direction is changes and approaches to the K_f line rapidly.
- The stability index (SI) is a relative value of p'. SI_{max} equals to 1 when $p'=p'_{max}$, and it can be negative when the Skempton's pore water pressure parameter A is greater than 1.
- The potential of failure increases rapidly when SI is less than 0.4.
  SI=0.4 could be assumed as a representative value to evaluate the potential of failure.

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