

Module 8 : Foundations in difficult ground

Lecture 34 : Collapsing Soils [Section 34.1 : Collapse potential measurement]

Objectives

In this section you will learn the following

- Collapse potential measurement

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Lecture 34 : Collapsing Soils [Section 34.1 : Collapse potential measurement]

Collapse potential measurement

Several researchers have proposed various methods for evaluating the physical parameters of collapsing soils for identification.

Jennings and Knight (1975) suggested a procedure for describing the *collapse potential* of a soil: An undisturbed soil specimen is taken at its natural moisture content and it is loaded up to 200 kN/m^2 in normal oedometer cell used for consolidation test. The void ratio is measured at this loading. Now the sample is flooded with water and kept for 24 hrs. Again the void ratio is measured.

If the void ratios before and after flooding are e_1 and e_2 respectively, the collapse potential may be calculated as

$$C_p = \frac{e_1 - e_2}{1 + e_0}$$

where, e_0 is the natural void ratio of the soil.

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Lecture 34 : Collapsing Soils [Section 34.1 : Collapse potential measurement]

Recap

In this section you have learnt the following.

- Collapse potential measurement

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Lecture 34 : Collapsing Soils [Section 34.2 : Corelation of collapse potential with foundation problems]

Objectives

In this section you will learn the following

- Corelation of collapse potential with foundation problems

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Lecture 34 : Collapsing Soils [Section 34.2 : Corelation of collapse potential with foundation problems]

Corelation of collapse potential with foundation problems

The severity of foundation problems associated with a collapsible soil can be correlated with the collapse potential C_p by Jennings and Knight (1975) which is summarized by Clemence and Finbarr (1981) and are given in the following table.

Table 8.1 : Relation of Collapse Potential to the severity of foundation problem

(Clemence and Finbarr, 1981)

C_p (%)	Severity of problem
0-1	No problem
1-5	Moderate trouble
5-10	Trouble
10-20	Severe trouble
20	Very severe trouble

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Lecture 34 : Collapsing Soils [Section 34.2 : Corelation of collapse potential with foundation problems]

Recap

In this section you have learnt the following.

- Corelation of collapse potential with foundation problems

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Lecture 34 : Collapsing Soils [Section 34.3 : Collapse of loessial soil]

Objectives

In this section you will learn the following

- Collapse of loessial soil

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Lecture 34 : Collapsing Soils [Section 34.3 : Collapse of loessial soil]

Collapse of loessial soil

Holtz and Hilf (1961) suggested that a loessial soil that has enough void space its moisture content to exceed its liquid limit upon saturation is susceptible to collapse. So, for collapse,

$$w_{(saturated)} \geq LL$$

where, LL = liquid limit

However, for saturated soils,

$$e_0 = wG_s$$

where, G_s = specific gravity of soil solids

Combining the above two equations for collapsible soil yields

$$e_0 \geq (LL)(G_s)$$

The natural dry unit weight of the soil required for its collapse is

$$\gamma_d \leq \frac{G_s \gamma_w}{1 + e_0} = \frac{G_s \gamma_w}{1 + (LL)(G_s)}$$

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Lecture 34 : Collapsing Soils [Section 34.3 : Collapse of loessial soil]

Recap

In this section you have learnt the following.

- Collapse of loessial soil