Geotechnical Engineering–I

BSc Civil Engineering – 4th Semester

Lecture # 16

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by

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Lecture Handouts: https://groups.google.com/d/forum/geotec-1

Practice Problem #1

A sand deposit was compacted dry to an in-place void ratio of 0.45. For this sand $e_{max.} = 0.7$ and $e_{min.} = 0.3$. Determine the relative density and relative compaction of this deposit. $G_s = 2.65$.

Practice Problem #2

(a) Why does a vibratory roller compact the granular soils more effectively? Explain.

(b) Laboratory compaction test results of a soil fill compacted at the site are:

γ_d (Mg/m^3)	1.62	1.66	1.72	1.70	1.63	1.57
w %	12.4	13.3	15.5	17.4	18.3	20.1

Specifications call for the compacted density to be at least 95% of the maximum laboratory density and w within ±2% of OMC. In a sand replacement test, the volume of the soil excavated was 1160 cm^3. It weighed 2210 grams wet and 1880 grams dry.

(i) What is the compacted dry density in the field?

(ii) What is the field moisture content?

(iii) What is the degree of compaction?

(iv) Does the test meet the specifications?

(v) What is the degree of saturation of the field sample?

(vi) If the sample was saturated at constant density, what would be the moisture content?

Practice Problem #3

During subsoil investigations in a sand deposit, it was found that the SPT blow count is very low. Subsequent tests on the sand revealed that it had an average in-situ void ratio of 0.70. The maximum and minimum void ratios were found to be 0.75 and 0.35 respectively. It was decided to densify the sand deposit by subsurface explorations. After the densification was carried out, the average void ratio of the deposit was found to be 0.55. Calculate the change in in-situ relative density of the sand deposit. Would the SPT blow count increases or decreases after densification?

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