Toolbox Talks

Excavation: Soil Classification

Toolbox Talks are intended to facilitate health and safety discussions.
Find more Toolbox Talks on the Occupational Safety web page.

Discussion Date: _____

Supervisor: _____

Participants: _____

General Information

Excavation and trenching related injuries and deaths occur every year in the workplace. Many of these incidents occur because adequate measures were not taken to protect employees. One component of safe excavation and/or trench work is the ability to classify soil properly.

Definitions (as they relate to excavation)

- Cohesivity – tendency of soil to "clump" or stick together.
- Compressive strength – maximum force soil or rock can withstand without compacting, measured in tons per square foot (tsf), or firmness.
- Disturbed – recently excavated or areas that have been filled.
- Fissured – fractured or cracked, includes sloughing.

Soil Classification

- Soil can be classified into four categories outlined in the table below:

Soil Class	Example	Cohesivity	Thumb test penetration	Compressive strength
Stable Rock	Limestone	Complete, vertical sides remain intact	None	>100 tsf
Type A	Clay and clay-mixes	Large clumps, can be formed and retain shape	Slight print visible	>1.5 tsf
Type B	Silt, loams, disturbed A	Small clumps or large clumps easily broken	base of the nail	1.5 – 0.5 tsf
Type C	Sand, pea gravel	Flowing or soils with seeping water	Complete	<0.5 tsf

- One trench or excavation site can have multiple classes of soil.

Thumb Penetration Test

- Take a fresh sample from excavated material.
- Press the end of your thumb firmly into the sample.
- Interpret results.

Photo Source: Iowa State IMSE