SOIL EXPLORATION

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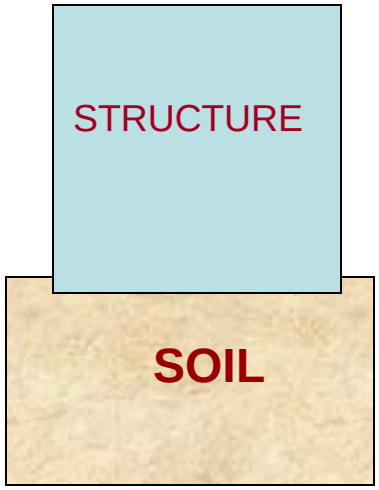
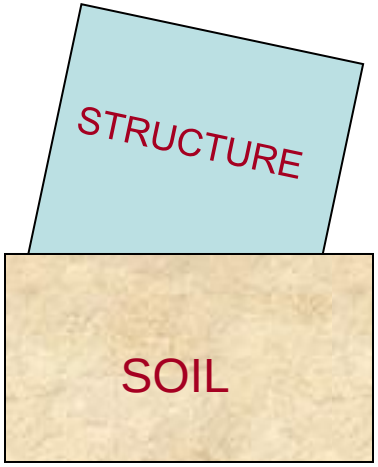
- Need of the study





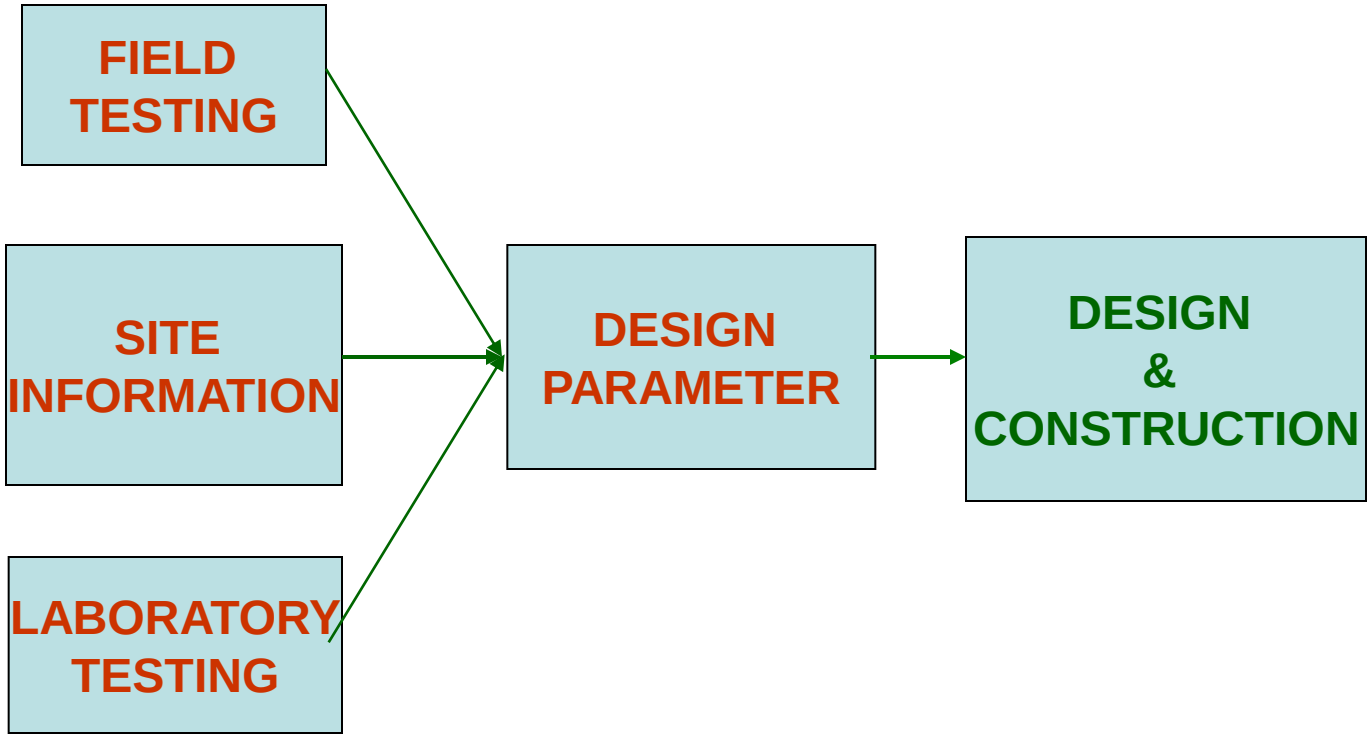
THEORETICAL BACKGROUND + EXPLORATION+ EXPERIENCE + ECONOMICS

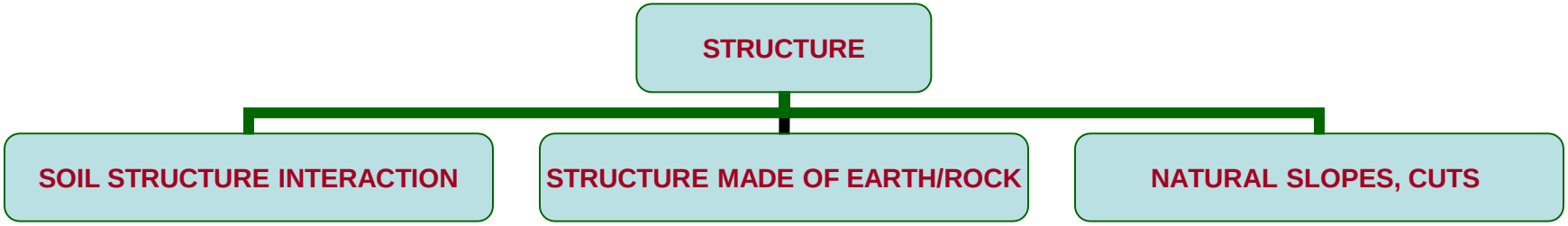
+ ENGINEERING JUDGEMENT → **SOLUTION**

CIVIL ENGINEERING PROJECTS TO BE HANDELED

WHY SOIL EXPLORATION?

- Steps involved in a project:





STRUCTURE

Structures for which the basic problem is the interaction of the structure and the surrounding ground. Such structures includes foundations, retaining walls, bulkheads, tunnel and buried pipelines.

Structure constructed of earth such as highway fills, earth and rockfill dams, bases and subbases of pavements, backfill behind retaining walls.

Structures of natural earth and rock as natural slopes and cut slopes. In this case knowledge of the properties of the natural materials is required

Information required from Exploration

- Areal extent, depth, and thickness of each identified soil stratum within a limited depth dependent on the size and nature of structure, together with the description of the soil including its degree of density if cohesionless and degree of stiffness in case of cohesive soil.
- Depth to top of rock and the characteristics of the rock, including such items as lithology, areal extent, depth, and thickness of each stratum; strike, dip and spacing of joints and bedding planes; presence of fault and shear zones; and state of weathering or decomposition.
- Location of ground water and the presence and magnitude of artesian pressures.
- Engineering properties of the soil and / or rock in situ such as permeability, compressibility and shear strength.

Steps of subsoil Investigation

SOIL EXPLORATION

PLANNING

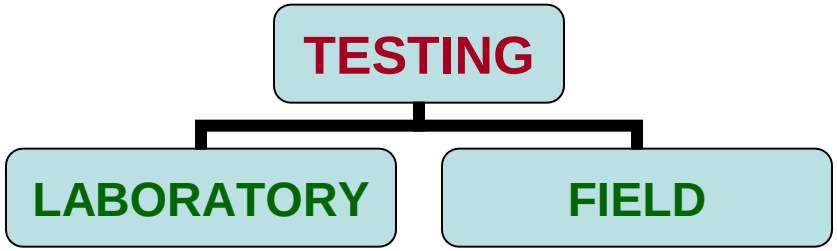
BORING

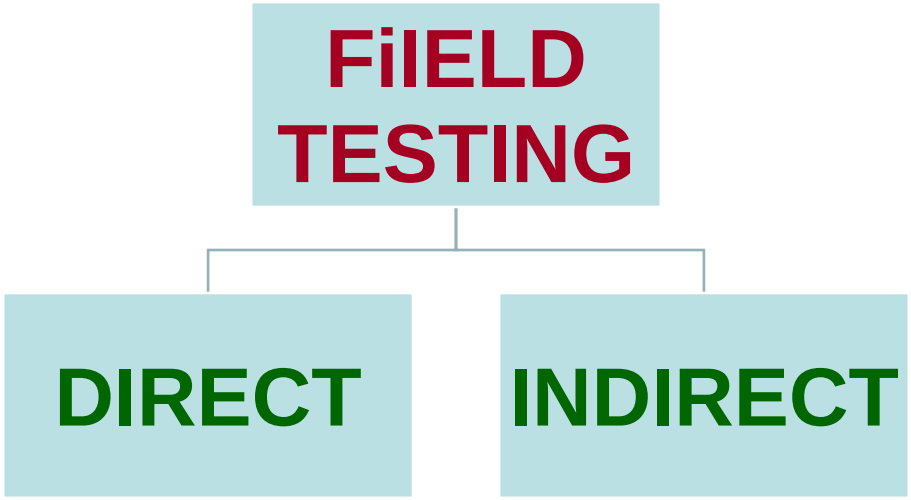
SAMPLING

TESTING

REPORTING

TESTING




FiIELD TESTING
DIRECT
INDIRECT

FIELD TESTING

INDIRECT METHOD

GEOPHYSICAL TESTING

Seismic Refraction

Electrical Resistivity

DYNAMIC TESTING

Downhole Seismic Method

Crosshole Seismic Method

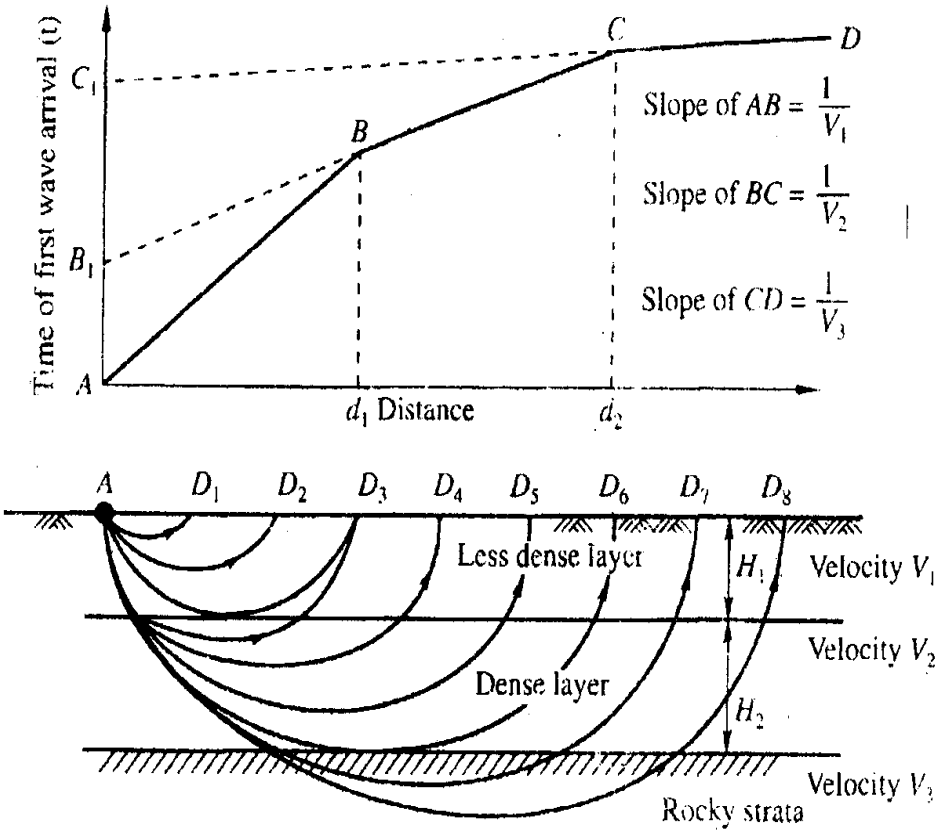
GEOPHYSICAL TESTING

Seismic Refraction

Electrical Resistivity

FIELD TESTING

Seismic Refraction



(a) Schematic representation of refraction method

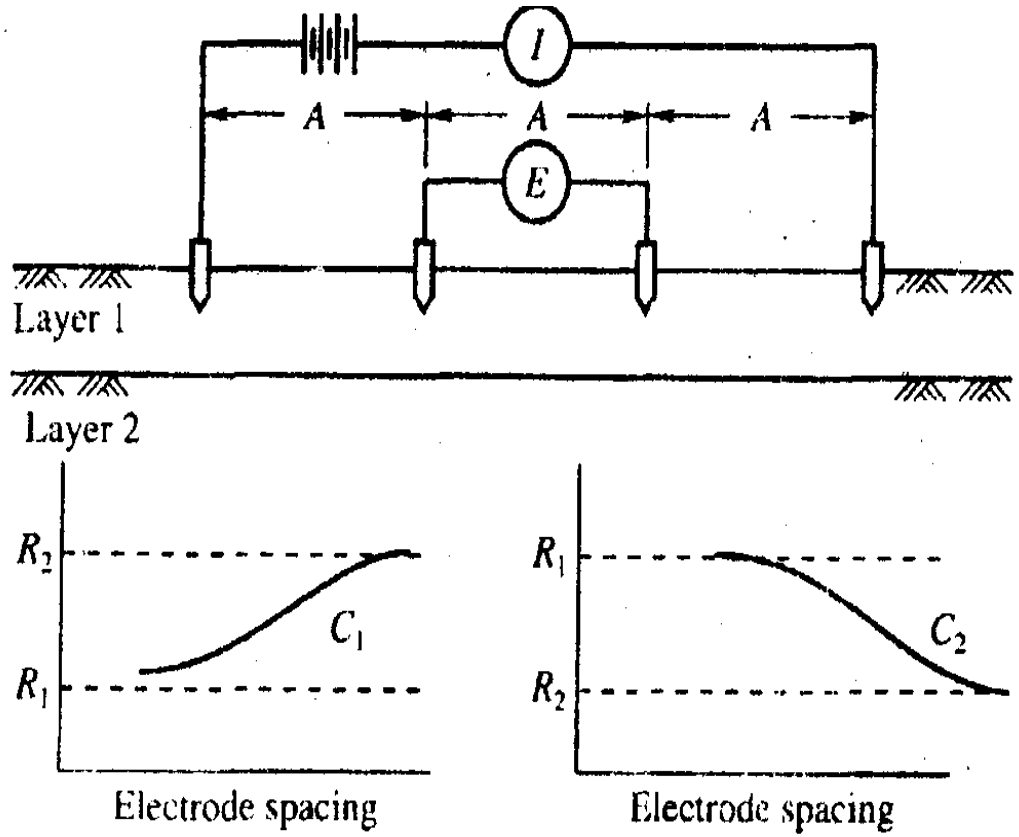
Seismic Refraction

Table 9.8 Range of seismic velocities in soils near the surface or at shallow depths (after Peck et al., 1974)

Material	Velocity	
	ft/sec	m/sec
1. Dry silt, sand, loose gravel, loam, loose rock talus, and moist fine-grained top soil	600-2500	180-760
2. Compact till, indurated clays, compact clayey gravel, cemented sand and sand clay	2500-7500	760-2300
3. Rock, weathered, fractured or partly decomposed	2000-10,000	600-3000
4. Shale, sound	2500-11,000	760-3350
5. Sandstone, sound	5000-14,000	1500-4300
6. Limestone, chalk, sound	6000-20,000	1800-6000
7. Igneous rock, sound	12,000-20,000	3650-6000
8. Metamorphic rock, sound	10,000-16,000	3000-4900

FIELD TESTING

Electrical Resistivity



(b) Schematic representation of electrical resistivity method