

TEST COVERAGE

In order to verify the above competencies, the test is aimed to evaluate the workers' knowledge in the following fields:

A. Basics of Mathematics / Natural Sciences

- Units and their conversion
- Calculation of cross-section and volumes (i.e. annuli, pits)
- Basic of technical mechanics (power, torque, tension)
- Work, energy, capacity
- Basics of fluid mechanics (hydrostatic pressure, flow-rate, viscosity, pressure loss in fluids)

B. Basics of Geology

- Geological cycle of formation of soil;
- Nature of soil and its stratification;
- Soil characteristics and classification;
- Common clay minerals;
- Properties of coarse and fine soils;
- Rock Properties, Classification and mode of formation;
- Physical and engineering properties of the soil and rock formations;
- Differences in behaviour of rock, soil and other engineering materials.

C. Geophysical Investigation Techniques

- Application Area of Geophysics;
- Geophysical investigation techniques and basic selection criteria;
- Principle of Geophysical investigation methods;
- Objectives of Geophysical investigation;
- Stages of Geophysical investigation;
- Demonstrations of Geophysical Techniques.

D. Project Realization

- Location plans and terrain profiles;
- Job site set-up;
- Documentation of system basics;
- Daily job reports;

E. Planning for Subsurface Investigation

- Preliminary Designs and Cost Estimation;
- Evaluation of Available surface and subsurface information;
 - ⇒ geological maps and memoirs;
 - ⇒ topographic map for studying terrain, access and site conditions
 - ⇒ Aerial photographs for the indication of geomorphology features, land use, problem areas and layout arrangements;
 - ⇒ Site Histories and Details of Adjacent Development.
- Site Reconnaissance to confirm the available information;
- Assessing the extent of subsurface investigation required for the Proposed Structures;
- Obtaining essential information for a trenchless technology project;
 - ⇒ Standard penetration values;
 - ⇒ Particle size distribution including presence of cobbles and boulders;

- ⇒ Shear strength;
- ⇒ Atterberg limits (liquid, plastic and shrinkage limits);
- ⇒ Moisture content;
- ⇒ Height and movement of water-table;
- ⇒ Permeability;
- ⇒ Presence of contaminated soils (hydrocarbons, etc).
- Selection of appropriate Geophysical investigation method.

F. Geophysical Investigation Requirements

- Determination of depth and thickness of geologic strata;
- Determination of perched water zones and depth of groundwater;
- Estimation of soil and rock composition;
- Location of fracture zones, faults, karst, and other hazards;
- Location of clay lenses and sand channels;
- Location of buried objects (metal and non-metal);
- Location of utilities, and backfilled areas;
- Assessment of ground response to changing natural conditions brought about by subsurface excavations;
- Assessment of any special construction problems with respect to the existing structures nearby;
- Presence of contaminated soils (hydrocarbons, etc).

G. Hazards Identification

- Unstable slopes
- Active or potentially active faults
- Regional seismicity
- Floodplains
- Ground subsidence
- Collapse
- Heave potential

H. Geophysical Tools for Sub Surface Investigations;

- Electrical Tomography:
 - ⇒ Equipments and mode of operation;
 - ⇒ Field of application.
- Seismic Techniques:
 - ⇒ Equipments and mode of operation;
 - ⇒ Field of application.
- Electromagnetic Methods:
 - ⇒ Equipments and mode of operation;
 - ⇒ Field of application.
- Ground Penetrating Radar:
 - ⇒ Components and mode of operation;
 - ⇒ Field of application.

I. Field Data Acquisition and Interpretations

- Instrument Precision Requirement;
- Instrument Calibration;
- Data Collection and Recording;
- Frequency of Observations;
- Field Data Acquisition;

- Field Data Processing & Interpretation;
- Use of Computer software in Geophysical Data Interpretations;
- Maps Creation and Report Writing.

J. Authority regulations / safety at work / environmental protection / work sheets

- Responsible persons;
- Work safety;
- Water protection;
- Pollutant and noise emission;
- Regulations for handling dangerous materials and agents;
- Basics of working and civil laws for drilling operations (liability, negligence etc.);
- Regulatory guidelines;
- Relevant laws, rules and regulations;
- Work sheet standards.