PBW 626 Engineering Geology and Rock Mechanics

Joint with

PBW 588 Engineering Geology

Lecturers:

Prof. Dr. Yasser Hegazy

Dr. Sherif Akl

Overview

- Engineering Geology (Dr. Sherif Akl)

Relation between geology and engineering - Classification of intact rocks and their engineering properties - Short overview of structural geology and Mapping - Weathering and Geomorphology– Methods of Exploration.

- Rock Mechanics (Prof. Yasser Hegazy)

Mechanical Properties of Rocks – Deformation and Settlement – Bearing Capacity – Slope Stability – Design of footings and drilled Shafts in Rocks.

Engineering Geology Lectures

Lecture	Date
Get to know the course	19/2
Introduction	19/2
Minerals and Rocks	26/2
Physical Geology	5/3
Structural Geology	12/3
Mapping and Cross-sections	19/3
Site Investigation	26/3

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Engineering Geology

Lecturer:

Dr. Sherif Akl

Acknowledgement

- Herbert Einstein
- Andy Link
- Peter Link
- Abdel-Samad Khafagy

Introduction

Lecture 1

Outline

- Definition
- Relationship between geology and Engineering.
- Life of a project.

Definition

Application of geological sciences to engineering practice for the purpose of ensuring that the significant geological factors affecting location, design, construction, and maintenance (operation) of structures are recognized and adequately provided for.

Relationship between geology and engineering

- Subsurface exploration
- Interpretation and stratification
- Bases for soil mechanics and rock mechanics
- Sources of uncertainty and hazard
- Terzaghi's point of view

Throughout the life of the project

- Exploration
- Testing
- Analysis
- Design
- Maintenance

Exploration

- Project layout---What are the sensitive parts in the project to sub-conditions
- Collect all available information about a much larger are than the project site---Why?
- Mapping and subsurface exploration
- Interpretation of investigation observations
- Refine exploration program
- Identify existing uncertainties
- Evaluate encountered conditions during construction

Testing

- Engineering Properties
  - Strength
  - Deformability
  - Permeability
- Index Properties
  - Atterberg limits
  - Grain size distribution
  - Cone penetration

Analysis

- Boundary Conditions
- Material Models
- Loads

Design

- Average Conditions
- Worst Case Scenario
- Contingency design
- Observational Method

Maintenance

- Monitoring Structure during and after construction
- Loads, deformations, water flow, change in ground surface
- Ensure safety
- Compare with anticipated behavior, assessment
- Adapt design if using observational method
- Collect data for research and develop new methods

Any Questions?

THANK YOU