CB 523
Methods and Equipment for Construction 1

Lecture 1:
Course Introduction

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Courtesy of Dr. Ahmed Alhady
Agenda

• Introduction to the Course
  • Course Objectives
• Topics covered throughout the course
• Syllabus Discussion
Course Description & Motivation

- Design and construction of formwork systems; horizontal formwork, and vertical formwork.
- Concrete technology; mixing and batching concrete, transporting concrete, and placing and compacting concrete.
- Design and construction of dewatering systems; open sumps system, well points system, and deep wells system.
- Design and construction of shoring systems; continuous piles system, secant piles system, and diaphragm walls system.
- Cranes; derrick cranes, mobile cranes, and tower cranes.

Health and safety precautions.
Course Objectives

- The course aims at introducing the student to the knowledge of construction engineering in the area of building construction.
- Acquaint students with the horizontal and vertical formwork systems.
- Provide knowledge for concrete production in field and batching plants.
- Provide information for the available dewatering systems and shoring systems used in the building construction industry.
- Acquaint students with different crane types used in the construction industry and to acquaint students with health and safety precautions.
Topics covered throughout the course

- **Introduction to Formwork**
  - **Loads on formwork:**
    - Calculation of the dead load on formwork, the construction live loads, and the lateral pressure of concrete on the vertical formwork.
  - **Properties of materials used in formwork:**
    - Behavior of wooden elements; the effect of moisture content on the lumber, the effect of number of using on the lumber, and the effect of finishing on the lumber.
    - Behavior of plywood; the relationship between grain direction and strength.
  - **Strength and rigidity of forming systems:**
    - Check for deflection, check for bending moment, check for shear force, and check for bearing stress.
Topics covered throughout the course (Cont’d)

- **Design of horizontal formwork:**
  - Design and construction of the slab formwork system; sheathing, joists, stringers, and shores.
  - Calculate the quantity of material required to erect the formwork.

- **Design of vertical formwork:**
  - Design and construction of the column formwork system; sheathing, studs, and clamps.
  - Calculate the quantity of material required to erect the formwork.
Topics covered throughout the course (Cont’d)

- **Batching and mixing concrete:**
  - Batching and mixing concrete in site.
  - Adjusting material proportioning according to the mixer capacity, the effect of moisture content of aggregate on the adding water, and the effect of mixing time on the concrete strength.
Topics covered throughout the course (Cont’d)

- **Transporting concrete:**
  - Equipment used in transporting concrete to the site.
  - Factors affecting the selection of the method of transporting.
  - Factors affecting the quality of concrete during transportation phase.
  - Transporting concrete by pumps.
  - Comparison between alternatives of transporting concrete.
Topics covered throughout the course (Cont’d)

- **Placing and compacting concrete:**
  - Equipment and tools used in placing of concrete.
  - Mechanism of vibration.
  - Precautions during Internal vibration.
  - Precautions during external vibration.
Topics covered throughout the course (Cont’d)

- **Dewatering systems:**
  - Introduction to dewatering theory.
  - Relationship between soil type and dewatering system.
  - Design and construction of open sumps system.

- **Wellpoint & deep wells system:**
  - Design and construction of well points system.
  - Design and **construction of deep wells system.**
Topics covered throughout the course (Cont’d)

- **Cases studies:**
  - Introducing cases of studies for projects used different dewatering systems.

- **Diaphragm walls.**
  - Method of construction for diaphragm walls.
Topics covered throughout the course (Cont’d)

- **Cranes**
  - Introduction to cranes. Derrick cranes. Mobile cranes; cranes mounted on crawler, cranes mounted on wheels, cranes mounted on lorry, and telescopic cranes.
  - Tower cranes.
  - Selection of the optimum location of tower crane.
  - Erecting and dismantling tower cranes.
  - Assessing the productivity of tower cranes.
Topics covered throughout the course (Cont’d)

- **Health and safety**
  - Working at height: Hazards & control.
  - Excavation work hazards.
Syllabus Discussion
Thank You

Questions ?