

Heavy Construction Estimating

Course Objective:

The objective of the course is to provide an awareness of cost parameters associated with heavy construction projects, as well as, the means and methods to incorporate these parameters in a structured manner into cost estimates of such projects. Contrasts in approaches to generating cost estimates for heavy construction projects and building projects are explored. Insight is given into the thought processes used in the preparation of heavy construction cost estimates. Examples of heavy construction projects are presented and the unique facets of the projects are discussed. Approaches to cost estimating of self performed work are examined. The concept of production rate based estimating is presented in detail. Use of HCSS estimating software is demonstrated. The structural elements of a heavy construction cost estimate are defined and the principle cost elements discussed. Interaction and interdependence of the cost estimate and the preliminary project schedule is demonstrated.

Following is a week-by-week description of the course:

Week 1: Introduction to and Overview of Heavy Construction

Wide spectrum of project types comprising the field of heavy construction is presented. Contrasts between these project types and building projects demonstrated. Differences in approach to construction delineated.

Week 2: Make-up of Estimate

Overview of project requirements that affect estimates. Discussion of the thought process that is required to prepare an estimate. Dialogue of internal and external factors that influence the preparation of an estimate.

Week 3: Estimating Process

Steps required in preparing an estimate. Bidding strategies. Discussion of the relationship between past history and estimating self-performed work. Interpreting plans and performing quantity survey/takeoff.

Week 4: Overview of HCSS Estimating Software

Review of homework. General overview of how HCSS works. Explanation of how estimates are set up in HCSS.

Week 5: Preparing an Estimate in HCSS

Students will go through the process of creating an estimate using HCSS software.

Week 6: Cofferdam Construction Concepts
Excavation techniques used in overburden as well as in rock. Support of excavation schemes. Impact of ground conditions to be encountered on selection of techniques and schemes.

Week 7: Tunnel Excavation and Lining Concepts
Tunneling concepts in earth, rock or mixed environments. Tunnel excavation plant and equipment. Geometric constraints on tunnel excavations. Tunnel support schemes. Tunnel lining methods. Serviceability requirements.

Week 8: Underground Construction Direct Cost Methodology
Cost development procedures. Generating cost components into a coherent structure. Production based estimating concepts and mechanics. Impact of site and schedule constraints. Interfacing of cost estimate with preliminary project schedule.

Week 9: Indirect Cost and Equipment Cost Components of the Estimate
Project general and administrative cost overview. Construction plant and equipment mobilization costs. Plant and equipment operation costs. Safety and environmental costs. Equipment purchase versus rental options. Equipment salvage.

Week 10: Risk Assessment
Inherent elements of risk associated with heavy construction identified. Project financing implications explored. Costs of delay reviewed.

Exam Week: Final Exam – Take Home

Text: No text is required. Class handouts will be provided.

Software: HeavyBid by HCSS - HeavyBid construction estimating software is designed for infrastructure contractors bidding projects that range from \$50,000 to more than \$1 billion. It is ranked No. 1 by infrastructure contractors and is used by approximately 35% of the infrastructure contractors in the country.

Grade determination:

Final examination	50%
Homework	40%
Class participation	10%