



CIQS Syllabus		Original:	May 28, 1993
Course No:	A306	Rev. No:	5
Course Title:	Measurement & Pricing of Civil Works	Rev. Date:	March 19, 2011

Course Description:

This subject deals with engineered construction such as sewers, roads, shoring and underpinning and mass excavation works. Unlike building construction, Civil or Engineered work has a high component of equipment costs. In addition, much of the work is undertaken in remote locations which add additional costs not found in building construction. Civil Works also commonly employ Unit Rate type contracts and Work Breakdown Structures to enhance project management.

Suggested Prerequisites:

Course No: A102 – Construction Technology I
A103 – Measurement of Construction Work I
A104 – Surveying Principles and Applications
A201 – Construction Technology II
A202 – Measurement of Construction Work II
A207 – Construction Technology III
A301 – Measurement of Construction Work III

Learning Outcomes:

The candidate will be able to:

1. Measure and price bulk excavation works including the costs of equipment.
2. Measure and price the installation of shoring of various types used in deep excavations.
3. Measure and price the installation of piping systems, including sewer and water works.
4. Measure and price road construction.
5. Calculate General Conditions costs of "out-of-town" construction works.
6. Develop Unit Rate Bid Sheets.

Course Content:

In the course of studies from the required texts, the candidate will cover:

1. Chapters 1 to 10, inclusive, of Principles and Practices of Commercial Construction by Cameron K. Andres and Ronald C. Smith dealing with: Site investigation; Site Layout; Excavations and Excavating Equipment; Site Development and Services; Foundations; Formwork; Concrete Work; Structural Timber Frame; Reinforced Concrete Frame; and Structural Steel Frame.
2. Chapters 1 to 11 and 22 to 25, inclusive, of Estimating Construction Costs by Robert L. Peurifoy & Garold D. Oberlander, dealing with: Introduction to Estimating; Bid Documents; Estimating Process; Conceptual Cost Estimating; Cost of Construction Labour and Equipment; Hauling and Transporting Material; Earthwork and Excavation; Highways and Pavements; Foundations; Concrete Structures; Steel Structures; Sewerage Systems; Water Distribution Systems; and Total Cost of Engineering Projects.
3. Chapters 10 to 17, inclusive, of Surveying with Construction Applications by Barry F. Kavanagh dealing with surveying for construction applications.
4. The student will study from CCDC 18 (2001) Civil Works Contract, the entire contract including general conditions and CCDC 48 (2002) A Guide to the Use of CCDC 18.
5. Chapters of the Caterpillar Performance Handbook, dealing with Owning and Operating Costs (Section 20; Mining and Earthmoving (Section 22); Land Clearing (Section 24). In addition, the candidate will study sections dealing with production estimate for Track-Type Tractors, Hydraulic Excavators, Front End Loaders (Tracked & Rubber Tired).



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Required Textbooks and Materials:

1. Principles and Practices of Commercial Construction, 8th Edition by Ronald C. Smith and Cameron K. Andres
2. Estimating Construction Costs, 5th Edition, by Robert L. Peurifoy & Garold D. Oberlander
3. Surveying with Construction Applications, 7th Edition, by Barry F. Kavanagh
4. CCDC 18 - 2001 Civil Works Contract
5. CCDC 48 - 2002 A Guide to the Use of CCDC 18-2001
6. Caterpillar Performance Handbook, 40th Edition, January, 2010

Additional Reference Materials:

1. Fundamentals of Construction Estimating, 3rd Edition, by David Pratt

Testing:

1. Demonstration of a clear understanding of the cost impacts of specific individual site locations.
2. Demonstration of a clear understanding of the impacts of remote site locations and the additional costs to be expected including determination of possible options.
3. Detailed measurement and pricing of bulk excavation and fill projects, including road works.
4. Detailed measurement and pricing of various heavy foundation systems and reinforced concrete structural elements.
5. Detailed measurement and pricing of water and sewerage systems.
6. Detailed calculation of equipment and labour costs.
7. Demonstration of an understanding of the types of equipment normally available and the proper function of the equipment to maximize productivity.
8. Demonstration of an understanding of the application of Unit Rate type contracts for Heavy Civil works.

Note:

Since the intent of the testing is to demonstrate an understanding of the measuring and estimating process, there is no requirement to memorize tables and charts. Required tabular data will either be provided with the examination or candidates will provide a reasonable assumed value.