Introduction to Project Estimating

Time: 40 hours

Maximum Class Size: 10

Prerequisites: None

Course Description: This 40-hour LIUNA Training and Education course provides an in-depth overview of project estimating. Students will learn about quantity take-offs and material pricing. Using hands-on exercises, students will calculate area and volume, determine quantity take-offs, material calculations and material pricing. They will also learn how to compute labor and equipment costs. Using a variety of worksheets, charts and blue prints, students will be given ample time for authentic and meaningful practice.

Goals/Objectives/Student Learning Outcomes:

- Identify at least six reasons for performing estimating on construction projects.
- Identify at least four types of estimates, and explain the purpose of each.
- Identify the elements of the bidding process and the role and purpose of each.
- Define the following elements of a project estimate:
    - Quantity take off
    - Material pricing
    - Man-hour
    - Labor pricing
    - Past performance records
    - Equipment costs
    - Mark-up
- Define and contrast the following types of estimates:
    - Unit price bids
    - Lump sum bids
    - Cost plus bids
- Given excerpts form example project estimates, recognize the difference 100 % of the time between:
    - Unit price bids
    - Lump sum bids
    - Cost plus bids
- Identify three reasons why bonding is required by construction owners.
- Define the following types of insurance and identify what they cover: construction insurance, general liability insurance, contractor's protective liability insurance, and contractor's equipment insurance.
- List at least four safety equipment costs that must be included in an estimate.
- Give at least four examples of how safety elements can increase man-hour estimates.

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- Given a set of project plans, perform a simple quantity take-off of a small part of the project.
- Define quantity take-offs and identify at least three reasons why quantity take-offs are done.
- Identify at least four of the documents needed to perform take-offs.
- Identify at least four key tasks done during quantity take-offs and who is responsible for performing each task.
- Given a set of project plans, a project manual, sections of the project divided into assemblies or systems, and working in small groups, each group member will find dimensions and calculate material quantities and record on a worksheet to within +/- 5%.
- Given a completed quantity take-off and a corresponding set of plans and specifications, analyze the take-off and correct any errors or omissions.
- Given take-offs of assemblies or systems and material pricing resources, calculate the prices for the components of the assembly or system using pricing resources to within +/- 5%.
- Identify at least four items to consider when estimating equipment costs.
- Define the following terms: price rate, ownership costs, rental costs, maintenance cost, fuel cost, transportation cost, depreciation cost.
- Identify at least three key tasks to be performed during a typical cost comparison when estimating cost effectiveness of equipment.
- Given a set of plans and a list of equipment prices and capabilities and working in small groups, determine equipment necessary to complete the work. Perform cost comparisons to determine the most effective equipment choice. Explain reasoning for each choice. Calculate the total equipment cost.
- Define labor cost and labor burden; identify at least four elements of labor cost.
- Define labor production rate and list at least five factors that could influence it.
- Given a set of plans and list of labor costs for a project, determine crew size and composition. Explain reasoning for choices. Calculate labor cost for the project.
- Define change orders and identify documentation used. Give at least two examples of when change orders could be used.
- Given a change order and a scenario, draw an as-built drawing showing the changes specified with no mistakes in the dimensions.
- Identify at least three estimating software programs. Identify at least four similarities between the different software programs.
- Explain the role of cost books in creating estimates.
- Identify the 16 divisions of the Construction Specifications Institute's Master Format.
- If possible:
- Practice using the Craftsman *National Estimator* program by completing the "Show Me" tutorial.
- Given a scenario for a portion of a construction project and using Craftsman *National Estimator* create an estimate for the project (within +/- 10% of the answer) and save the estimate to file.
- Working in small groups, review the above estimate and compare to others in the group. Identify any discrepancies.
- Practice using the R.S. Means *CostWorks* program. Identify and navigate between the following screens and explain the function of each: Settings, Unit Cost and Project Cost.
- Use the *search and find* functions of the program and the 16 Divisions of the Construction Institute's Master Format to locate at least 6 line items within the cost books.
- Locate the following in the *Costworks* program and explain the purpose of each: Bookmark, Cost List, Reference, Graphics, Crew Components, Calculator, Dictionary, Abbreviations.

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- Perform the following operations using the R.S. Means *CostWorks* Program: Select a line item, specify quantities, change material prices, change equipment and labor costs, send items to the cost list and edit and adjust the cost list.
- Given a scenario for a portion of the construction project and using the R.S. Means *CostWorks* program, create and estimate for the project (within +/- 10% of the answer sheet) and save the estimate to file.
- Identify at least three "additional functions" that typical estimating software packages can perform.

Classroom Rules and Procedures

- All classes begin at 6:30 am and end at 3:00 pm
- Upon entering classroom, all participants must sign in and be seated by 6:30 am
- Class will consist of a combination of lecture, video, demonstration, coached group exercises, individual exercises and assessment.
- Students are required to report to class ready to work and maintain the provided PPE

Textbooks/Readings/Materials

- Introduction to Project Estimating IG/PG
- Introduction to Project Estimating Handout Packet
- LIUNA Project Estimating PowerPoint

Personal Protective Equipment

- 10 pairs of gloves
- 10 pairs of safety glasses
- 20 pairs of earplugs
- 12 hard hats

Course Requirements

To receive credit for the course, participants must:

- Be present for the full 40 hours
- Participate in all classroom exercises
- Pass a written exam

Course Policies

- Participants must be on-time and ready to work.

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- Participants must return from breaks on-time.
- Participants must participate in each exercise and assignment

Assessment and Grading

Participants will be assessed on the following:

- All written exams must be passed with a score of 80% or above.
- All hands-on exercises are graded on performance and participation. They are pass/fail and must be passed with a score of 80% or above.

Safety

Failure to maintain and use PPE may result in dismissal from the course.