Introduction to Tri-Services Pricing Guide
Content Overview

**Cost estimates** are one of the fundamental building blocks of the acquisition process. The cost estimate and its supporting budget are a part of the baseline against which a program's progress and success are measured.

The Government must be able to produce and use cost estimates in order to evaluate whether a system is affordable and consistent with the DoD component's and DoD's overall long-range investment and force structure plans. Cost estimates also form the basis for budget requests to Congress.

This module focuses on basic cost estimating tools and techniques.
Objectives

By the end of this module, you will be able to:

- Recognize the important elements of the Tri-Services guide
- Select relevant portions in developing a cost estimate.
Question 1

Which of the following cost estimating techniques uses a database of like systems and performance specifications to generate a cost estimate for the new system based on statistical analysis of system performance or design characteristics?

- Analogy
- Extrapolation
- Bottoms-up
- Parametric

Check Answer
Question 2

A life cycle cost estimate includes which of the following cost categories:

- Research and Development, Procurement, Operations and Maintenance, and Personnel
- Research and Development, Production, Support, and Military Construction
- Technology Development, System Development and Demonstration, Production, and Operations and Support
- Research and Development, Investment, Operating and Support, and Disposal

Check Answer
The Golden Rule of Estimating

Consider not only the cubic foot, the cubic yard, the square foot or the lineal foot the pound or ton, but include all the complicating conditions encountered inputting the work in place.

Beginning in 2000, the Department of Defense (DOD) began a consolidation effort to unify all service related design and construction technical criteria. This effort was under the direction of the chief engineers of each service and the Deputy Undersecretary of Defense for Installations. Under this consolidation, the military departments converted most of the existing facility related handbooks, design manuals, engineering manuals, and technical manuals into Unified Facilities Criteria (UFC) documents.

For an estimate to be accurate, the work must be accomplished in the manner that the estimator envisions. Therefore it is highly advisable for the estimator to visit the site to appreciate the nature of the work. Before attempting to estimate the work, the estimator should envision what the finished project will look like; how the work will be done; and, what obstacles come into play (low power lines, narrow doors, asbestos, utilities or other work).
Purposes and Importance

The DD1391 estimate package is intended to provide documentation to meet the needs of budget decision makers and the project team. The importance of accurate planning/design cost estimates cannot be overemphasized, as they could be the determining factor as to whether or not the project is included in the budget year program.

Although requirements and justifications are important parts of project submittals, this document deals only with scope and cost, and information presented herein is supplied in addition to the information presented in UFC 1-300-09N, UFC 3-701-01, UFC 3-730-01, and UFC 3-740-05. Scope is included because an estimate is no better than the definition of scope that has been determined; an incomplete scope will result in an incomplete proposed project cost.
Cost Estimating Formats

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departmentss, the Defense Agenciess, and the DoD Field Activities in accordance with USD(AT&L) Memorandum date 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA). Therefore, the SOFA, the HNFA, and the BIA, as applicable.

UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services's responsibility for providing technical criteria for military construction. Headquarters, U.S Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Center for Engineering and the Environment (AFCEE) are responsible for administration of the UFC system. www.bdg.org/cch/DoD/UFC/ufc_3740_05. pdf
Whole Building Design Guide site: http://dod.wbdg.org

Per UFC 3-740-05 (June 2011) Handbook: Construction Cost Estimating offers two format structures:
• Work Breakdown Structures (WBS)
• Uniforimat II (ASTM Standard E1557-97) for Design-Build projects using the Whole Building Design Guide.

Unique WBS for Military Programs been developed:
• MCACES/Mil for Army Projects
• SUCCESS for Navy Projects
• PACES for Air Force Projects
Estimating Tools

Throughout this document several tools may be referenced that are necessary to accomplish the cost engineering tasks being discussed. These include:

- **SuccessEstimator™** The NAVFAC Detailed Cost Estimating Tool available from USCOST.
- **Parametric Cost Estimating System (PACES).** The Tri-Services supported parametric cost modeling tool. **HII (formerly HAG).** The Tri-Services supported historical cost database and analysis tool (DOD Only).
- **Electronic Project Generator (EPG).** NAVFAC’s web based DD1391 budget documentation application (NAVFAC Only).
- **RSMeans CostWorks,** the electronic version of the RSMeans Cost Data publications.
Software Parametric Tools

SUCCESS Estimator
While primarily used as a QTO (Unit Price) estimating system, Success Estimator™ (SUCCESS) also provides extensive parametric modeling capabilities thru the use of user defined and/or commercially available assemblies from sources such as RSMeans, Richardson’s, etc. SUCCESS integrates multiple databases, decision trees, and cost models, and links to other applications via API, OLE, and ODBC while incorporating customizable Visual Basic functionality.

SUCCESS interfaces directly with PACES parametric software and MII (the “Micro-Computer Aided Cost Estimating System (MCACES), Second Generation” used by the U.S. Army Corps of Engineers), thus allowing advanced users complete control of project costs. SUCCESS allows virtually unlimited format flexibility, but unless otherwise directed by the NAVFAC Cost Engineer, NAVFAC requirements are to use the MWBS for Design Bid Build projects and UNIFORMAT II™ for Design Build projects. Architect-Engineer (AE) firms must procure SUCCESS Estimator and specified databases directly from USCost.

PACES
Use of PACES parametric estimating software allows the project estimator to estimate and manage costs during the critical planning and programming stage of project development. PACES uses predefined model relationships to link basic facility parameters (function, gross floor area, number of floors, heating load, electric load, etc.) to detailed engineering quantities. The models have been prepared from past projects and Air Force Models (Tri-Service sponsored), and projects can be reported in either the Military Work Breakdown Structure (MWBS, for Design Bid Build projects) or UNIFORMAT II (for Design Build).

Appropriate modifications must be made to the base model to ensure estimate accuracy and account for standard features, special costs, and recent criteria changes. NAVFAC provides PACES user licenses to all in-house cost estimators, while Architect-Engineer (AE) firms must purchase the software from AECOM.
DD1391 (DD Form 1391) Scope Considerations

The DD1391 document includes separate entries for specific features of additional cost. Certain features are listed below as examples only. Other specific features may not be discussed in this section, but should also be shown as a separate item to emphasize significant cost.

- PCAS (Post Construction Award Services) LID (Low Impact Development)
- Operation and Maintenance Support Information (OMSI) Intrusion Detection System (IDS)
- TEMPEST, HEMP, and RFI Shielding Uninterruptible Power System (UPS)
- Telephone/Communication (cost of manholes, duct banks, cable trays, hand holes) Hazardous Material Abatement
- Access Roads (Off-Station)
- Anti-terrorism Force Protection Program
Guidance Costs

The Tri-Services Committee on Cost Engineering maintains the Department of Defense Guidance Unit Costs (DOD GUC), Size Adjustment Factors, Tri-Service Escalation Factors, and Area Cost Factors (ACF). This information is assembled and distributed by the Office of the Under Secretary of Defense (OSD) in the "DOD Facilities Pricing Guide" (UFC 3-701-01).

The guidance unit cost for a facility may be used as a check against a parametric estimate, or may serve as a baseline estimate for the facility to which will be added special features costs.
Purpose

Cost estimates for construction projects are intended to be used by the Government to establish and verify budget cost and contract bid prices; to develop historical data for future estimating; and, to assist in setting the DOD Guidance Unit Cost (GUC) through collection of construction data via HII (the Tri-Service sponsored historical data collection software). In general, when called out by contract requirements, Detailed Government Construction Cost Estimates shall follow the general guidance of AACE Recommended Practices 56R-08 as referenced herein. Note that a Parametric estimate does not meet the requirements of a Class 3, Class 2, or Class 1 estimate. Converting a Parametric (e.g. PACES) estimate to a Detailed Cost Estimate (Class 2 or Class 1) by exporting/importing to SUCCESS Estimator requires an analysis of each individual unit price task (DIA) to ensure that each task is representative of the actual design quantities, utilizes appropriate material unit pricing, and labor/crew resource rates for each task are reasonable for the project location.

Classes of Detailed Government Construction Cost Estimates (per AACE Recommended Practices (RP) 56R-08 Table 1)

- Class 5, 0% to 2% design completion, -20% to +50% accuracy range
- Class 4, 1% to 15% design completion, -10% to +30% accuracy range
- Class 3, 10% to 40% design completion, -5% to +20% accuracy range
- Class 2, 30% to 75% design completion, -5 to +15% accuracy range Prefinal).
- Class 1, 65% to 100% design completion, -3% to +10% accuracy range
Detailed Cost Estimates for Design-Bid-Build

Detailed Cost Estimates (alternately described as Quantity Take-Off, QTO, Unit Price Estimate w/crews and productivity) are required with each project submittal as indicated in the Appendix “A”/Statement of A-E Services (SAES) or as otherwise required by contract. Prepare all detailed estimates (typically, Design Bid Build projects) using the Military Work Breakdown Structure (MWBS), NAVFAC Uniforformat (typically, only for Design Build Projects), or as determined on a case-by-case basis by the cognizant Cost Engineer. Estimates shall be prepared using the SUCCESS Estimator program for all projects over $500,000.

For projects under $500,000, contact the cognizant Cost Engineer for formatting requirements. For each Design Phase submittal or as otherwise required by contract, develop and submit a complete SUCCESS format electronic copy of the estimate (see http://www.uscost.net/costengineering/ for version information). Architect-Engineer (AE) firms must procure SUCCESS Estimator and specified databases directly from USCost. Unless otherwise stipulated in writing by the Cost Engineer, the order of precedence for the source of detail line items used to develop estimates is:

1) current commercially available unit costs utilizing crews and productivity (such as data from RSMeans, Richardson’s, etc)
2) user generated line items which incorporate labor/crew production rates, and
3) “LS” user generated pricing.
Detailed Cost Estimates for Design-Bid-Build, Cont’d

The estimate detail for each submittal shall be commensurate with the level of design required for that submittal. The estimate shall include extraordinary expenses such as travel, subsistence, premium pay and similar costs as separate considerations in field overhead. Adjust the unit prices provided in commercial databases to reflect quantity discounts, local variation, latest labor rates, latest material prices, bidding climate, foreign construction materials, project specific requirement, crew productivity, etc. for the area and the project’s complexity.

Contact should be made with the Project Manager prior to submission to reconfirm programmed construction costs for the contract. Where an A&E estimate exceeds 90% of programmed construction costs, recommendations for cost reduction or proposed bid items should be provided.

Cost Estimates
Estimating Methodology

In general, the accuracy increases as the method of estimation progress from Order of Magnitude method, to the other methods, square foot, building systems, parameters and quantity take-offs.
Multiple Estimates

Prepare and segregate separate cost estimates for each new non-identical building, structure, or addition in a project. Costs of altering existing buildings will not be included with the new building addition costs. When one construction contract contains more than one type of work (e.g., new construction, repair, equipment installation), the estimate shall be structured such that each type of work is identified and summarized separately. See also the requirements of Paragraph 5, “Bid Schedules”.
Estimate Requirements

Figure 1 portrays the typical estimate type that may be required for projects by construction contract type.

<table>
<thead>
<tr>
<th>Estimate Requirements</th>
<th>DB Post-Award Services</th>
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</table>
| Design Build Contract  | 15%  
(AACE Class)  
(Class 5, 4, 3)  
(s)  
(Final) |
| Design-Build (DB)      | 35%  
(---)  
(---)  
(---) |
| Design-Bid Build Contract | 15%  
(Class 5, 4, 3)  
(s)  
(Final) |
| Invitation for Bid (IFB) | 35%  
(Class 3, 2)  
(S)  
(S)  
(S) |
| Request for Proposal (RFP)  
/ Best Value (BV) | 60%/65%  
(Class 2, 1)  
(S)  
(S)  
(S) |
|                         | 100%  
(Class 1)  
(S)  
(S)  
(S) |
|                         | Final  
(Class 1)  
(S)  
(S)  
(S) |

**KEY**

- P = PACES/Parametric
- S = SUCCESS
- E = Engineer’s Estimate from DB Contractor (As Specified by Appendix A/SAES)

1. The 60%/65% design submittal requirement typically only applies to Air Force projects.

In general, the accuracy increases as the method of estimation progress from Order of Magnitude method, to the other methods, square foot, building systems, parameters and quantity take-offs.
Estimates for Changes Orders

Estimates for change orders to the contract plans and specifications shall be accomplished with adequate backup to negotiate. Estimates and summaries must be prepared for both increases and decreases in contract cost.
Negotiated Construction Contracts

For estimates for negotiated construction contracts meeting the following requirements the cost estimator must:

a) Develop a SUCCESS estimate unless estimated construction cost is less than $500,000 and alternate instructions are provided by the cognizant Cost Engineer.

b) Insure that final estimate accurately reflects the final plans and specifications. Field overhead must be itemized. Where conflicts exist between A&E estimate and construction contractor estimate, the A&E will provide prompt verification for items in question.
Estimates for Special Projects

For DBB projects over $500,000, SUCCESS Estimator estimates are required; contact the Cost Engineer for further clarification of format. In preparing the estimates, itemize specific quantities and unit costs for each item whenever possible in lieu of lump sum costs. The project cost estimate may either have the contractor overhead and profit, inflation, and contingencies within each line item of the estimate or these costs may be listed separately at the end of the cost estimate.

For combination projects, the cost estimate must identify the classification of work (construction, repair, maintenance, or equipment installation) for each line item or group of line items. Estimated costs must be based on current prices and escalated to the year proposed for project execution.
Cost Estimates- Primary Facility Costs

Captures costs for principal features of work

Commonly referred to as "costs inside the 5-foot line" for vertical construction

For utility infrastructure and range projects, the Primary Facility cost estimate includes all work within the project limits

- For Ranges, this is everything from the "Flag Pole" to the end of the range
- Utility runs from cantonment area to a range complex is NOT a primary facility cost

Estimate only includes separate lines items for AT Measures above and beyond minimum standards, which are not included in the unit construction price

IT costs automatically rolled into a separate line item

Line item for Sustainability and Energy Measures-Add 2% for any conditioned vertical construction or specific measures justified by a lifecycle cost analysis
Cost Estimates- Supporting Facilities Costs

Captures costs for principal features of work

Commonly referred to as "costs outside 5-foot line" for vertical construction

Separate sections for Electric Service; Water, Sewer, Gas; Steam; Paving, Walks, Curbs, Gutters; Storm Drainage; Site Improvements; Demolition; Information Systems; Antiterrorism; Ither

Privatized Utility costs- Connection Fee

Demo Cost Estimating- FRP Toolbox & PAX Newsletter

Supporting Facility Costs typically range between 15% to 25% of primary costs

If Supporting Facility Costs exceed 25% of the Primary Facilities Costs, they must be justified and described in the Description of Proposed Construction
Cost Estimates- Contingency Factors

Contingency is an allowance to cover unknowns that are not possible to adequately evaluate from available data at hand during engineering and design but which should be represented in the project estimate.

HQDA guidance is currently 5%.
Module Completion

You have completed this module.

Please use your browser window (X) to close out this lesson.

As a reminder, please complete all six precourse modules before taking the final exam in Blackboard.

Thank you.