



# MILITARY SEALIFT COMMAND

## MSC Work Item Cost Estimating Overview

Prepared for Military Sealift Command  
by Emprise Corporation

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# Learning Objectives

- **The overarching objective of this module is to introduce you to MSC's philosophy, policies and practices for developing independent government cost estimates (IGEs) for performance-like work items.**
- **At the conclusion of this module, you will understand and be able to describe the following:**
  - **MSC's policies and practices for developing independent government cost estimates for performance-like work items**
  - **Classification of cost estimates**
  - **Cost estimating terminology**
  - **Cost estimating process (definition, planning, data collection, analysis, estimate formulation, third party review, and estimate documentation)**
  - **Engineering approach (bottom-up cost estimating approach)**



# Cost Estimating

- **Structured analytical process for developing an estimate of future costs for procuring or producing goods and/or services**



# Independent Government Estimate (IGE)

- **Required by Federal Acquisition Regulations (FAR) for all acquisitions**
  - Prepared for each individual work item
- **Includes:**
  - All direct labor, material, and equipment to accomplish the scope of work described in work item
  - All subcontractor costs associated with accomplishment of scope of work described in work item (e.g., additional services, waste disposal, etc.)
- **Based upon composite labor rate provided by N10**



# Classification of Cost Estimates

<b><i>Class</i></b>	<b><i>Description</i></b>
<b><i>A</i></b>	<b><i>Detailed cost estimate</i></b>
<b><i>C</i></b>	<b><i>Budget quality estimate (new construction)</i></b>
<b><i>D</i></b>	<b><i>Budget quality estimate (modernization and repair)</i></b>
<b><i>F</i></b>	<b><i>Feasibility estimate</i></b>
<b><i>R</i></b>	<b><i>Rough order of magnitude estimate</i></b>

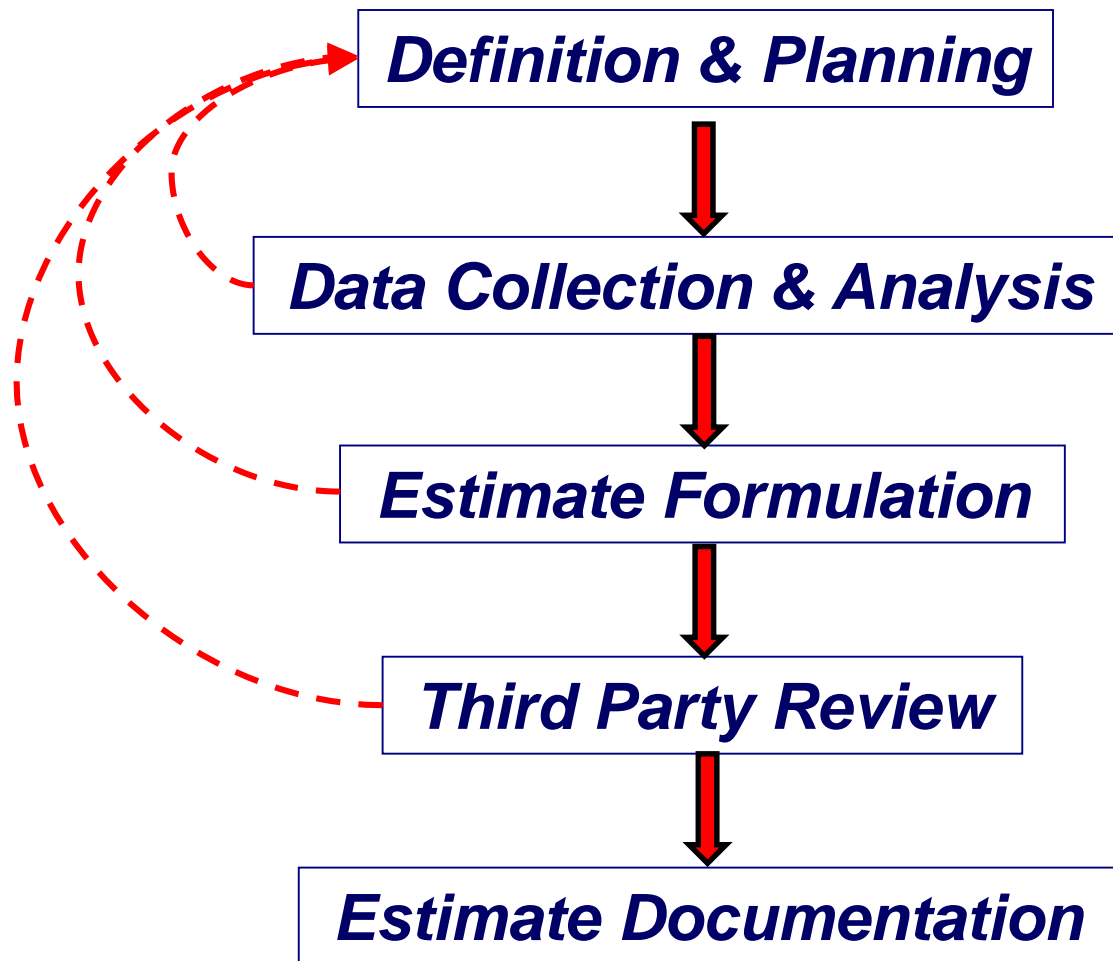


# Cost Estimating Terminology

- Labor costs, material costs, and other direct costs
- Recurring costs vs. nonrecurring costs
- Direct costs vs. indirect costs
- Fixed costs vs. variable costs
- Overhead costs
- Sunk costs
- Opportunity costs
- Standard costs
- Life-cycle costs



# Cost Estimating Process





# Definition

- **Desired outcome (e.g., product or service)**
- **Purpose of cost estimate**
- **By whom will the cost estimate be used**





# Planning

- **Planning**
  - **Ground rules and assumptions**
  - **Selecting appropriate estimating methodology**
  - **Selecting estimating team**



# Data Collection

- **Type of data needed to develop a cost estimate depends upon purpose of estimate and estimating methodology**
- **Four main types of data**
  - **Cost data**
  - **Schedule data**
  - **Technical data**
  - **Programmatic data**



# Potential Data Sources

- Estimator's and other estimators' personal knowledge and experience
- MSC historical data and/or cost estimating standards
- Manufacturer and vendor catalogs and price lists
- Contractor's historical data and/or cost estimating standards
- Estimating handbooks or guidelines
  - MSC Cost Estimating Guide (February 2001)
  - A Guide to Ship Repair Estimates in Man-hours by Don Butler (ISBN 9780080982625); 2012
  - NAVSEA 2005 Cost Estimating Handbook
  - Government Accountability Office Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs (March 2009)
  - Department of Energy Cost Estimating Guide (May 2011)
- International Cost Estimating and Analysis Association (ICEAA):  
<http://www.iceaaonline.com>



# Potential Data Sources (cont.)

- **Databases maintained by other Government agencies that have performed similar work**
  - **USD(A&T): [www.acq.osd.mil](http://www.acq.osd.mil)**
  - **Naval Center for Cost Analysis: [www.ncca.navy.mil](http://www.ncca.navy.mil)**
  - **Navy Visibility and Management of Operating and Support Costs (VAMOSOC): <https://www.vamosc.navy.mil/>**
- **Internet**



# Data Analysis

- **Commonly encountered data problems**
  - **Availability**
  - **Accessibility**
  - **Completeness**
  - **Accuracy**
  - **Reliability**
  - **Comparing “apples-to-oranges”**



# Estimate Formulation

- **Cost estimating is a mixture of art and science**
- **Non-parametric estimating methodologies leverage an estimator's knowledge, experience, intuition, and judgment**
  - **Analogy**
  - **Expert Opinion**
  - **Cost Factors**
  - **Extrapolation from Actuals**
  - **Engineering Approach**



# Analogy

- **Identify analogous goods, service, or system and associated cost data**
- **Determine attributes of analogous goods, service, or system that are major cost drivers**
- **Assess similarities and differences in major cost driver attributes between goods, service, or system of interest and analogous goods, service, or system**
- **Adapt costs for analogous goods, service, or system to reflect similarities and differences**



# Expert Opinion

- **Involves consultation with team of subject matter experts who use their collective knowledge and experience to define major cost drivers and associated estimated costs**
- **Two widely recognized approaches**
  - Delphi technique
  - BOGSAT





# Cost Factors

- **Cost factors developed at platform, major system, or unit of work level**
- **Cost estimate developed by multiplying applicable cost factor by number of units**



# Extrapolation from Actuals

- **Estimated future production costs are based upon historical costs for past production for continuing production situations**



# Engineering Approach

- Detailed “bottom-up” approach for developing estimated labor and material costs
  - Decompose scope of work based upon work breakdown structure
  - Estimate costs for decomposed work elements
  - Aggregate costs for decomposed work elements



# Decompose Scope of Work

- **Work breakdown structure creates detailed outline for developing cost estimate**
- **Typical MSC work breakdown structure decomposes scope of work into 10 subsections**
- **Each subsection typically further decomposed into three major categories of activities**



# Estimate Costs for Decomposed Work

- Estimate labor manhours requirements by trade
- Estimate material requirements
- Estimate specialized equipment and/or technical representative requirements



# Aggregate Cost Estimate

- **Combine estimated labor, material, specialized equipment, and technical representative costs for each major work category and each major activity in decomposed work breakdown structure**



# Cost Estimating Considerations

- **Competitive procurements**
- **Non-competitive procurements**
- **New work / growth work**
- **Specialized types of work**
- **Schedule change**



# Competitive Procurement Considerations

- **Estimating for competitive procurements is complicated by not knowing the identify of prospective contractors prior to developing estimate**





# Non-Competitive Procurement Considerations

- **Estimating for non-competitive procurements is somewhat less complicated by virtue of knowing the identity of the contractor prior to developing estimate**



# New Work / Growth Work Considerations

- **Changes to scope of work for an existing contract can have consequences that need to be taken into consideration in government cost estimates**



# Specialized Types of Work Considerations

- **Certain types of work may require use of more advanced and efficient technologies and production processes, which needs to be taken into consideration in government cost estimates**



# Schedule Change Considerations

- **Delaying or accelerating completion of certain contract milestones may result in contractor incurring unplanned costs**



# Third Party Review

- **Third party reviews estimate for:**
  - **Completeness**
  - **Realism**
  - **Appropriateness for intended purpose**



# Estimate Documentation

- **Document cost estimate**
  - Purpose of cost estimate
  - Who will be using estimate
  - Intended product, service or system
  - Ground rules and assumptions
  - Estimating methodology
  - Estimating team
  - Work breakdown structure
  - Data and associated sources
  - Decomposed costs
  - Aggregated costs



# Let's Review

- **What are the most commonly encountered cost estimate classifications encountered at MSC?**
- **What are three commonly used non-parametric cost estimate formulation methodologies?**
- **Describe the engineering cost estimating approach.**
- **What are the key advantage and disadvantage associated with the engineering cost estimating approach?**
- **Why is documenting a cost estimate important?**



# Summary

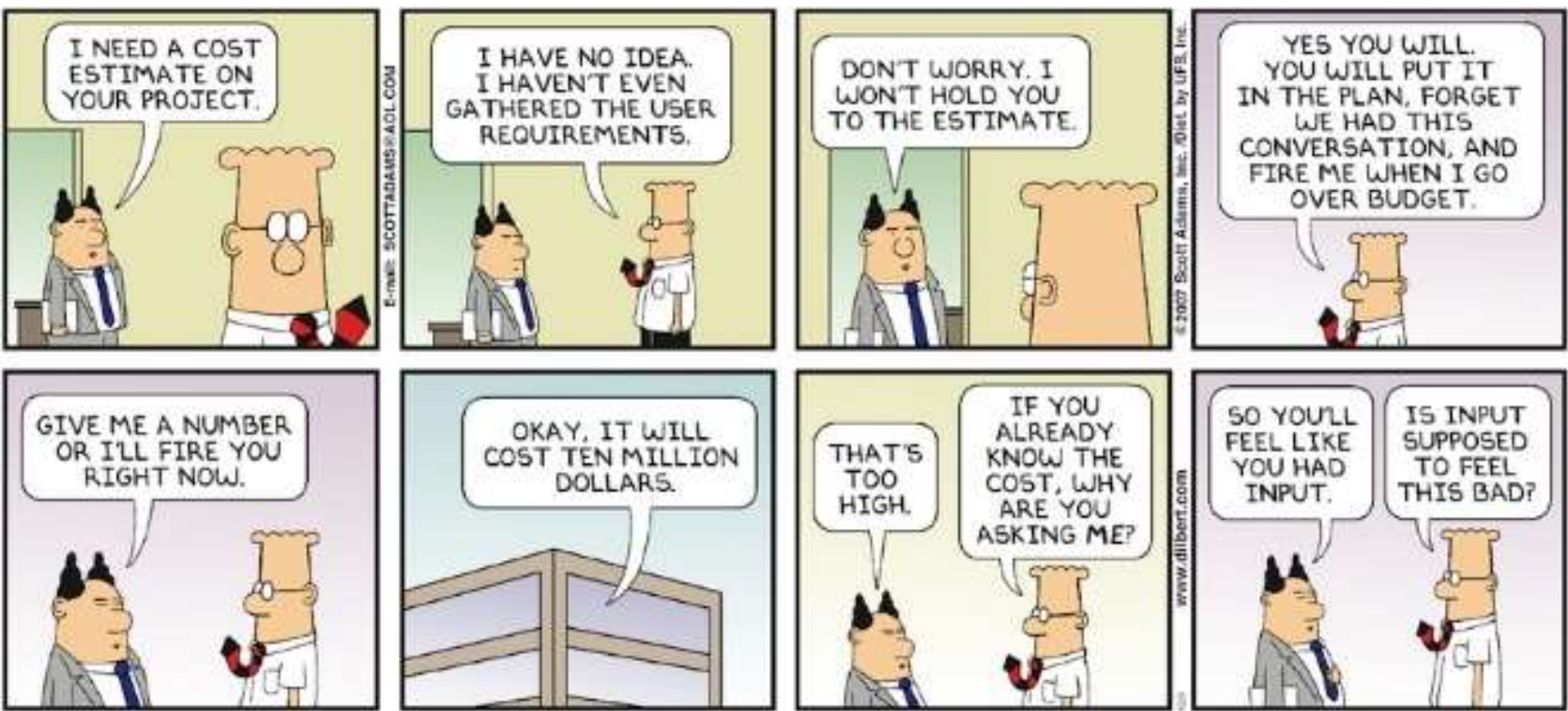
- **During this module, we have discussed:**
  - **MSC's policies and practices for developing independent government cost estimates for performance-like work items**
  - **Classification of cost estimates**
  - **Cost estimating terminology**
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# Additional Information

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<http://www.iceaaonline.com>
- **Government cost estimate databases:**
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  - **Naval Center for Cost Analysis:** [www.ncca.navy.mil](http://www.ncca.navy.mil)
  - **Navy Visibility and Management of Operating and Support Costs (VAMOSOC):**  
<https://www.vamosc.navy.mil/>



Scott Adams, December 9, 2007



# Final Questions





# Revision History

Date	Version	Description	Author
4/29/19	0.0	Draft presentation	Gary Fields
8/13/19	0.1	Corrected minor format errors	Gary Fields