

Shipyard Cost Estimating

(Using *PERCEPTION*® Version 7)



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Chapter 1: Introduction

Every cost estimate should be developed from a basic plan for the effort. This plan will help ensure that the estimate correctly addresses all contract specifications and requirements and covers all areas of anticipated expenditures, both direct and indirect.

The cost estimate not only should be complete, but it should be realistic, reflecting the current market prices for materials and subcontracted services and the expected methods that would be used in construction.

This document outlines general guidelines for developing both new ship construction and ship repair cost estimates. Each cost proposal is oftentimes unique, so methods may change to suit the given requirements. Explained is the cost estimating processes as available through the use of SPAR's *PERCEPTION ESTI-MATE* software. This is the same software that underlies the U.S. Navy's Product Oriented Design and Construction (*PODAC* Cost Model). Estimators wishing to use *PERCEPTION* should first familiarize themselves with the general layout of the software by reviewing "Getting Started With *PERCEPTION*." Additional details of the cost estimating process are provided in a supplemental user manual, "Cost Estimating New Construction & Ship Repair."

This document references cost estimate relations, or simply CERs. These are the unit costs (labor hours per ton, labor hours per square foot, \$ per foot, etc.) used by the estimator to develop a cost estimate. Included are recommendations for developing CERs, cataloging them on the system database, and how to apply them for a cost estimate.

System Highlights

ESTI-MATE provides estimating functions designed to improve the quality of the estimating process and to reduce the time needed to generate the bid estimates.

The system offers a toolbox of estimating functions:

- Input of the bid estimates that can be summarized by work breakdown structures including options for a product work breakdown structure based upon an effective build strategy
- Input of specific cost estimate items (labor, material, subcontractor & travel)
- Automated generation of cost estimate items from parametric formulas
- Automated generation of cost estimate items from libraries of pre-packaged estimates
- Automated generation of cost estimate items copied from other projects on the database

- Automated calculations of labor and indirect costs, including overhead, G&A and profit from user-defined rate tables
- Automated calculations of purchased sales taxes against selected purchased costs
- Global modifications to selected ranges of cost estimate data
- Estimate reports summarizing costs by Contract, SWBS, PWBS and by work center Chart of Accounts (COA)

To augment these capabilities, the system also provides features for fine-tuning the estimate:

- Application of learning curves
- Complexity and productivity factors
- Cost escalation
- Cost risk analysis
- Cost trade-offs
- Global edits and updating
- Return cost data analysis
- User documentation and comments regarding the estimate
- Tracking of data sources and changes

Direct labor costs are computed automatically by the system from input labor man-hours and labor rate tables defined by the user. These tables can be time-phased for multi-year contract proposals.

Indirect costs also are computed automatically by the system from the user-defined rate tables:

- Overhead and general administrative cost rates also identifiable by work (cost) center
- Material burden and handling rates
- Sales tax and duty rates
- Labor and material profit rates that can be identifiable to individual work centers

System Database

ESTI-MATE provides a wide array of cost estimating capabilities that are organized around a central, multi-user database. The database is unique in the scope of information it can manage (Figure 1-2):

- A central repository of prior cost estimates that can be copied in whole or in part to formulate a new estimate.
- Various summaries of Work Breakdown Structures (WBS) associated with each cost estimate: ship systems; levels of interim products; stages of construction and manufacturing processes, etc.

- Tables of ship design characteristics that can be used to drive selected CERs in developing a cost estimate.
- Libraries of Cost Estimating Relationships (CERs), that allows the user to create the details of a cost estimate. These CERs can be cataloged by work type so that the system user can more conveniently retrieve them.
- Libraries of Standard Interim Product (IP) Packages, that allow the users to develop labor and material details about any standard work effort to whatever level of detail is required.
- A Parts Catalog of standard purchased parts, stock items, and standard manufacturing interim products (components, sub-assemblies, assemblies, modules, etc.). This catalog manages unit costs for these parts and can be the basis for standardizing design and production cost management practices.
- Files of supporting cost information, including time-phased work center labor rates, escalation tables, productivity factors, etc.
- Shipyard Return Costs that can be analyzed with system statistical tools to develop CERs that may be ultimately stored on the CER libraries.

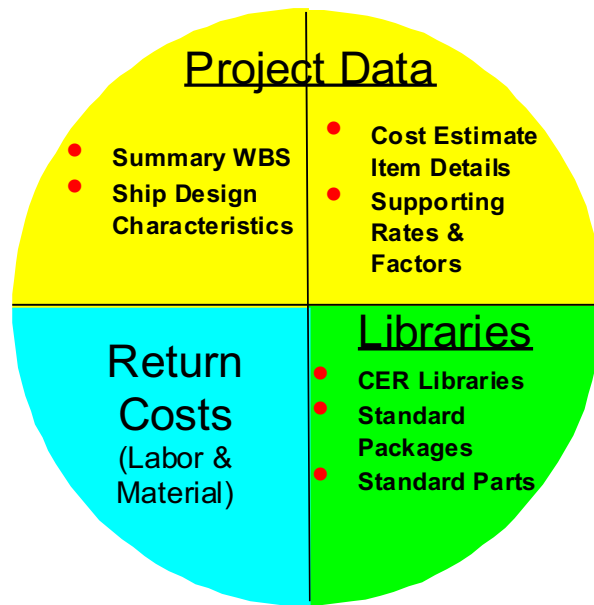


Figure 1-2: PERCEPTION ESTI-MATE Database