

# Generic New Construction Cost Estimating Libraries



# Computerized Cost Estimating

- **Computer-based tools to quickly formulate a cost estimate**
- **Manage cost data from central database**
- **Maintain current catalog of actual costs**
- **Maintain catalog of prior estimates**



# Establish Libraries of Centrally Available Cost Data

PERCEPTION - ESTI-MATE

File Edit View Global Library Return Cost Reports Database Window Help

C P G A Z U

Package Items For Reuse Package: PEP1

Package	Description	Quantity	UoM	Labor Hours	Material Cost
30	MS Bulkheads				
31	MS-B Deck w/shell				
32	MS-B Shaped Side Shell				
33	MS-C Deck w/shell				
34	MS-C Flat deck				
35	MS-C Flat Inner Bottom				
36	MS-C Shaped Outer Btm				
37	MS-C Shaped Side Shell				
38	MS-M Deck w/shell				
39	MS-M Flat deck				
40	MS-M Shaped Inner Btm				
41	MS-S Deck w/shell				
42	MS-S Flat deck				
43	MS-S Shaped Outer Btm				
44	MS-S Shaped Side Shell				
45	MS-S Skeg				
46	F/CS-FIN				
47	F/CS-Lab				
48	PEP1				
49	PEP2				
50	FG2				
51	FG3				
52	PM1				
53	PME1				
54	PME11				
55	PME12				
56	PME14				

Package Item ID	Description	Quantity	UoM	Labor Hours	Material Cost
1	Line Shaft	2.00	EA	0.00	35,000.00
2	Tail Shaft	1.00	EA	0.00	20,000.00
3	Line Shaft Bearings	4.00	EA	0.00	25,000.00
4	Stem Tube Bearing	1.00	EA	0.00	25,000.00
5	Thrust Bearing	1.00	EA	0.00	15,000.00
6	Fwd Stem Tube Seal	1.00	EA	0.00	1,000.00
7	Propeller	1.00	EA	0.00	35,000.00
8	Fairwater Cap	1.00	EA	0.00	2,500.00
9	Fab Coupling Bolts	1.00	PKG	100.00	1,000.00
10	Machine Stem Tube	1.00	PKG	400.00	0.00
11	Bore & Fit Stem Tube	1.00	PKG	750.00	0.00
12	Assemble Gear Box Intermediate Coupling	1.00	PKG	150.00	0.00
13	Install Shafts	1.00	PKG	400.00	0.00
14	Shaft Alignment	1.00	PKG	300.00	0.00
15	Assemble Propeller	1.00	PKG	500.00	0.00
16	Install Rope Guard	1.00	PKG	50.00	0.00

Ready



**The *Generic New Construction Cost Estimating Libraries* provide a wide range of labor and material cost data useful for estimating construction costs across almost any ship type.**

**The libraries contain cost estimating relationships (“CER”s) applicable to many different manufacturing and assembly operation.**

**Rates based upon average mid-size U.S. commercial new construction shipyard.**

**Factors are provided for other size yards, foreign and domestic, and for military contractors.**



**The basis for the CERs has been pulled from a wide range of actual production cost data from many different shipyards, large and small, in the United States and Canada, over the past 10-15 years.**

**The CERs are the result of blending this data across the shipyards, each with different levels of productivity and manufacturing methods.**

**Factors have been selectively applied to the data to account for shipyard size, its relative level of production technology and an assessment of the shipyards' relative level of competence in managing its costs and schedules.**



**The blending of actual costs has been performed to develop a generic mid-size (500-1000 production employees) commercial shipyard that has mid-1990's production facilities including numerically controlled plate cutting and automated panel assembly line.**

**The CERs are in no way expected to reflect the actual cost performance of any given shipyard. Additional factors and considerations are always required when applying these CERs to a specific shipyard, its elected build strategy, and details of the ship design and selection of equipment and materials.**

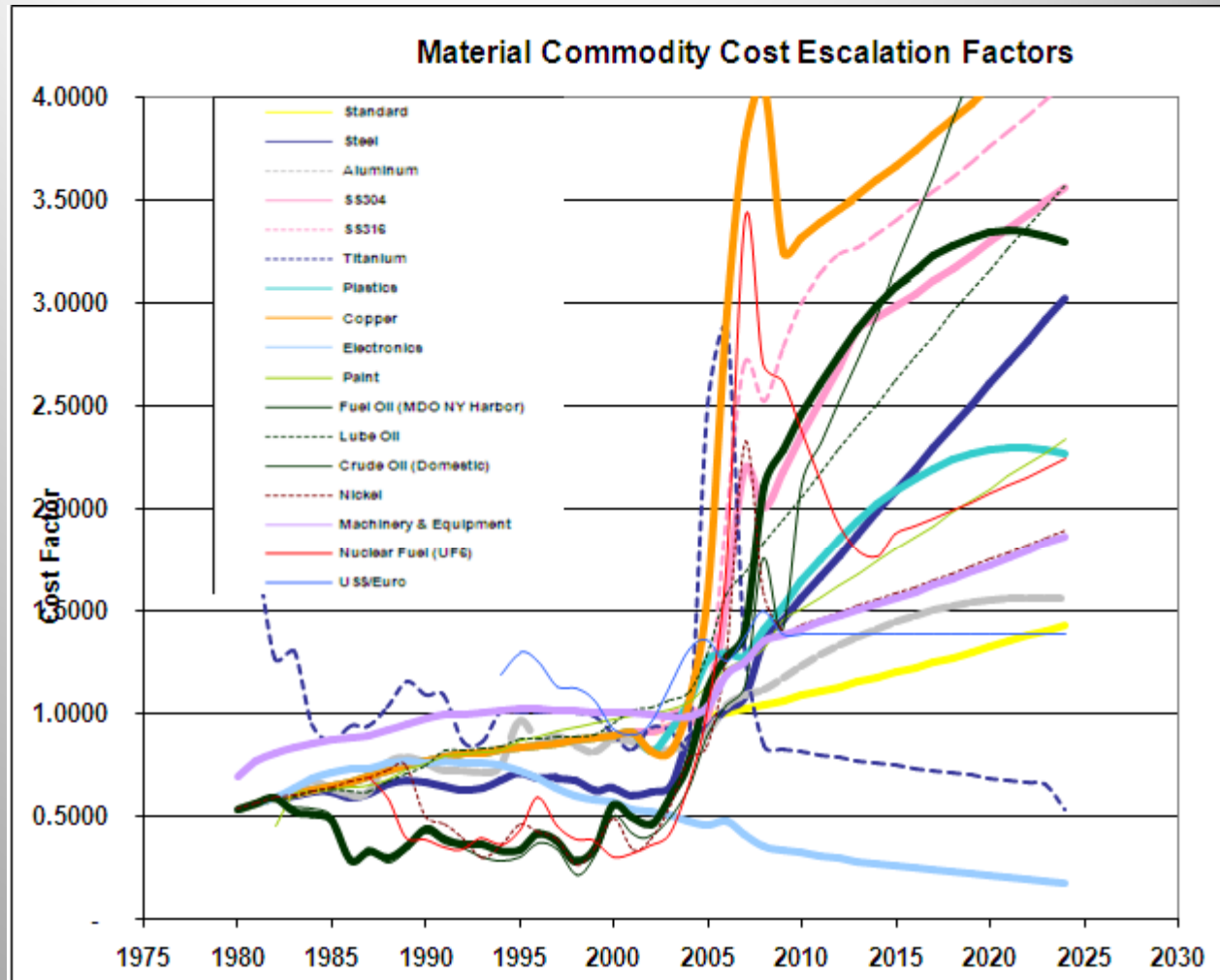


**The use of these CERs should be undertaken with the same care as any level of business information that approximates or simulates any real-world situation.**

**The CERs are not advertised to guarantee an exact correlation with the actual costs that would ultimately be incurred.**



Commodity-based escalation factors are applied to material cost CERs so that they are available to a common, current year value.





**Variations due to specific materials, equipment models and configurations, and vendor pricing methods should be expected.**

**Costs assume commercial grade shipbuilding materials and quality management. Factors may be applied for various levels to allow for added costs of military specifications.**



**The shipyard data used to develop the CERs is largely proprietary information and maintained in strict confidence with these shipyards.**

**SPAR's precise methods for blending also are proprietary and they are not offered for public use.**

**However, the use of these CERs have yielded cost estimate results that have been tested on numerous occasions and have been found to be highly credible when compared with other independent cost estimating methods.**



## Shipyard Cost & Performance Factors

- Commercial Vs Military
- International Cost Factors
- Hull Size Factors
- Pre-Outfit Productivity Factors
- Material Cost Escalation Factors
- Currency Exchange Rates
- USA Wage Rates
- International Wage Rates
- Learning Curves



## **Structures – Metal Materials**

- **Structural Metals Material Prices –Steel (Mild, HTS, HY, HSLA), Aluminum, Titanium, Stainless Steel (304 & 316)**

## **Structures – Cutting & Welding**

- **Cutting Times - Oxy-fuel, Plasma & Laser (Conventional, LoPOx & HiPOx) for Steel, Inconel, Stainless & Aluminum.**
- **Welding Rates (Steel, Stainless, Inconel, Aluminum, Manual, & Robotic)**

## **Structures – Metal:**

- **Benchmark Labor Rates for Over 100 Types of Hull Blocks & Assemblies to Prep, Fabricate, Assemble & Erect and Weld-out**
- **Steel & Aluminum**

## **Structures – Composites:**

- **Composite Materials Prices**
- **Stiffened Sections**
- **Cold Molding**



## Machinery Systems

### Propulsion Plants

- Diesel
- Diesel Electric
- Gas Turbines
- Fuel Cells
- Nuclear

### Propulsors

- Propellers
- Pods
- Water Jets
- Z-Drives
- Shafting & Gear

### Boxes

- Thrusters

### Stabilizers

- Electric Generators (Service & Emergency)
- Steering Gear
- Winches & Warping Gear
- Auxiliary Machinery
- Machinery Installation Details

- High Performance Gasoline Engines
- Outboard Power Plants



## Piping Systems

- Bilge & Ballast
- Fire Extinguishing
- Fuel Vents
- Fuel Fill, Transfer & Purify
- Fuel Oil Heating
- Fuel Burning
- Lube Oil
- Waste Oil
- Exhaust, Stacks & Uptakes
- Steam Condensate & Feed
- Sea Water Cooling
- Fresh Water Cooling
- Compressed Air
- Miscellaneous Machinery Piping

- HVAC Piping
- Potable Water
- Sewerage
- Deck Heating
- Liquid Cargo
- Pumps & Valves
- Helo Refueling
- LNG Re-Liquidation
  
- Pipe Prices (Steel, Stainless, FRP, CuNi, Titanium)
- Pipe Bending Process Costs
- Tubing - Aluminum



## Electrical Systems

- Electric Power Cables & Hangers
- Cable Work
- Cable Hookup
- Electrical Switchboards, Panels, Receptacles, Transformers
- Electrical Appliances & Fixtures
- Lighting
- Communications

## Electronics Systems

- Machinery Bridge Controls
- Navigation Electronics
- Communications Electronics
- Signaling Systems
- Vessel Security Systems
- US Navy C4ISR Electronics



## Outfit Systems

- Floors, Ladders, Walkways & Grates
- Manholes & Cleaning Ports
- Tanks
- Railings
- Hull Insulation
- Cathodic Protection
- Windows & Ports
- Deck Coverings
- Ceilings
- Doors
- Hatches
- Metal Sheathing & Bulkheads
- Joiner Work & Furnishings

- Berthing Areas
- Food Prep Area
- Passenger Lounge Facilities
- Medical Facilities
- Laundry Facilities
- Ship's Office Facilities
- Wheelhouse & Chartroom

### Furnishings

- Machinery Spaces
- Furnishings
- Shops & Storerooms
- Lockers
- Masts & Spars
- Hull Designations & Markings





## Outfit Systems

- HVAC
- Hull Outfit & Equipment
- Machinery Spaces Outfit
- Coatings – Interior & Exterior, Loose Parts, Large Areas, Pipe
- Cranes, Lifts & Elevators
- Cell Guides & Tie-Downs
- Hydrographic Research Equipment
- Sub-Sea Vehicles
- Drilling Equipment
- Fire Fighting Equipment
- Pollution Control
- Life & Rescue (Boats, Rafts, Davits & Evacuation)
- Life Jackets & Survival Suits
- Mooring & Towing Equipment
- Anchor & Anchor Gear
- Fenders & Fender Gear
- Rigging & Canvas
- Doors & Ramps
- Domes



## **Fees (Insurance & Bonding)**

### **Shipyard Services**

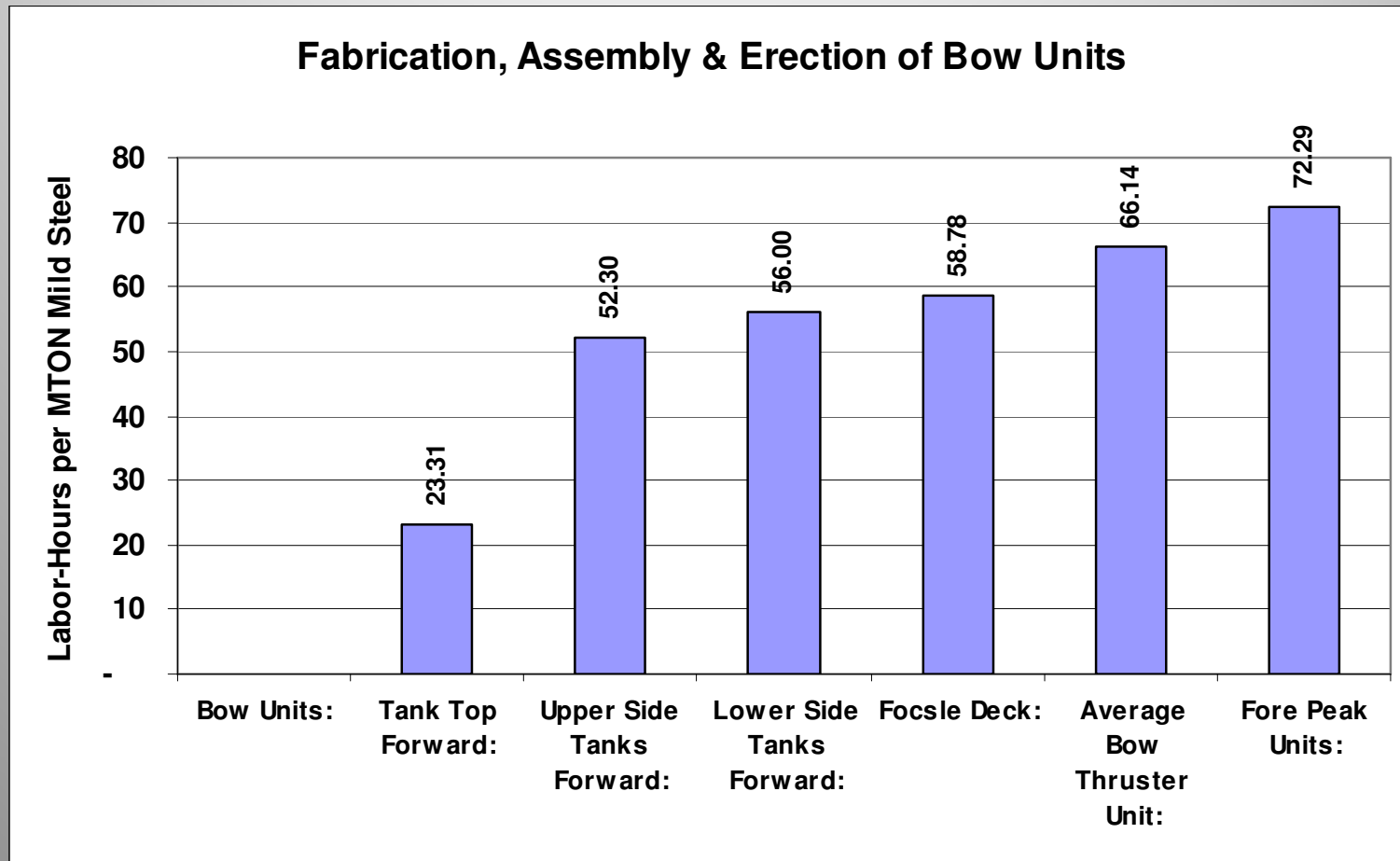
- **Technical Services**
- **Production Support Services**

### **Miscellaneous**

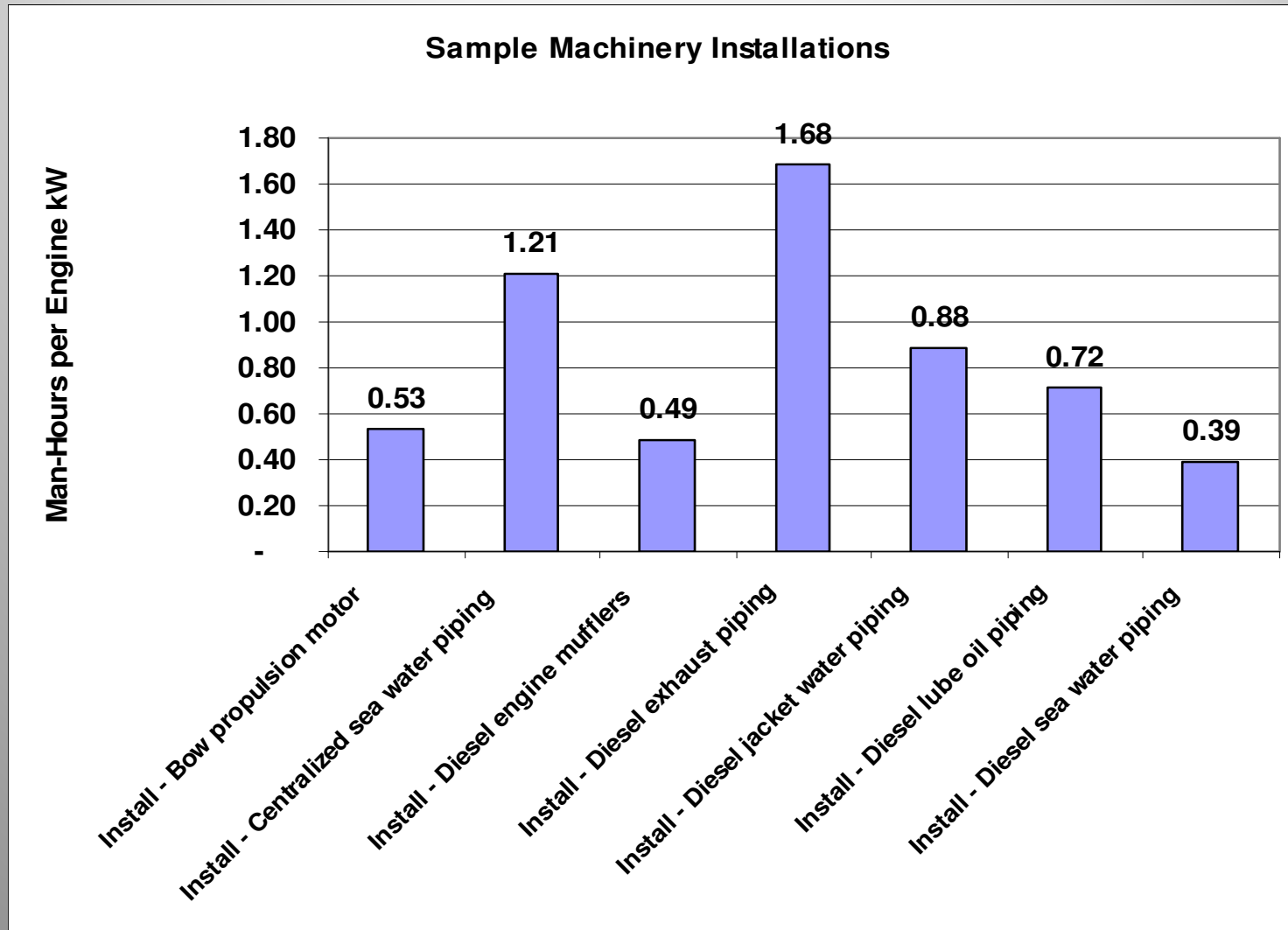
- **Work Types**
- **Ship Types**
- **Units of Measure**
- **Ship Characteristics**



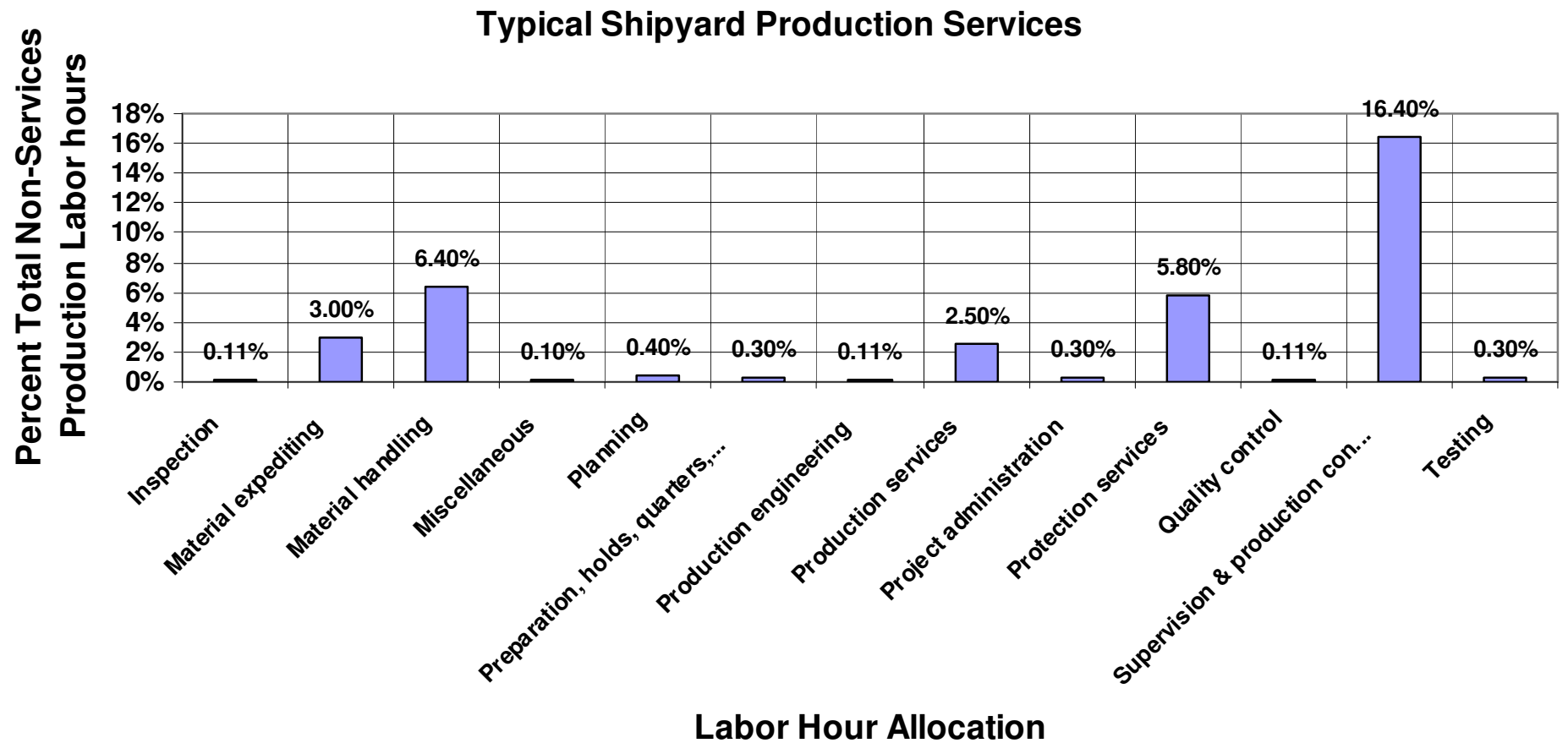
# Sample Hull Block Construction



# Sample Installations



# Sample Level of Effort



**Users can modify the generic CERs to better suit their shipyard's actual cost experience as well as add additional ones to further expand the value of the libraries.**



# Benefits

- Fewer cost surprises
- Faster bid response
- Lower cost risk
- Greater profit potential
- More competitive bids



# Over 35 Years Serving the Shipbuilding & Repair Industry

