

General Instructions

Developing Standard Cost Estimating Templates

Using *PERCEPTION*[®]



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NOTE: Any resemblance of costs shown in the following discussion with real costs should be regarded as strictly coincidental.

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Chapter 1: Introduction

Cost estimating can be a tedious process and often fraught with opportunities to miss important cost considerations. In addition, any way to quickly translate or convert the cost estimate into useable production information is important. However, for such a translation to be of much value the estimate must be reasonably complete and be to a level of detail that can correlate reasonably well with actual costs collected during contract execution. Tracking of actual costs against the estimate is a direct way to help ensure that the estimate was both reasonably complete and a fair representation of the actual costs. The tracking also enables any significant variances between the estimate and the actual costs to be better recognized and enable future estimates to benefit from this valuable feedback of information.

This document describes various methods available in the *PERCEPTION* system that help ensure cost estimates are both accurate and complete. The discussions then proceed to demonstrate how the cost estimate can be translated directly into production data: material requisitions and production work orders. The material requisitions can be used as the basis for purchase orders and for marshalling material for the production work orders.

Libraries & Sources Of Cost Estimating Data

To help expedite and ensure that a cost estimate is complete, *PERCEPTION*'s cost estimating module, *ESTI-MATE*[™], provides the estimator with libraries of standard costs. These libraries can be developed to accommodate a variety of cost information, including the following:

- Standard cost estimating relationships (CERs) cataloged by type of work; structural, machinery, piping, electrical, HVAC, outfit, paint, and miscellaneous.
- Standard material costs as maintained in the system's Parts Catalog.
- Standard work packages that enable multiple cost items to identify a range of labor processes and material detail requirements.

In addition, the system enables the estimator to use cost estimate information from prior estimates in whole or in part. Manual adjustments and vendor price quotations complete the possible sources of cost information. All of these sources are available for use by the estimator for any given bidding situation.

Libraries Of Standard Work Packages

This particular document focuses on developing standard cost estimating templates using the standard work package facility available in *ESTI-MATE*. The work package can utilize cost data from other cost libraries and there is considerable flexibility for the estimator to formulate standard packages depending on the type of work involved in them.

Typically, templates focus on one specific work type, although that is not a requirement. Examples include dry-docking and pipe renewal for ship repair.

There are many ways to develop cost estimate templates. The following describes just one approach that uses the re-usable interim product package for the template. The idea for this package is to provide a full menu list of possible cost items that is complete with the appropriate cost estimating relationships, or CERs.

Chapter 2: Example Standard Package (Template)

The following example develops templates for each type of pipe material and restricted to a particular area of the ship (ship zone)¹. In this way, the estimator can use one of these templates when the type of pipe is known. Knowing where the pipe is located also is likely to be important, as that will affect the scope of work involved. For example, pipe renewal out on deck is easier and less costly than doing the work down in the double bottoms.

The following figure 2-1 lists selections of pipe renewal templates (i.e., packages).

Interim Product Packages for the Estimating Environment		
	Package	Description
26	PIR40-001	Pipe Renewal - Black Steel Sch 40 - On Deck
27	PIR40-002	Pipe Renewal - Black Steel Sch 40 - Engine/Pump Room
28	PIR40-003	Pipe Renewal - Black Steel Sch 40 - Superstructure
29	PIR40-004	Pipe Renewal - Black Steel Sch 40 - Holds
30	PIR40-005	Pipe Renewal - Black Steel Sch 40 - Oil Tanks/Double Bottoms
31	PIR40G-001	Pipe Renewal - Std Galv - On Deck
32	PIR40G-002	Pipe Renewal - Std Galv - Engine/Pump Room
33	PIR40G-003	Pipe Renewal - Std Galv - Superstructure
34	PIR40G-004	Pipe Renewal - Std Galv - Holds
35	PIR40G-005	Pipe Renewal - Std Galv - Oil Tanks/Double Bottoms
36	PIR80-001	Pipe Renewal - Black Steel Sch 80 - On Deck
37	PIR80-002	Pipe Renewal - Black Steel Sch 80 - Engine/Pump Room
38	PIR80-003	Pipe Renewal - Black Steel Sch 80 - Superstructure
39	PIR80-004	Pipe Renewal - Black Steel Sch 80 - Holds
40	PIR80-005	Pipe Renewal - Black Steel Sch 80 - Oil Tanks/Double Bottoms
41	PIR80G-001	Pipe Renewal - ExHvy Galv - On Deck
42	PIR80G-002	Pipe Renewal - ExHvy Galv - Engine/Pump Room
43	PIR80G-003	Pipe Renewal - ExHvy Galv - Superstructure
44	PIR80G-004	Pipe Renewal - ExHvy Galv - Holds
45	PIR80G-005	Pipe Renewal - ExHvy Galv - Oil Tanks/Double Bottoms

Figure 2-1: Pipe Renewal Packages (By Type Pipe & Ship Zone)

Within each package, the estimator may list as many different cost items as may be needed for the template. Figure 2-2 list cost items and their related labor and material CERs for each pipe size in the template. These items are restricted to carbon steel black pipe, schedule 40 and for work done only on the weather deck. As listed in figure 2-1 above, other templates can be developed in a similar manner.

¹ Productivity factors for where the work is performed also can be entered directly to cost items in the project estimate worksheet.

Interim Product Package Items for the Estimating Environment							
Package ID	Package Item Description	Quantity	UoM	Labor CER	Material CER	CER Type	CER ID
1	PIR40-001 001 Rem&Renew CS Pipe - 1" IPS/SCH.40 - W. Dk (STRAIGHT)	0.00	M	1.3000	\$6.7500	Pipe CER Table	PIR-CS40DK-100
2	PIR40-001 002 Rem&Renew CS Pipe - 1.25" IPS/SCH.40 - W. Dk (STRAIGHT)	0.00	M	1.6300	\$7.6100	Pipe CER Table	PIR-CS40DK-125
3	PIR40-001 003 Rem&Renew CS Pipe - 1.5" IPS/SCH.40 - W. Dk (STRAIGHT)	0.00	M	1.9500	\$8.4300	Pipe CER Table	PIR-CS40DK-150
4	PIR40-001 004 Rem&Renew CS Pipe - 2" IPS/SCH.40 - W. Dk (STRAIGHT)	0.00	M	2.6000	\$10.1300	Pipe CER Table	PIR-CS40DK-200
5	PIR40-001 005 Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - W. Dk (STRAIGHT)	0.00	M	3.3000	\$15.1900	Pipe CER Table	PIR-CS40DK-250
6	PIR40-001 006 Rem&Renew CS Pipe - 3" IPS/SCH.40 - W. Dk (STRAIGHT)	0.00	M	4.0000	\$20.2600	Pipe CER Table	PIR-CS40DK-300
7	PIR40-001 017 Rem&Renew CS Pipe - 1" IPS/SCH.40 - W. Dk (SHAPED)	0.00	M	1.4950	\$6.7500	Pipe CER Table	PIR-CS40DKY-100
8	PIR40-001 018 Rem&Renew CS Pipe - 1.25" IPS/SCH.40 - W. Dk (SHAPED)	0.00	M	1.8745	\$7.6100	Pipe CER Table	PIR-CS40DKY-125
9	PIR40-001 019 Rem&Renew CS Pipe - 1.5" IPS/SCH.40 - W. Dk (SHAPED)	0.00	M	2.2425	\$8.4300	Pipe CER Table	PIR-CS40DKY-150
10	PIR40-001 020 Rem&Renew CS Pipe - 2" IPS/SCH.40 - W. Dk (SHAPED)	0.00	M	2.9900	\$10.1300	Pipe CER Table	PIR-CS40DKY-200
11	PIR40-001 021 Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - W. Dk (SHAPED)	0.00	M	3.7950	\$15.1900	Pipe CER Table	PIR-CS40DKY-250
12	PIR40-001 022 Rem&Renew CS Pipe - 3" IPS/SCH.40 - W. Dk (SHAPED)	0.00	M	4.6000	\$20.2600	Pipe CER Table	PIR-CS40DKY-300
13	PIR40-001 033 Rem&Renew CS Pipe <4M - 1" IPS/SCH.40 - W. Dk (STRAIG	0.00	M	0.0000	\$6.7500	Equation Library	PIR-CS40<4DK-100
14	PIR40-001 034 Rem&Renew CS Pipe <4M - 1.25" IPS/SCH.40 - W. Dk (STRA	0.00	M	0.0000	\$7.6100	Equation Library	PIR-CS40<4DK-125
15	PIR40-001 035 Rem&Renew CS Pipe <4M - 1.5" IPS/SCH.40 - W. Dk (STRAI	0.00	M	0.0000	\$8.4300	Equation Library	PIR-CS40<4DK-150
16	PIR40-001 036 Rem&Renew CS Pipe <4M - 2" IPS/SCH.40 - W. Dk (STRAIG	0.00	M	0.0000	\$10.1300	Equation Library	PIR-CS40<4DK-200
17	PIR40-001 037 Rem&Renew CS Pipe <4M - 2.5" IPS/SCH.40 - W. Dk (STRAI	0.00	M	0.0000	\$15.1900	Equation Library	PIR-CS40<4DK-250
18	PIR40-001 038 Rem&Renew CS Pipe <4M - 3" IPS/SCH.40 - W. Dk (STRAIG	0.00	M	0.0000	\$20.2600	Equation Library	PIR-CS40<4DK-300
19	PIR40-001 100 Pipe Bends	0.00	EA	4.0000	\$0.0000	Manual CER	NONE
20	PIR40-001 101 Pipe Penetrations	0.00	EA	3.0000	\$0.0000	Manual CER	NONE

Figure 2-2: Remove & Renew Standard Package Cost Items

The package items can have CERs defined either manually, or be linked to library CERs and standard parts from the Parts Catalog. With library CERs, cost data can be managed centrally regardless of where they are used in the system. The central management of costs can be done using the Parts Catalog for material costs. Estimate items that link to library CERs and to the Parts Catalog can be easily updated with a simple “rollup.”

The package items listed above in figure 2-2 use various CERs.

- Library Pipe CERs (items #1-12)
- Library Equation CERs (items #13-18)
- Manual CERs (items #19-20)

CERs, whether from the libraries or manually entered for items can define labor and/or material costs. Package items #1-18 use material costs from the Parts Catalog.

Note: Material CERS from the Parts Catalog always over-ride material CERs provided either manually or from library CERs. The Parts Catalog has no influence on labor CERs.

Package Items Using Library CERs

A selection of the package cost items is listed for work only on straight pipe. Figure 2-3 lists the library CERs for this work, and they are linked to package items that use them.

Pipe CER Information for the Estimating Environment						
CER ID	Description	UoM	Standard Labor CER	Productivity Factor	Factored Labor CER	
5	PIR-CS40DK-100 Rem & Renew CS Pipe - 1" IPS/SCH.40 - W.Dk (STRAIGHT)	M	1.3000	1.0000	1.3000	
6	PIR-CS40DK-125 Rem & Renew CS Pipe - 1.25" IPS/SCH.40 - W.Dk (STRAIGHT)	M	1.6300	1.0000	1.6300	
7	PIR-CS40DK-150 Rem & Renew CS Pipe - 1.5" IPS/SCH.40 - W.Dk (STRAIGHT)	M	1.9500	1.0000	1.9500	
8	PIR-CS40DK-200 Rem & Renew CS Pipe - 2" IPS/SCH.40 - W.Dk (STRAIGHT)	M	2.6000	1.0000	2.6000	
9	PIR-CS40DK-250 Rem & Renew CS Pipe - 2.5" IPS/SCH.40 - W.Dk (STRAIGHT)	M	3.3000	1.0000	3.3000	
10	PIR-CS40DK-300 Rem & Renew CS Pipe - 3" IPS/SCH.40 - W.Dk (STRAIGHT)	M	4.0000	1.0000	4.0000	
11	PIR-CS40DK-400 Rem & Renew CS Pipe - 4" IPS/SCH.40 - W.Dk (STRAIGHT)	M	5.3000	1.0000	5.3000	
12	PIR-CS40DK-500 Rem & Renew CS Pipe - 5" IPS/SCH.40 - W.Dk (STRAIGHT)	M	6.6000	1.0000	6.6000	
13	PIR-CS40DK-600 Rem & Renew CS Pipe - 6" IPS/SCH.40 - W.Dk (STRAIGHT)	M	7.9000	1.0000	7.9000	
14	PIR-CS40DK-700 Rem & Renew CS Pipe - 8" IPS/SCH.40 - W.Dk (STRAIGHT)	M	10.6000	1.0000	10.6000	
15	PIR-CS40DK-800 Rem & Renew CS Pipe - 10" IPS/SCH.40 - W.Dk (STRAIGHT)	M	13.2000	1.0000	13.2000	
16	PIR-CS40DK-900 Rem & Renew CS Pipe - 12" IPS/SCH.40 - W.Dk (STRAIGHT)	M	15.8000	1.0000	15.8000	

Figure 2-3: Remove & Renew Carbon Steel Black Pipe CERs (Straight Sections) On Deck

Other items are for work on bent or shaped pipe. Figure 2-4 lists the library CERs for this work.

Pipe CER Information for the Estimating Environment						
CER ID	Description	UoM	Standard Labor CER	Productivity Factor	Factored Labor CER	
5	PIR-CS40DK-100 Rem & Renew CS Pipe - 1" IPS/SCH.40 - W.Dk (STRAIGHT)	M	1.3000	1.0000	1.3000	
6	PIR-CS40DK-125 Rem & Renew CS Pipe - 1.25" IPS/SCH.40 - W.Dk (STRAIGHT)	M	1.6300	1.0000	1.6300	
7	PIR-CS40DK-150 Rem & Renew CS Pipe - 1.5" IPS/SCH.40 - W.Dk (STRAIGHT)	M	1.9500	1.0000	1.9500	
8	PIR-CS40DK-200 Rem & Renew CS Pipe - 2" IPS/SCH.40 - W.Dk (STRAIGHT)	M	2.6000	1.0000	2.6000	
9	PIR-CS40DK-250 Rem & Renew CS Pipe - 2.5" IPS/SCH.40 - W.Dk (STRAIGHT)	M	3.3000	1.0000	3.3000	
10	PIR-CS40DK-300 Rem & Renew CS Pipe - 3" IPS/SCH.40 - W.Dk (STRAIGHT)	M	4.0000	1.0000	4.0000	
11	PIR-CS40DK-400 Rem & Renew CS Pipe - 4" IPS/SCH.40 - W.Dk (STRAIGHT)	M	5.3000	1.0000	5.3000	
12	PIR-CS40DK-500 Rem & Renew CS Pipe - 5" IPS/SCH.40 - W.Dk (STRAIGHT)	M	6.6000	1.0000	6.6000	
13	PIR-CS40DK-600 Rem & Renew CS Pipe - 6" IPS/SCH.40 - W.Dk (STRAIGHT)	M	7.9000	1.0000	7.9000	
14	PIR-CS40DK-700 Rem & Renew CS Pipe - 8" IPS/SCH.40 - W.Dk (STRAIGHT)	M	10.6000	1.0000	10.6000	
15	PIR-CS40DK-800 Rem & Renew CS Pipe - 10" IPS/SCH.40 - W.Dk (STRAIGHT)	M	13.2000	1.0000	13.2000	
16	PIR-CS40DK-900 Rem & Renew CS Pipe - 12" IPS/SCH.40 - W.Dk (STRAIGHT)	M	15.8000	1.0000	15.8000	

Figure 2-4: Remove & Renew Carbon Steel Black Pipe CERs (Shaped Sections) On Deck

In figure 2-4 above, the basis for the shaped pipe CERs is the same as for the straight pipe CERs. The shaped CERs are increased 15% due to the added scope of work involved using a “productivity factor” of 1.15. Figure 2-5 below lists the shaped pipe CERs for the oil tanks and double bottoms. Work in these areas alone adds 25% more work. A combined productivity factor for these CERs is 1.44 (=1.15 x 1.25). Note that all these variations of CERS all are derived from the same baseline CERs of “W.DK” and “STRAIGHT.”

Pipe CER Information for the Estimating Environment						
CER ID	Description	UoM	Standard Labor	CER ² Productivity Factor	Factored Labor	CER
29	Rem & Renew CS Pipe - 1" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	1.3000	1.4400	1.872C	
30	Rem & Renew CS Pipe - 1.25" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	1.6300	1.4400	2.347C	
31	Rem & Renew CS Pipe - 1.5" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	1.9500	1.4400	2.808C	
32	Rem & Renew CS Pipe - 2" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	2.6000	1.4400	3.744C	
33	Rem & Renew CS Pipe - 2.5" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	3.3000	1.4400	4.752C	
34	Rem & Renew CS Pipe - 3" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	4.0000	1.4400	5.760C	
35	Rem & Renew CS Pipe - 4" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	5.3000	1.4400	7.632C	
36	Rem & Renew CS Pipe - 5" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	6.6000	1.4400	9.504C	
37	Rem & Renew CS Pipe - 6" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	7.9000	1.4400	11.376C	
38	Rem & Renew CS Pipe - 8" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	10.6000	1.4400	15.264C	
39	Rem & Renew CS Pipe - 10" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	13.2000	1.4400	19.008C	
40	Rem & Renew CS Pipe - 12" IPS/SCH.40 - Oil Tanks & Dbl Btms (SHAPE)	M	15.8000	1.4400	22.752C	

Figure 2-5: Remove & Renew Carbon Steel Black Pipe CERs (Shaped Sections) Tanks & Double Bottoms

Figure 2-2 package items #13-18 use Equation CERs. Figure 2-6 lists various equation CERs. CERs numbered 2 and 3 use the ship characteristic of gross tons (GRT) as the equation variable (an equation can be formulated with multiple variables).

A new feature of the system has been added so that equations can be developed not only using ship characteristics as variables, but also the quantity as defined for the cost item that uses the equation. The equation CERs numbered 4 -19 use cost item quantity (“QTY!”) as its variable. These CERs develop labor CERs that are variable with pipe length, the variable quantity input to these equations.

Parametric Equations for the Estimating Environment						
Name	Description	Equation	UoM	Labor/Material Flag		
1	Warfage	Warfage charges per metter LOA per day	5.00* LOA	DAYS	<input type="radio"/> Labor	<input checked="" type="radio"/> Material
2	Undocking	Charge for undocking	1.25*GRT	GRT	<input type="radio"/> Labor	<input checked="" type="radio"/> Material
3	Prepare Dry-Dock	Charge to prepare dry-dock	2.20*GRT	GRT	<input type="radio"/> Labor	<input checked="" type="radio"/> Material
4	PIR-CS40<4DK-900	Rem & Renew CS Pipe <4M - 12" IPS/SCH	15.8*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
5	PIR-CS40<4DK-800	Rem & Renew CS Pipe <4M - 10" IPS/SCH	13.2*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
6	PIR-CS40<4DK-700	Rem & Renew CS Pipe <4M - 8" IPS/SCH	10.6*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
7	PIR-CS40<4DK-600	Rem & Renew CS Pipe <4M - 6" IPS/SCH	7.9*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
8	PIR-CS40<4DK-500	Rem & Renew CS Pipe <4M - 5" IPS/SCH	6.6*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
9	PIR-CS40<4DK-400	Rem & Renew CS Pipe <4M - 4" IPS/SCH	5.3*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
10	PIR-CS40<4DK-300	Rem & Renew CS Pipe <4M - 3" IPS/SCH	4*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
11	PIR-CS40<4DK-250	Rem & Renew CS Pipe <4M - 2.5" IPS/SCH	3.3*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
12	PIR-CS40<4DK-200	Rem & Renew CS Pipe <4M - 2" IPS/SCH	2.6*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
13	PIR-CS40<4DK-150	Rem & Renew CS Pipe <4M - 1.5" IPS/SCH	1.95*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
14	PIR-CS40<4DK-1300	Rem & Renew CS Pipe <4M - 20" IPS/SCH	26.4*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
15	PIR-CS40<4DK-125	Rem & Renew CS Pipe <4M - 1.25" IPS/SCH	1.62*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
16	PIR-CS40<4DK-1200	Rem & Renew CS Pipe <4M - 18" IPS/SCH	23.8*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
17	PIR-CS40<4DK-1100	Rem & Renew CS Pipe <4M - 16" IPS/SCH	21.1*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
18	PIR-CS40<4DK-1000	Rem & Renew CS Pipe <4M - 14" IPS/SCH	18.5*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
19	PIR-CS40<4DK-100	Rem & Renew CS Pipe <4M - 1" IPS/SCH	1.3*(4+QTY!)*.75	M	<input checked="" type="radio"/> Labor	<input type="radio"/> Material
20	Dry-Docking Following	Charge for dry-docking each following day	1.35*GRT	GRT	<input type="radio"/> Labor	<input checked="" type="radio"/> Material
21	Dry-Docking 1st Day	Charge for dry-docking 1st day	1.5* GRT	GRT	<input type="radio"/> Labor	<input checked="" type="radio"/> Material

Figure 2-6: Sample List Of Equation CERs

The user can formulate the equation first by clicking on the *Equation* column data field. This will open the equation window (figure 2-7) where the user constructs the equation in the *Define Expression* box using whatever combination of keypad buttons (or direct input from the key-board) and variables. The ship characteristics variables that are available can be selected from the *Characteristic* drop-down list. The cost item quantity, identified as QTY!, can be selected as a variable from the *Thruput Variable* drop-down list.

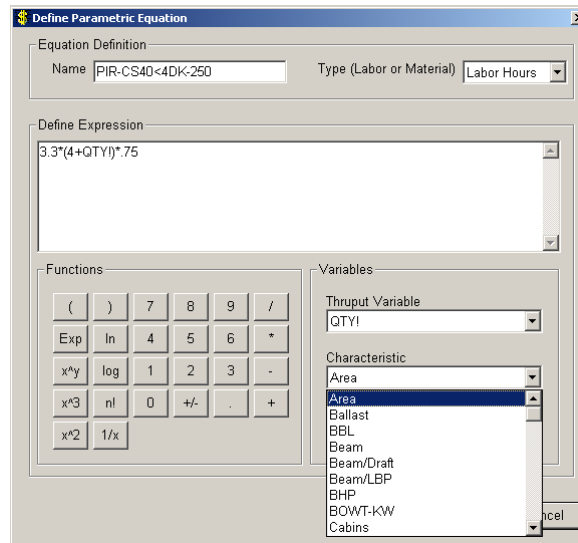


Figure 2-7: Formulating A CER Equation


Package Items Using Standard Parts (Stock & Direct Purchase)

When linking package items to standard parts in the Parts Catalog, the items will always receive the current unit price as maintained in the catalog (figure 2-8). All cost estimate reports will indicate material costs based on the unit purchase price. However, the formal bid document, *Customer Estimate Report*, will use the retail price as maintained on the Parts Catalog. The retail price, which is the unit purchase price adjusted by a markup percentage, also will be used on the system's *Customer Billing Report*.

Parts Catalog Detail Information for the Estimating Environment								
Parts Catalog		Attributes						
Classification	Part ID	Description	UoM	Unit Price	Markup %	Retail Price	Qty On Shelf	Last Purch Price
1 Pipe	PI-CS40-150	Carbon Steel Black Pipe - 1.5" IPS/SCH.40	M	8.4300	15.00	9.6945	0.00	0.0000
2 Pipe	PI-CS40-200	Carbon Steel Black Pipe - 2" IPS/SCH.40	M	10.1300	15.00	11.6495	0.00	0.0000
3 Pipe	PI-CS40-250	Carbon Steel Black Pipe - 2.5" IPS/SCH.40	M	15.1900	15.00	17.4685	0.00	0.0000
4 Pipe	PI-CS40-300	Carbon Steel Black Pipe - 3" IPS/SCH.40	M	20.2600	15.00	23.2990	0.00	0.0000
5 Pipe	PI-CS40-400	Carbon Steel Black Pipe - 4" IPS/SCH.40	M	28.1400	15.00	32.3610	0.00	0.0000
6 Pipe	PI-CS40-500	Carbon Steel Black Pipe - 5" IPS/SCH.40	M	38.2700	15.00	44.0105	0.00	0.0000
7 Pipe	PI-CS40-600	Carbon Steel Black Pipe - 6" IPS/SCH.40	M	48.4000	15.00	55.6600	0.00	0.0000
8 Pipe	PI-CS40-700	Carbon Steel Black Pipe - 8" IPS/SCH.40	M	73.1600	15.00	84.1340	0.00	0.0000
9 Pipe	PI-CS40-800	Carbon Steel Black Pipe - 10" IPS/SCH.40	M	97.9200	15.00	112.6080	0.00	0.0000
10 Pipe	PI-CS40-900	Carbon Steel Black Pipe - 12" IPS/SCH.40	M	126.0600	15.00	144.9690	0.00	0.0000
11 Pipe	PI-CS40-100	Carbon Steel Black Pipe - 1" IPS/SCH.40	M	6.7500	15.00	7.7625	0.00	0.0000
12 Pipe	PI-CS40-125	Carbon Steel Black Pipe - 1.25" IPS/SCH.40	M	7.6100	15.00	8.7515	0	0.0000

Figure 2-8: Sample List Of Parts Catalog Of Pipe

Chapter 3: Copying A Standard Package To A Project Estimate Worksheet

To copy a standard package into a project worksheet, the user must first open the project cost item worksheet and click on the “Add IP package” button  on the toolbar. The system then will copy all of the package items to the worksheet. Figure 3-1 shows the wizard for copying one or more packages into the estimate worksheet.

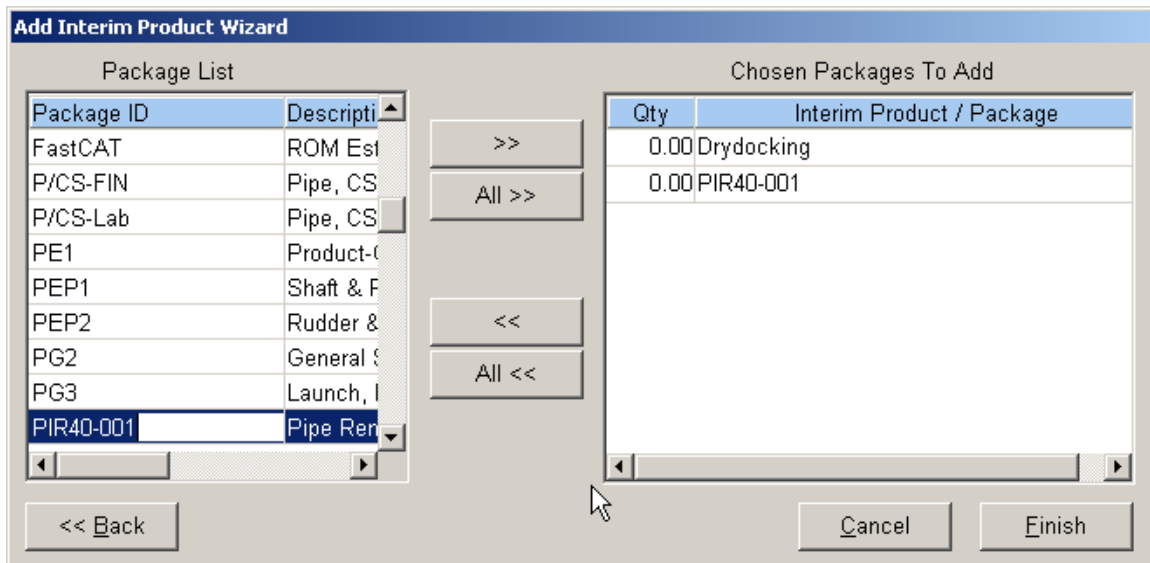


Figure 3-1: Wizard To Copy Packages To Project Estimate

Figure 3-2 shows the resulting cost items copied from the package. If no cost item quantities are defined in the package, the estimator must define the quantities in this worksheet. Note that the items that use quantity as a variable in the CER equations (items numbered 6 and 23) initially are set by the system to zero, since the initial quantity is zero. When the estimator enters the quantity, the system will immediately compute the CERs.

Cost Item Information for the Estimating Environment										
Contract	Project	Work Center	Cost Item	Heading	Quantity	UoM	Labor Unit Hours (CER)	Material Unit Cost (CER)		
1	B-DEMO	5	0	6	Rem&Renew CS Pipe - 1" IPS/SCH.40 - W.	24.00	M	1.3000	6.7500	
2	B-DEMO	5	0	7	Rem&Renew CS Pipe - 1.25" IPS/SCH.40 -	16.00	M	1.6300	7.6100	
3	B-DEMO	5	0	8	Rem&Renew CS Pipe - 1.5" IPS/SCH.40 - V	0.00	M	1.9500	8.4300	
4	B-DEMO	5	0	9	Rem&Renew CS Pipe - 2" IPS/SCH.40 - W.	0.00	M	2.6000	10.1300	
5	B-DEMO	5	0	10	Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - V	15.00	M	3.3000	15.1900	
6	B-DEMO	5	0	11	Rem&Renew CS Pipe - 3" IPS/SCH.40 - W.	0.00	M	4.0000	20.2600	
7	B-DEMO	5	0	12	Rem&Renew CS Pipe - 1" IPS/SCH.40 - W.	0.00	M	1.4950	6.7500	
8	B-DEMO	5	0	13	Rem&Renew CS Pipe - 1.25" IPS/SCH.40 -	0.00	M	1.8745	7.6100	
9	B-DEMO	5	0	14	Rem&Renew CS Pipe - 1.5" IPS/SCH.40 - V	0.00	M	2.2425	8.4300	
10	B-DEMO	5	0	15	Rem&Renew CS Pipe - 2" IPS/SCH.40 - W.	0.00	M	2.9900	10.1300	
11	B-DEMO	5	0	16	Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - V	0.00	M	3.7950	15.1900	
12	B-DEMO	5	0	17	Rem&Renew CS Pipe - 3" IPS/SCH.40 - W.	0.00	M	4.6000	20.2600	
13	B-DEMO	5	0	18	Rem&Renew CS Pipe <4M - 1" IPS/SCH.40	0.00	M	3.9000	6.7500	
14	B-DEMO	5	0	19	Rem&Renew CS Pipe <4M - 1.25" IPS/SCH	2.00	M	7.2900	7.6100	
15	B-DEMO	5	0	20	Rem&Renew CS Pipe <4M - 1.5" IPS/SCH.	0.00	M	5.8500	8.4300	
16	B-DEMO	5	0	21	Rem&Renew CS Pipe <4M - 2" IPS/SCH.40	0.00	M	7.8000	10.1300	
17	B-DEMO	5	0	22	Rem&Renew CS Pipe <4M - 2.5" IPS/SCH.	3.00	M	17.3250	15.1900	
18	B-DEMO	5	0	23	Rem&Renew CS Pipe <4M - 3" IPS/SCH.40	0.00	M	12.0000	20.2600	
19	B-DEMO	5	10	1	Prepare Drydock	1.00	GRT	0.0000	35,200.0000	
20	B-DEMO	5	10	2	Drydocking - first Day	1.00	GRT	0.0000	24,000.0000	
21	B-DEMO	5	10	3	Drydocking - Follow Days	1.00	GRT	0.0000	21,600.0000	
22	B-DEMO	5	10	4	Warfage	10.00	DAY\$	0.0000	1,625.0000	
23	B-DEMO	5	10	5	Undocking	1.00	GRT	0.0000	20,000.0000	
24	B-DEMO	5	10	24	Pipe Bends	25.00	EA	4.0000	0.0000	
25	B-DEMO	5	10	25	Pipe Penetrations	9.00	EA	3.0000	0.0000	

Figure 3-2: Estimate Cost Items After Packages Are Copied

When the estimator uses this package, all package item quantities may be pre-set to zero. The estimator must enter the appropriate quantities to those items in the project estimate worksheet that are required for the project. Items that are not needed can be deleted from the worksheet. This process can be done easily first by clicking on the “Total Cost” column heading so that the system will sort the worksheet items in ascending order of total cost. The un-needed items will “float” to the top of the worksheet, and they can be deleted as a group.

Cost items numbered 1-5 were created from another standard work package for dry-docking. These items are linked to the specific ship’s set of design characteristics that are shown in figure 3-3.

Ship Characteristics Information for the Estimating Environment							
Contract ID	Project	Characteristic Type	Characteristic	Description	UoM	Value	
1	B-DEMO	5	Dimensions	Beam	Maximum Beam	Meters	50
2	B-DEMO	5	Dimensions	Depth	Depth of Hull	Meters	20
3	B-DEMO	5	Dimensions	Draft	Designed Draft	Meters	15
4	B-DEMO	5	Dimensions	DWL	Designed Waterline	Meters	300
5	B-DEMO	5	Dimensions	Freeboard	Freeboard draught	Meters	0
6	B-DEMO	5	Dimensions	LBP	Length Between Perpendiculars	Meters	300
7	B-DEMO	5	Dimensions	LOA	Length Overall	Meters	325
8	B-DEMO	5	Machinery	SHP-KW	Shaft Horsepower	KW	3000
9	B-DEMO	5	Operational	CruiseSpeed	Cruise Speed	KTS	10
10	B-DEMO	5	Operational	DWT	Dead Weight Tons	MTON	3000
11	B-DEMO	5	Operational	MaxSpeed	Max Speed	KTS	15
12	B-DEMO	5	Weights-Volume	Displ-MT	Full Load Displacement	MTON	4500
13	B-DEMO	5	Weights-Volume	GRT	Gross Tonnes	MTON	16000

Figure 3-3: Sample Set Of Ship Characteristics Used For Selected Cost Items

Figure 3-4 shows the final list of estimate items after the quantities required have been entered and those without quantities deleted.

Cost Item Information for the Estimating Environment									
Contract	Project	Work Center	Cost Item	Heading	Quantity	UoM	Labor Unit Hours (CER)	Material Unit Cost (CER)	
1 B-DEMO	5	0	6	Rem&Renew CS Pipe - 1" IPS/SCH.40 - W.	24.00	M	1.3000	6.7500	
2 B-DEMO	5	0	7	Rem&Renew CS Pipe - 1.25" IPS/SCH.40 -	16.00	M	1.6300	7.6100	
3 B-DEMO	5	0	10	Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - V	15.00	M	3.3000	15.1900	
4 B-DEMO	5	0	19	Rem&Renew CS Pipe <4M - 1.25" IPS/SCH	2.00	M	7.2900	7.6100	
5 B-DEMO	5	0	22	Rem&Renew CS Pipe <4M - 2.5" IPS/SCH.	3.00	M	17.3250	15.1900	
6 B-DEMO	5	10	1	Prepare Drydock	1.00	GRT	0.0000	35,200.0000	
7 B-DEMO	5	10	2	Drydocking - first Day	1.00	GRT	0.0000	24,000.0000	
8 B-DEMO	5	10	3	Drydocking - Follow Days	1.00	GRT	0.0000	21,600.0000	
9 B-DEMO	5	10	4	Warfage	10.00	DAY	0.0000	1,625.0000	
10 B-DEMO	5	10	5	Undocking	1.00	GRT	0.0000	20,000.0000	
11 B-DEMO	5	10	24	Pipe Bends	25.00	EA	4.0000	0.0000	
12 B-DEMO	5	10	25	Pipe Penetrations	9.00	EA	3.0000	0.0000	

Figure 3-4: Project Estimate Cost Items

Project Work Breakdown Structure (WBS) Assignments

The shipyard's WBS can be defined on the package cost items so that the estimator does not need to define it each and every time the package is used in an estimate. However, cost items that are entered manually will need to be identified with the correct SWBS.

Figure 3-5 lists a sample SWBS set of WBS accounts.

SWBS Account Information for the Estimating Environment					
Contract	Project	Group	Account	Description	
1 B-DEMO	5	1	101	Rip-Out Plating	
2 B-DEMO	5	1	102	Fab new plating	
3 B-DEMO	5	1	103	Install new plating	
4 B-DEMO	5	2	201	Fresh water system: remove & renew piping	
5 B-DEMO	5	9	997	Drydocking & Warfage	

Figure 3-5: Sample SWBS Accounts For A Project

Packages also may identify areas of ship. Using the PWBS ship zones provides this information directly. Figure 3-6 lists a sample PWBS set of PWBS ship zones.

PWBS Zone Information for the Estimating Environment				
	Contract	Project	Zone	Description
1	B-DEMO	5	AFT	Stern areas & transome
2	B-DEMO	5	CT	Cargo Tanks
3	B-DEMO	5	DB	Double Bottoms
4	B-DEMO	5	ER	Engine Room
5	B-DEMO	5	FWD	Foredeck & Focsle
6	B-DEMO	5	HULL	Hull Exterior
7	B-DEMO	5	SS	Superstructure
8	B-DEMO	5	SW	Ship Wide
9	B-DEMO	5	WD	Weather Deck

Figure 3-6: Sample PWBS Ship Zones For A Project

Work Center Assignments

Each and every cost item must be assigned to a shipyard work center. The work center should at least identify the type work to be performed or the workshop normally responsible for the work.

Figure 3-7 lists a sample set of shipyard work centers.

\$ Rate Tables and Indirect Formulas for the Estimating Environment				
	Contract	Project	Work Center	Description and Comments
1	B-DEMO	5	0	Pipe Shop
2	B-DEMO	5	04	Steel Weldout
3	B-DEMO	5	10	Production Servces

Figure 3-7: Sample List Of Shipyard Work Centers For A Project

Figure 3-8 shows a sample set of labor rates applicable to the work centers. Labor rates can be made to vary from work center to work center and from project to project. The rates can be defined across any number of applicable years.

Rate Table Information for the Estimating Environment						
	Rate	Percent Profit	Percent G&A	Percent Overhead	Percent Local Tax	Percent Fed Tax
Year	2001	Description Pipe Shop				
Labor	16.50	10.00%	0.00%	50.00%	0.00%	0.00%
Material		5.00%	15.00%	0.00%	5.00%	0.00%
SubCon	0.00	0.00%	0.00%	0.00%	0.00%	0.00%
Travel		0.00%	0.00%	0.00%	0.00%	0.00%
Year	2002	Description Pipe Shop				
Labor	17.25	10.00%	0.00%	50.00%	0.00%	0.00%
Material		5.00%	15.00%	0.00%	0.00%	0.00%
SubCon	0.00	0.00%	0.00%	0.00%	0.00%	0.00%
Travel		0.00%	0.00%	0.00%	0.00%	0.00%

Figure 3-8: Sample Work Center Labor Rates For A Project

Chapter 4: Sample Cost Estimate Reports

Figure 4-1 displays the total project cost estimate.

Project Details Information for the Estimating Environment					
Details		Options		Milestones	Characteristics
Contract	E-DEMO		Description		Sample Cost Estimate w/Templates
Project	5				
Ship Type	OBO				
	Labor	Material	SubCon	Travel	
Hours	300.34		0.00		
Cost	4,955.61	117,622.40	0.00	0.00	
Profit	743.35	5,925.23	0.00	0.00	
G&A	0.00	882.17	0.00	0.00	
Overhead	2,477.82	0.00	0.00	0.00	
Local Tax	0.00	5,881.12	0.00	0.00	
Federal Tax	0.00	0.00	0.00	0.00	
Sub Totals	8,176.78	130,310.92	0.00	0.00	
Start Date	00/00/0000	Min. Risk	138,487.70	Weight	0.00
Finish Date	00/00/0000	Total Cost	138,487.70	Volume	0
		Max. Risk	138,487.70	# of Cost Items	12

Figure 4-1: Total Project Cost Estimate

Figure 4-2 presents the cost item details for the estimate. This particular report sorts the cost items by SWBS account. Other reports will sort this information by work center, PWBS, etc.

08/30/2002 11:54:15 (Date format: MM/DD/YYYY)		Chesapeake Marine Industries						Page 1 of 1					
Cost Item Listing by SWBS Accounts(CI03)													
Contract B-DEMO Demo Contract for WORK-PAC Tutorial													
Project Range:		5 to 5		Group Range:		0 to ZZZZZZZZ		Account Range:				0 to ZZZZZZZZ	
Center	Cost Item	Heading	Qty	UoM	Labor CER	Mat'l CER	Labor Hours	Labor Cost	Material Cost	Extended Cost	Last Updated		
Project 5 Sample Cost Estimate w/Templates													
Group 2 - Outfit Work													
Account 201 - Fresh water system: remove			0.00										
0	6	Rem&Renew CS Pipe - 1" IPS/SCH.40 - W. L	24.00	M	1.3000	6.7500	31	515	162	677	08/30/2002		
0	7	Rem&Renew CS Pipe - 1.25" IPS/SCH.40 - V	16.00	M	1.6300	7.6100	26	430	122	552	08/30/2002		
0	10	Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - W	15.00	M	3.3000	15.1900	50	817	228	1,045	08/30/2002		
0	19	Rem&Renew CS Pipe <4M - 1.25" IPS/SCH.4	2.00	M	7.2900	7.6100	15	241	15	256	08/30/2002		
0	22	Rem&Renew CS Pipe <4M - 2.5" IPS/SCH.4	3.00	M	17.3250	15.1900	52	858	46	903	08/30/2002		
10	24	Pipe Bends	25.00	EA	4.0000	0.0000	100	1,650	0	1,650	08/30/2002		
10	25	Pipe Penetrations	9.00	EA	3.0000	0.0000	27	446	0	446	08/30/2002		
					Account: 201 Totals		300	4,956	572	5,528			
					Group: 2 Totals		300	4,956	572	5,528			
Group 9 - Services & Drydocking													
Account 997 - Drydocking & Warfage			0.00										
10	1	Prepare Drydock	1.00	GRT	0.0000	35,200.0000	0	0	35,200	35,200	08/30/2002		
10	2	Drydocking - first Day	1.00	GRT	0.0000	24,000.0000	0	0	24,000	24,000	08/30/2002		
10	3	Drydocking - Follow Days	1.00	GRT	0.0000	21,600.0000	0	0	21,600	21,600	08/30/2002		
10	4	Warfage	10.00	DAYS	0.0000	1,625.0000	0	0	16,250	16,250	08/30/2002		
10	5	Undocking	1.00	GRT	0.0000	20,000.0000	0	0	20,000	20,000	08/30/2002		
					Account: 997 Totals		0	0	117,050	117,050			
					Group: 9 Totals		0	0	117,050	117,050			
					Project: 5 Totals		300	4,956	117,622	122,578			
					Contract: B-DEMO Totals		300	4,956	117,622	122,578			

Figure 4-2: Cost Item Detail Report (Sorted By SWBS Account)

Figure 4-3 presents the cost estimate summarized by SWBS account. Similar reports summarize by work center, PWBS, etc.

08/30/2002 11:55:27 (Date format: MM/DD/YYYY)		Chesapeake Marine Industries						Page 1 of 1					
SWBS Account Summary Report (SUM03)													
Contract B-DEMO - Demo Contract for WORK-PAC Tutorial													
Project Range:		5 to 5		Group Range:		0 to ZZZZZZZZ		Account Range:				0 to ZZZZZZZZ	
Account	Description	Labor Hours	Labor Cost	Material Cost	SubCon Hours	SubCon Cost	Travel Cost	Direct Cost	Taxes	Indirect Cost	Total Cost	Profit	Total Price
Project 5 Sample Cost Estimate w/Templates													
Group 1 Hull Work													
101	Rip-Out Plating	0	0	0	0	0	0	0	0	0	0	0	0
102	Fab new plating	0	0	0	0	0	0	0	0	0	0	0	0
103	Install new plating	0	0	0	0	0	0	0	0	0	0	0	0
Group: 1 Totals		0	0	0	0	0	0	0	0	0	0	0	0
Group 2 Outfit Work													
201	Fresh water system: remove & rene	300	4,956	572	0	0	0	5,528	29	2,482	8,039	772	8,811
Group: 2 Totals		300	4,956	572	0	0	0	5,528	29	2,482	8,039	772	8,811
Group 9 Services & Drydocking													
997	Drydocking & Warfage	0	0	117,050	0	0	0	117,050	5,853	878	123,780	5,896	129,677
Group: 9 Totals		0	0	117,050	0	0	0	117,050	5,853	878	123,780	5,896	129,677
Project: 5 Totals		300	4,956	117,622	0	0	0	122,578	5,881	3,360	131,819	6,669	138,488
Contract: B-DEMO Totals		300	4,956	117,622	0	0	0	122,578	5,881	3,360	131,819	6,669	138,488

Figure 4-3: Cost Summary Report (Sorted By SWBS Account)

The following figure 4-4 displays another report in a proposal format.


Page 1 of 1							
							
<table border="1"> <tr> <td style="text-align: center;">Estimate Date</td> </tr> <tr> <td style="text-align: center;">08/30/2002</td> </tr> </table>						Estimate Date	08/30/2002
Estimate Date							
08/30/2002							
TO CUSTOMER		ESTIMATE		PROPOSAL FROM			
927 West Street Annapolis, MD 21401				Chesapeake Marine Industries 927 West Street Annapolis, MD 21401			
Contract B-DEMO - Demo Contract for WORK-PAC Tutorial							
Project 5 - Sample Cost Estimate w/Templates							
Cost Item #	Quantity	UoM	Description	Unit Price	Extended Cost		
Account 201							
6	24.00	M	Rem&Renew CS Pipe - 1" IPS/SCH.40 - W. Dk (STRAIGHT)	42.87	1,028.90		
7	16.00	M	Rem&Renew CS Pipe - 1.25" IPS/SCH.40 - W. Dk (STRAIGHT)	52.81	844.92		
10	15.00	M	Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - W. Dk (STRAIGHT)	106.67	1,600.07		
19	2.00	M	Rem&Renew CS Pipe <4M - 1.25" IPS/SCH.40 - W. Dk (STRAIGHT)	206.91	413.81		
22	3.00	M	Rem&Renew CS Pipe <4M - 2.5" IPS/SCH.40 - W. Dk (STRAIGHT)	488.55	1,465.65		
24	25.00	EA	Pipe Bends	108.90	2,722.50		
25	9.00	EA	Pipe Penetrations	81.68	735.08		
				Total for Acct: 201	8,810.93		
Account 997							
1	1.00	GRT	Prepare Drydock	38,997.20	38,997.20		
2	1.00	GRT	Drydocking - first Day	26,589.00	26,589.00		
3	1.00	GRT	Drydocking - Follow Days	23,930.10	23,930.10		
4	10.00	DAYS	Warfage	1,800.30	18,002.97		
5	1.00	GRT	Undocking	22,157.50	22,157.50		
				Total for Acct: 997	129,676.77		
				Total for Project: 5	138,487.70		

Figure 4-4: Sample Cost Estimate Proposal Document

Chapter 5: Transferring Cost Estimate To Production Information

The system's "tool box" provides for a wizard function that transfers cost estimate information directly into production budgets, material requisitions and work orders.


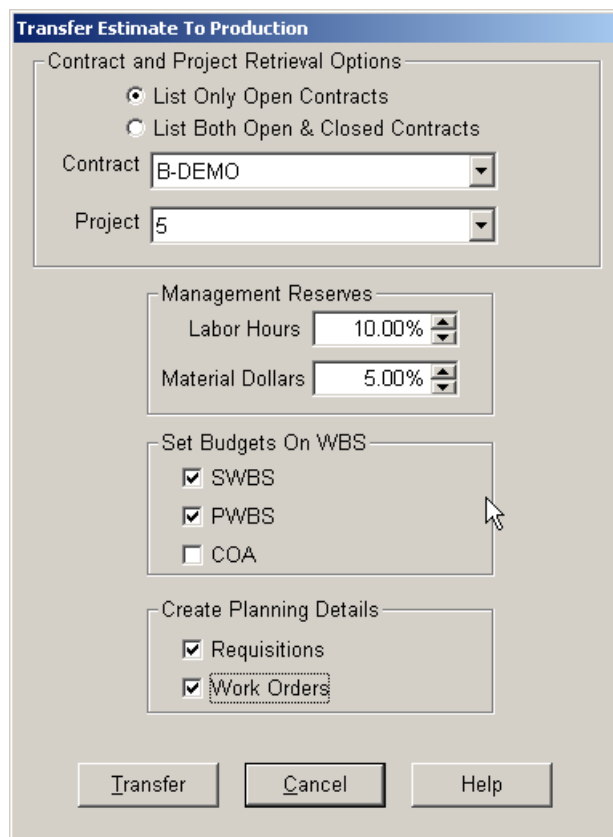
Special Note: Prior to using this wizard, the user should always ensure that all cost items have been correctly cataloged against the project WBS. This can be accomplished by clicking on the "Validate Displayed Data" button  for the cost items displayed in the project estimate worksheet. This is important, since only those cost items correctly cataloged to the project WBS will be transferred to material requisitions and to work orders.

Figure 5-1 shows the system wizard that makes this transfer from the estimate.



The screenshot shows a dialog box titled "Transfer Estimate To Production". It contains several sections for configuration:

- Contract and Project Retrieval Options:** Includes two radio buttons: "List Only Open Contracts" (selected) and "List Both Open & Closed Contracts". Below are dropdown menus for "Contract" (set to "B-DEMO") and "Project" (set to "5").
- Management Reserves:** Includes two spinners: "Labor Hours" (set to 10.00%) and "Material Dollars" (set to 5.00%).
- Set Budgets On WBS:** Includes three checkboxes: "SWBS" (checked), "PWBS" (checked), and "COA" (unchecked).
- Create Planning Details:** Includes two checkboxes: "Requisitions" (checked) and "Work Orders" (checked).

At the bottom of the dialog are three buttons: "Transfer", "Cancel", and "Help".

Figure 5-1: System Wizard Transferring Cost Estimate Data To Material Requisitions And Work Orders

Note that the user has specified that the resulting labor budgets are reduced from the estimate by 10% (labor management reserve), and that the resulting material budgets are reduced from the estimate by 5% (material management reserve).

The following Figure 5-2 displays a summary of production budgets for the project.

Project Details Information for the Production Environment									
Details	Material Status	Overall Status	Indexes	Variances	Notes	Baseline	Options	Milestones	Characteristics
Contract	B-DEMO		Description					Sample Cost Estimate w/Templates	
Project	5		Effective Date:					08/26/2002	
	Budgeted Cost of Work Scheduled	Budgeted Cost of Work Performed	Actual Cost of Work Performed	Budgeted Cost	Estimated at Completion	Reserves	Rework		
Man-Hours	0	0	0	270.31	270	30	0		
Rate/Hour	16.50		0.00		16.50		0		
Labor Cost	0	0	0	4,460	4,460	496	0		
Overhead	0	0	0	0	0	0	0		
Mat'l Cost	0	0	0	111,741	111,741	5,881	0		
Total Cost	0	0	0	116,201	116,201	6,377	0		
	Total Reserves:			6,377	Estimated Remaining Hours				
	Total Budget + Reserves:			122,578	270				
	Less Total EAC:			116,201	NOTE: Rework included in ACWP and EAC				
	Less Current Total Rework Cost:			0					
	Net Cost Margin:			6,377					

Figure 5-2: Project Budget Summary

Automated Generation Of Material Requisitions

The system’s “tool box” wizard has the option to transfer cost estimate material information directly into project material requisitions. The requisitions then may be converted to purchase orders, as well as to production “pallets”.

This automated transfer function ensures that the material requirements of the cost estimate are fully defined for the purchasing and material control processes of the shipyard. These material requisitions may be modified to suit actual project requirements and the automated requisitions may be regarded as a preliminary for general planning purposes.

Special Note: Cost items like dry-docking that are based upon a standard fee should be set with Part Type “Milestone Payment” so that they can be readily recognized as items that are not purchased, but simply billed to the customer. The Part Type can be set either on the standard package items or on the project estimate cost items.

The following Figure 5-3 displays the two requisitions that are created from the cost estimate. A separate requisition is created for each SWBS account of the estimate.

Requisition Information for the Production Environment							
Contract	Project	Reqn	Heading	Budget	Account	Drawing	Drawing File Name
B-DEMO	5	201	Fresh water system: remove & renew pipin	543.78	201		
B-DEMO	5	997	Drydocking & Warfage	111,197.50	997		

Figure 5-3: List Of Automated Material Requisitions

The following figures 5-4a and 5-4b present the details of the first requisition. Figures 5-4c and 5-4d present the details of the second requisition.

Requisition Details Information for the Production Environment

Requisitions | Requisition Items

Contract: B-DEMO | Reqn: 201 | Heading: Fresh water system: remove & renew pipin

Proj: 5 | Drawing: | Center: | Work Order: | Budget: 543.78

Auth: | Auth Date: 00/00/0000 | Need Date: 00/00/0000

Auth By: SPAR | Complete: | - Buffer Days: 0

Date Created: 08/30/2002 | Revision: | = Required In Yard: 00/00/0000

RFQ Date: 00/00/0000 | Rev Date: 00/00/0000 | - PO Lead Time: 0

Destination: | = PO Action Date: 00/00/0000

Responsible: spar

SWBS Group: 2 | Acct: 201 | **COAs** Division: | Center: | Shop: | Supervisor: |

PWBS Zone: | Unit: | Sub Assy: | Activity Center: | Outfit Zone: | Assembly: | Part: | Activity: |

Figure 5-4a: Requisition Header Information

Requisition Details Information for the Production Environment

Requisitions | Requisition Items

	Contract	Project	Req	Req Item	Part ID	Description	Qty Required	UoM	Unit Price	Budget Cost	Account	Zone
1	B-DEMO	5	201	6	PI-CS40-100	Carbon Steel Black Pipe - 1" IPS/SCH.40	24.00	M	6.4125	153.90	201	WD
2	B-DEMO	5	201	7	PI-CS40-125	Carbon Steel Black Pipe - 1.25" IPS/SCH.40	16.00	M	7.2295	115.67	201	WD
3	B-DEMO	5	201	10	PI-CS40-250	Carbon Steel Black Pipe - 2.5" IPS/SCH.40	15.00	M	14.4305	216.46	201	WD
4	B-DEMO	5	201	19	PI-CS40-125	Carbon Steel Black Pipe - 1.25" IPS/SCH.40	2.00	M	7.2295	14.46	201	WD
5	B-DEMO	5	201	22	PI-CS40-250	Carbon Steel Black Pipe - 2.5" IPS/SCH.40	3.00	M	14.4305	43.29	201	WD

Figure 5-4b: Requisition Detail Items Information

Requisition Details Information for the Production Environment

Requisitions | Requisition Items

Contract: B-DEMO Reqn: 997 Heading: Drydocking & Warfage

Proj: 5 Drawing: Center: Work Order: Budget: 111,197.50

Auth: Auth Date: 00/00/0000 Need Date: 00/00/0000

Auth By: SPAR Complete: - Buffer Days: 0

Date Created: 08/30/2002 Revision: = Required In Yard: 00/00/0000

RFQ Date: 00/00/0000 Rev Date: 00/00/0000 - PO Lead Time: 0

Destination: = PO Action Date: 00/00/0000

Responsible: spar

SWBS Group: 9 Acct: 997

COAs Division: Center: Shop: Supervisor:

PWBS Zone: Unit: Sub Assy: Activity Center: Outfit Zone: Assembly: Part: Activity:

Figure 5-4c: Requisition Header Information

Requisition Details Information for the Production Environment

Requisitions | Requisition Items

Contract	Project	Req	Req Item	Part ID	Description	Qty Required	UoM	Unit Price	Budget Cost	Account	Zone
1 B-DEMO	5	997	1	59971	Prepare Drydock	1.00	GRT	33,440.0000	33,440.00	997	SW
2 B-DEMO	5	997	2	59972	Drydocking - first Day	1.00	GRT	22,800.0000	22,800.00	997	SW
3 B-DEMO	5	997	3	59973	Drydocking - Follow Days	1.00	GRT	20,520.0000	20,520.00	997	SW
4 B-DEMO	5	997	4	59974	Warfage	10.00	DAYS	1,543.7500	15,437.50	997	SW
5 B-DEMO	5	997	5	59975	Undocking	1.00	GRT	19,000.0000	19,000.00	997	SW

Figure 5-4d: Requisition Detail Items Information

Automated Generation Of Production Work Orders

The system’s “tool box” wizard also provides the option to transfer cost estimate labor information directly into production work orders.

This automated transfer function ensures that the labor work requirements of the cost estimate are fully defined for the production work centers of the shipyard. These work orders may be modified to suit actual project requirements and the automated work orders may be regarded as a preliminary for general planning purposes.

Figure 5-6 lists the seven work orders that are created from the cost estimate.

Work Orders Information for the Production Environment								
Project	Center	Work Order	Heading	Planned Qty	UoM	Budgeted Labor Hours	Budgeted Labor Cost	Budgeted Material Cost
5	0	7	Rem&Renew CS Pipe - 1.25" IPS/SCH.40 - W	16.00	M	23.47	387.29	115.67
5	0	6	Rem&Renew CS Pipe - 1" IPS/SCH.40 - W. D	24.00	M	28.08	463.32	153.90
5	10	25	Pipe Penetrations	9.00	EA	24.30	400.95	0.00
5	10	24	Pipe Bends	25.00	EA	90.00	1,485.00	0.00
5	0	22	Rem&Renew CS Pipe <4M - 2.5" IPS/SCH.40	3.00	M	46.78	771.90	43.29
5	0	19	Rem&Renew CS Pipe <4M - 1.25" IPS/SCH.40	2.00	M	13.12	216.51	14.46
5	0	10	Rem&Renew CS Pipe - 2.5" IPS/SCH.40 - W.	15.00	M	44.55	735.08	216.46


Figure 5-6: Listing Of Seven Work Orders Created From The Cost Estimate

Figure 5-7 displays the details of one of these work orders.

Work Order Details Information for the Production Environment											
Contract	B-DEMO	Project	5	Heading	Rem&Renew CS Pipe - 2.5" IPS/SCH.40					Issue Date	
Center	0	Work Order	10	Description	Rem&Renew CS Pipe - 2.5" IPS/SCH.40					00/00/0000	
IPT		Planner		Foreman		Revision		Rev Date	00/00/0000		
Division		Shop		Center		Drawing		Start Date	Finish Date		
								Planned	Actual		
Supervisor				Qty	15.00		0.00	Planned	Actual		
								00/00/0000	00/00/0000		
Zone	WD	Labor CER	3.30	UoM	M	Date of Last Charge					
Outfit Zone		Labor Rate	14.85			Budget Material \$	216.46				
Unit/Block		Budget	44.55	Hours		Actual	0.00	Cost	0.00		
Assembly		Actual	0.00			Product Code					
Sub Assembly		Rework	0.00			WO Type	Discrete				
MFG Part		Premium	0.00			Manpower Curve					
SWBS Group	2	After Close	0.00			Authorization	NOT Authorized				
SWBS Account	201	Estimated to Complete	0.00			Rework Status	NOT a Rework WO				
CLIN		Manual Progress	0.00	%		Pallet Budgeted Hours	0.00				
Activity Center		Change Order ID				Work Order Serial Number	2698				
Planning Activity											

Figure 5-7: Details Of A Work Order Created From The Cost Estimate

Chapter 6: Generating Purchase Orders

Purchase orders may be generated directly from material requisitions. Figure 6-1 displays a collection of requisition items that are identified for a purchase order. By clicking on the “Define Purchase Order” button  the system presents to the user the purchase order wizard, Figure 6-2.

Requisition Items Information for the Production Environment									
Contract	Project	Req	Req Item	Description	Part ID	Qty Required	UoM	Part Type	
1	B-DEMO	5	201	6	Carbon Steel Black Pipe - 1" IPS/SCH.40	PI-CS40-100	24.00	M	Direct Purchase
2	B-DEMO	5	201	7	Carbon Steel Black Pipe - 1.25" IPS/SCH.40	PI-CS40-125	16.00	M	Direct Purchase
3	B-DEMO	5	201	10	Carbon Steel Black Pipe - 2.5" IPS/SCH.40	PI-CS40-250	15.00	M	Direct Purchase
4	B-DEMO	5	201	19	Carbon Steel Black Pipe - 1.25" IPS/SCH.40	PI-CS40-125	2.00	M	Direct Purchase
5	B-DEMO	5	201	22	Carbon Steel Black Pipe - 2.5" IPS/SCH.40	PI-CS40-250	3.00	M	Direct Purchase
6	B-DEMO	5	997	1	Prepare Drydock	59971	1.00	GRT	Milestone Paymer
7	B-DEMO	5	997	2	Drydocking - first Day	59972	1.00	GRT	Milestone Paymer
8	B-DEMO	5	997	3	Drydocking - Follow Days	59973	1.00	GRT	Milestone Paymer
9	B-DEMO	5	997	4	Warfage	59974	10.00	DAY	Milestone Paymer
10	B-DEMO	5	997	5	Undocking	59975	1.00	GRT	Milestone Paymer

Figure 6-1: Collecting Requisition Items For A Purchase Order

Figure 6-2: The Purchase Order Wizard

Figure 6-3 displays the resulting purchase order. Note that PO item numbers 2 and 3 have consolidated quantity requirements of like parts to simplify the purchase order for the vendor. This consolidation, however, does permit different delivery dates if necessary.

Chesapeake Marine Industries

Purchase Order # 12352

Page 1 of 1

Terms Demo 30


A110 Aeroquip 927 West Street Annapolis, MD 21401, USA				Ship To Chesapeake Marine Industries 927 West Street Annapolis, MD 21401 Care of Vendor	
Date Of Order	Required In Yard	Promised ETA	F.O.B.	Phone	Amendment ID
09/03/2002				-	
Sales Contact		Purchaser	Ship Via	Fax	Amendment Date
				-	
PO Heading	Pipe for Project 5				
Seller's Reference					
Item	Qty	UoM	Description	Unit Price	Ext Cost
1	24.00	M	PI-CS40-100 - Carbon Steel Black Pipe - 1" IPS/SCH.40 Project: 5 Account: 201 Qty: 24.00 Need Date:	6.4100	153.84
2	18.00	M	PI-CS40-125 - Carbon Steel Black Pipe - 1.25" IPS/SCH.40 Project: 5 Account: 201 Qty: 16.00 Need Date: Project: 5 Account: 201 Qty: 2.00 Need Date:	7.2300	130.14
3	18.00	M	PI-CS40-250 - Carbon Steel Black Pipe - 2.5" IPS/SCH.40 Project: 5 Account: 201 Qty: 15.00 Need Date: Project: 5 Account: 201 Qty: 3.00 Need Date:	14.4300	259.74
				Subtotal	543.72
				Total P.O. Cost	543.72
Authorized Signature _____					

Figure 6-3: Completed Purchase Order

Figure 6-4 displays the labor and material cost status for the project, summarized by SWBS account. The labor hour budgets have been reduced from the estimate by 10% and the material budgets have been reduced by 5%. After a material rollup has been performed, the report also displays the commitment of the purchase order developed (figure 6-3) against the project.

09/03/2002 14:56:59 (Date format: MMDD/YYYY)		Chesapeake Marine Industries					Page 1 of 1					
Labor/Material Status (C7) - By Account												
Contract B-DEMO - Demo Contract for WORK-PAC Tutorial												
Project 5 - Sample Cost Estimate w/Templates												
Project:		5 to 5		Group:		0 to ZZZZZZZZ		Account:			0 to ZZZZZZZZ	
		Budgets		Current Status			Estimate at Completion					
Account	Description	Labor Man-hours	Material Cost	Actual Hours	% Prog	Committed Material	Total Labor Man-hours	Man-hour Savings	Total Material Dollars	Material Savings		
101	Rip-Out Plating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
102	Fab new plating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	Install new plating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Group 1 Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
201	Fresh water system: remove & renew piping	270.31	543.78	0.00	0.00	543.72	270.31	0.00	543.78	0.00		
	Group 2 Total	270.31	543.78	0.00	0.00	543.72	270.31	0.00	543.78	0.00		
997	Drydocking & Warfage	0.00	111,197.50	0.00	0.00	0.00	0.00	0.00	111,197.50	0.00		
	Group 9 Total	0.00	111,197.50	0.00	0.00	0.00	0.00	0.00	111,197.50	0.00		
Project 5	Total # Accts Reported 5	270.31	111,741.28	0.00	0.00	543.72	270.31	0.00	111,741.28	0.00		

Figure 6-4: C7 Labor/Material Status Report By Project SWBS Account

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