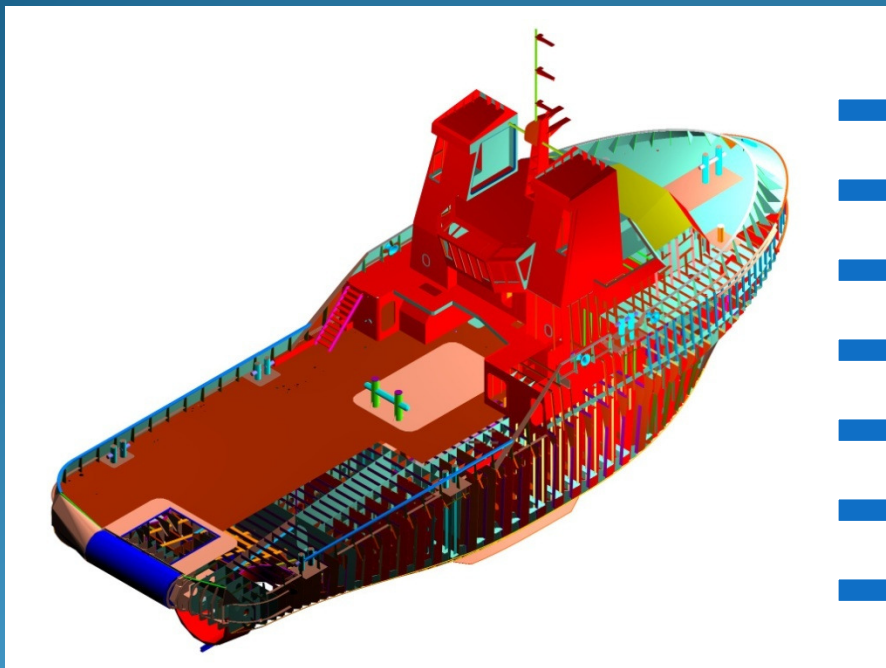


# PERCEPTION<sup>®</sup>

## ERP with ShipConstructor

### ShipConstructor

### PERCEPTION



*ShipConstructor* is a CAD system developed by Albacore Research Ltd. (ARL).

*ShipConstructor* is a suite of software functions with capabilities for structure, piping, outfit, nesting, build strategy, and N/C code generation.






***PERCEPTION*** interfaces with  
***ShipConstructor***.

**This interface can be used to down-load  
detailed bills of material for**

- **Cost Estimating**
- **Purchase Requisitions**
- **Work Order Bills of Materials**

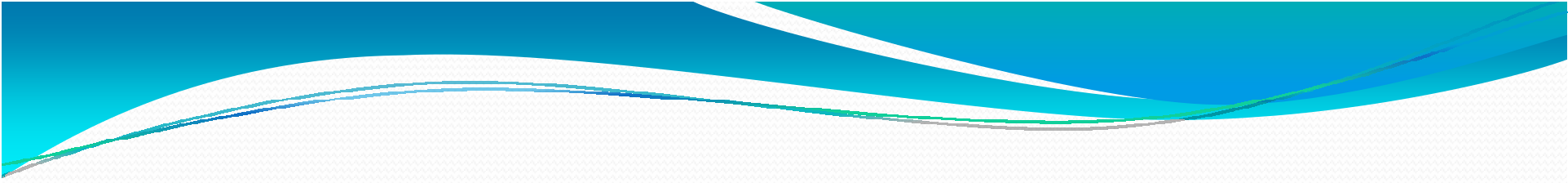




***PERCEPTION*** downloads  
*ShipConstructor* detailed bills of material  
as ***PERCEPTION*** drawing bills of  
**material.**

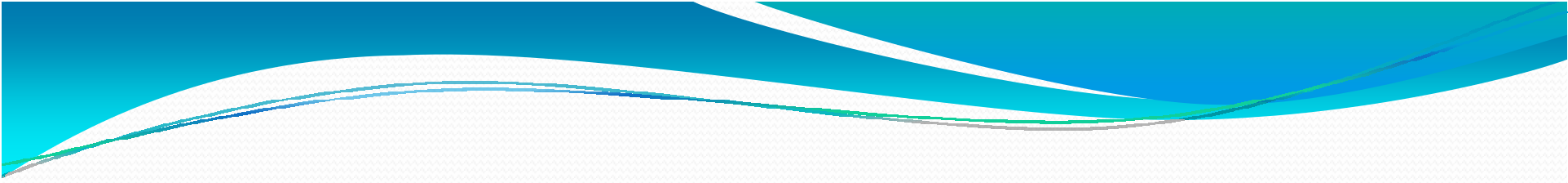
The path of the *ShipConstructor* drawing  
file also is recorded the ***PERCEPTION***  
drawing record.





In addition, the *ShipConstructor* product oriented work breakdown structure (PWBS) may also be downloaded into *PERCEPTION*.

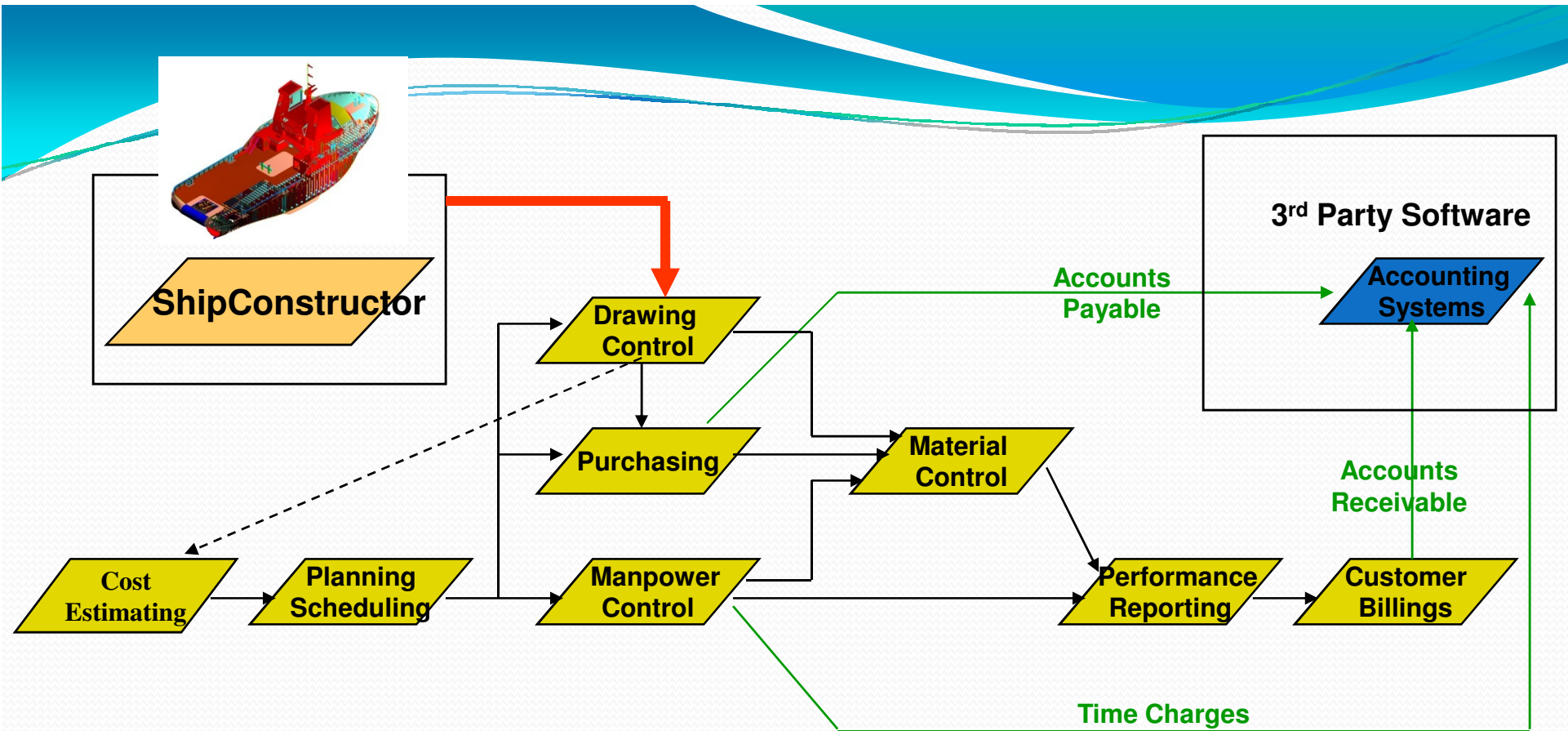




**This data then can be processed directly into material requisitions, purchase orders, and/or work order pallets.**

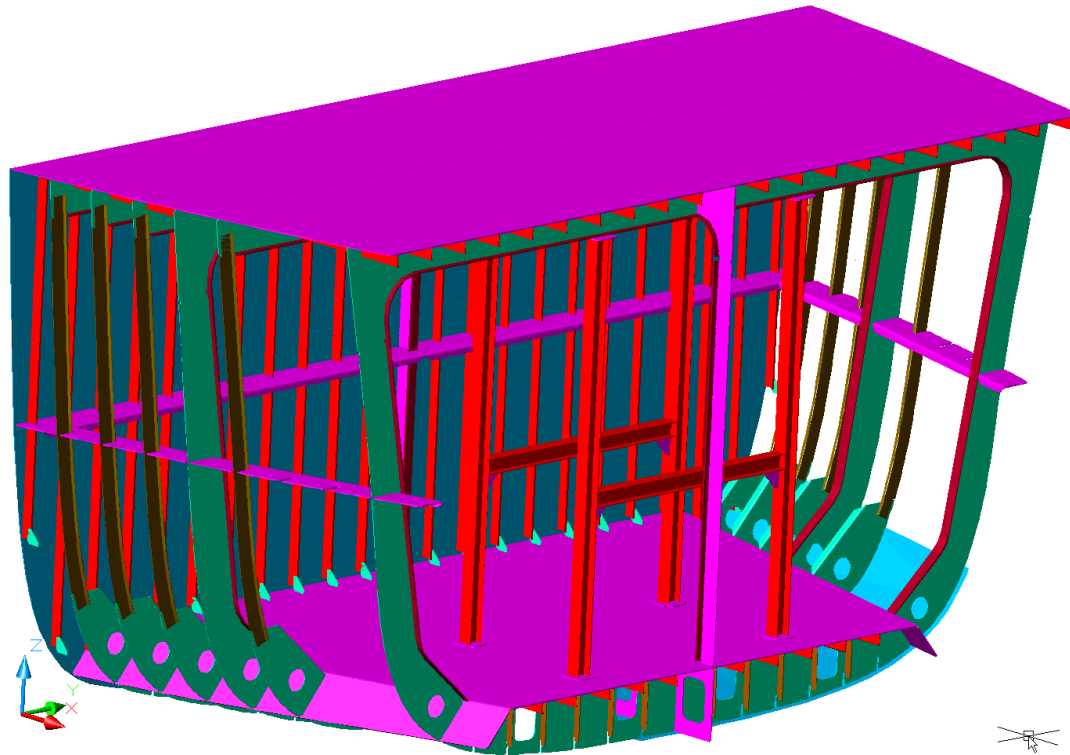
**The data also can be directed into the *PERCEPTION* cost estimating functions.**





***PERCEPTION***  
**Integrated Shipyard Resource Management System**

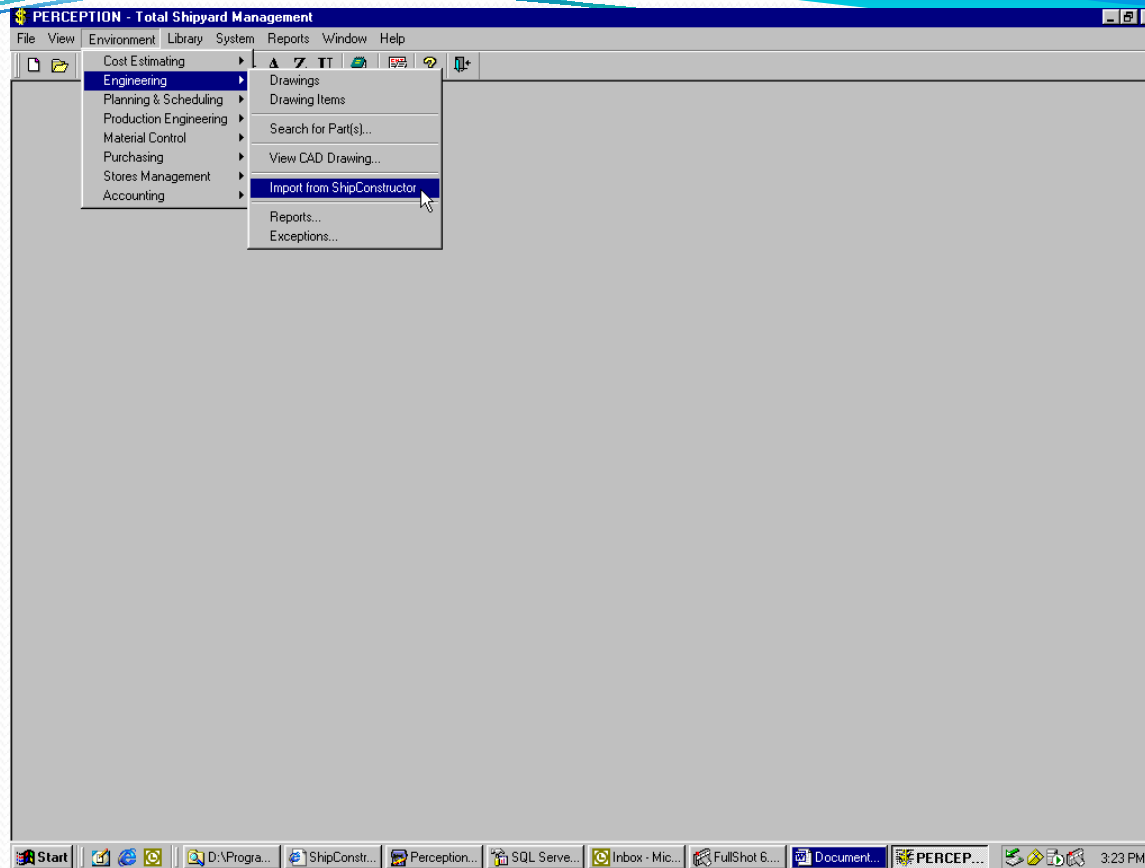




## *Sample ShipConstructor Unit 11*







## *Opening PERCEPTION & Proceeding to ShipConstructor Link*



# Select ShipConstructor Database & Project

**Import ShipConstructor Information**


PERCEPTION Contract and Project Selection

List Only Open Contracts  
 List Both Open & Closed Contracts

Contract 5098

Project 5098

ShipConstructor



Select ShipConstructor Project File

C:\Projects2005\SC2005Demo\SC2005

Connect to ShipConstructor Database

SC2005Demo

Project and Unit Selection

Project  
Demo

Unit  
U11

Select Import Options

Import Project PWBS  
 Import Structure Bill of Material  
 Import Pipe Bill of Material  
 Import Outfit Bill of Material

Progress

*Select Unit  
Number &  
Import  
Options  
(Project  
PWBS &  
Structures Bill  
of Material)*


**Import ShipConstructor Information**

PERCEPTION Contract and Project Selection

List Only Open Contracts  
 List Both Open & Closed Contracts

Contract: 5098  
Project: 5098

ShipConstructor



Select ShipConstructor Project File  
C:\Projects2005\SC2005Demo\SC2005 Browse

Connect to ShipConstructor Database  
SC2005Demo Connect

Project and Unit Selection

Project: Demo  
Unit: U11

Select Import Options

Import Project PWBS  
 Import Structure Bill of Material  
 Import Pipe Bill of Material  
 Import Outfit Bill of Material

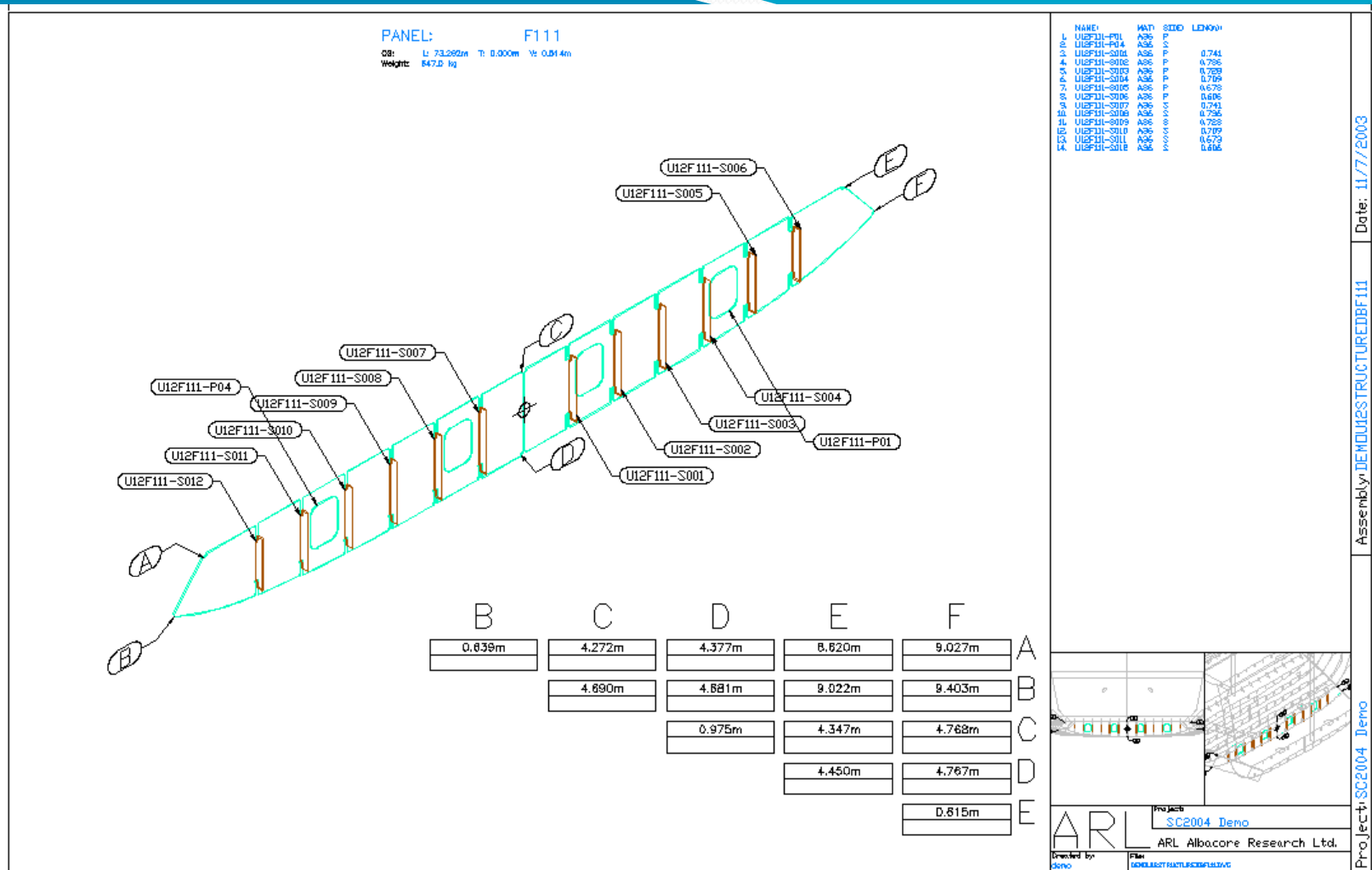
Progress

OK Close Help

Drawings Information for the Engineering Environment						
	Contract	Project	Drawing	Description	Drawing File Name	Grt
1	5098	5098	U11	U11.DWG	C:\Projects2005\SC2005Demo\U11\U11.DWG	
2	5098	5098	U11BOTTOMSHELL	U11BOTTOMSHELL.DWG	C:\Projects2005\SC2005Demo\U11\CrvPlate\U11BOTTOMSHELL	
3	5098	5098	U11FR_097	U11FR_097.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_097.DWG	
4	5098	5098	U11FR_098	U11FR_098.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_098.DWG	
5	5098	5098	U11FR_099	U11FR_099.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_099.DWG	
6	5098	5098	U11FR_100	U11FR_100.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_100.DWG	
7	5098	5098	U11FR_101	U11FR_101.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_101.DWG	
8	5098	5098	U11FR_102	U11FR_102.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_102.DWG	
9	5098	5098	U11FR_103	U11FR_103.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_103.DWG	
10	5098	5098	U11FR_104	U11FR_104.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_104.DWG	
11	5098	5098	U11FR_105	U11FR_105.DWG	C:\Projects2005\SC2005Demo\U11\FRAME\U11FR_105.DWG	
12	5098	5098	U11HGDR2190	U11HGDR2190.DWG	C:\Projects2005\SC2005Demo\U11\Deck\U11HGDR2190.DWG	
13	5098	5098	U11HGDR4590	U11HGDR4590.DWG	C:\Projects2005\SC2005Demo\U11\Deck\U11HGDR4590.DWG	
14	5098	5098	U11HGDR6390	U11HGDR6390.DWG	C:\Projects2005\SC2005Demo\U11\Deck\U11HGDR6390.DWG	
15	5098	5098	U11LBH-2400	U11LBH-2400.DWG	C:\Projects2005\SC2005Demo\U11\LngBhd\U11LBH-2400.DWG	
16	5098	5098	U11LBH-4800	U11LBH-4800.DWG	C:\Projects2005\SC2005Demo\U11\LngBhd\U11LBH-4800.DWG	
17	5098	5098	U11LBH-6000	U11LBH-6000.DWG	C:\Projects2005\SC2005Demo\U11\LngBhd\U11LBH-6000.DWG	
18	5098	5098	U11LBHBLG	U11LBHBLG.DWG	C:\Projects2005\SC2005Demo\U11\LngBhd\U11LBHBLG.DWG	
19	5098	5098	U11LBHC	U11LBHC.DWG	C:\Projects2005\SC2005Demo\U11\LngBhd\U11LBHC.DWG	
20	5098	5098	U11MNDECK	U11MNDECK.DWG	C:\Projects2005\SC2005Demo\U11\CrvPlate\U11MNDECK.DWG	
21	5098	5098	U11SIDESHELL	U11SIDESHELL.DWG	C:\Projects2005\SC2005Demo\U11\CrvPlate\U11SIDESHELL.DWG	
22	5098	5098	U11TTOP	U11TTOP.DWG	C:\Projects2005\SC2005Demo\U11\Deck\U11TTOP.DWG	

*PERCEPTION pulls in all drawings related to this unit from ShipConstructor.*





*The PERCEPTION Drawing Record stores the ShipConstructor drawing file location for direct viewing.*

**Drawing Detail Information for the Engineering Environment**

Drawing Drawing Items

	Drawing Item	Description	Part Type	Part ID	Item Tag Number	Header
1	10	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
2	11	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
3	12	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
4	13	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
5	7	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
6	8	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
7	9	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
8	P001	Plate - PL12	Manufactured Part	PL12	U11FR_097-P001	Plate
9	P004	Plate - PL12	Manufactured Part	PL12	U11FR_097-P004	Plate
10	P005	Plate - PL12	Manufactured Part	PL12	U11FR_097-P005	Plate
11	P007	Plate - PL12	Manufactured Part	PL12	U11FR_097-P007	Plate
12	P008	Plate - PL12	Manufactured Part	PL12	U11FR_097-P008	Plate
13	S001	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S001	Bulb Flat
14	S002	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S002	Bulb Flat
15	S003	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S003	Bulb Flat
16	S004	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S004	Bulb Flat
17	S005	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S005	Bulb Flat
18	S006	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S006	Bulb Flat
19	S007	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S007	Bulb Flat
20	S008	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S008	Bulb Flat
21	S009	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S009	Bulb Flat
22	S010	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S010	Bulb Flat
23	S011	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S011	Bulb Flat
24	S012	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S012	Bulb Flat
25	S013	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S013	Bulb Flat
26	S014	Bulb Flat - BF160X09	Manufactured Part	BF160X09	U11FR_097-S014	Bulb Flat
27	S015	Flatbar - FB100x12	Manufactured Part	FB100x12	U11FR_097-S015	Flatbar
28	S016	Flatbar - FB100x12	Manufactured Part	FB100x12	U11FR_097-S016	Flatbar
29	S017	Flatbar - FB100x12	Manufactured Part	FB100x12	U11FR_097-S017	Flatbar

*Click on the Drawing Items tab to view all items in that drawing's bill of material.*



*The ShipConstructor detail bills of material then can be processed within PERCEPTION for cost estimating, for material requisitions and /or for production work order bills of material (PERCEPTION “Pallets”).*



# Cost Estimating

*PERCEPTION* was developed to permit cost estimating that can reflect modern ship design and production methods.

Using product- and process-based information, cost estimates can be generated quickly and accurately at any level of detail:

- **Parametric cost estimates** based upon modifiable ship design and mission characteristics
- **Standard shipbuilding & ship repair interim products & services**
- **Detail cost estimates** based upon engineered bills of material and equipment specifications.





- 
- **Contract Work Breakdown Structure**
  - **Estimate Cost Items**
  - **Estimating Documents & Reports**
  - **Estimate Cost Data Libraries**



**For user convenience, standard cost estimating relationships (CERs) can be cataloged in different database tables:**

- 1. Structural work CERs**
- 2. Machinery work CERs**
- 3. Pipe work CERs**
- 4. Electrical work CERs**
- 5. HVAC work CERs**
- 6. Outfit work CERs**
- 7. Paint work CERs**
- 8. Miscellaneous work CERs**
- 9. Parametric Equations**





***PERCEPTION*** also provides for libraries of standard work packages.

A Standard Package is a set of cost items that define the scope of work and material requirements for a specific production process or product.

Each package item is developed in a way similar to the development of cost items in a project estimate. However, the standard package can be made parametric and it can be used as many times as necessary in a project estimate.



# Sample Summary Cost Proposal



<b>Estimate Date</b>
----------------------

08/08/2002
------------

<b>TO CUSTOMER</b>	<b>ESTIMATE</b>	<b>PROPOSAL FROM</b>
400 Seventh Street, SW Washington, DC 20590		Chesapeake Marine Industries 927 West Street Annapolis, MD 21401

**Contract PD-337 - Multiple Commercial Cargo Ship Program - Estima**  
**Project 337 - Ship #1 Sample Detail Cost Estimate**

Cost Item #	Quantity	UoM	Description	Unit Price	Extended Cost
<b>Account 243</b>					
3108	2.00	EA	Line Shaft	17,500.00	35,000.00
3109	1.00	EA	Tail Shaft	20,000.00	20,000.00
3113	1.00	EA	Fwd Stern Tube Seal	1,000.00	1,000.00
3117	1.00	PKG	Machine Stern Tube	400.00	0.00
3118	1.00	PKG	Bore & Fit Stern Tube	750.00	0.00
3120	1.00	PKG	Install Shafts	400.00	0.00
3121	1.00	PKG	Shaft Alignment	300.00	0.00
			<b>Total for Acct: 243</b>		<b>56,000.00</b>
<b>Account 244</b>					
<b>Propulsion Shaft Bearings</b>					
3110	4.00	EA	Line Shaft Bearings	6,250.00	25,000.00
3111	1.00	EA	Stern Tube Bearing	25,000.00	25,000.00



# Planning & Scheduling

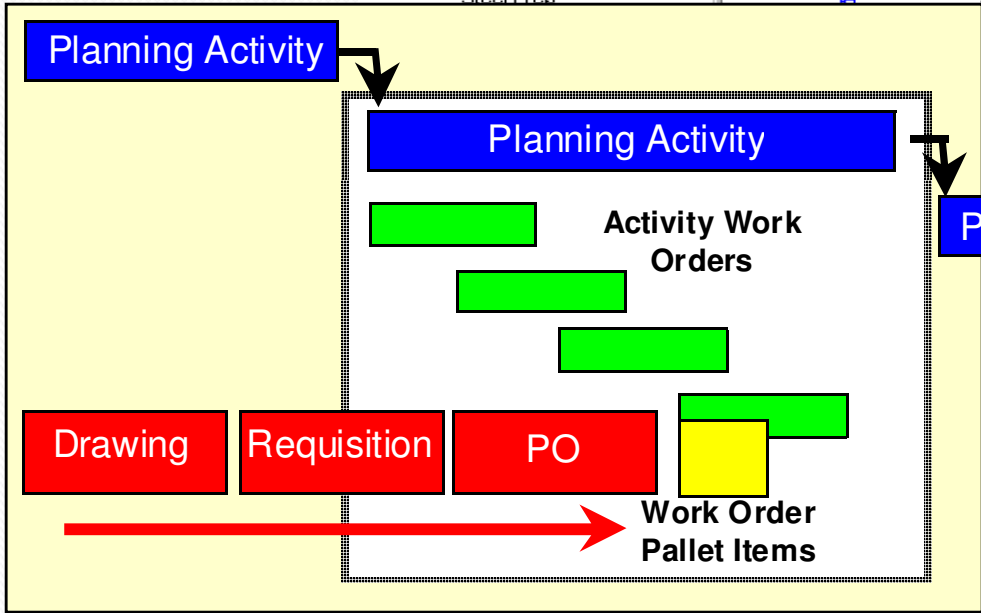
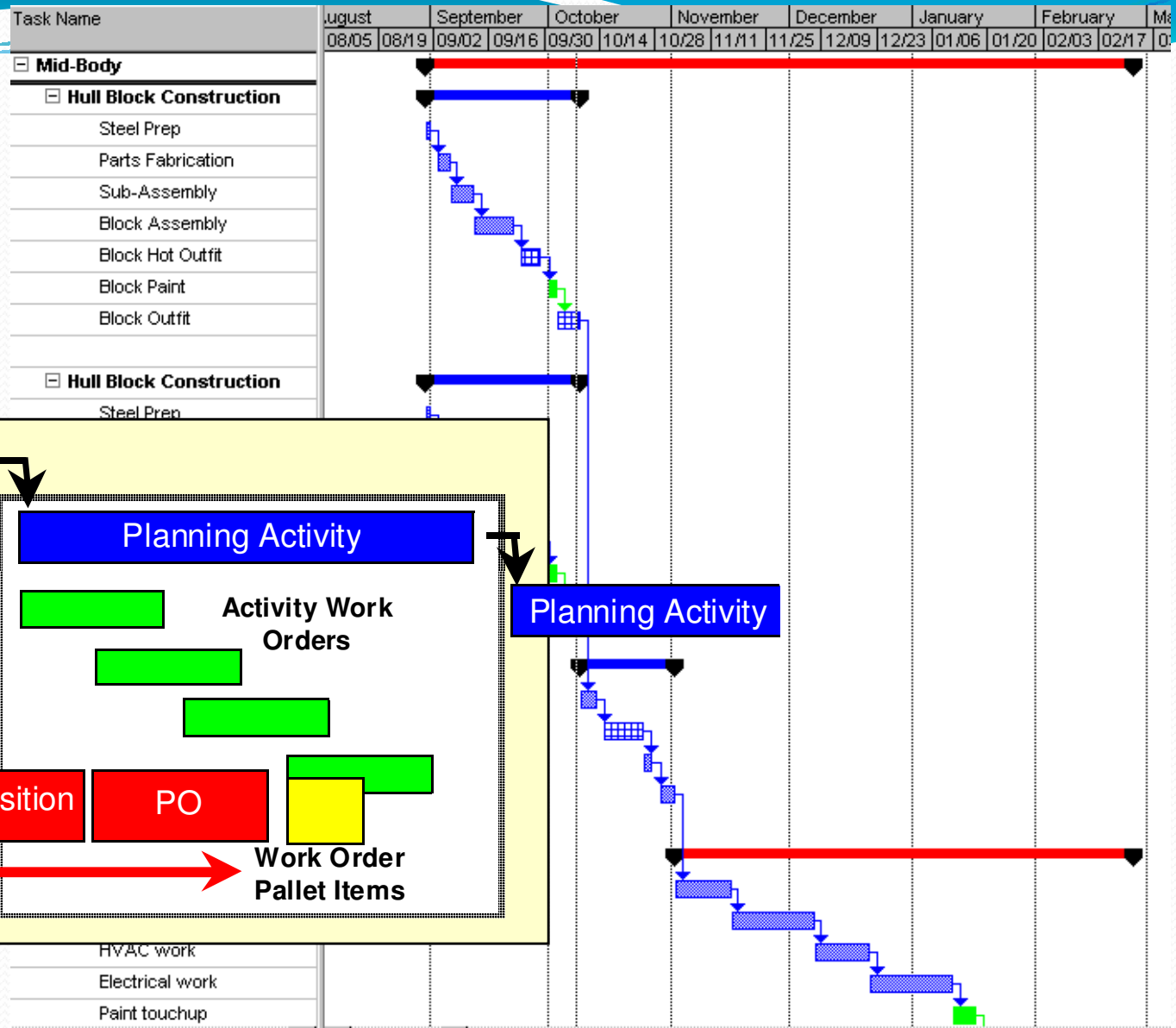
*PERCEPTION* has features for planning and scheduling all project activities:

- **Schedule Design & Engineering Activities**
- **Schedule Engineering Drawings**
- **Schedule Production Work Orders**
- **Schedule Work Order Material Pallets**
- **Schedule Purchased Material Deliveries**
- **Schedule Subcontractors**
- **Schedule Tests & Trials**

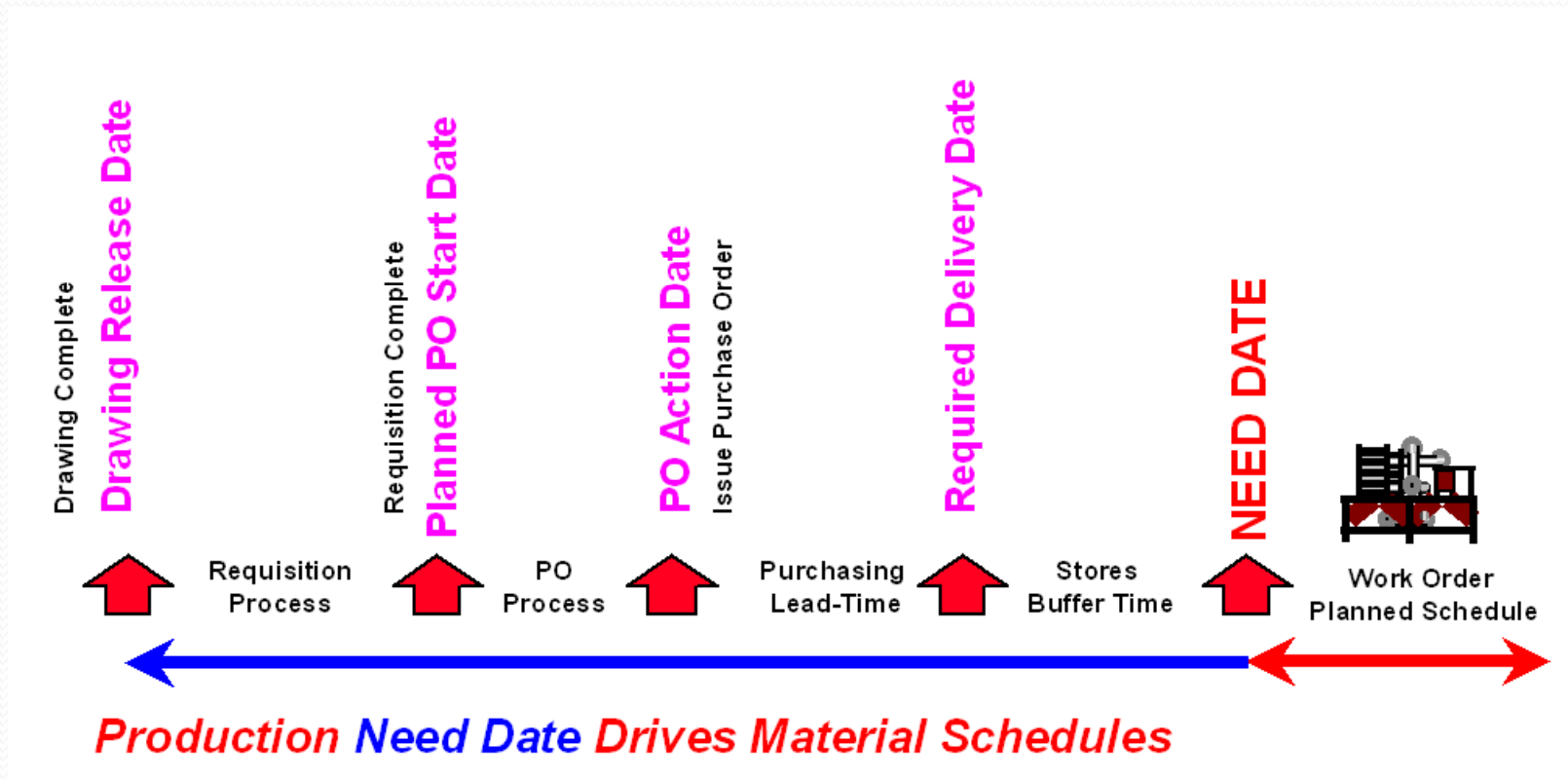


- 
- **Build Strategy Development**
  - **Master Scheduling**
  - **Detail Scheduling (Drawings, Purchasing, Work Orders, & Subcontractors)**
  - **Resource Loading & Leveling**



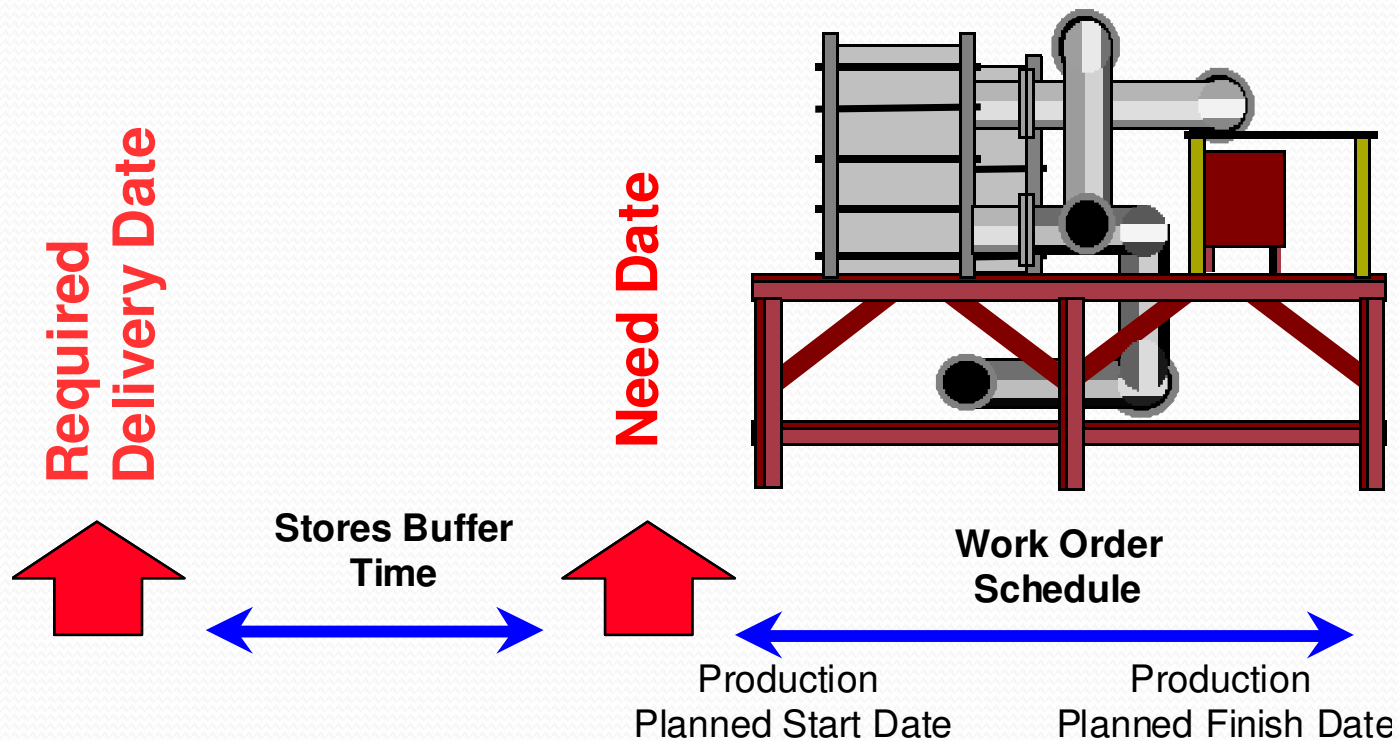


# *PERCEPTION* can schedule and track various stages of material schedules.





# Material Deliveries Must Be Scheduled to Meet Required Delivery Dates



# Drawing Control

Material requirements for a project can begin with requisitions.

**However, requisitions can be preceded by engineering drawings and their bills of material (BOMs).**

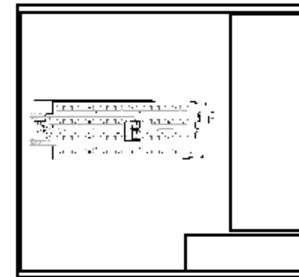
Drawing BOMs can be entered manually or via downloading this detail information from *ShipConstructor*.



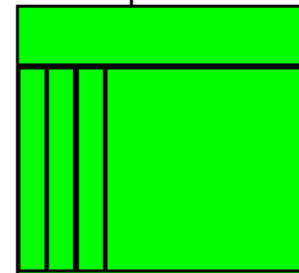
# Drawings Linked to Requisitions

With *PERCEPTION*, a drawing BOM can be used to generate one or more requisitions.

Drawing Bill of Material



Material Requisition



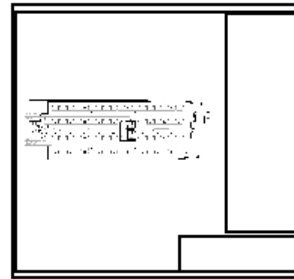
# Drawings

## Linked to Work Order Pallets

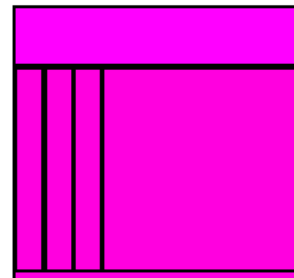
With *PERCEPTION*, a drawing BOM can be used to generate one or more work order pallets.

The pallets then can be used to generate a requisition.

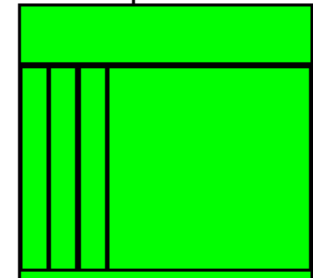
Drawing Bill of Material



Work Order Pallet



Material Requisition



- **Drawing Lists & Schedule Control**
- **Drawing Bills of Material Control**
- **CAD Interfaces For Electronic Down-Load**



# Purchasing

*PERCEPTION* generates a variety of purchase orders:


- Normal POs formulated directly from purchase requisitions
- QUICK PO for items not entered on a requisition.
- Blanket Purchase Agreement
- Bulk Purchase Order



- **Purchase Requisitions**
- **Purchase Orders**
- **Expediting Functions & Reports**
- **Receiving Functions**
- **Vendor Invoice Control**
- **Transactions To Accounting System's Accounts Payable (A/P) & General Ledger (G/L)**



# Sample Purchase Order Document Using Domestic Funds

Chesapeake Marine Industries				Page 1 of 1																					
				Purchase Order 12345																					
				Terms 30																					
				Tax ID 02569864																					
A108 A-J Marine, Inc. Main Company Address Distribution Center 123 South Park View Avenue Toronto, ONT L2R 7C1, Canada				<b>Ship To</b> Trenergy 927 West Street Annapolis, MD 21401  <b>Care of Vendor</b>																					
<b>Date of Order</b> 09/04/2001	<b>Required In Yard</b> 05/01/2001	<b>Promised ETA</b>	<b>F.O.B.</b> Plant	<b>Phone</b> 410-263-8993	<b>Amendment ID</b> 4																				
<b>Sales Contact</b> Joe Smith	<b>Seller's Reference</b> Letter 6/1/2001	<b>Purchaser</b>	<b>Ship Via</b> Long Haul Trucking C	<b>Fax</b> 410-267-0903	<b>Amendment Date</b> 09/04/2001																				
<b>PO Reading</b> Steel for drawing																									
Item	Qty	UoM	Description	Unit Price	Est Cost																				
1	150.00	Kg	THIS PO IS CONFIRMATION OF VERBAL ORDER GIVEN TO Purchasing Manager- PLATE,STEEL DELIVERY: ALL MATERIAL SHALL BE DELIVERED IN PLANT NO LATER THAN 17 June 2001.	1.2900	187.50																				
			<b>Total Taxes:</b> <table border="0" style="margin-left: 20px;"> <tr><td><b>Fed</b></td><td>9.30</td><td></td><td></td></tr> <tr><td><b>MD</b></td><td>11.25</td><td><b>Subtotal</b></td><td>187.50</td></tr> <tr><td><b>City</b></td><td>0.00</td><td><b>Total Shipping</b></td><td>0.00</td></tr> <tr><td><b>Misc</b></td><td>0.00</td><td><b>Total Taxes</b></td><td>20.63</td></tr> <tr><td><b>Duty</b></td><td>0.00</td><td><b>Total P.O. Cost</b></td><td>208.13</td></tr> </table>	<b>Fed</b>	9.30			<b>MD</b>	11.25	<b>Subtotal</b>	187.50	<b>City</b>	0.00	<b>Total Shipping</b>	0.00	<b>Misc</b>	0.00	<b>Total Taxes</b>	20.63	<b>Duty</b>	0.00	<b>Total P.O. Cost</b>	208.13		
<b>Fed</b>	9.30																								
<b>MD</b>	11.25	<b>Subtotal</b>	187.50																						
<b>City</b>	0.00	<b>Total Shipping</b>	0.00																						
<b>Misc</b>	0.00	<b>Total Taxes</b>	20.63																						
<b>Duty</b>	0.00	<b>Total P.O. Cost</b>	208.13																						
<b>Authorized Signature</b> _____																									





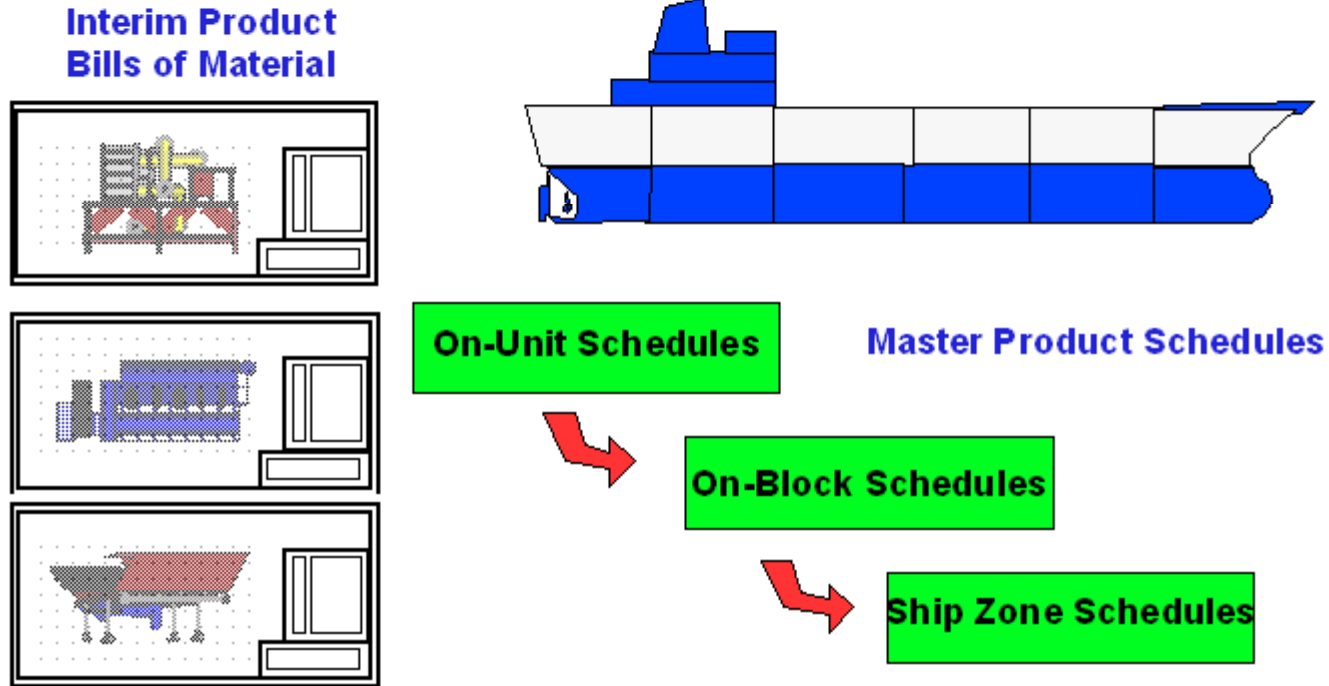
# Sample Purchase Order Document Using Foreign Funds

Chesapeake Marine Industries				Page 1 of 1	
Purchase Order 12346				Terms 2%/10/30	
A101 Sales Office SPAR Associates, Inc 927 West Street Annapolis, MD 21401, USA				Ship To Chesapeake Marine Industries 927 West Street Annapolis, MD 21401	
		Care of Vendor			
Date Of Order 03/15/2001	Required In Yard	Promised ETA	F.O.B. Annapolis	Phone 410-263-8593	Amendment ID
Sales Contact L. Deschamps	Seller's Reference Letter 9/1/01	Purchaser	Ship Via UPS	Fax 410-267-0503	Amendment Date
PO heading Misc. sailboat fittings					
Item	Qty	UoM	Description	Unit Price	Ext Cost
			DELIVERY: ALL MATERIAL SHALL BE DELIVERED IN SHIPYARD NO LATER THAN SEPTEMBER 19th		
1	1.00	EA	Harken Roller Furling set Cat No. 1234-4321	0.0000	0.00
2	1.00	SET	Furling lines & blocks	0.0000	0.00
CERTIFICATES SHALL BE SUPPLIED IN QUADRUPPLICATE FREE ISSUE T-O SHIPYARD Discounts to apply per April agreement					
				Currency	Canadian
				Subtotal	0.00
				Total Shipping	0.00
				Total P.O. Cost	0.00
				Domestic Cost	0.00
Exchange Rate    Exchange Date					
0.65                    12/16/1998					
Authorized Signature _____					



# Planning & Scheduling Material Purchases & Deliveries

## Scheduling Deliveries to Meet Master Product Schedules



# Manpower Control

*PERCEPTION* provides features for planning and forecasting shipyard manpower requirements by project, by work center, and by trade.

*PERCEPTION* provides for a full compliment of features for developing work orders and for collecting time charges.



- **Manpower Planning & Forecasting**
- **Work Order Budgeting & Scheduling**
- **Work Order Authorization & Release**
- **Work Order Time Charging**
- **Work Order Closings**
- **Exception Reporting (Late Start & Finish, Budget Variances, Rework, Premium Time Charges, etc.)**
- **Time Charge Transactions To Accounting System's Payroll**



04/15/2003 10:42:10

(Date format: MM/DD/YYYY)

SPAR Associates, Inc.

Work Order Listing Report (WO04)

Project/SWBS Account/WC/VO Sort

T TSHIP CONTRACT - T11

Page 4 of 102

Work Center	Work Order	Heading	Zone
Project 2002 Effective Date: 01/14/1993			
Group 0 STEELWORK			
Account 9 STEEL SEATS + AUX. EQUIP. OMS			
T11	912	ASS TRANSFER SEATS	41
T11	914	ASSEMBLE TRUNNION	82
T11	916	ASS SPAR DK SEATS	80
T11	918	ASS GALLEY SEATS	92
T11	922	FIT TRANSFER SEATS	41
T11	924	FIT TRUNNION+SEATS	82
T11	926	FIT SEAT SPAR M'SHIP	80
T11	928	FIT GALLEY SEATS	92
T11	930	FIT SEAT ACCOMM SPAR	91
T11	932	INSTAL BRIDGE SEATS	95

05/13/2002 16:02:35

(Date format: MM/DD/YYYY)

Chesapeake Marine Industries

Bar Code Work Order Listing Report (BAR02)


Work Center/VO Planned Start Date Sort

Contract:	Ship Repair to	Ship Repair	Project:	0 to ZZZZZZZZ	Division
Work Center:	0 to ZZZZZZZZ		Outfit/Zone:	0 to ZZZZZZZZ	Department
Work Order:	0 to ZZZZZZZZ		Unit:	0 to ZZZZZZZZ	Process
Group:	0 to ZZZZZZZZ		Assembly:	0 to ZZZZZZZZ	Planned Date:
Account:	0 to ZZZZZZZZ	Sub Assembly:	0 to ZZZZZZZZ	Actual Date:	
Zone:	0 to ZZZZZZZZ	Part:	0 to ZZZZZZZZ	Drawing:	

Work Order	Heading	Start Date	Finish Date	Barcode	Work Order	Heading
<b>Work Center: 0</b>					<b>Work Center: 0</b>	
506001	Remove & replace sea grids	00/00/0000	00/00/0000		120006	Top coat alkyd
102002	U.T. emergency room bhd	09/29/1998	10/09/1998		127001	Paint ships name
700001	Dock preparation	09/29/1998	10/09/1998		129001	Paint draft marks
102001	U.T. hull	09/29/1998	10/09/1998		201001	Rivets & seams
112001	Remove manhole covers	09/29/1998	10/09/1998		112003	Repairs to covers



# Sample Work Order Ticket Pages

<div style="text-align: right;"> <b>Chesapeake Marine Industries</b>      &lt;DRAFT&gt;  <b>Work Order Ticket</b>                  Project Description: Sample Work Orders             </div> <div style="text-align: left;">  </div> <div style="text-align: right;">                 08/16/2002 12:23:24      Page 1 of 1             </div> <hr/> <table border="0"> <tr> <td>Contract: 0-DEMO</td> <td>Center: 0</td> <td>Work Order: Demol</td> <td>Heading: Sample w/CAD dwg &amp; pallet list</td> </tr> <tr> <td>Project: 01</td> <td>Center: 0</td> <td>CLIN:</td> <td>Change Order ID:</td> </tr> <tr> <td>Group:</td> <td>Zone: M</td> <td>Foreman:</td> <td>Drawing: 301-000</td> </tr> <tr> <td>Account:</td> <td>Unit: 101</td> <td>Drawing File: L:\SPAR\Version\CAD\Reelers\CW.dwg</td> <td></td> </tr> <tr> <td>Issue Date: 02/05/2002</td> <td>Planned Start Date: 08/15/2002</td> <td>Planned Finish Date: 10/05/2002</td> <td></td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Trade ID</th> <th>Trade Description</th> <th>Budgeted Hours</th> <th>Budgeted Man/days</th> </tr> </thead> <tbody> <tr> <td>21</td> <td>Pipe Worker</td> <td>250.00</td> <td>31.25</td> </tr> <tr> <td>22</td> <td>Pipe Worker Apprentice</td> <td>190.00</td> <td>23.75</td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>Total Work Order Budget</b></td> <td><b>440.00</b></td> <td><b>55.00</b></td> </tr> <tr> <td colspan="2" style="text-align: right;">Unplanned</td> <td>10.00</td> <td>1.25</td> </tr> </tbody> </table> <p>Please note here any unscheduled delays or discrepancies: _____</p> <p style="text-align: right;">Job Completion _____</p> <p style="text-align: right;">Signature: G.C. Reelder _____</p> <p style="text-align: right;">Signature: Foreman _____</p>	Contract: 0-DEMO	Center: 0	Work Order: Demol	Heading: Sample w/CAD dwg & pallet list	Project: 01	Center: 0	CLIN:	Change Order ID:	Group:	Zone: M	Foreman:	Drawing: 301-000	Account:	Unit: 101	Drawing File: L:\SPAR\Version\CAD\Reelers\CW.dwg		Issue Date: 02/05/2002	Planned Start Date: 08/15/2002	Planned Finish Date: 10/05/2002		Trade ID	Trade Description	Budgeted Hours	Budgeted Man/days	21	Pipe Worker	250.00	31.25	22	Pipe Worker Apprentice	190.00	23.75	<b>Total Work Order Budget</b>		<b>440.00</b>	<b>55.00</b>	Unplanned		10.00	1.25	<div style="text-align: right;"> <b>Chesapeake Marine Industries</b>      &lt;DRAFT&gt;  <b>Work Order Ticket</b>                  Project Description: Sample Work Orders             </div> <div style="text-align: center;"> <b>Work Order Instructions</b> </div> <div style="text-align: right;">                 08/16/2002 12:23:36      Page 2 of 3             </div> <hr/> <table border="0"> <tr> <td>Contract: 0-DEMO</td> <td>Center: 0</td> <td>Work Order: Demol</td> <td>Heading: Sample w/CAD dwg &amp; pallet list</td> </tr> <tr> <td>Project: 01</td> <td>Center: 0</td> <td>CLIN:</td> <td>Change Order ID:</td> </tr> <tr> <td>Group:</td> <td>Zone: M</td> <td>Foreman:</td> <td>Drawing: 301-000</td> </tr> <tr> <td>Account:</td> <td>Unit: 101</td> <td></td> <td></td> </tr> <tr> <td>Issue Date: 02/05/2002</td> <td>Planned Start Date: 08/15/2002</td> <td>Planned Finish Date: 10/05/2002</td> <td></td> </tr> </table> <p><b>Description</b></p> <p>Assemble piping module:</p> <ol style="list-style-type: none"> <li>1. Assemble pipe &amp; flings on unit in shop per drawing #301-000</li> <li>2. Install pumps on unit foundation</li> <li>3. Install all filters</li> <li>4. Pre-test unit piping</li> </ol>	Contract: 0-DEMO	Center: 0	Work Order: Demol	Heading: Sample w/CAD dwg & pallet list	Project: 01	Center: 0	CLIN:	Change Order ID:	Group:	Zone: M	Foreman:	Drawing: 301-000	Account:	Unit: 101			Issue Date: 02/05/2002	Planned Start Date: 08/15/2002	Planned Finish Date: 10/05/2002		<div style="text-align: right;"> <b>Chesapeake Marine Industries</b>  <b>Work Order Ticket Material List</b> </div> <div style="text-align: right;">                 08/16/2002 12:23:45      Page 3 of 3             </div> <hr/> <table border="0"> <tr> <td>Contract: 0-DEMO</td> <td>Center: 0</td> <td>Work Order: Demol</td> <td>Heading: Sample w/CAD dwg &amp; pallet list</td> </tr> <tr> <td>Project: 01</td> <td>Center: 0</td> <td>CLIN:</td> <td>Change Order ID:</td> </tr> <tr> <td>Group:</td> <td>Zone: M</td> <td>Foreman:</td> <td>Drawing: 301-000</td> </tr> <tr> <td>Account:</td> <td>Unit: 101</td> <td>Drawing File: L:\SPAR\Version\CAD\Reelers\CW.dwg</td> <td></td> </tr> <tr> <td>Issue Date: 02/05/2002</td> <td>Planned Start Date: 08/15/2002</td> <td>Planned Finish Date: 10/05/2002</td> <td></td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Item</th> <th>Description</th> <th>Part ID</th> <th>Item Tag Number</th> <th>Qty</th> <th>Pallet</th> <th>UoM</th> </tr> </thead> <tbody> <tr> <td colspan="7"><b>Pallet 1001</b></td> </tr> <tr> <td>1</td> <td>6-inch pipe spools - straight</td> <td>4PS-01</td> <td>Reeler unit</td> <td>10.00</td> <td></td> <td>EA</td> </tr> <tr> <td>2</td> <td>6-inch pipe spools - 90-degree</td> <td>4PS-01</td> <td>Reeler unit</td> <td>2.00</td> <td></td> <td>EA</td> </tr> <tr> <td>3</td> <td>6-inch flanges w/inside bolts</td> <td>4FL-01</td> <td>Reeler unit</td> <td>13.00</td> <td></td> <td>EA</td> </tr> <tr> <td>4</td> <td>6-inch filter rings</td> <td>4FR-01</td> <td>Reeler unit</td> <td>4.00</td> <td></td> <td>EA</td> </tr> <tr> <td>5</td> <td>150 GPM pump</td> <td>150GPM-01</td> <td>Reeler unit</td> <td>1.00</td> <td></td> <td>EA</td> </tr> </tbody> </table>	Contract: 0-DEMO	Center: 0	Work Order: Demol	Heading: Sample w/CAD dwg & pallet list	Project: 01	Center: 0	CLIN:	Change Order ID:	Group:	Zone: M	Foreman:	Drawing: 301-000	Account:	Unit: 101	Drawing File: L:\SPAR\Version\CAD\Reelers\CW.dwg		Issue Date: 02/05/2002	Planned Start Date: 08/15/2002	Planned Finish Date: 10/05/2002		Item	Description	Part ID	Item Tag Number	Qty	Pallet	UoM	<b>Pallet 1001</b>							1	6-inch pipe spools - straight	4PS-01	Reeler unit	10.00		EA	2	6-inch pipe spools - 90-degree	4PS-01	Reeler unit	2.00		EA	3	6-inch flanges w/inside bolts	4FL-01	Reeler unit	13.00		EA	4	6-inch filter rings	4FR-01	Reeler unit	4.00		EA	5	150 GPM pump	150GPM-01	Reeler unit	1.00		EA
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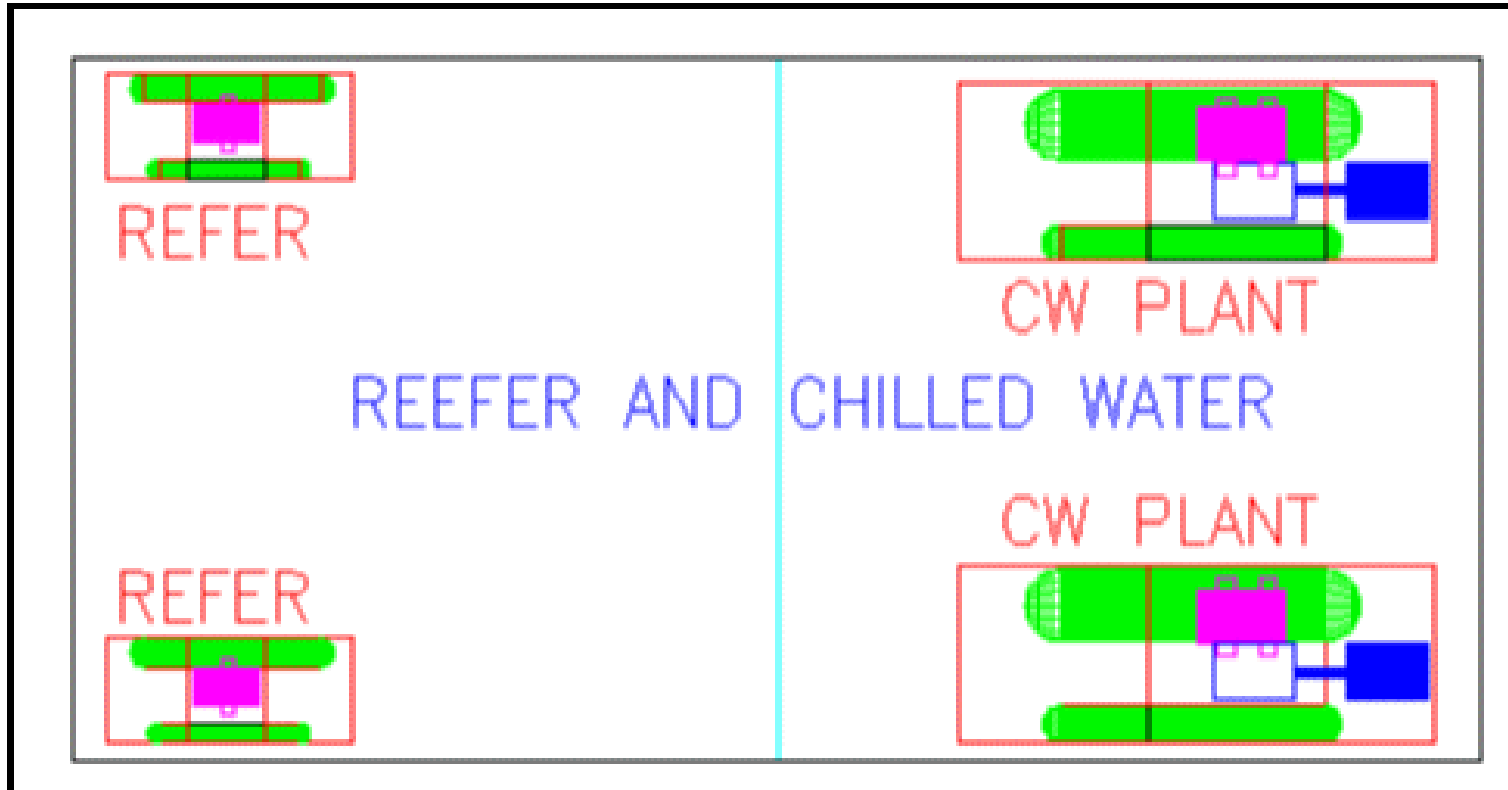
**Work Order Ticket Cover with budget, schedule, & trade requirements**

**Detail work instructions**

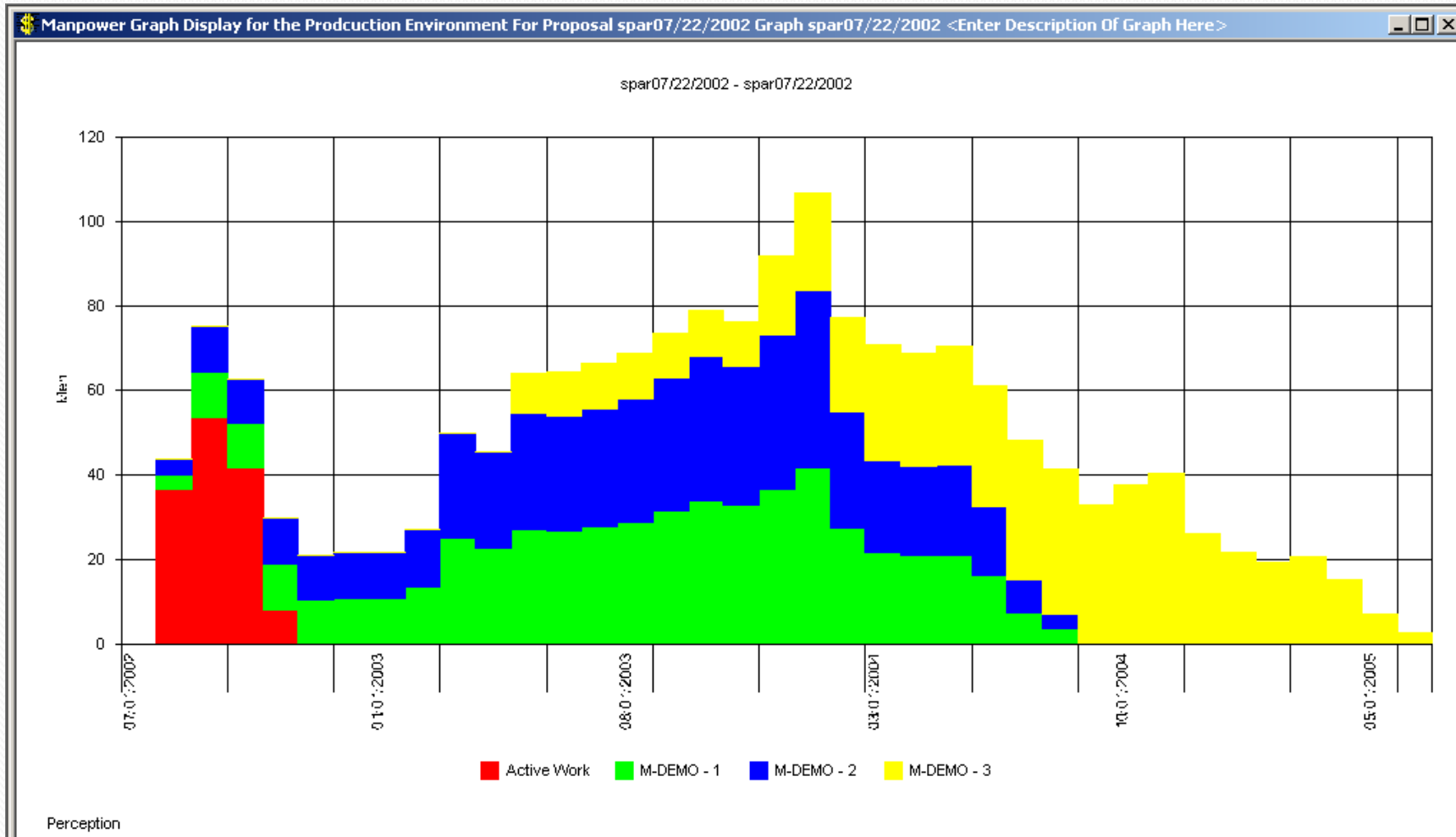
**Work Order Material Requirements List**



# Work Order Ticket CAD Drawing Page

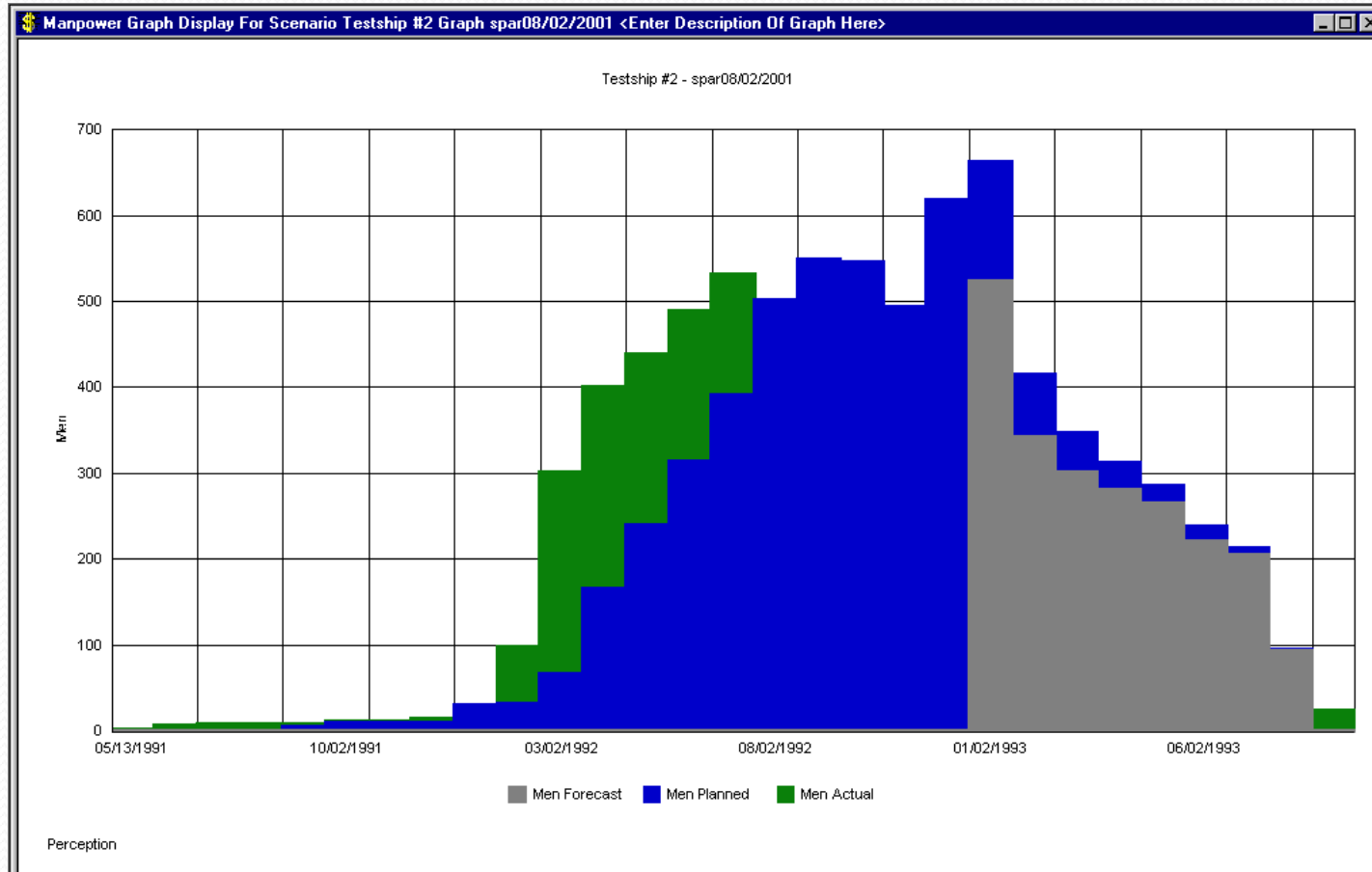


# Sample Manpower 'Proposal' Graphic Report





# Manpower planning & forecasting, by project, by work center, and by trade across the yard.



# Material Control

*PERCEPTION* has many features for managing material throughout the shipyard operations.



- 
- **Material Storage & Buffer Areas Management**
  - **Work Order Material Requirements (Pallets)**
  - **Electronic Interfaces With Engineering CAD Drawing Systems**
  - **Stock Requisitions**
  - **Manufactured Parts Control**
  - **Stock Inventory Control & Replenishment**
  - **Small Tools Control**



***PERCEPTION*** supports a **Parts Catalog** that can be used in the following areas of the system's capabilities:

- **Cost estimating** that identifies detail material requirements using Part IDs from the catalog.
- **Stock inventory control**, where stock items are managed in the Parts Catalog.
- **Standard Direct Purchase Material** Items that provide the means for bulk purchasing benefits.
- **Production pallet planning** and management functions using standard parts (stock and/or direct purchase items) from the catalog.
- **Engineering drawing bills of material** using standard parts (stock and/or direct purchase items) from the catalog.



If part attributes are to be used, open the next tab window and enter attribute values.

Pictures, drawings & spec files also can be identified here.

**Parts Catalog Detail Information**

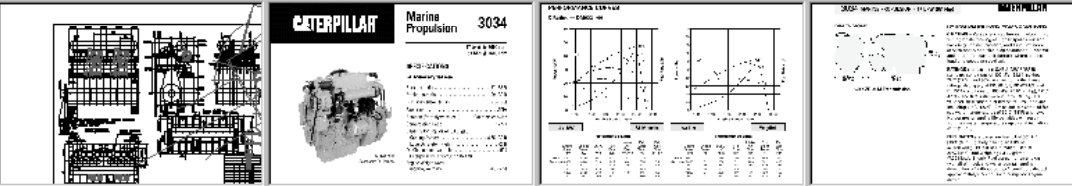
Parts Catalog | **Attributes** | Inventory | Transactions | Last Receipts | Pending Deliveries

Classification: Engines, Diesel    Part Type: Direct Purchase    Description: Caterpillar 3034 NA

Part ID: CAT-3034 NA    MFG P/N: 3034 NA

NATO ID: - - -

Drawing File Name: L:\SPAR\SPARDATA\Drawings Pi    Thumbnail Picture File Name:    3-D Model File Name: L:\SPAR\SPARDATA\Drawings Pi    Spec Document File Name: L:\SPAR\SPARDATA\Drawings P



**Attributes**

	Part Attribute Type	Part Attribute	Description	Value	UoM
1	Material	Weight	Engine Weight	579	LBS
2	Material	Width	Engine Width	20.5	IN
3	Physical	Bore x Stroke	Bore x Stroke	3.82 x 3.94	IN
4	Physical	Continuous Duty HP	Continuous Duty HP	63	HP
5	Physical	Continuous Duty kW	Continuous Duty kW	47	kW
6	Physical	Continuous Duty RPM	Continuous Duty RPM	2600	RPM
7	Physical	Cylinders	Number of Cylinders	4	NO
8	Physical	Displacement	Engine Displacement	183	CUIN
9	Physical	Height	Engine Height	20.5	IN



# Performance Reporting

The process of tracking and managing contract performance requires accurate and timely feedback of costs and schedules which can be measured against a baseline of budgets and planned schedules.

*PERCEPTION* can produce a wide variety of reports that provide visibility of project performance at different levels of detail.



- **Contract WBS Cost & Schedule Performance Reporting**
- **Shipyard Work Center Cost & Schedule Performance Reporting**
- **Interim Products Cost & Schedule Performance Reporting**
- **Cost & Schedule Tracking & Forecasting**
- **Progress Measurement & Tracking**
- **Cost Estimate Analysis**
- **On-Line Status & Reports Generation**



# On-Line Reporting of Cost/Schedule Status

Project Details Information									
Details	Material Status	Totals	Indexes	Variations	Notes	Baseline	Options	Milestones	Characteristics
Contract	TSHIP CONTRACT		Description	Sewern Bulk Carriers (Detail Work Orders)					
Project	2002								
	Budgeted Cost of Work Scheduled	Budgeted Cost of Work Performed	Actual Cost of Work Performed	Budgeted Cost	Estimated at Completion	Reserves	Effective Date:	01/14/1993	
Man-Hours:	693,209	689,077	660,525	1,014,393	984,555	1,000,000.00			
Rate/Hour:	17.30		16.27		16.16				
Labor Cost:	11,989,786	11,918,328	10,748,477	17,545,014	15,907,329	1,730,000			
	Budget + Reserves	Less EAC	Less Rework	= Labor Margin	Estimated Remaining Labor				
Man-Hours:	1,114,393	984,555	8,503	121,335	324,030				<i>NOTE: Rework included in ACWP or EAC</i>
Labor Cost:	19,275,014	15,907,329	147,150	3,220,535	5,158,852				
	Start	Finish	Total Progress	67.93 %	(Closed	58.26 %	In-Process	9.67 %	
Planned	09/12/1991	09/17/1993	Total Planned	68.34 %	(Behind	-0.41 %		-0.21 weeks)	
Actual	05/13/1991	00/00/0000	Total Manual	58.20 %			Number of Work Packages:	2529	
							Budgeted Hours:	1,014,393.00	





# Cost & Schedule Performance Reports

04/14/2003 08:32:57

(Date format: MM/DD/YYYY)

SPAR Associates, Inc.

Page 1 of 1

## SWBS Group Progress Report (PROG02)

Contract TSHIP CONTRACT - T-SHIP Series Contract

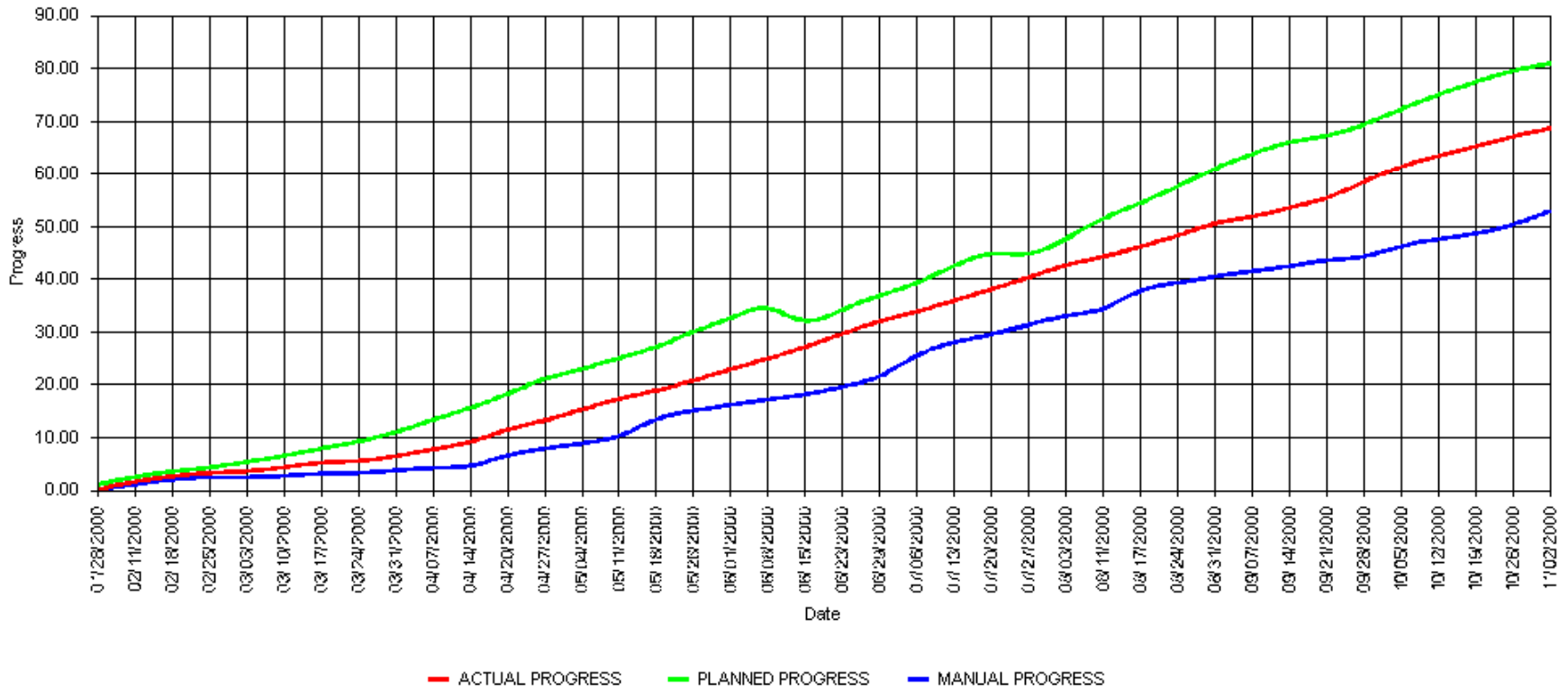
Project: 0 to ZZZZZZZZ Group: 0 to ZZZZZZZZ

Group	Description	Effective Date:	Percent Progress				Current Labor Hours				Final Hours			
			Planned	Actual	Ahead	Weeks Ahead	BCWS	BCWP	Actual Hours	Schedule Ahead	Budget	EAC	ETC	Savings
Project	2002	01/14/1993	Sewern Bulk Carrier (work orders)											
			<b>68.66</b>	<b>68.04</b>	<b>-0.62</b>	<b>-0.33</b>	<b>698,984</b>	<b>692,646</b>	<b>660,706</b>	<b>-6,338</b>	<b>1,017,998</b>	<b>984,817</b>	<b>324,111</b>	<b>33,181</b>
0	STEELWORK		90.85	95.36	4.51	3.65	431,102	452,518	450,719	21,416	474,528	474,895	24,176	-367
1	ACCOMODATIONS OUTFIT		16.55	26.00	9.45	4.70	9,138	14,358	16,020	5,221	55,222	58,120	42,100	-2,898
2	CARGO SYSTEMS OUTFIT		56.66	64.47	7.81	1.58	31,964	36,370	26,925	4,406	56,418	44,712	17,787	11,706
3	MECHANICAL SYSTEMS OUTFIT		38.56	32.92	-5.64	-1.47	31,921	27,265	20,641	-4,656	82,784	73,453	52,812	9,331
4	PIPING SYSTEMS		55.66	48.02	-7.64	-3.40	45,891	39,601	26,504	-6,290	82,450	62,160	35,656	20,290
5	MACHINERY SYSTEMS		54.17	39.12	-15.05	-6.11	15,112	10,913	7,712	-4,199	27,899	23,832	16,120	4,067
6	ELECTRICAL SYSTEMS		38.33	8.95	-29.38	-9.20	22,242	5,195	4,821	-17,047	58,027	55,591	50,770	2,436
7	PRODUCTION SERVICES		57.24	62.95	5.71	3.99	73,617	80,951	81,089	7,334	128,601	131,270	50,181	-2,669
8	OWNER CHANGES		55.12	16.71	-38.41	-25.13	13,485	4,089	4,282	-9,396	24,466	32,702	28,420	-8,236
9	DESIGN & DRAWING		88.80	77.66	-11.14	-8.93	24,512	21,436	21,993	-3,076	27,603	28,084	6,091	-481
<b>Group Totals for Project - 2002</b>			<b>68.66</b>	<b>68.04</b>	<b>-0.62</b>	<b>0.62</b>	<b>698,984</b>	<b>692,695</b>	<b>660,706</b>	<b>-6,289</b>	<b>1,017,998</b>	<b>984,817</b>	<b>324,111</b>	<b>33,181</b>



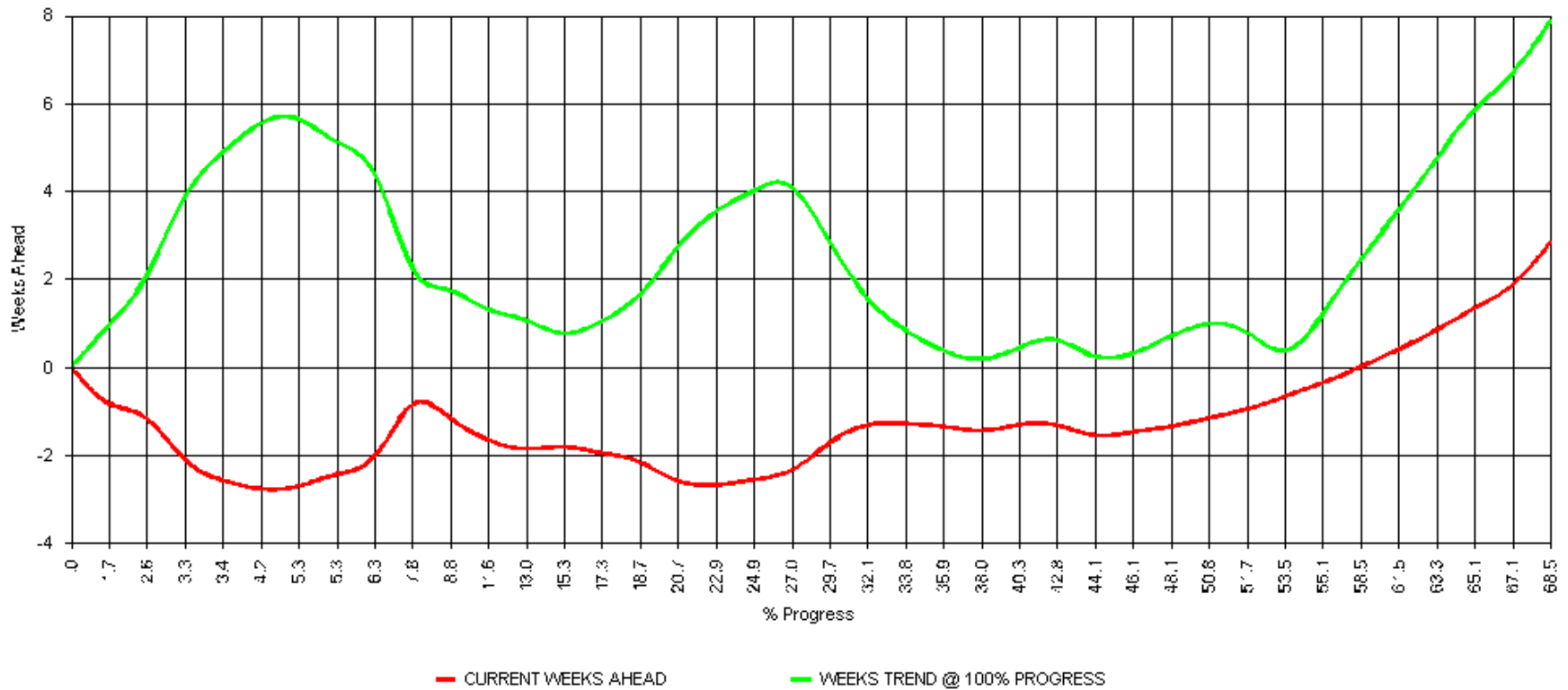
# Tracking Progress

Planned vs. Actual Progress For Contract 47K Tanker Project 1



# Tracking & Forecasting Schedule Variance

Ahead/Behind Schedule For Contract 47K Tanker Project 1



# **Earned Value Management is a project management technique designed to:**

- ✓ **Ensure work is properly & adequately planned, budgeted & scheduled**
- ✓ **Isolate problems for corrective action**
- ✓ **Measure cost & schedule performance of work accomplished**
- ✓ **Measure true cost condition**
- ✓ **Forecast completion date & final cost**



# **PERCEPTION ties together all areas of** **Earned Value Management:**

- 1. Cost Estimating**
- 2. Planning, Budgeting & Scheduling**
- 3. Labor Work Order & Manpower Management**
- 4. Purchasing & Inventory Control**
- 5. Change Order Management**
- 6. Earned Value Performance Measurement Reporting**
- 7. Cost & Schedule Forecasting**
- 8. Cost Analysis For Future Work Estimating**




# Customer Billings

*PERCEPTION* generates customer bills quickly and easily:

- Time & Material Charges
- Progress Payments Billings
- Fixed Price Services
- Transactions To Accounting System's Accounts Receivable (A/R) and General Ledger (G/L)



- Time & Material Charges
- Progress Payments Billings
- Fixed Price Services
- Transactions To Accounting System's Accounts Receivable (A/R) and General Ledger (G/L)

Chesapeake Marine Industries 927 West Street Annapolis, MD 21401				<b>Invoice</b> Page 1 of 2	
				<b>Date</b>	<b>Invoice #</b>
				10/31/2001	1234
<b>BILL TO</b> Laury 927 West Street Annapolis, MD 21401			<b>DRAFT</b>		
<b>PROJECT DESCRIPTION</b> Sample Material Control					
<b>BILLING PERIOD</b>		<b>DUE DATE</b>	<b>TERMS</b>	<b>CONTRACT</b>	<b>PROJECT</b>
09/15/2001 To 10/15/2001		11/30/2001	Net 30 Days	A-DEMO	01
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>RATE</b>	<b>AMOUNT</b>	
11	Mechanical & Electrical Labor	31.20	50.00	1,560.00	
15	Yard Work Labor	36.31	50.00	1,815.50	
20	F E12 Self Tapping FH SS 10 x 3/4	4.00	0.12	0.48 T	
21	ANC 312503 12-10 H/S Ring Trml 5/16 (pkg 3)	1.00	3.86	3.86 T	
22	ANC 312303 12-10 H/S Ring Trml 10 (pkg 3)	1.00	3.94	3.94 T	
23	EDS 9635B Edson throttle handle	1.00	62.10	62.10 T	
24	F F27 Self Tapping PH SS 12 x 3/4	4.00	0.28	1.12 T	
25	1234-20 Y-Belt 25-7240	1.00	12.03	12.03 T	
26	1234-21 Y-Belt 25-7290	1.00	12.57	12.57 T	
27	F F09 Self Tapping OH SS 10 x 1	2.00	0.11	0.22 T	
28	CLR X Bleach Gal	1.00	1.79	1.79 T	
29	PRS 4539 Heavy Duty Thick Latex Gloves	2.00	0.39	0.78 T	
31	PRS 4539 Heavy Duty Thick Latex Gloves	2.00	0.39	0.78 T	
32	HSE 1.5 SANI 1-1/2 in. Sanitation Hose	15.00	2.30	34.50 T	
33	SON 38-50 1-1/2 - 2-1/16 in. SS Clamp	6.00	3.14	18.84 T	
34	F F30 Self Tapping PH SS 12 x 1-1/2	2.00	0.20	0.40 T	
35	NAPA 1452 Oil Filter	1.00	10.11	10.11 T	
36	DRD 25005 Drydene Dexron III/Mercron QT	1.00	3.25	3.25 T	
37	Y 40030GT Oil 30WT Oil Qt	4.00	3.59	14.36 T	
38	1234-33 JS 10-24225-1 Pump	1.00	307.92	307.92 T	
39	1234-34 Freight (pump)	1.00	15.10	15.10 T	



# Accounting Systems

*PERCEPTION* generates transactions that can be electronically input into accounting systems:

- Purchase Orders & Receipts
- Vendor Invoices
- Time Charges





## Accounting Systems Interfaces:

- **Great Plains**
- **Peachtree**
- **Solomon**
- **Quick Books**
- **Generic Interface Transactions**



**Over 35 Years Serving the Shipbuilding &  
Repair Industry**

