



2nd Tier Shipyard Design Enhancement Program



NSRP Crosscut Meeting Brief in Mobile, AL

May 10th, 2006



VT Halter Marine, Inc.

MARINETTE MARINE
PROVEN PERFORMANCE IN THE MARINE INDUSTRY

NORTHROP GRUMMAN

Ship Systems
Avondale Operations

GENERAL DYNAMICS
Electric Boat

BENDER  **Bollinger**
Shipyards, Inc.

ShipConstructor
Software USA, Inc.

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Innovative Ideas and technologies

PROTEUS ENGINEERING
Anteon

Introduction to STSDEP

&

Education & Training Proposed Project Module

Presented by Patrick Roberts - R&D Manager @ Bender Shipbuilding





Presentation Outline



- Overview
 - ShipConstructor Software Inc.
 - Second Tier Shipyard Design Enhancement Program
- STSDEP II- Implementation Results
 - CPC Integration
 - Structural Module (DDRROM)
 - Pipe & HVAC
 - SC2006 & AutoCAD 2007
- STSDEP I - 3D Model vs. “As-Built”
- STSDEP III - Proposed Module
 - Education & Training Module Outline



Overview - ShipConstructor Software, Inc.



- What is this ShipConstructor Software?
 - 3D geometric modeling software w/focus on surface ships
 - Runs in conjunction with AutoCAD
 - Software written around the shipbuilding process
 - Software modules can be purchased as a suite or in standalone modules (as per customer requirements).
 - Used by a number of small to mid size shipyards and design agents (very cost effective).
 - Continuous improvements & enhancements as directed by the shipyards. Relationship started in 1997 with a structural beta software & Bender's structural design group.



Overview - ShipConstructor Software, Inc.



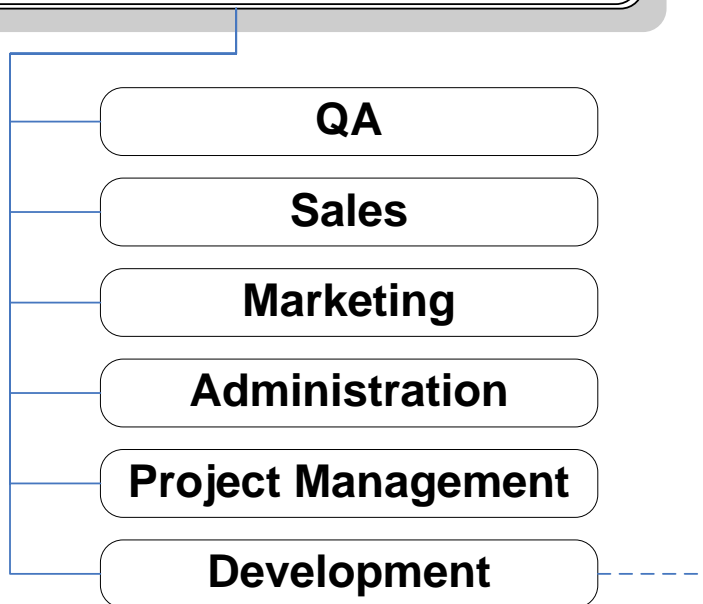
- ShipConstructor Software Inc. (SSI, formerly Albacore Research, Ltd. (ARL)) will continue core software development and provide technical support to SSIUSA
 - Canadian company
 - Focus on international sales & marketing, U.S. sales & marketing, core software development, feature development and de-bugging
- ShipConstructor Software USA, Inc. (SSIUSA) incorporated on November 28, 2005
 - U.S. owned company
 - ShipConstructor name and technology licensed from ShipConstructor Software, Inc.
 - Research and development, U.S. Navy and government projects, custom integration as primary focus areas



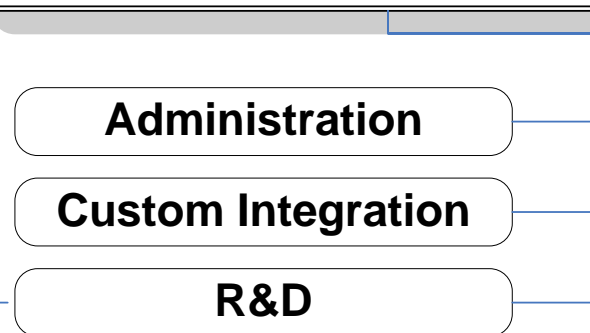
Overview - ShipConstructor Software, Inc.



ShipConstructor Software Inc. (SSI)
(Formerly Albacore Research Limited, ARL)



ShipConstructor Software USA, Inc. (SSIUSA)





Overview - STSDEP Proposed & Funded Project Work



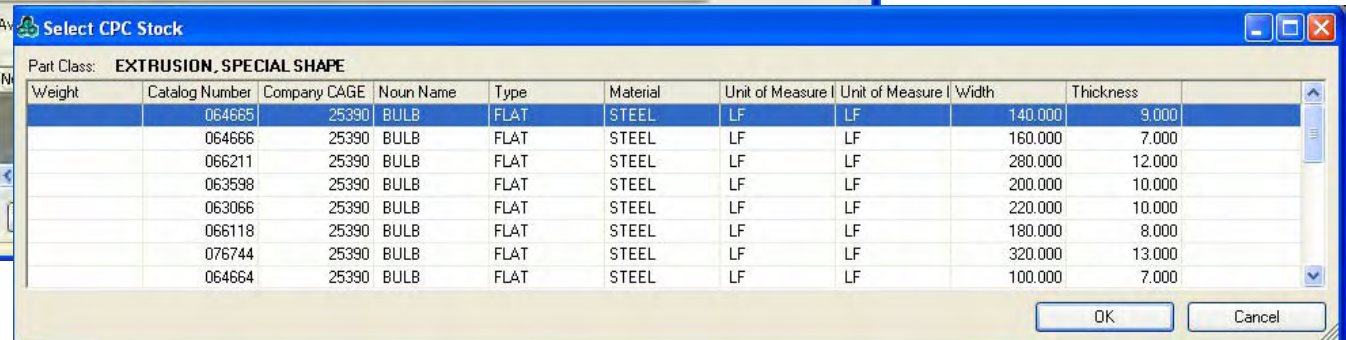
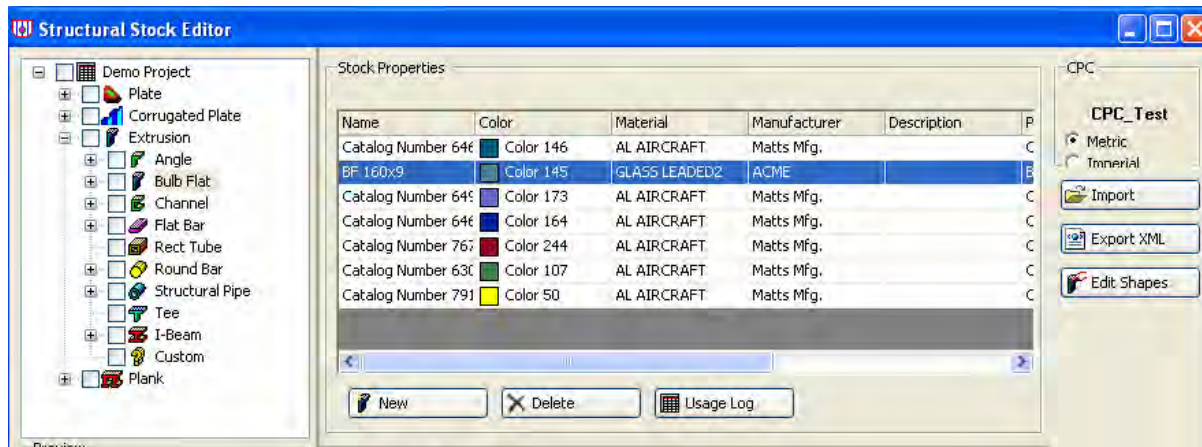
- ***FY2004 Phase I – 100%***
 - Common Parts Catalog for 2nd Tier Shipyards
 - HVAC Module
 - Piping Module
 - NURBS (Non-UnifoRm B-Splines) Module
 - FotoG Pilot
 - Penetration Module
- ***FY2005 Phase II – 95%***
 - CPC Integration w/SC2006 & Flagship
 - 3D Product Model Splitting & Merging
- ***FY2006 Phase II Extension – 5%***
 - Electrical Design Software Specification Module
 - Weld Tracking and Planning Software Specification Module
- ***FY2007 Phase III Proposed Module – 0%***
 - Education & Training Module



STSDEP Status - SC2006 CPC Integration (Single Item Creation)



- Operates through existing Stock Editor functionality





STSDEP Status - SC2006 CPC Integration (Stock Libraries Bulk Importing)



- Operates through importing a CSV file which contains a list of GUIDs from the CPC.

The screenshot shows the Structural Stock Editor software interface. The main window is titled "Structural Stock Editor" and contains several panels:

- Left Panel:** A tree view showing the project structure for "SC2006", including "Plate", "Corrugated Plate", "Extrusion", and "Plank".
- Stock Properties Panel:** A table listing stock items with columns for Name, Color, Material, and Mar. The first row is selected.
- Right Panel:** A "CPC" section with "CPC_Bender" options, including "Metric" and "Imperial" radio buttons, and "Import" and "Export XML" buttons.
- Bottom Panel:** A table showing "Available Sizes" for the selected stock, with columns for Nest Priority, # in Use, Inventory, Length, Width, and User Code.

Name	Color	Material	Mar
0.438IN THK X 10.000FT W X 40.000FT L	<input type="checkbox"/> By Block	CS A36	COF
0.563IN THK X 8.000FT W X 40.000FT L	<input type="checkbox"/> By Block	CS A36	COF
0.875IN THK X 10.000FT W X 40.000FT L	<input type="checkbox"/> By Block	CS A36	COF
0.313IN THK X 10.000FT W X 40.000FT L	<input type="checkbox"/> By Block	CS A36	COF
0.250IN THK X 10.000FT W X 40.000FT L	<input checked="" type="checkbox"/> Color 30	CS A36	COF
0.375IN THK X 10.000FT W X 20.000FT L	<input type="checkbox"/> By Block	CS A36	COF
1.500IN THK X 8.000FT W X 20.000FT L	<input checked="" type="checkbox"/> Color 150	CS A36	COF
0.500IN THK X 10.000FT W X 40.000FT L	<input checked="" type="checkbox"/> Color 102	CS A36	COF
0.625IN THK X 10.000FT W X 40.000FT L	<input type="checkbox"/> By Block	CS A36	COF
0.750IN THK X 10.000FT W X 40.000FT L	<input type="checkbox"/> By Block	CS A36	COF

Nest Priority	# in Use	Inventory	Length	Width	User Code
1	0	0	480 in	96 in	25390
2	0	0	480 in	120 in	25390
3	0	0	360 in	96 in	25390
4	0	0	480 in	240 in	25390

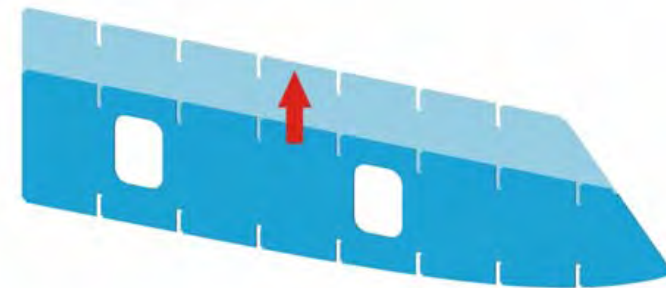




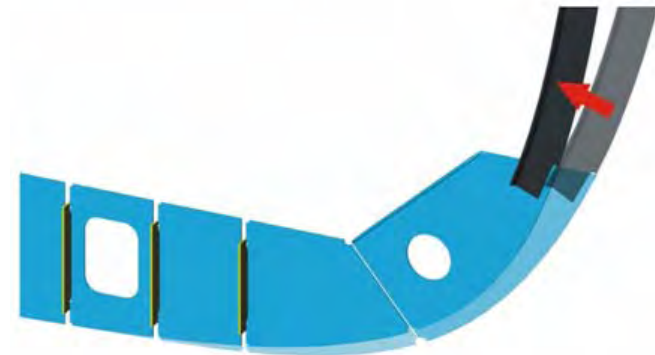
STSDEP Status - SC2006 Structural Module (DDROM – Database Driven Relational Object Model)



- 2005 Part is a Block – 2006 Part is Intelligent Associative Geometry
- 1-Click part definition – no trim break, extend
- Now use plain ACAD commands on Parts
 - Copy, Mirror, Array
- ✓ Significant savings in modeling
- ✓ Significant savings in design changes



Automatic update of plate part after tank-top moved



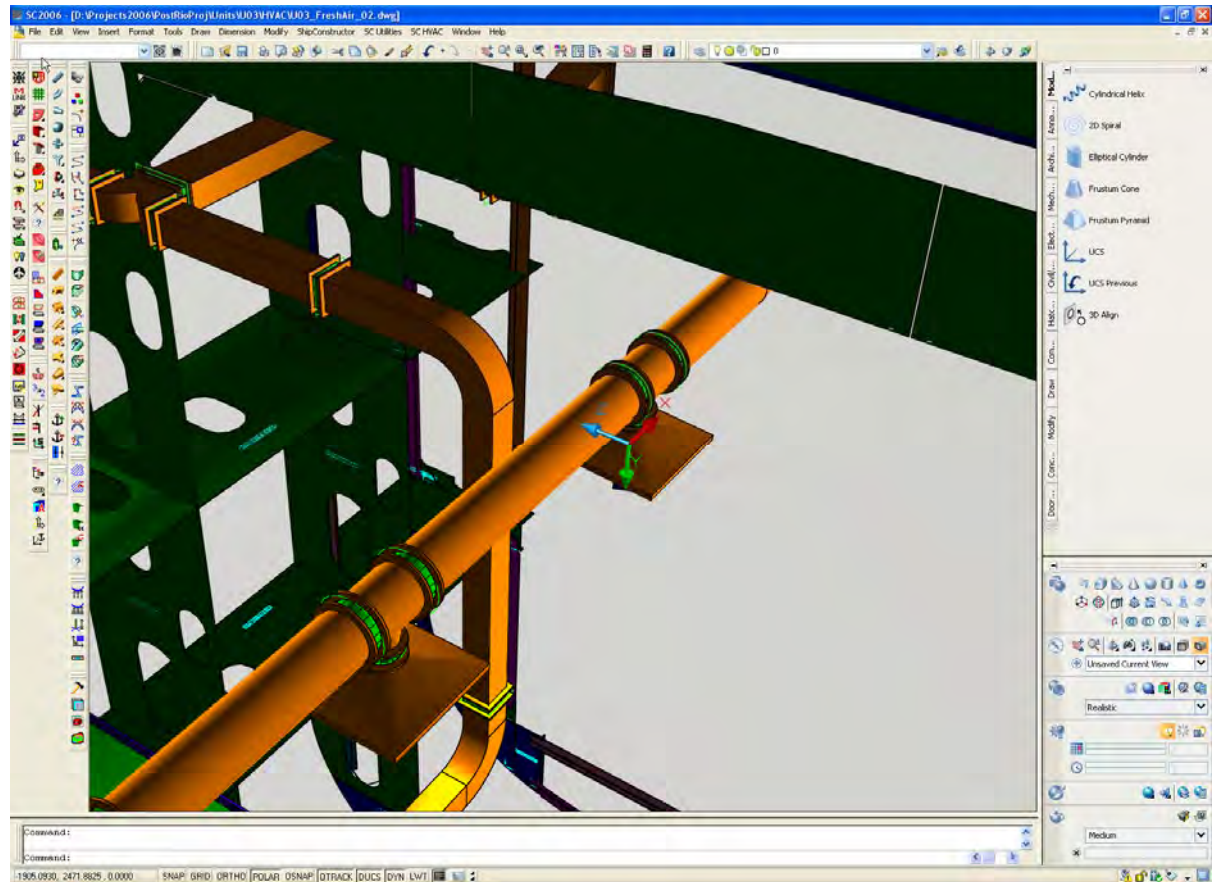
Automatic update several parts after hull trace change



STSDEP Status - SC2006 Pipe & HVAC

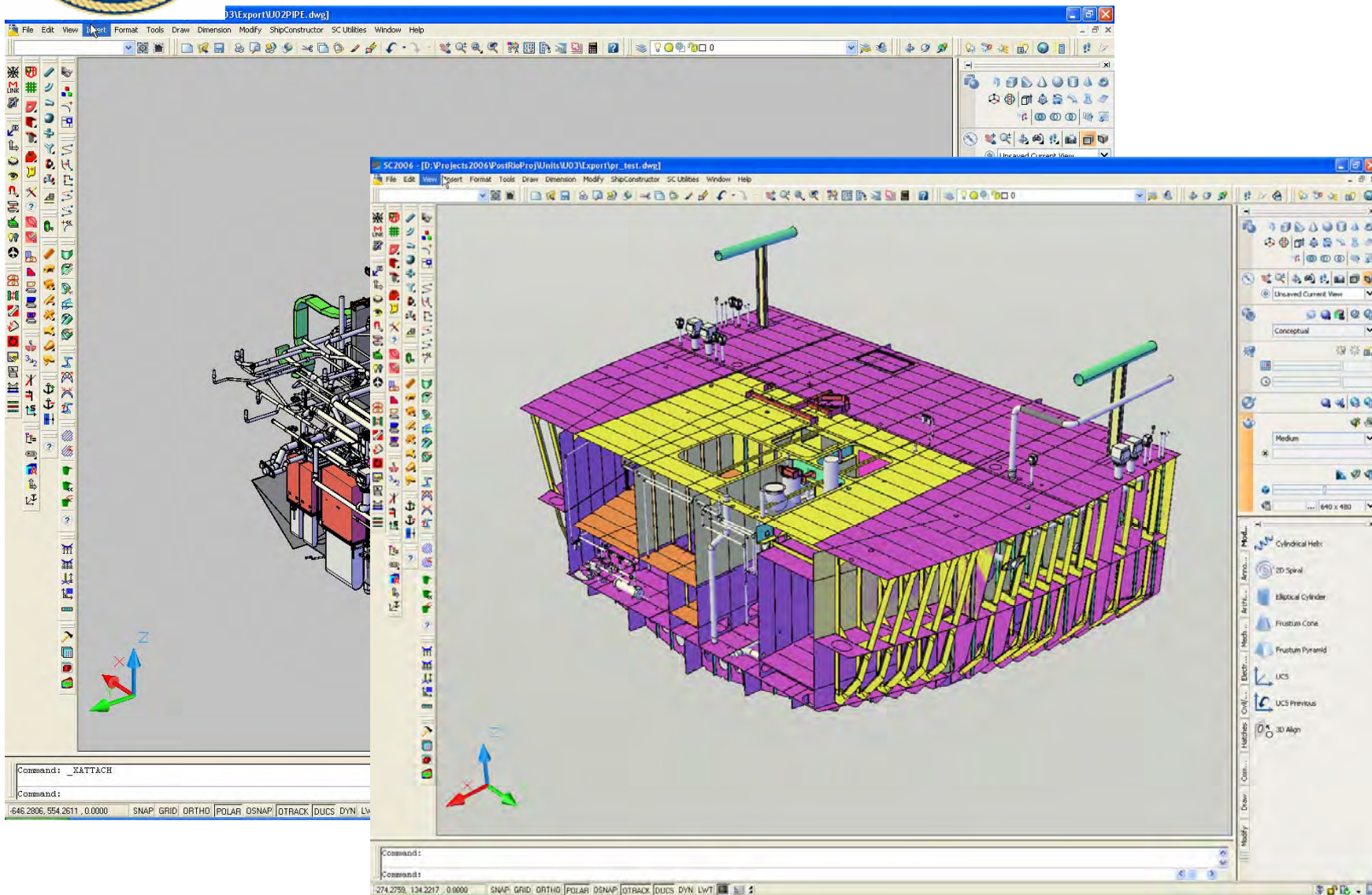


- Rapid Modeling Engine
- Realistic Rendering





STSDEP Status - SC2006 in AutoCAD 2007



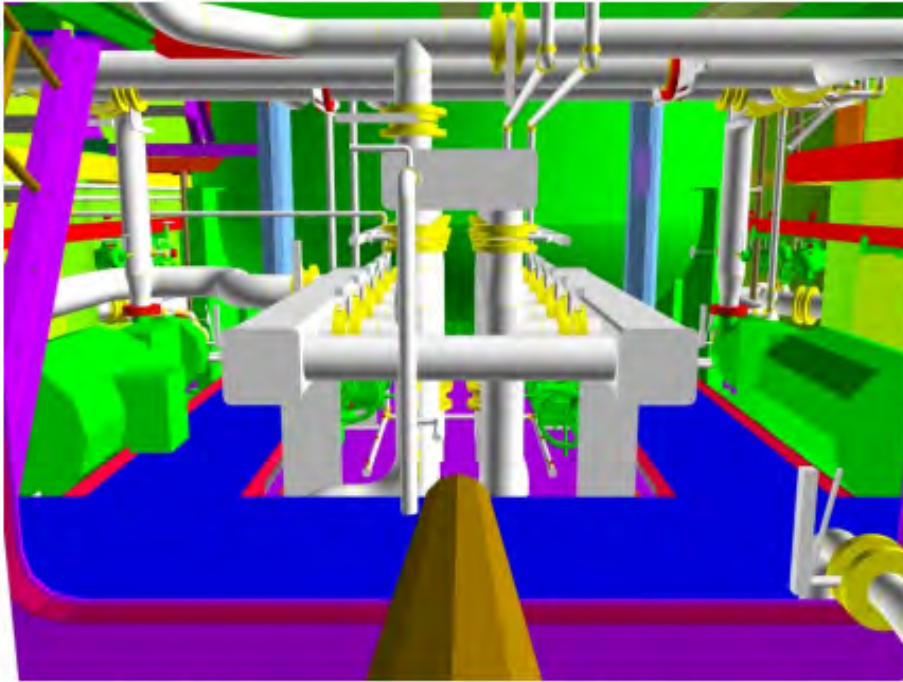


2nd Tier Shipyard Design Enhancement Program



3D Model vs. “As-Built”

Design Phase



Model shot of the Cargo Fuel Oil Manifold.

Delivered Product



Picture of the actual Cargo Fuel Oil Manifold.

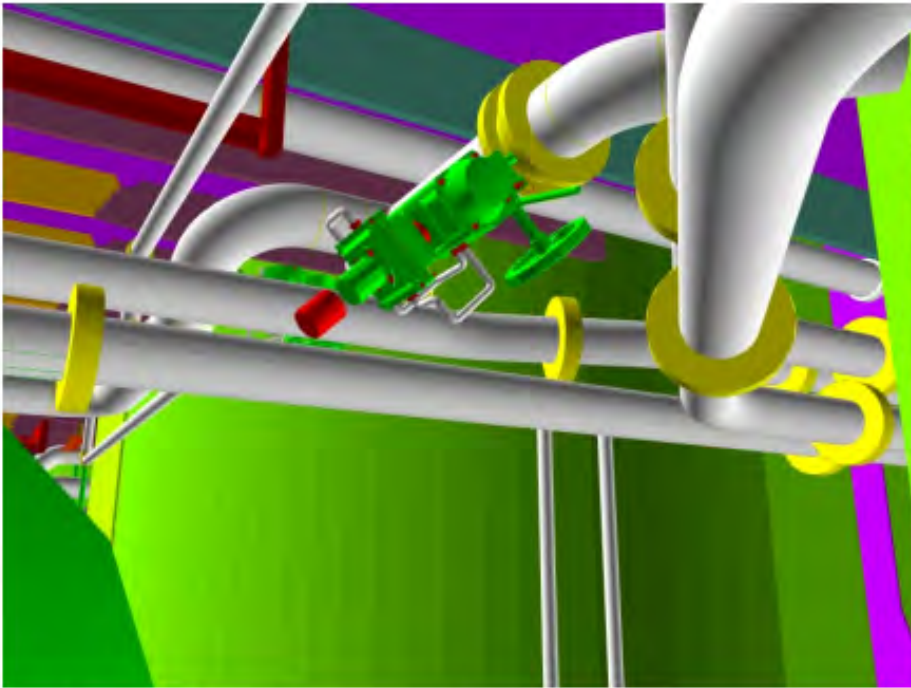


2nd Tier Shipyard Design Enhancement Program



3D Model vs. “As-Built”

Design Phase



Model shot of bulk mud fill and discharge lines.

Delivered Product



Picture of the actual bulk mud fill and discharge lines.



2nd Tier Shipyard Design Enhancement Program

Proposed Education & Training Module



- Objective, addresses the need for;
 - The shipyards and design agents to have access to a training curriculum and resources that will allow them to take full advantage of the major changes in the ShipConstructor Software Package.
 - A customized and tiered training package which allows shipyards and design agents to obtain appropriate levels of training for managers, supervisors, and design group supervisors as well as the front line designers and engineers.
 - To incorporate design software training at appropriate points in the curriculum at 4 year accredited Naval Architecture, Marine Engineering and Ocean Engineering schools.



2nd Tier Shipyard Design Enhancement Program



Proposed Education & Training Module

- **Scope – split into two focus areas;**
 - 1) **Software Users** – includes development of a tiered training curriculum, design and generation of training course material, and implementation and evaluation by project participants.

Result: a complete, standardized set of training courses with appropriate audio-visual materials and training projects. Significant increases in proficiency and familiarization levels with the new ShipConstructor tools & processes developed.
 - 2) **Engineering Degree Programs** – includes several workshops, inviting faculty from schools & universities that have identified the need for integration of ship design software training into the course curriculum.

Result: a curriculum will be developed and will be made available for implementation in Fall semester of 2007. Engineering students will graduate with real world working knowledge of a common ship design system (ShipConstructor), and faculty involved will have an opportunity to update their understanding of the current state technology in Computer Aided Ship Design.



2nd Tier Shipyard Design Enhancement Program



Proposed Education & Training Module

- **Technical Discussion**

- The NSRP Crosscut Panel would be used extensively to provide input for the creation of the best possible delivery mechanism for training.
 - Guidance in providing standardized training formats and presentations that will help to develop a training package that incorporates interactive software and computer based video were appropriate.
- Conventional software training consist of a tutorial and a manual, often augmented by classroom training that can last from one day to two weeks, depending on the complexity of the system being learned.
- Current training for ShipConstructor consist of a basic tutorial and classroom training, with no use of audio-visual or multi-media material.
 - Done on a case by case basis, paid for by individual companies, often centered around “on-the-job” training.
 - Generally only provided for the hands on designers, and no management.



2nd Tier Shipyard Design Enhancement Program



Proposed Training Module

- **Proposed Tiered Training Curricula Development –**
 1. A questionnaire/survey will be created and sent out to all project participants (will be compensated for completing the survey). The survey will be used to establish the priorities and the major content areas for the training modules, which will be defined by in the curriculum outline.
 2. A training development team will conduct a workshop with the Crosscut Panel to help define the best formats and delivery platforms for the training, combining interactive computer based learning with augmented conventional classroom training. Final budgets/schedules for each training tier will be established base on refinement of content & method.
 3. The ShipConstructor USA team will prepare the courses, utilizing the Crosscut Panel's expertise where appropriate. Real time training with selected project team members, incorporating feedback into final modifications of the training package.



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Proposed Education Module

- **Proposed 4 year Education Curricula Development –**
 1. Conduct a 2-3 day workshop, inviting faculty from all of the major universities that offer four-year or graduate programs in Naval Architecture, Marine Engineering and Ocean Engineering, as well as Computer Science departments.
 2. A common curriculum will be identified (as a result from the workshop), incorporating a phased learning approach for the software, and addressing issues such as covering cost for guest lectures.
 3. After course curriculum materials have been prepared, a second workshop will be conducted to evaluate the output. The Crosscut would also provide assistance with this effort.
 4. Once tested and evaluated, curriculum to be offered by ShipConstructor Software Inc. for incorporation to the institutions educational programs.



2nd Tier Shipyard Design Enhancement Program



Proposed Education & Training Module

- **Business Case (Why?) –**
 1. Major changes have been made in the ShipConstructor Software over the past 3 years that have increased enhancements through NSRP.
 2. New features and capabilities require changes in the way the design process is approached.
 3. High levels of integration from the SC Modules required advanced planning and greater effort put into the design management.
 4. New features and capabilities must be learned by designers already accustomed to earlier versions of the package.
 5. Supply & Demand of available ShipConstructor Users.
 6. Provide a technology transfer of education in ship design software to emerging workforce.
 7. Many shipyards & design agents spend months training “newbies” & then spend \$ trying to keep them from leaving after they are trained.

