Zebec
MARINE CONSULTANTS & SERVICES

DETAILED DESIGN

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Zebec undertakes complete *DETAILED DESIGN* turnkey projects. The projects are executed by a strong team of qualified Naval Architects and dedicated Production design engineers with extensive working experience in detailed design and on the production floor of large shipyards.

Zebec owns the ***ShipConstructor*** software suite, which is extensively used in Shipbuilding and Offshore industry across the globe, Navisworks and AutoCAD for preparation of complete production drawings and detailed reports/ handouts required by yards.

The software can quickly and easily

- Model surfaces and compartments in 3D
- Make changes and re-evaluate the design to ensure that it is technically feasible and satisfies the requirements, the ship owner, the shipyard and the authorities.

In addition the special features of this software are;

- Generates many kinds of annotated production drawings complete with "user defined" bill of materials (B.O.M).
- Changes to design if any are only made to changed parts leaving all customization work done to the drawing intact.
- Reports the production drawing which need to be updated after a design change.
- Thus ensuring that only up-to-date production documents are released.
- Allows production documentation to start early, fostering concurrent engineering
- Results in savings to production time

Production DWG Features

Hull

- Forming template creation
- Pin jig creation

Structure

- Automatic assembly drawings
- Approval drawing creation

Pipe

- Automatic spool drawing creation
- Automatic arrangement drawing creation

HVAC

- Automatic spool drawing creation
- Automatic arrangement drawing creation

Penetrations

- Automatic penetration detail drawings

Equipment

- Automatic arrangement drawing creation

*Using **ShipConstructor** we can seamlessly work with the models developed in other standard software's like MaxSurf, Rhino etc. The design details/ data can be best shared with clients due to its Autocad interface when compared to other prevailing software's offering better scope for concurrent design reviews*

Detail Design Features

Hull	Structure	Pipe & HVAC	Penetrations	Equipment
• Shell Expansion • Plate Expansion • Stinger Layouts • Pin jigs	• Parametric Modeling • Design of Frame, Longitudinal and Deck members • Standard parts • Corrugated bulkheads • Weld shrinkage • Plate and Profile green • Automatic stiffener cutouts	• Parametric Modeling • Intelligent routing • Logical connection • Spec driven • Intelligent change engine • Equipment Connections • Offset routing	• Penetration creation • Automatic hole creation • Approval Process • Spec driven • Accessories	• Placing of equipment items • Pipe connections • HAVC connections

SmartParts technology

- Allows simple parametric changes of standards, stocks and of general design features.
- Converts the initial design into a built in 3D model.
- Extract 2D detailed drawings from 3D design.

Hull Module

- Combines proven ShipCAM surfacing technology with new smart surface objects and the simplicity of working inside of AutoCAD.
- Allows creation and manipulation of complex surface models.
- Allows the freedom to use standard AutoCAD drafting techniques.

Hull provides powerful features such as;

- surface-surface intersection,
- surface trimming,
- plate expansion,
- structural section definition,
- shell expansion,
- shell stringer definition,
- offset book printing,
- Pin jig drawing generation.

Image courtesy of ShipConstructor Software Inc.,
- Shanghai Design Associates and Zhejiang Shipyards

The external hull production model seamlessly interfaces into the Structure module.

Image courtesy of ShipConstructor Software Inc.,
- Estaleiro Atlântico Sul

Structure Module

- Combines 3D structural production detailing with the ease of 2D drafting.
- Provides features such as plate part, stiffener faceplate, and corrugated plate modeling.
- Other features include dynamic stiffener cutouts, parametric plate flanges, standard brackets, plate bevel information.

Pipe Module

Image courtesy of ShipConstructor Software Inc

- Complete 3D production modeling package for pipe systems.
- Modeling is based on a parametric catalog of stocks and standards.
- Connections between pipe items are verified against the catalog before allowing the connection to be made.
- Allow changes to piping system whilst intelligently modifying connected parts.
- Can create complex pipe runs relative to structure irrespective if center-line, bottom-of-pipe, or top-of-pipe routing is preferred.
- Pipe run or item can be equipped with surface finishes or insulation.
- Automatically creates spool drawings.

Image courtesy of ShipConstructor Software Inc.

HVAC Module *(Heating, Ventilation & Air Conditioning)*

- Integrates with all of the other modules.
- Easily creates complex HVAC runs relative to structure, irrespective if the center line or any side of the duct is used as the reference plane.
- Automatic creation of spool drawings.

Image courtesy of ShipConstructor Software Inc., Drydocks World - Southeast Asia Pte. Limited

Equipment Module

- Provides the ability to insert any type of equipment item into the structure model.
- Ergonomics can be checked and verified to ensure adequate space for maintenance.

Image courtesy of ShipConstructor Software Inc., Estaleiro Atlântico Sul

Penetrations Module

- Allows the creation of intelligent penetrations through structural members.
- Supports powerful features such as Multi-pipe (and HVAC) penetrations and penetration accessory items.

Product Hierarchy and Build Strategy

- This is the software's hub for production preparation.
- Defines the assembly sequence for the project.
- Build Strategy is optimized based on production capabilities together with need-by and procurement dates.
- Implements better production planning and save cost.
- All Software production output functions are driven by the Build Strategy, allowing for near-automatic generation of production drawings and ease of work during such processes as just-in-time nesting.
- Visual format
- Build Strategy assembly sequence
- Multiple product hierarchies
- Drives production processes
- Automatic part renaming based on location

Image courtesy of ShipConstructor Software Inc

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Split & Merge

- Portions of the model can be split into separate projects.
- Completed work on the split projects is re-integrated into the main project as if the work was performed on site.

Virtual Walkthroughs

- Coupled with NavisWorks JetStream, allows walkthroughs and inspections of the model at any time.
- Production workers can be given direct read-only access to any part of the project model over the company network.

Image courtesy of ShipConstructor Software Inc.,

Report

- Allows for the definition and maintenance of complex production detail reports.
- Has advanced features such as grouping, sorting, summary fields and full control over the visual aspects of the report.
- This tool provides the means to extract the information required for the entire team.
- Report can be exported to Microsoft Excel as well as other formats for further calculation and analysis.

Delivery Control

- Has features for data management and change control which are designed to prevent accidental changes.
- Contains user permissions, approval processes, as well as drawing and part.
- Approves and tracks issued production materials.
- Utilizes features such as DWF generation of production drawings.

Build Module – Plate nesting and NC code generation

Image courtesy of ShipConstructor Software Inc.

- Provides both plate and profile nesting packages to support manufacturing.
- Plate nesting can be performed manually and via automatic nesting routines.
- Optimizes material usage.
- NC code generation, done via NC-Pyros, allows controller specific NC code to be generated for selected nests.
- Estimates for cutting time, which can be used for scheduling,
- Also creates profile plot drawings which provide fabrication information for stiffeners.

Maintain

The original model and design documents are vital for repair and refit work. A ShipConstructor model does not outlive its usefulness once the project is successively built. The design data is used to carry out future modifications and refits that may take place.