

Smart moves into the future

Bridge Systems

ABB is exploring the next generation of Bridge Systems, combining smart technology with intuitive user interfaces to deliver solutions that are customised, robust and highly efficient.

In early 2014, ABB China partnered with SaierNico, a local leader in the design and manufacturing of marine switchboards and automation systems, to develop ABB's Bridge Systems expertise. The team identified real market potential for a user-friendly solution capable of enhancing operational efficiency, and being flexible enough to be customised for a vessel type. They believed 'hundreds of console sets' could be supplied annually to vessels.

Three pilot projects were initiated to develop the Bridge Systems concept. ABB created the solution 'roadmap', detailed in this article, with the aim of both enhancing user experience, developing automation competence and supporting marine business development.

Concept

ABB delivers many consoles and subsystems, generating considerable customer feedback. Product reliability and efficiency are two areas where customers are seeking enhanced standards for their crews. With this in mind, the Vessel Information and Con-

trol product group teams from China and Finland began work on designing a bridge console especially for the demands of the Platform Supply Vessel (PSV) segment, where conditions are exacting and vibrations challenging. The usability and modularity of the console were key considerations.

To maximise operator space, the team utilised a c-shape design for the prototype. The console features three main modules: a 'basement' with horizontal operation side; a level for monitors; and an easy-to-open equipment box, which can be modified for different components, such as ABB's remote control system (RCS) levers.

Process improvements were developed to cut console manufacturing time and minimise human error. These included the use of new materials as metal alloy fixed by screws and changeable overlays. As a core enhancement, the width of the consoles can be easily modified for different needs. One design patent covers the three shapes (C, Y, T) illustrated in Figure 1.

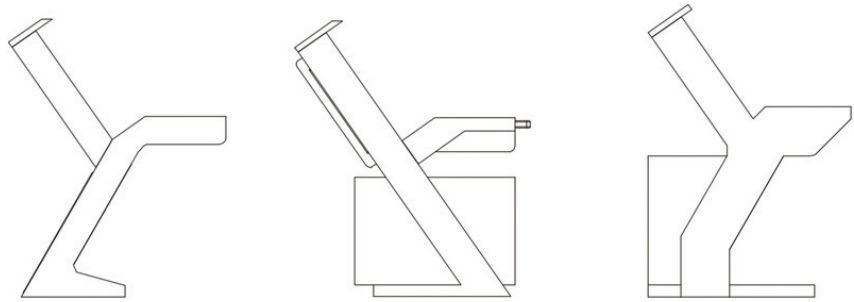


Figure 1: Three typical shapes (C, Y, T), Design patent (No. ZL 2014 3 0393789.2) and Utility model patent (No. ZL 2014 2 0603128.2)

Design that delivers

The overall design is described as simple, modular and clean with plain surfaces. Based on the ABB Marine global design guidelines, which emphasise safety and situational awareness, the design shows discipline and professionalism. The solution utilises black and white as the main colours, while other colours are used to highlight safety features and guide users. The products are provided with consistently high standards as ‘assembly kits’ for replacement.

Bridge Systems is designed as a communication bridge between ABB, shipyards and users. The platform reduces engineering work on planning, production, implementation and maintenance.

Customised service

The China Technology team re-designed the layout of the Marine New Lab in Shanghai, creating a virtual vessel for training and demonstration purposes.

This customisation process mirrors the approach that is required for the marketplace, where solutions and services must be tailored to meet customer needs and vessel types. Deliveries of ABB’s Bridge Systems rarely share the same configurations.

Continuous optimisation

Demonstration consoles were set up in Marine New Lab’s virtual vessel, allowing feedback to be collected and acted upon. Modifications were made to meet both vessel types and user preferences. Collected feedback was categorised according to factors such as appearance, operation, function, design and craft process, amongst others. ABB is working on the continuous optimisation.

Integrated Bridge Systems

Traditionally, the Integrated Bridge Systems (IBS) concept has evolved from integrated navigation systems (INS) in the first generation, auto-pilot in the second, ECDIS in the third, and integrated for the fourth generation. Most manufacturers have now reached a consensus on standards for MFWs (Multi Function Workstations) and smarter software for advisory systems.

IBS systems include ECDIS (Electronic Chart Display and Information), Conning, Radar (S-band & X-band), ARPA (Automated Radar Plotting Aid), AIS (Automated Identification System), Steering & Autopilot System, GPS & DGPS, Gyro Compass, Echo Sounder, Doppler Log, Wind Sensor, VDR (Voyage Data Recorder), Alarm System, and Communication Equip-

ment, amongst other component parts and systems. This enables advanced concepts such as Voyage Management Systems.

ABB’s Bridge Systems

ABB’s Bridge Systems include remote control system for propulsion, various advisory solutions (e.g. for motion, trim and speed advisory) and auxiliary control systems. ABB’s marine automation and electrical propulsion expertise allows it to fully focus on propulsion remote control (PC), auxiliary navigation (AN), and miscellaneous engineering (ME) at the heart of the MFWs.

ABB’s Bridge Systems cabinets and consoles also provide an integration enabler for larger IBS systems including third party solutions, and third party navigational communication (NC), internal communication (IC) and dynamic positioning (DP) can be integrated into the system.

ABB has a long history of working with specialist partners when creating optimal ergonomic and well-functioning working environments for operators. This helps minimise unwanted incidents and accidents.

The functions of ABB’s Bridge Systems meet the unified interpretation from IACS (International Association Of Classification Societies). The BDEAP



ABB's Bridge Systems launch in China



ABB's Bridge Systems rendering

(Bridge Design, Equipment Arrangement, Process) standard summarises the applicable clauses of IMO MSC / Circ.982, SOLAS, ISM, STCW.

Hardware and software

ABB 800xA (Hardware & Software), MAPL (Marine Automation Platform Library) and Marine UI design guidance are the foundations of Bridge Systems created to satisfy a wide range of automation and control tasks on board a modern vessel. The unified hardware and software help eliminate human errors.

The system can be enhanced through the addition of ABB RCS Interface, Advisory System, IAS vessel management (VMS), and energy efficiency solutions.

The consoles contain subsystems and act as a bridge between operators and their vessels.

Feedback and the future

In response to demand, design and engineering work is now in progress to cover vessel types including service operation as subsea operation vessel (SOV), mercy hospital vessel (MHV) and pure car truck carriers (PCTC).

One of the pilot projects covers Auxiliary Navigation System and Engineering Equipment, including Hospital Call System, Refrigerator Call System, ER Light Column, Remote Start/Stop Box, and Emergency Cut Off.

Another pilot project includes one set of Bow Thruster RCS and a New Drive Control Unit. All of these contain elements of Bridge Systems, while some have the full scope of consoles (ECR, FWD Bridge, AFT Bridge, DP Backup). Shipyards have reacted well to the new innovations, providing active feedback into the design process, while shipowners and classification societies see real potential for the future of ABB's Bridge Systems.

The 'Concept' phase of ABB's Bridge Systems has been completed, with the 'Core' stage now underway in which propulsion remote control (PC), auxiliary navigation (AN), and miscellaneous engineering (ME) subsystems are implemented. 'Complete' is the next and final stage of the roadmap "Concept, Core and Complete".

The result will be a customisable system that sets new standards by meeting demands and satisfying a wide range of user requirements.

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