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# SUDOSTROENIE 3 2014

## /SHIPBUILDING/

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##### **CIVIL SHIPBUILDING**

#### ***Frantsev M. E.* Application of parametric methods at early stages of designing the vessel from composite materials**

Development of domestic shipbuilding from composite materials currently needs advanced and straight method to design such ships. Application of parametric methods to define main vessel specifications at early design stages allows advancing of design procedure. This article reviews parametric method for design of ships with composite hull. The algorithm of design procedure is provided.

##### **NAVAL SHIPBUILDING**

#### ***Katanovich A. A.* Prospects for application of new technologies in radio receiving equipment of Russian Navy**

The author hereby proposes method to design HF radio receiver based on open modular architecture with standard interfaces and unified operating system, thus allowing application of software for adjustment of radio equipment depending on objectives set.

##### **INFORMATION TECHNOLOGIES**

#### ***Ronnov E. P., Kochnev Y. A.* Modeling of shipbuilding equipment with use of «digital prototype» technology**

The authors take high-holding power anchor as an example to demonstrate new methods for design of sophisticated ship equipment using «digital prototype» technology, which allows simulation of their operational behavior and predicts relevant optimal specifications.

#### ***Teplyakov M. V., Khazieva M. D.* Tolerances for simulation modeling and durability calculation of current feedthroughs onboard the ship**

The authors hereby use well-known mathematic model of ship current feedthrough and its main component (insert) as a basis for indication of main tolerances used to calculate insert durability. This article specifies calculation results for two design options of current feedthrough walls achieved with use of ANSYS program documentation with similar mounting field for current-carrying rods.

##### **SHIP POWER PLANTS**

#### ***Kostylev I. I., Myasnikov Y. N., Petukhov V. A.* Human factor and navigation safety**

Secure of navigation safety remains urgent problem despite complex automation and centralization of control over correct operation of ship equipment. Numerous surveys of shipwrecks and accidents show importance of human factor in their occurrence. The authors hereby analyze technical aspects and physical capabilities of a marine engineer and come to the conclusion that conventional automated vessel raises greater demands to crew qualification (above the minimum level of those accepted by the Convention) and requires staff training to continuously advance their curriculums and special training programs.

***Berestovitsky E. G., Zommer G. V., Zimatsky M. A. Experimental surveys of regulation system for feed water supply to steam generator***

This article reviews results of testing the software for flow rate meter comprising feed water control loop of steam generator. Influence of adjustment of flow rate meter on transition quality inside control loop is demonstrated. Operation results allow to select optimal software for flow rate meter to obtain finest adjustment of feed water consumption in steam generator.

## **MARINE EQUIPMENT**

***Kuprina E. E., Kirillov A. I., Bobylev V. S., Brosalina A. A., Drozdov V. V. Advantages of electrochemical technology for purification of ballast water of fishing vessels from biological contamination***

In order to decrease ecological, epidemiological and other stresses inflicted to water environment due to discharge of unpurified ballast waters from vessels, the IMO accepted (12.02.2004) the Convention on control and treatment of ship ballast waters and fallouts which is applied to all types of civil vessels. JSC Giprorybflot developed efficient low-cost technology and modular equipment for vessels of 50–500 m<sup>3</sup> ballast water capacity. Ballast water gets purified in special electrolytic cells of original design (two types) which simultaneously synthesize oxidizers (generated in course of seawater electrolysis) and nanobiocide, which significantly enhance the purification effect of oxidizers. Their combined action reduces active oxidizers concentration rate required for bactericidal effect and increases its duration in comparison with conventional electrochemical technologies.

***Kuprina E. E., Kirillov A. I., Bobylev V. S., Brosalina A. A. Innovation technology and modular equipment for purification of ship ballast waters from biological contamination using electrochemical method***

There are various methods for purification of ship ballast waters. Most known are: deoxygenation, ozonation, ultraviolet radiation, electromechanical partitioning, cavitation. Available purification equipment (mostly of foreign manufacture) is capable to apply several decontamination methods and therefore their price is very high (250.000–5.000.000 US dollars). In order to solve this problem, JSC «Hyprorybflot» manufactured modular equipment for purification of ballast waters from biological contamination using only electrochemical method. This allows to obtain 100% purification rate due to original design of electrolytic cell and combined effect of electrochemically synthesized oxidizers and nanobiocide from seawater.

***Flidleader V. E., Klyukvin O. N., Solodchenkov E. V. Volumetric pump for deepwater vehicle***

This article reports, that specialists of JSC LGM developed high-pressure pump «CKAT-1100» purposed to operate on deep-diving (up to 11 000 meters) manned vehicles.

***Rytkov S. N., Avdeyenko M. V. Deck ventilation of sea oil and gas tankers using swirling jets***

The authors hereby narrate about deck ventilation system with central-hollowed axial-vane swirler, which emits swirled jets thus preventing formation of stagnant fire and explosion dangerous areas on LNG-carrier or tanker decks. Application of swirled jet intensifies air mixing in whole volume ventilated and therefore increases ventilation efficiency.

## SHIPBUILDING ORGANIZATION AND TECHNOLOGY

### ***Polyakov Y. I., Andrianov V. K., Filatov I. N., Pugachev B. N. Programs for audit and certification of construction procedures and equipment employed in civil marine equipment manufacturing***

The wear of main equipment at shipbuilding enterprises reached 75% in the recent 20 years. Lack of new equipment at shipbuilding enterprises indicates underrun of domestic shipbuilding complex in respect development and application of new technologies. In order to define actual state of shipbuilding enterprises and to set priority tasks on their refitting for building new science-intensive equipment, one must estimate their production capabilities, i. e. conduction of audit and certification is required for applied processing procedures and equipment. These tasks shall be solved by set of regulatory documents developed in course of performing R&D program «Quality». It includes special software intended for conduction of audit and certification of procedures and equipment used to build civil marine equipment.

## SHIPBUILDING MATERIALS

### ***Gorynin I. V., Oryshenko A. S., Leonov V. P., Mikhailov V. I., Kudryavtsev A. S. High-tensile titanium allows as basis for construction of deepwater marine equipment***

Due to their high specific and mechanochemical resistance, titanium alloys are best for construction of deepwater marine equipment. Currently, maximum yield limit of hull made from titanium alloys equals 840–850 MPa. Further modernization of deepwater marine equipment requires development of titanium alloys of higher strength, considering specifications to be provided.

### ***Sokolova N. P., Andreev E. A., Manana Z. «Tizol» – new domestic heat insulation material for shipboard fire extinguishing structures.***

This article contains comparative analysis of physical and mechanical values and price of various heat insulation materials of domestic and foreign origin which are widely used as heat and fire protection of ship structures. The following brands are reviewed: TizolFlot, SeaRox, Rockwool, ParocMarine.

## INFORMATION SECTION

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## HISTORY OF SHIPBUILDING AND FLEET

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**The author describes design, building and active service of destroyer «Serditiy» on the Baltics in first stage of Great Patriotic War. Ship's specifications are provided.**

### ***Klimovsky S. D. Capstan steamers on rivers of Russia***

This article tells the history of capstan steamers which appeared in Russia in the middle of 19th century and were used for transportation of dumb cargo vessels up the river. Ship structure and application methods are provided.

### ***Grebenshikova G. A. History of design and construction of steam-driven frigate «Vladimir»***

The author uses previously unknown archive materials to reveal some interesting details of design and construction of steam-driven frigate Vladimir.