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# SUDOSTROENIE 5 2019

## /SHIPBUILDING/

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### AT SHIPBUILDING YARDS

**M. V. Aleksandrov. Cooperation between JSC «SSTC» and JSC PA «Sevmash»**

### CIVIL SHIPBUILDING

**V. I. Lyubimov, E. P. Ronnov, A. G. Malyshkin, V. I. Baryshev. Current state, trends of development and commercial use of high-speed vessels.**

This article reviews modern state and development trends of high-speed vessels of the Russian Navy, their prospective types and application areas. Generalized experience of high-speed vessels design and exploitation considers their advantages and new navigation features to extend their application area.

*Keywords:* high-speed vessels, hydrofoil vessels, hovercrafts, surface-effect crafts, specifications, design features, transport system

**A. S. Bayov. Features of mixed river-sea going bulkers in XX and XXI centuries.**

The author hereby analyzes complex method to evaluate functional efficiency of various transportation system and their rolling stock as well as plotting of composite factors in form of such functions as «polynomial», «posynomial» and «norm». Analysis of technical level of such vessels revealed, that mixed river-sea going vessels of XX and XXI century respectively belong to «river-sea» and «sea-river» categories.

*Keywords:* method, complex evaluation, «polynomial», «posynomial» and «norm» functions, mixed river-sea going vessels, technical level, exploitation efficiency and restrictions.

### SHIP POWER PLANTS

**F. A. Gelver. Building high-capacity electric ship propulsion systems.**

This article analyzes existing methods for building high-capacity electric ship propulsion systems and reveals their advantages and disadvantages. Based on analysis conducted, the author submits design of high-capacity electric ship propulsion system utilizing cascade frequency converter which allows to exclude the adjusting transformer from the power circuit of electric drive and to significantly enhance exploitation and power specifications thereof. Furthermore, the submitted design has high versatility, competitiveness, reliability, flexibility and almost no restrictions to maximum output capacity. The author describes various architectures of electric ship propulsion system with cascade electric converter and analyzes advantages and effects from its implementation.

*Keywords:* electric propulsion system, electric propulsion drive, cascade frequency converter, single-phase frequency converter, modulation frequency, quality, reliability.

### SHIPBOARD EQUIPMENT

**A. A. Iva, I. V. Grachyov. Calculation methods applied for flat polymeric compensators in attachment assemblies of shipboard machinery and equipment.**

Usage of polymeric materials aimed to compensate errors during installation of machinery, equipment, assembly units is currently the main trend to meet technical

requirements and to reduce duration and labor intensity of the installation procedure. This article describes calculation method developed to define quantity of polymeric compensators, their dimensions, strength, applied pressures or stresses which are currently not given in the normative documents.

*Keywords:* installation, shipboard machinery, equipment, polymeric compensators, estimated application methods

### ***M. V. Kuklin.* Reduction of noise and vibration in shipboard hydraulic systems**

Russian shipbuilding industry broadly applies screw-type pumps as part of hydraulic systems for rudder deflection, lifting and lowering of extractable devices, opening and closing of hydraulic-driven valves. Pumps operation causes higher vibration levels in ship hull structures. This article reviews main paths of vibrational energy distribution under pump operation and gives recommendations how to reduce vibration impact on ship structures.

*Keywords:* pipelines, pressure pulsations, vibration energy, noise, vibration, pump.

## **SHIPBUILDING ORGANIZATION AND TECHNOLOGY**

### ***G. V. Egorov, O. G. Egorova.* Methods for reduction of hull metal consumption of mixed river-sea going vessels.**

This article researches hull strength of mixed river-sea going vessels aiming to achieve reasonable reduction of metal consumption of mixed river-sea going vessels. For this purpose, vessels, tugs and barges of «Volgo-Don Max» class should comply with PC R2 class, which has significant advantages before R1 class, which are particularly noticeable for vessels with unlimited navigation. The article reveals, that metal consumption of vessels with limited navigation area R2, R2–RSN and R2–RSN 4.5 can only be affected by altering square of side coamings of bulkers and decks of bulk oil-carriers.

*Keywords:* mixed river-sea going vessels, hull, metal consumption, strength, rules of classification societies.

### ***A. N. Patrakeev, V. A. Ievlev, S. F. Myliuev, V. A. Sulzhenko.* Implementation of new quality control method for welded pipeline connections.**

This article reflects outcome and implementation procedure of new quality control method for welded pipeline connections of air and gas systems in JSC «SC Zvezdochka». This method lays in replacement of hydraulic testing (working pressure x1.5) with pneumatic testing (working pressure x1.0) with compulsory and simultaneous monitoring by means of acoustic-emission examination method. This procedure allows to exclude: dismantling, installation of valves, disconnection of pipes from reservoirs, filling pipeline sections with high-purity water, air drying of pipelines after hydraulic testing. This significantly reduces labor intensity and duration of quality control procedure.

*Keywords:* welded connections, pipelines of air/gas systems, hydraulic and pneumatic testing, acoustic emission, acoustic-emission examination.

### ***A. G. Ryukhin, V. I. Bertov.* Chamber for cleaning and painting blocks in JSC PA «Sevmash».**

This article about chamber for cleaning and painting blocks in JSC PA «Sevmash».

*Keywords:* shipbuilding, chamber, cleaning, blocks, painting, puls.

## **SHIPS OPERATION ISSUES**

### ***V. P. Shegolikhin.* Algorithm to reveal vibration mechanisms as main sources of ship hull vibrations.**

This article describes algorithm to reveal vibration mechanisms utilizing correlation method allowing quantitative evaluation of ship hull vibration induced by several simultaneously operating vibration mechanisms.

It is noted, that in actual exploitation conditions the solution may be complicated by vibrations induced from other simultaneously operating hardware.

It is stated, that usage of this algorithm as part of software for existing shipboard measuring and information systems should enhance their capability to reveal vibration mechanisms as main sources of hull vibration and noise emitted by the ship.

*Keywords:* shipboard machinery, vibration levels, hull vibration field, shipboard measuring and information system, vibration check point, spectral component, selective correlation factor, transfer ratio.

**V. N. Klyakhin, A.B. Fomichev, S. G. Chulkin. Ensuring information safety during field trials of ships and weapon systems.**

The author hereby submits new approach aimed to estimate sufficiency of measures undertaken to ensure information safety during field trials of ships and weapon systems.

*Keywords:* information safety, field trials, ships, weapons, threat, protective measures.

## **INFORMATION SECTION**

**JSC «Zavod Burevestnik» — 95 years anniversary! V. I. Pozdnyakov, Yu. M. Gutkin, V. A. Korenko, V. E. Nesterov. Activities of «Soyuzproektverf» (JSC SSTC) in post-war reconstruction of shipbuilding. V. Ya. Pospelov. State governance of shipbuilding industry: at the turn of the century. Foreign information. Support for domestic shipbuilding.**

## **HISTORY OF SHIPBUILDING AND FLEET**

**S. D. Klimovsky. «General-admiral» – the 70-cannon propeller frigate.**

Frigate «General-admiral» belonged to intermediate type of naval ship in the period before appearance of ironclad battleships. Technical innovations used therein were creatively reworked and adopted by Russian Navy for building of cruisers.

*Keywords:* history of shipbuilding, history of fleet, frigate, sailing-propeller frigate.

**N. V. Mityukov, S. L. Bautina. Project 543 boats for Izhevsk operating company.**

Project 543 boats belong to so-called Soviet «river bus» series. Due to substandard quality of construction performed by Kashirsky shipyard, their service life was frequently less than 15 years. This article aims to recover the story of two such boats – «Pobeda» and «Russia» owned by Izhevsk operating company.

*Keywords:* history of shipbuilding, river boat, inland navigation company, Kashirsky shipyard.

**A. G. Amosov. Projects of ships and vessels developed by CDB «Iceberg».**

The author narrates about the input of CDB «Iceberg» in building of ships and vessels for the Russian Navy and describes specifications thereof.

*Keywords:* history of shipbuilding, central design bureau, ship design.