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# Морской Вестник



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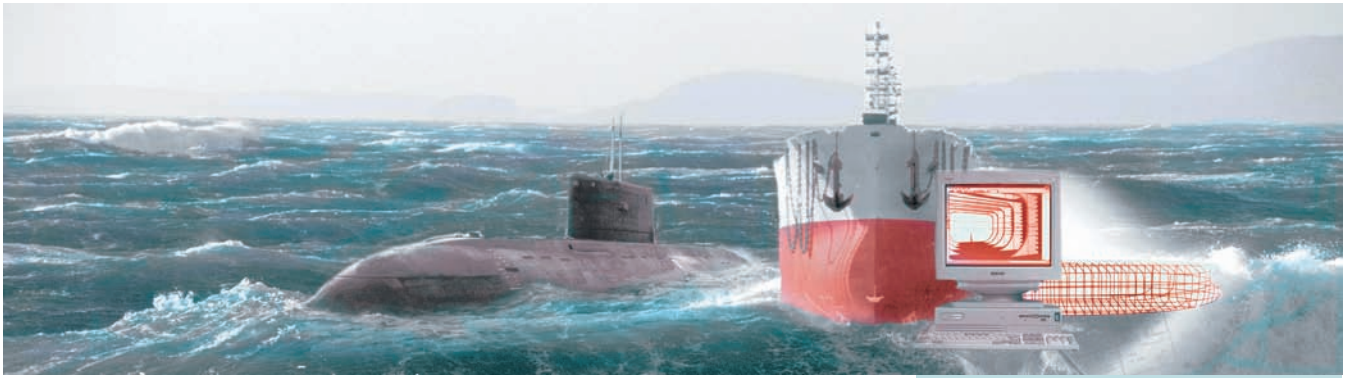
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ABSTRACTS

UDC 623.8 **Keywords:** shipbuilding, trends, ships of the main classes, development prospects, purpose of the Navy

**V.N. Polovinkin, A.B. Fomichev. Shipbuilding activity of twelve countries of the world in 2021–2022 //Morskoy Vestnik. 2022. № 1 (81). P. 7**

The description of two global trends influencing the change in the face of military operations at sea is given. The shipbuilding activity of twelve key players in the field of military shipbuilding is considered, statistical data on the composition of the navies of the leading countries of the world are given. The strategic goal of using the Navy in peacetime, in peacetime during a crisis situation, and also in wartime is revealed. T. 8. Fig. 1.

UDC 629.5.01 **Keywords:** ship composition, renewal, change of generations of ships, combination of approaches, forecast

**A.V. Shlyakhtenko, I.G. Zakharov. When the new generation comes //Morskoy Vestnik. 2022. № 1 (81). P. 13**

Approaches to planning the change of ship generations are analyzed. The construction of a new generation without taking into account the results of scientific and technological progress can lead to a disorderly process of forced modernization of serial ship complexes. The creation of a new generation of ships, based solely on the «new idea», disrupts the rhythm of generational change and leads to obsolescence of the ship's composition. Only a harmonious combination of approaches to the emergence of key models of new generation ships based on the forecast and to planning their commissioning can give the desired result. Fig. 4.

UDC 629.12:539.433 **Keywords:** steady-state oscillations, quasi-one-dimensional model, joint oscillations, inertial-stiffness characteristics, partial responses

**A.L. Melkonyan, D.A. Nikolaev. Joint vibration of the ship's hull and its structural modules with a small interface area //Morskoy vestnik. 2022. № 1 (81). P. 17**

The article proposes a number of approaches for calculating the joint vibration of the ship's hull and its structural modules (ship structures and devices). Calculation algorithms have been developed, the implementation of which makes it possible to uniformly solve problems of steady vibrations of structures modeled by quasi-one-dimensional models. The essence of the method is to correct and modify the values of the inertial-stiffness characteristics of such a model, as well as the load acting on it. A program for calculating the parameters of joint steady-state oscillations has been created. T. 1. Fig. 4. Bibliography 6 titles.

UDC 004.021:523.3 **Keywords:**waveresistance,Froude number, ship waves, mathematical modeling, marine operations simulating system

**V.G. Grachev. Ship waves interference accounting in the wave resistance mathematical modeling //Morskoy vestnik. 2022. № 1 (81). P. 22**

The article discusses the physics of the bow and stern transverse ship waves interference phenomenon and describes a new scientific and technical solution – a

method to take into account the influence of interference in mathematical modeling of the ship movement wave resistance. Fig. 12. Bibliography 18 titles.

UDC 620.197.3 **Keywords:**lasertechnology,precision, cutting, welding, body assembly

**D.A. Polyanskaya, V.I. Trusov. Method of temporary anticorrosive protection of stainless steels //Morskoy vestnik. 2022. № 1 (81). P. 31**

The method of conservation of stainless steel during the execution of the order with the help of conversion phosphate coating «HOTEX» is considered. The formation of fine-crystalline medium phosphates of iron, zinc, chromium and nickel in the process of phosphating levels the electrochemical heterogeneity of the steel surface and improves its anti-corrosion properties. T. 1. Fig. 3. Bibliography 4 titles.

UDC 621.436:621.438 **Keywords:** propulsion module, ship power plant (PP), propulsion electric motor (PM), low-speed PPM, high-speed PPM, concept of substantiating the appearance of promising power plants

**K.G. Golubev. On the issue of creating a propulsion module built into the shafting of promising multi-purpose surface ships//Morskoy Vestnik. 2022. № 1 (81). P. 33**

Analysis of the data showed that the concept of substantiating the appearance of the power plant of promising multi-purpose ships in design bureaus-designers should be radically revised. In the new concept, there must be a place for a propulsion module built into the shaft line, which will help improve the combat and operational characteristics of promising surface ships. Fig. 7. Bibliography 7 titles.

UDC 621.438:620.193 **Keywords:** heat-resistant alloys, corrosion resistance, sea water salts

**A.Z. Bagerman, S.A. Zavodov. Evaluation of the corrosion resistance of nickel-based heat-resistant alloys //Morskoy vestnik. 2022. № 1 (81). P. 37**

Two methods are proposed for assessing the corrosion resistance of heat-resistant alloys, including «predictive» by the chemical composition of the alloy without a need for field trials. T. 3. Bibliography 9 titles.

UDC 629.12.037 **Keywords:** ship machines and mechanisms, parts, strength, endurance, fatigue, durability, crack, residual life

**V.K. Rumb, Htoo Naing Aung. Ideological prerequisites for the transition from strength calculations to predicting the durability of ship machines and mechanisms //Morskoy vestnik. 2022. № 1 (81). P. 40**

Methods for calculating the strength of parts of ship machines and mechanisms in the dialectical development, starting from static loading and ending with the action of variable stresses, are considered. Particular attention is paid to endurance calculations, because part failures are most often associated with material fatigue. It is proposed to evaluate the performance of parts not by strength, but by durability. The methodological provisions for predicting durability for the stage of nucleation and appearance of the first visible cracks and residual durability for the stage of crack growth to a critical size are given. Fig. 1. Bibliography 6 titles.

UDC 629.5.035.58 **Keywords:** coaxial contra-rotating propellers, power transmission

**A.R. Togunjac, S.L. Anchikov, L.I. Vishnevsky. On the technical requirements for electrical power transmission to counter-rotating coaxial propellers//Morskoy vestnik. 2022. № 1 (81). P. 43**

The examples of the main design solutions of propulsors with contra-rotating propellers (CRP) are presented. The justification of technical requirements for electric power transmission to the CRP is given on the basis of generalized operational data for existing ships, as well as calculations of the ship propulsion of two typical ships with powers transmitted to the CRP of 1800 kW and 3000 kW. An estimate is given for the maximum permissible diameters of the nacelle diameter of the steerable propulsor with CRP with a power of 1800 kW and 3000 kW. Fig. 7. Bibliography 20 titles.

UDC 623.973 **Keywords:** converting devices, parallel connection, power summation

**V.V. Fogel', V.Yu. Selyakova, V.N. Grachev. Parallel connection of energy converters in relation to systems for compensation of ship's magnetic fields//Morskoy vestnik. 2022. № 1 (81). P. 49**

The possibility of parallel connection of converter devices to increase the output power is considered. Mathematical calculations describing this solution are presented. Fig. 4.

UDC 629.12.8 **Keywords:** air independent power plant (AIP), unified gas turbine plant (YGTU), underwater vehicle, closed cycle, Arctic shelf, nuclear power plant

**P.S. Andreev. Prospects for the use of an air-independent power plant with a closed-cycle gas turbine engine//Morskoy Vestnik. 2022. № 1 (81). P. 53**

A AIP with a closed cycle gas turbine engine (CCG) is being considered, which can be used as part of an underwater technical facility intended for the development of the Arctic shelf. A description of the operation of the installation, its principal arrangement is given, as well as generalized conclusions are given on the feasibility of using AIP with a gas turbine engine of the closed cycle as a single gas turbine, the operation of which is expected to be submerged for a long time in conditions of continuous ice cover. Fig. 3.

UDC 629.12.037 **Keywords:** material fatigue, crack, residual life, calculation algorithm, stress intensity factor

**V.K. Rumb, Htoo Naing Aung. Determination of the residual durability of parts with cracks in ship machines and mechanisms//Morskoy vestnik. 2022. № 1 (81). P. 57**

The main methodological provisions and the algorithm for calculating the residual durability of parts with cracks are given. Specific examples show the practical application of the proposed algorithm. It has been proved that in some cases parts with cracks have a sufficient margin of safety and can be used for a long time without breakage. Bibliography 6 titles.

UDC 629.5.035 **Keywords:**shipshafting,propellershaft, stern tube bearing, clearance, wear, transverse vibrations, elastic support, stiffness coefficient

A.A. Khalyavkin, S.A. Makeev, A.I. Mashchenko, D.O. Shatskov, A.Ya. Auslender. On one approach to the calculation of transverse vibrations of a ship's shafting, taking into account the wear of the stern tube bearing //Morskoy vestnik. 2022. № 1 (81). P. 62

The working condition of the shafting is considered depending on the size of the gap between the propeller shaft and the stern tube bearing, which increases due to the wear of the latter, as well as the existing methods for determining the allowable gaps in the bearing based on the parameters of the rotating shaft and the bearing assembly. It is indicated that bearing wear is the cause of the resonant state during transverse vibrations of the shafting. A developed method for determining the allowable wear of a stern tube bearing based on the calculation of transverse vibrations of a ship's shafting is presented. Three design schemes are analyzed in the form of a beam with a constant section along the length, which are based on elastic supports. Elastic supports model a stern tube bearing. To assess the effect of elastic properties and wear of stern tube bearings on the value of the natural frequency of transverse vibrations, the method of initial parameters was used. T. 1. Fig. 3. Bibliography 15 titles.

UDC 620.9:44.41.29 **Keywords:** absorber, control valve, recirculation valve, cleaning system, pump, drive, power, head, performance, oscillogram, loop

A.N. Dyadik, D.M. Kuchinsky, D.O. Glazyrina. The task of controlling the working gas cleaning system using an electric pump of unregulated capacity //Morskoy vestnik. 2022. № 1 (81). P. 65

The initial equations for the control problem for a working gas cleaning system with an unregulated pump and the results of calculations using a program compiled according to these equations are presented. It is noted that when operating at low pressures of external water  $p_v$  and temperatures  $t_v$ , when the pressure developed by an unregulated pump is close to the maximum, and the flow through the pump slightly exceeds the specified one, the energy consumption for the operation of this pump and the pump of variable capacity in the schemes of the purification system become comparable, and the higher reliability of the first version of the water supply system comes to the fore. In other cases, the second version has an advantage when a variable displacement pump is used. This is especially true from an economic point of view, although the variable displacement pump drive is more complex, and an economic comparison of both options requires additional study. Fig. 2. Bibliography 4 titles.

UDC 681.5 **Keywords:** active filter, analysis, modeling, signal, power circuits

S.G. Cherny, A.S. Sobolev, A.A. Zinchenko, E.G. Zinchenko, K.S. Chernobay. Operation of ship equipment on the platform of intelligent systems to improve the reliability of automation systems //Morskoy vestnik. 2022. № 1 (81). P. 68

Vessels have an all-metal hull, which is a conductor of generated interference during the operation of various ship equipment, so the problem under consideration is relevant. Domestic and foreign solutions implemented in recent years are analyzed, a review of the main directions for the implementation of active filtering in networks with various types of load is made. Fig. 8. Bibliography 10 titles.

UDC 62-932.2 **Keywords:** coalescent, separator, MEPC, oil products, tests

M.A. Baranov, M.Yu. Khokhlov. Investigation of the coalescing properties of materials in the composition of the SNLV-5 oily bilge water separator //Morskoy vestnik. 2022. № 1 (81). P. 73

A mechanism for the creation and testing of a coalescing block for an oily bilge water treatment plant at Vineta JSC is described, as well as the calculation of its hydraulic resistance and permeability. Fig. 5. Bibliography 3 titles.

UDC 629.564.3 **Keywords:** propulsion complex, complex of the technical means control system, main switchgear, frequency converters

P.G. Fedorov, E.V. Pimenov. Interfacing of components and systems of the propulsion complex of a research vessel //Morskoy vestnik. 2022. № 1 (81). P. 77

The main components of the propulsion complex and their interaction with the Dynpos-2 dynamic positioning system are described using the example of a research vessel. Fig. 3. Bibliography 3 titles.

UDC 621.51 **Keywords:** compressor, development, design, production, demand

L.G. Kuznetsov, Yu.L. Kuznetsov. Compressor JSC for 145 years has not lost its leading position in the production of compressors for all types of vessels and ships //Morskoy Vestnik. 2022. № 1 (81). P. 81

Compressor JSC is one of the leading Russian developers and manufacturers of compressor equipment. They have come a long way from the production of the first domestic compressors to the most modern models of compressor technology. First of all, the team provides for the needs of USC, and today there is practically not a single domestic ship where the compressors of Compressor JSC would not be installed. In addition, the enterprise works a lot and fruitfully in the interests of the rocket and space industry, the fuel and energy complex, including the nuclear and oil and gas industries, fulfills orders from the Ministry of Emergency Situations and Russian Railways. The proposed solutions allow you to operate the equipment in the most difficult conditions. The products of Compressor JSC are supplied abroad. Fig. 8.

UDC 621.396.962 **Keywords:** radiating targets, recognition system, adaptation and training, discriminant functions, F-distribution, convolution of distribution laws, hypothesis theorem

G.A. Korzhavin, Yu.F. Podoplyokin, O.G. Mal'tsev. Adaptation and training of a recognition system on the Bayesian classification of a radiating targets //Morskoy vestnik. 2022. № 1 (81). P. 87

The modes of adaptation and training of the recognizing system as part of the shipborne passive radar complex, which provide an increase in the reliability of the Bayesian classification of radiating targets, are studied. Structures of catalogs of a priori data in the form of relational databases and an interface «operator-system» were developed to prepare catalogs for work in a given tactical area. T. 1. Bibliography 7 titles.

UDC 656.61 **Keywords:** navigation safety, a-Navigation, electronic cartographic navigation information system, autonomous navigation system, navigation tasks, coordinated control system

A.S. Korenev, A.S. Skrypka, S.P. Khabarov. Autonomous navigation on existing ships //Morskoy vestnik. 2022. № 1 (81). P. 92

The experience gained by the specialists of Sitronics KT JSC in refining existing ships to implement autonomous navigation technology (a-Navigation) is briefly described. The problem of the lack of requirements for a remote control station outside the ship is highlighted. Fig. 4. Bibliography 5 titles.

UDC 681.532.8 **Keywords:** Navigation, traffic control, displacement ships, autopilots

A.G. Shektorov, A.S. Korenev. Rumb autopilot //Morskoy vestnik. 2022. № 1 (81). P. 95

The main features of the Rumb autopilot product developed by Sitronics KT JSC are briefly outlined. The description of the product is given and its functionality is listed. Fig. 3. Bibliography 3 titles.

UDC 681.51 **Keywords:** control system, control equipment, simulator, test automation

D.S. Sverchkov, S.V. Golovkin. Digital system simulators as test equipment //Morskoy vestnik. 2022. № 1 (81). P. 99

The construction of a system for automated testing of functioning for control units for various purposes based on a digital simulator of behavior models of actuators connected to the control unit is considered. The composition and characteristics of the equipment of the actuator simulator, the connection diagram to the unit under test and an example of an operator interface are shown. Fig. 12.

UDC 620;691 **Keywords:** system safety, dangerous state of the system, technical risk, expected damage, naval surface ships, complex technical systems, functional integrity scheme, ship fire simulation

P.A. Zubkov. Logical and probabilistic assessment of the fire safety of ship premises using innovative technical solutions of the MKS company //Morskoy Vestnik. 2022. № 1 (81). P. 103

The main possibilities of using logical-probabilistic methods in assessing the fire safety of ship premises are disclosed. The main results of using the apparatus of logical-probabilistic methods in conjunction with a mathematical model of the development of a fire in premises are illustrated, which make it possible to quantify the probabilistic characteristics of the fire safety of residential and office premises, depending on the materials used. T. 3. Fig. 5. Bibliography 8 titles.

UDC 629.584 **Keywords:** autonomous uninhabited underwater vehicle, unmanned vessel, gas pipeline, crewed vessel

V.G. Danilova. Diagnostics technologies of the Nord Stream 2 gas pipeline //Morskoy Vestnik. 2022. № 1 (81). P. 110

Variants of the technology for diagnosing gas pipelines laid along the seabed are considered using the Nord Stream-2 gas pipeline as an example. The study was carried out as an initiative work at the Department of Design and Production Technologies of Marine Submersible Vehicles and Robots of the FMP. Fig. 2. Bibliography 6 titles.

UDC 656.61.052 **Keywords:** navigation, navigation safety, methodology for calculating standard indicators, standards for navigational training

P.S. Voitsekhovskiy, I.S. Garmatenko. Methodology for determining the normative indicators of navigation and navigation safety //Morskoy vestnik. 2022. № 1 (81). P. 112

A theoretical substantiation of the results of experimental studies of the establishment of normative indicators used to assess the level of training of personnel in navigation and navigation safety is presented. T. 6. Bibliography 4 titles.

UDC 629.5 **Keywords:** Leningrad Admiralty Association, Novo-Admiralteysky Plant, Admiralteysky Plant, merger, results in numbers

From the Leningrad Admiralty Association to the Admiralty Shipyards //Morskoy Vestnik. 2022. № 1 (81). P. 115

About the work of the Leningrad Admiralty Association, the predecessor together with the Novo-Admiralteysky Plant of JSC «Admiralty Shipyards». Fig. 3.

UDC 623.8. **Keywords:** Maritime Ministry, Maritime Technical Committee, World War I, technical condition, battleship, battlecruiser

S.V. Fedulov, B.A. Barbanel', D.A. Solov'yov, A.A. Vasilyeva. Construction of battleships for the Russian Imperial Navy in the interwar period (1905-1914) //Morskoy Vestnik. 2022. № 1 (81). P. 117

After the Russian-Japanese War, it was necessary to recreate the fleet. The article highlights the problem of the construction of the newest battleships, battlecruisers and their fate during crises and cataclysms. Fig. 5. Bibliography 20 titles.