

ABSTRACT MECHANICAL AND ELECTRICAL SCIENCE

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EFFICIENCY STUDY OF THE HYDRAULIC DISTRIBUTOR WITH DRAWER

Abstract: This paper work studies the efficiency of the hydraulic distributor, analyzing the liquid running through the controller, the variation of the pressure and its speed for various forms of the ring valve controller.

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MONITORING SYSTEMS

Abstract: The proposed project target is to develop an integrated experimental system for monitoring moving or stationary, marine, land and air targets and displaying the information about these objects on an electronic chart[1]–[7]. The proposed system will improve the capabilities of the Romanian authorities to incidents and accidents at sea, performing search and rescue missions, and will help to prevent loss of life and to conserve marine flora and fauna in protected areas.

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DATA ANALYSES OF ONBOARD DISTRIBUTION NETWORK

Abstract: This paper presents a real-time software implementation for a vessel network supply data acquisition system. The software that are used is realized in LabVIEW and the hardware target is a NI-USB-6221 Data Acquisition System from National Instruments.

AURELIA CHIOIBAS

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INFLUENCE OF FRICTION IN THE DRAWING A CYLINDRICAL PART STEEL – PART I

Abstract: In this paper are analyzed the variation of deformation, the stresses of flow, the wall thickness in case of drawing process simulation conducted under two conditions: without the use of a lubricant used in liquid form. The analysis aims to establish the influence of friction on the quality of the drawing steel piece.

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EFFECTS OF SULPHATE REDUCING BACTERIA ON THERMOSETTING POLYMERS/ZN COMPOSITE COATINGS

Abstract: Ships and barges are exposed to a lot of corrosion environments, an important role being microbiologically induced corrosion that attack ballast tanks and void spaces, cargo holds in commercial ships. The rate of corrosion increased quickly and it necessary repair and replacement of structural details, incurring very considerable cost penalties due to direct repair costs and to delay costs. Sulphate Reducing Bacteria is a group of phylogenetically diverse anaerobic microorganisms that were first discovered by Beijerinck in 1895. At present, 14 genera have been identified, the two most established genera of SRB being *Desulfovibrio* and *Desulfotomaculum*. Corrosion induced by Sulphate Reducing Bacteria has made high losses in shipping and gas industry every year. The paper evaluate the attachment effect of Sulphate Reducing Bacteria and the variation of roughness values before and after the attachments on the surfaces of zinc and zinc – thermosetting polymers composite coatings obtained by electro co-deposition. For testing it was used two types of thermosetting polymers as disperse phase in zinc matrix. It was used zinc matrix because this metal is the most widely used material for protection of steel against corrosion. The success of using zinc as a coating on steel can be attributed to its sacrificial nature, low cost and ease of application. Investigations of the surfaces were made using atomic force microscopy method and epifluorescence method. Sessile bacteria on samples were stained with 4', 6-diamidino-2- phenylindol (DAPI). After testing it was observed that attachment of bacteria and the roughness of the composite coatings surfaces are lesser than on zinc surface. By decrease the roughness the pitting attack will be better controlled. Those facts indicated that the thermosetting polymers/Zn composite coatings are more resistant to the attack of microorganisms like Sulphate Reducing Bacteria.

DORU COSOFRET, MARIAN BUNEĂ, FLORIN NICOLAE, MARIAN RISTEA

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THE ACTUAL TRENDS IN REDUCING THE MARITIME TRANSPORT ASSOCIATED EMISSIONS

Abstract: The maritime transport is facing a new and complex environment, which is launching both challenges and opportunities. Among all these existing challenges, the climate change is one of the most important and it's countermeasures are rising most of the problems, both on a political level and in the day by day life. Due to the obvious developing trends of the marine technology, the ships are rapidly becoming one of the biggest pollution source; the air pollutants generated by maritime transport activities are significantly contributing to the increased concentration of the air pollutants. The international bodies are defining the following piers in regulating the emissions level in the maritime transport which comprises several sets of rules and regulations in the field, identifying the funding sources for the required activities, research and development activities in the field of the green technologies and energy efficiency, developing a safety culture towards the marine environment. The companies which are activating in the maritime transport industry will have to align to these trends.

ALEXANDRU COTORCEA, ION VISA, MACEDON D. MOLDOVAN, MARIAN RISTEA

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PERFORMANCE ASSESSMENT OF SOLAR THERMAL COLLECTORS IN VARIOUS SEA STATES

Abstract: In the paper, performance assessment of the flat plate solar thermal collectors installed on the merchant vessels is analyzed. Performance evaluation of the collectors is made by taking into account solar radiance and two significant motions of the vessel: roll and pitch. The amplitude of the roll and pitch angles of a general cargo ship was identified for a degree between 1 and 5 on International Sea and Swell Scale (Douglas scale). For relevance, the height of the waves was considered between 0.1 and 4.0 meters. The simulations of ship motions were carried out using OrcaFlex, a marine dynamics program for static and dynamic analysis of a wide range of offshore systems. Further, considering permanent reorientation of solar collectors due to roll and pitch motions of the ship, a performance

assessment is carried out. This is done in order to determine the influence of the roll and pitch motions on the solar collectors performance under the solar radiation quantity that reaches the collectors surface.

DORIN ANDREI D. DASCĂLU, DUMITRU I. DASCĂLU

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EVALUATION OF STRESSES AND STRAINS DURING THE APPLICATION PROCESS FINPLAST

Abstract: FINPLAST is an original method proposed for anti-friction surface finish of the sliding bearings. The process extends cold plastic deformation technology, for finishing antifriction surfaces of the sliding bearings. In this paper presents the results of the evaluation of the state of stresses and strains obtained by simulation using the finite element method.

DUMITRU I. DASCĂLU, DORIN ANDREI D. DASCĂLU

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ECOLOGICAL ASPECTS OF FINPLAST PROCEDURE

Abstract: This paper presents an analysis of the process FINPLAST compared to other similar finishing processes. The analysis is done in terms of environmental effects that accompany the surface finishing operations anti-friction bearings with sliding alloys.

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PROSPECTS FOR INCREASING SUSTAINABILITY OF SHIPPING THROUGH THE NEW TRENDS IN THE USE OF NATURAL LIGHT INDOORS

Abstract: In this context, the paper aims to assess and warn the impact of using new solutions and future possibilities related to artificial lighting of working spaces, technical spaces and living spaces on board of merchant vessels.

FLORENTIU DELIU, PETRICĂ POPOV

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STUDY ON WORLDWIDE RENEWABLE ENERGY EXPLOITATION

Abstract: This paper presents in an original manner, gradually, the current market issues and factors that determine electricity use and large scale integration of renewable energy sources. We carried out a systematic bibliographical study on the current state of the global use of renewable energy sources and highlighted the main issues that define the wind as the main source of renewable energy in terms of investment and integration in the electricity.

VASILE DOBREF, PETRICĂ POPOV, LUCIAN DUMITRACHE

Naval Academy, Constanta, Romania/ Romanian Maritime Hydrographic Directorate, Constanta

ANALYSIS OF THE TERRESTRIAL MAGNETIC FIELD ANOMALIES GENERATED BY UNDERWATER OBJECTS, USING MAGNETOMETRY METHODS

Abstract: Study of the terrestrial magnetic field is a topical issue in the context of understanding and interpretation of anomalies generated by materials with ferromagnetic properties. Analysis of the earth's magnetic field changes, using magnetometry methods, allows detection on the surface, of these types of materials. This paper presents some elements of magnetic field theory and the way in which magnetometry data obtained in the Romanian seaside have been interpreted.

TRAIAN FLOREA, STOIAN PETRESCU, CORNELIU MOROIANU, MONICA COSTEA, LIGIA-ADRIANASPORIS, M. FEIDT

Naval Academy, Constanta, Romania/ "Politehnica" University Bucharest/ Laboratoire d'Énergétique et de Mécanique Théorique et Appliquée, Vandœuvre, France

APPLICATION OF THE DIRECT METHOD TO OTTO AND DIESEL IRREVERSIBLE CYCLES

Abstract: The Direct Method from Thermodynamics with Finite Speed (TFS) studies the irreversibility's (internal and external) produced during operation of real thermal machines, through progressive analysis and direct integration of the First Law of Thermodynamics, combined with the Second Law of Thermodynamics for processes with Finite Speed, for each process of the cycle. Thus are obtained analytical expressions for the Efficiency (for Power cycles), respectively COP (for Refrigeration Machines and Heat Pumps) and Power (produced, respectively consumed) function of the speed of the processes and of the functional and geometrical parameters of the machine. This paper presents the Main Moments in the Development of Thermodynamics with Finite Speed and Direct Method "invented" in its framework. Recent Progresses in Application of the Direct Method to Otto and Diesel cycles are presented.

DAN FOSTEA, LAURENȚIU DUMITRU, CIPRIAN RĂCUCIU, MIHAI ENACHE

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AUTOMATING THE PROCESS OF TESTING THE FUNCTIONALITIES OF COMPLEX COMMUNICATIONS SYSTEMS

Abstract: One very important part in a product or systems' life cycle is the testing, or better said, how we do it and how we interpret the results. One has to test while developing a product in order to assure its reliability and conformity with the handed requirements. Once you acquire a product or system, you have to test it to be sure you got what you wanted and to determine exactly its limitations. Forward on, while exploiting a product, you will have to test it periodically to prevent loss of functionalities or diminishing performance of some characteristics. Testing specific products, especially when speaking about electronic devices, had become more automated. In these particular cases, testing is much faster and more reliable. Complex communication systems are composed of a variety of products and, even if each one works perfectly independently, all kinds of problems may appear at system level. To avoid these difficulties we have to test the system and use the results in order to improve the system as a whole. In the first part of this paper we present a series of testing procedures, with an accent on military communications systems, presenting the difficulties we have encountered. From those, we have selected some procedures that are suitable for an automated process conducted by an application for software assisted testing. As a necessary step in introducing the software assisted testing, we presented the software requirements for this application. The following steps will conclude by presenting the improvements of testing procedures with regard to rapid and objective tests' results.

ION ADRIAN GÎRBĂ, ANASTASE PRUIU, BEAZIT ALI, LEVENT ALI

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CONSIDERATIONS ABOUT SHIP CLASSIFICATION SOCIETIES RULES CONCERNING NAVAL PROPULSION SYSTEMS MONITORING GAS TURBINES FOR SAFE OPERATION CONDITIONS

Abstract: The work has been done on the study of bibliography and experience in the operation of the doctoral students in the field of gas turbine power plants. The paper highlighted that rules of ship classification societies concerning the main design and functional

parameters of gas turbine integrated in naval propulsion systems, their design and construction, and a brief overview of the role of companies classification.

FLORIN MEDELEANU, MARIUS ROGOBETE, CIPRIAN RACUCIU

Ministry of National Defense, Romania/ Alstom GRID Romania/ "Titu Maiorescu" University

CONSIDERATIONS ON DIFFERENTIAL CRYPTANALYSIS ATTACKS ON LIGHTWEIGHT BLOCK CIPHERS

Abstract: *The most part of symmetric block iterative algorithms are designed to be resistant to cryptanalytic attacks by using nonlinear elements, usually substitution boxes (S-box). Recently, new families of symmetric block iterative algorithms (e.g. lightweight block ciphers) were designed. These new classes are not using substitution boxes, but they have an increased number of rounds. The authors considered useful to compare the resistance of these two subclasses of block ciphers against differential cryptanalysis attack, having in mind that this attack, along with linear cryptanalysis attack, is one of the most important cryptanalytic attack used in evaluation of symmetric block encryption algorithms.*

CORNELIU MOROIANU, LIGIA ADRIANA SPORIS, TRAIAN FLOREA

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THE NITROGEN OXIDE AND SOOT REDUCTION USING WATER/HEAVY FUEL OIL EMULSION

Abstract: *The soot and oxides of nitrogen (NO_x) emissions from marine engines are significant on a global level. Soot and oxides of nitrogen emissions participate in the formation of photochemical smog and acid rain. The challenge is to control soot and O_x emissions without increasing fuel consumption and smoke. There is much interest in the potential of utilizing oil/water emulsion in liquid-fueled combustors for pollutant reduction and enhanced fuel economy. In this work it is preferred to emulsify by using an ultrasonic method in a hydrodynamic generator, because the fuel and water produce a very finely dispersed emulsion. The graphic transposition of the processes of fuels and oil/water combustion is defined by the combustion graphology, developed in a simulator. The graphic representation of the combustion processes development for a droplet of liquid fuel used in the industrial combustion may be made by means of the so-called "combustion oscillogram".*

NEAGU IONUȚ DRAGOȘ

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ACCIDENT SEQUENCE PRECURSORS IN RISK MANAGEMENT FOR OFFSHORE INDUSTRY

Abstract: *Active and aware risk management analysis of increasing offshore constructions development into the context of international trend in exploiting oil and gas reserves in high water depth, wind and wave power. Combining accident sequence precursor (ASP) from nuclear industry with probabilistic risk assessment (PRA) helped by innovative analytic hierarchy process (AHP) proposed by T. Saaty a software tool for evaluating risk is developed. Competent authorities in risk management (like MWS) could beneficiate from a standardised tool for risk evaluation and decision making used to maintain risk as low as possible at all times.*

NICOLAE PARASCHIV

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A HIERARCHICAL APPROACH TO AUTOMATION FUNCTIONS

Abstract: *Process control can be done either automatically or manually in order to achieve the objectives of quality, efficiency and security. The automatic approach consists in totally or partially implementing the monitoring, control, safety and optimization functions. This paper presents a hierarchical approach to the four fundamental functions of process automation along with formalization elements of two-level hierarchical systems. Hierarchical organization along with distributed approach on one or more levels increases the ability for data processing in real-time and creates the premises of advanced automatic control implementation. The hierarchical approach to the control of a vessel on a navigable river is presented as a case study.*

ADRIAN POPA, MARIAN RISTEA, DRAGOS NEAGU, MIRCEA PAVEL

Naval Academy, Constanta, Romania/Marine & Offshore Consultants S.R.L.

CONSIDERATIONS REGARDING THE STRUCTURAL MODIFICATIONS OF A 110.000 GRT PASSENGER SHIP IN ORDER TO IMPLEMENT THE ANNEX VI MARPOL REGULATIONS

Abstract: *The new regulations regarding the SO_xemissions involves implementation of new technologies onboard ships. This usually means redesigning local structures in order to be able to support the increased loads induced by new equipments. The new structure has to be checked in order to see if it respects class requirements. This paper is a good practice example of a structural check for a redesigned structure in order to support new added scrubbers.*

IONEL POPA, RADU –ALEXANDRU POPA²

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PORTABLE DEVICE OF FIRE SIMULATION ON BOARD MARITIME AND RIVER SHIPS

Abstract. *The fire consists in the phenomena of burning initiated by a well-defined cause and triggered with or without the will of man. Being out of control, it produces damage and disruption and thus, it needs an act of a fire-fighting intervention with appropriate means. In order to prepare the crew for fast elimination of a possible fire on board a maritime or river ship, it takes a series of active measures which consist in the personnel's related periodic training on board under specific conditions. In this regard, a "portable mode simulation of fire" was built, with the stated goal of modernizing the vitality polygon of the Navy Academy to increase readiness, training and testing of embarked students and staff in a potential fire fighting. Portable fire simulation mode can be used on board of any ship, sea or river, so that the crew can be properly and specifically trained, even on ship it serves.*

EMIL PRICOP

Petroleum-Gas University of Ploiesti, Romania

ON THE DESIGN OF A MONITORING AND ALARMING SYSTEM FOR HAZARDOUS GOODS TRANSPORTATION BY SHIPS

Abstract: *Various hazardous goods and materials are now transported all over the world in ships and vessels. In order to minimize the high risks posed to the people and environment, the recipients containing flammable substances, toxic or nuclear wastes should be tracked and monitored in every transport phase: loading on the ship, storage during the haulage on the sea and unloading at destination. An innovative system that is able to respond to these requests is presented in this paper. The proposed solution core is an innovative RFID tag with a special memory structure. The system integrates automated location devices (GPS / Glonass), data recorders, specially created intelligent RFID readers and a central monitoring station that is able to communicate with governmental authorities (emergency services, environment protection organizations) in order to alert in case of dangerous and emergency situations.*

MARIAN RISTEA, ADRIAN POPA, DRAGOS NEAGU, MIRCEA PAVEL, FLORIN NICOLAE

Naval Academy, Constanta, Romania/ Marine & Offshore Consultants S.R.L.

STUDY ON QUAY MOORING CAPABILITIES OF A CLB

Abstract: *When loading heavy payloads, during the several offshore operations, there is necessary to prove the capabilities and reliability of the envisaged systems for the activity itself. One of the biggest concerns that are considered by the Marine Warranty Surveyors is the mooring capability of a vessel supposed to receive and furthermore transport the offshore equipment. The present article is aiming to present a study on the quay mooring analysis of a cable laying barge, which is supposed to receive a 8km batch of submarine high voltage offshore cable.*

GHEORGHE SAMOILESCU, SERGHEI RADU, ADELINA BORDIANU³

Naval Academy, Constanta, Romania/ Stena Crewing/ "Polytechnica" University, Bucharest

TRENDS TO INCREASE THE QUALITY OF ELECTRICITY ON BOARD

Abstract : *The quality indicators of electricity must meet the next conditions: universality with the purpose of using them in exploitation and for realization of a control methodology using simple and cheap measuring means and with the needed precision; perfectibility, precisely defined and few for characterization of distinctive properties of energy in stable conditions of the naval electro-energetic system functionality. The deviation of voltage and frequency, the voltage asymmetry and deviation from the sinusoidal form are the main indicators of quality of electricity with a practical importance. In the S.E.N., when permanent conditions is set, the sign of voltage deviations is the same for all electrical parts and can be different from the voltage sign. Voltage and frequency deviation depending on the nominal value can be positive or negative. Frequency and voltage decrease on electrical appliances electrical terminals leads to rotation moment decrease and for a constant load, the current value increases. The frequency decrease rises the currents value towards the consumer on account of increasing the magnetization current of transformers and inductive reactance decreases in circuits. The maxim allowed limits of voltage deviation are +/- 10% for permanent conditions and +/- 20% for 1,5 seconds or +/- 30% for 5 seconds for short period conditions. Voltage asymmetry of ships appears in three-phasic systems because of connecting mono-phasic consumers and lead to occurrence in S.E.N. to consumers of harmonic components with frequencies of over 50Hz, components that increase power losses and lead to heating the generators, engines and cables. The deviation from the sinusoidal form is generated by generators (up to 20%) or by consumers (up to 5%). When naval generator terminals are connected to nonlinear resistances, the consumed current has an asinusoidal form, and voltage drops of the superior harmonics of the current changes for tension curve in S.E.N.. Energy static converters represent the main nonlinear load of a naval electrical network. Under the rules of international maritime registers, the deviation from the sinusoidal form mustn't exceed 5% out of the peak value. The changing in form of the voltage curve in S.E.N. happens because of energy static converters depends on: the nature of the load; parameters of energetic sources on ships; adjustment depth; the ratio between the sources power onboard and the static converters used. As advert effects we find generator and appliances heating, precise reduction of automatic adjustment systems and command of generators.*

FLORIAN VASILE, DANIEL MARASESCU

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THE KINEMATIC OF ENGINE DRIVE MECHANISM. CONSIDERATIONS ON BOXER ENGINE CRANK CONFIGURATIONS INFLUENCE ON THE ENGINE EQUILIBRATION

Abstract: *In the present paper are presented in the first part some theoretical aspects linked by the engine kinematics and defined the dimensional relationships for the kinematic engine drive mechanism, submitted graphically and analytically. This are proceeded in the second part with considerations on crank configurations influence on the engine equilibration in general and extensively for BOXER engine configurations. Following these questions, a great importance is attached for the study of the advantages and disadvantages of using the BOXER configurations in naval engines.*