

ПРОБЛЕМИ С НИСКОТЕМПЕРАТУРНАТА КОРОЗИЯ ПРИ КОРАБНИТЕ ТУРБОКОМПРЕСОРНИ АГРЕГАТИ

PROBLEMS WITH THE LOW TEMPERATURE CORROSION ON THE MARINE TURBOCHARGERS

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Извършеното от авторите литературно проучване показва, че има само няколко случая, в които се разглеждат въпроси свързани с нискотемпературната корозия при корабните турбокомпресорни агрегати. Обикновено се акцентира върху високотемпературната корозия. В публикацията авторите разглеждат случай от своята практика свързан с нискотемпературна корозия при корпусите и турбинните колела на турбокомпресорни агрегати NR20/R, монтирани на главните двигатели 6T23LU на м/к „Бриз“. Извършен е анализ на причината за тази корозия и действията на сервизния персонал при създалата се ситуация.

There are a few cases of marine turbochargers low temperature corrosion investigated. Generally, the focus of the researches is on the high temperature corrosion seen on the marine turbochargers. In this publication, the authors focus on the low temperature corrosion of the turbine rotors and the gas casings of the turbochargers NR20/R on which they have maintenance carried out. The turbochargers were mounted to the both main engines 6T23LU of m/v "Bриз". The reasons for the low temperature corrosion in this case were analyzed. The actions taken by the servicing personnel were described.

ПРОВЕРКА ЦЕНТРОВКАТА НА КОРАБЕН ВАЛОПРОВОД ПО МЕТОДА „JACK UP”

SHIPS LINE ALIGNMENT VERIFICATION BY “JACK UP” TEST

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Целта на настоящата разработка е да се приложи метода на „JACK UP” - тест за проверка центровката на корабен валопровод

Ключови думи: Корабен валопровод, центровка, “Jack up” тест, изместване, пречупване

Abstract: The purpose of this development is to apply the JACK UP method to test the alignment of a ship's line

Key words: “Jack up” test, shaft alignment, SAG, GAP

надеждната работа на системата „гребен винт – енергетична установка”, а така също и на кораба като цяло. В тази връзка, качеството на центровката на валопровода има изключително важно значение.

Предназначението на центровката е да се убедим, че лагерите на корабния валопровод (дейдвудни лагери, лагери на междинния вал, основни лагери) са правилно натоварени (нито претоварени, нито недостатъчно натоварени).

Целта на настоящата разработка е да се провери центровката на корабен валопровод по метода на

An Investigation of Mode of Vibrations on An Axial Centrifugal-Compressor Wheel depending on its aerodynamic loading

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Abstract — the study presents the numerical modeling of Axial Centrifugal-Compressor Wheel (ACCW) from ship engine SULZER RTA 52U. The modeling is performed by CAD software program ANSYS Workbench. The design of the compressor wheel is modeled by the Finite Element Method (FEM) technique available in ANSYS environment. The purpose of the study is to establish the real cause of VTR564-32 turbocharger's damage from real ship's engine SULZER RTA 52U. It has been calculated twenty own frequencies of Axial Centrifugal-Compressor Wheel taking into account aerodynamic loading over his blades. The main value of the presented study is that here it has been considered the influence of aerodynamic load from fluid flow acting on the ACCW according to its own frequencies which is extremely important for the correct engine turbocharger operating modes. A comparison of the obtained values for the compressor wheel's own frequencies with and without external load has been made; on the basis of that the true reason for VTR564-32 turbocharger's destruction has been established.

Turbocharger technical condition influence on the carbon dioxide emissions on natural gas fueled engine

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Abstract — In the present paper a research with a natural gas turbocharged engine has been carried out. The influence of the deterioration of the turbocharger condition to the carbon dioxide emissions has been investigated. Trend figures and equations of the relation have been presented. Results from the planned maintenance of the turbochargers have been incorporated.

ЕКСПЛОАТАЦИЯ НА СИСТЕМИ ЗА ЦИЛИНДРОВО МАЗАНЕ НА НИСКОЧЕСТОТНИ КОРАБНИ ДВИГАТЕЛИ ПРИ НИСКО СЯРНО СЪДЪРЖАНИЕ В ГОРИВОТО СЛЕД 01.01.2020 ГОДИНА

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Анотация. В публикацията е представен експеримент със система за цилиндрово мазане на електронно управляем ниско честотен двигател в условията на използване на ниско серни горива. Представените резултати са оценени и са предложени препоръки за корективни действия за предотвратяване на очакваните нежелани последствия от предозиране на цилиндрово масло.

Study Of The Impact Of Technical Condition Of The Turbocharger Unit On Nitrogen Oxides Emissions Of Engine Running On Natural Gas With Pre-Chamber Ignition And Lean Fuel-Air Mixture

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Abstract - A study about the LNG fueled engine with spark ignition and pre-chamber is conducted. The control system and its dependence on the supercharging system condition is considered. Experiment with the performance of the system during build up process of deposits on the turbochargers surfaces is carried out. Statistically the data was processed and polynomial models on the NOx emissions changes were established. Recommendations on further actions were stated.

EGR OPERATION INFLUENCE ON THE MARINE ENGINE EFFICIENCY

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Abstract. In the work presented, the focus is on the influence of the EGR operation on the engine performance factors. Basic principles of the EGR operation are considered and experiment with electronically controlled engine is carried out on a Kongsberg marine simulator. The influence of the EGR on the efficiency, specific fuel consumption and CO₂ emissions is evaluated. Recommendations for the performance adjustment of the supercharging system are stated.

Keywords: EGR (exhaust gas recirculation); marine engine simulator experiment; EGR basic concept; EGR influence evaluation,

EGR operated engines process water equipment operational safety procedure

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Abstract: In this publication the wash water subsystem features of an exhaust gas recirculation (EGR) system of marine diesel engine are considered. In regard with the safety of the operation, a procedure for handling the wash water system of the EGR is proposed. The chemical reactions between the flue gas and the process water are observed. The wash water system components and their specifics related to the chemical reactivity are presented. The problems with the water impurities, pH value and the operation of the EGR system are highlighted. The engineering crew special precautions on safety on using caustic soda on board is considered. Recommendations are proposed.

Keywords: EGR WASH WATER, CAUSTIC SODA, MARINE ENGINE EGR, EGR WASH WATER SAFETY PROCEDURE

LNG fueled ship type "C" storage tank pressure rise particularities related to the bunkering flow

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Abstract: In the proposed publication it is conducted simulation-based experiment with the bunkering process of type "C" LNG containing tank. According to the specific features of the LNG bunkering process it is analysed the nature of the boiling off mechanism of the cryogenic fluid during bunkering transfer. The attained data by the experiment is analysed including the specific condition of heat ingress simulation. On the base of the results there are stated conclusions and recommendations to the ship operators related to the limiting conditions of the pressure vessels operation as it is the type "C" tank.

Keywords: LNG AS MARINE FUEL, TYPE C BUNKERING TANK, BUNKERING FLOW, TANK PRESSURE RISE, HEAT INGRESS TO TANK

TURBOCHARGER FOULING INFLUENCE ON THE PERFORMANCE OF EGR-EQUIPPED MARINE DIESEL ENGINE

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In this publication the turbocharger turbine side fouling is considered in the context of EGR operated engine. Performance test on marine two stroke engine was carried out on a marine simulator. Different degrees of the fouling are considered and the influence on the engine performance and emissions are presented in set of figures. The influence on the EGR on the deteriorated parameters of the engine has been evaluated to be not substantially defining. The EGR influence was proven to not improve the deficiencies of the fouled turbine of the turbocharger.

Methane number influence on the dual fuel four stroke marine engine performance at high load range

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Abstract: In the present publication it is considered the technology and the features of the operation of the newly introduced in the marine industry wide spreading dual fuel four stroke engines. There are analysed the significant differences between the conventional Diesel engines and the dual fuel Otto engines in their operation process. The influence of the gas fuel quality in the case of the dual fuel engines is in the main concern underlined. Simulation based experiment is carried out for data attaining, related to the performance of the dual fuel engines influenced by the fuel quality on high load range. The acquired data is analysed, and evaluation of the engine derating outcome is performed. On the base of the results are stated conclusions and recommendations to be followed by the engineering crew members dealing with such kind of engines on board LNG fuelled ships.

Keywords: LNG METHANE NUMBER, OTTO CYCLE MARINE ENGINE, KNOCKING OF THE ENGINE, GAS FUEL QUALITY, HIGH LOAD OPERATION

MARINE FIXED FIRE FIGHTING CARBON DIOXIDE SYSTEMS RECENT FAILURES ANALYSIS

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In this publication the issue with the safe state of the CO₂ fixed fire fighting systems were stressed. The regulatory framework on the requirements on the systems regular checks and maintenance are summarized. The good practices described by IMO are underlined as they are implemented in the companies' procedures. Several critical case studies are represented, and the roots of their issues are underlined. On the base of the observations, conclusions are made, and recommendations are stated for further actions to be taken with intention to mitigate the problems with the CO₂ fixed firefighting systems failures.

Dual fuel four stroke lean burn engine supercharging system operational features

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Abstract: In the present publication are considered the features of the dual fuel four stroke lean burn engines supercharging system operational features. The supercharging system control means are analysed and performance data is collected from an engine in operation on an offshore vessel. The data obtained from the engine in operation is analysed, processed and figures of related parameters are obtained. The latter are analysed in relation to the importance of the supercharging technical condition. Conclusions and recommendations are stated as a final outcome.

Keywords: DUAL FUEL LEAN BURN FOUR STROKE MARINE ENGINE, SUPERCHARGING SYSTEM CONTROL, WASTE GATE, MARINE TURBOCHARGER SPEED CONTROL