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# MOTIONS ANALYSIS OF A SHALLOW WATER BARGE IN REGULAR WAVES

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## ABSTRACT

*The behaviour of the ships dedicated to the offshore industry has to be investigated when the characteristics of the areas of operation and the operational loading cases are taken into consideration. Moreover, the amplitudes of horizontal motions have to be carefully evaluated in order to identify the operation limits due to the type of activity to be performed. The paper presents some results of a systematic evaluation of the motions carried out for a specific location in the Caspian Sea in operating condition and extreme conditions for a range of heading angles and two significant loading cases.*

**Keywords:** offshore structures, hydrodynamics, seakeeping

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# NUMERICAL PROCEDURES FOR GLOBAL-LOCAL STRENGTH ANALYSIS OF SHIP HULL STRUCTURE, BASED ON 3D-FEM MODELS EXTENDED ON CENTRAL CARGO-HOLDS COMPARTMENTS

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## ABSTRACT

*This paper focuses on the numerical procedures used for the global-local strength analysis of the ship hull structure, based on 3D-FEM models partially extended over the ship length, covering the three cargo-holds central part compartments. The hull structure of an oil-tanker with 160 m total length, with double shell and corrugated* bulkheads is considered as testing case. *The numerical procedures are developed using Femap NX Nastran and SolidWorks Cosmos/M user subroutines technique; the analysis of the differences between the two FEM programs implementation is also included in the study.*

**Keywords:** user subroutines, 3D-FEM cargo-holds models, global-local strength analysis.

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# SIMULATION OF THE INLAND PUSHED CONVOY MANOEUVRES

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## ABSTRACT

*The manoeuvrability of the inland pushed convoy represents a very important problem due to the increase of the traffic density in inland navigation conditions. The convoy safety depends on the manoeuvres efficiency. The present article describes the results obtained using an in house computer code developed in order to simulate the standard manoeuvres of an inland pushed convoy in the time domain, based on a modular mathematical model. The computer code may be used in order to estimate the manoeuvring performance in inland navigation conditions.*

**Keywords:** inland pushed convoy, standard manoeuvres numerical simulation

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# ELASTIC AND PLASTIC BEHAVIOUR OF SHIP STRUCTURES. COMPARISONS BETWEEN OPTIMIZED AND UNOPTIMIZED STRUCTURES

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## ABSTRACT

*This paper presents both the theoretical aspects concerning the elastic and plastic behaviour of materials and the development of a methodology to approach the study of elastic and plastic behaviour of ship structures.*

**Keywords:** the Johnson-Cook fracture model, specific deformations, nonlinear analysis.

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# AN ALTERNATIVE FOR GENERATING ADDITIONAL HULL SURFACES

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## ABSTRACT

*This paper presents an algorithm for import and activation of surfaces made in Rhinoceros in Aveva Marine modules. Facilities for generating complex surfaces of Rhinoceros combined with computing and detail design facilities of Aveva Marine is main advantage of this work.*

**Keywords:** additional surface,3D, Rhinocerus, Aveva Marine.

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# INLAND PUSHED CONVOY RESISTANCE

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## ABSTRACT

*The resistance of an inland pushed convoy represents an important problem related to establish the powering of the inland navigation system in given condition. The present article describes the results obtained using an in house computer code developed in order to determine the resistance of a inland pushed convoy, based on a mathematical model proposed by Fominski. The computer code may be used in order to estimate the convoy resistance performance with and without the influence of the shallow water condition.*

**Keywords:** inland pushed convoy, resistance performance, numerical analysis

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# THE DYNAMIC RESPONSE OF TWO DIFFERENT TYPES OF SHIPS IN IRREGULAR WAVES BASED ON NUMERICAL SEAKEEPING ANALYSIS

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## ABSTRACT

*The present work describes a seakeeping analysis of two ships, with a total of 149.5 m and 133.35 m length, respectively. The study includes the comparative seakeeping analysis of a container ship and an oil tanker having in common only the same displacement. The seakeeping analysis calculation coupled heave- pitch and uncoupled roll motion, in irregular waves, heading angle 0 ÷ 360 deg., for ITTC, ISSC, JONSWAP and Pierson-Moskowitz reference wave power density spectrum. The numerical seakeeping analysis is carried on with DYN_OSC program code based on linear seakeeping method and statistical short term prediction response method. The objective of the present work is to analyse the ship speed and heading angle influence on maximum RMS heave, pitch, roll motion and acceleration amplitudes. Taking into account the specific limits of the seakeeping criteria, the dynamic response statistical polar diagrams are obtained, on each motion degree and cumulative, pointing out the influence of the ship speed and heading angle for seakeeping assessment.*

**Keywords:** seakeeping analysis, specific limits of seakeeping criteria, irregular waves

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# COMPARATIVE SHORT-TERM SEAKEEPING ANALYSES FOR SPECIFIC WAVES SPECTRA

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## ABSTRACT

*This paper focuses on the numerical study of short-term seakeeping response of a test ship, considering specific waves spectra from literature references. Based on a 2D linear strip theory, the frequency domain response transfer functions at heave, pitch and roll motions are obtained. Four standard wave power density spectra are used: ITTC, ISSC, Pierson-Moskowitz and JONSWAP. The numerical analysis is carried on with the eigen programs package codes DYN. This study is developed into a BVR project, Activity I.1, for a prismatic barge test ship, with 97 m length and L/B ratio 2.94. The seakeeping criteria, for navigation limits, are selected so that the barge main deck remain dry during the operations in rough sea, at zero speed condition. The numerical results lead to a comparative analysis of the dynamic response for the selected wave spectra, with specific wave energy description.*

**Keywords:** statistical short-term analysis, numerical seakeeping analysis, dynamic response.

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# AXIAL WAKE TESTS IN A SMALL TOWING TANK WITH KCS MODEL

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## ABSTRACT

*The accuracy of model experimental tests is a complex problem, influenced by the modelling scale which imposes the dimensions of the experimental model. The Towing Tank of the Faculty of Naval Architecture at the Dunarea de Jos University of Galati has a small length, of about 45m. In the present research a comparative analysis is made for the axial wake experimental results that were obtained for a model with 3.502 m in length, of KCS container ship, in the Towing Tank of the Dunarea de Jos University of Galati and the results that were determined in the large towing tank of Tokyo Ship Research Institute, for a 7.279 m KCS model. The comparison confirms the possibility to obtain acceptable results for the axial wake measurement in a small towing tank, for similar type of ships.*

**Keywords:** axial wake, model experimental test, small towing tank

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# STRENGTH ASSESSMENT OF A LARGE BULKCARRIER, BASED ON 3D-FEM THREE CARGO-HOLDS MODEL, UNDER HEAD QUASI-STATIC WAVES

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## ABSTRACT

*The purpose of this paper is to study the global-local ship strength assessment for a double sided large bulk carrier, with the length between perpendiculars of 279 m, based on yielding stress criteria according to CSR-BC and IACS Rules. The structural criteria are taken into consideration for the 3D-FEM model extended on three cargo-holds, for two main loading cases: full cargo and ballast. As external loads, the head equivalent quasi-static waves are considered. The hull structure scantling is according to the CSR-BC and IACS Rules, using GL Poseidon ND program and the finite element 3D-FEM model is developed by Femap NX Nastran software. The numerical results highlight the structural details having significant hot-spot stress and the recommended actions in order to improve the structure.*

**Keywords:** three cargo-holds model, quasi-static head wave, large bulk-carrier strength.

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# DESIGN WAVE PRINCIPLE AND HYDRODYNAMIC INDUCED LOADS FOR A PIPE LAYER OPERATING IN SPECIFIC AREAS

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## ABSTRACT

*One of the main characteristics of offshore floating structures is the lack of systematic results to be used as input data for design purposes. The present study is foccused on the evaluation of the hydrodynamic induced forces and moments due to the behaviour of a floating barge on a certain location. The aim of the present paper is to underline the importance of the evaluation of the environmental forces due to waves using the design wave principle which depends on the area of operation. On the other hand, it is also important to emphasize the influences of the loading cases which clearly differ from the classical ones, specific to merchant ships.*

**Keywords:** offshore engineering, pipe layer, hydrodynamics

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# THE MANIFOLD FLOW THEORY APPLIED TO SHIP SYSTEM

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## ABSTRACT

*Manifold flow theory has many applications. This paper proposes an application of a ship fire fight sprinkler system. The input data are discharge of the main and diameters of main and branches (ports). The calculation stats from the port situated at downstream end of main considering pressure that assures functioning of sprinklers. Step by step, the discharge in every branch (port), energy line and hydraulic grade line are calculated.*

**Keywords:** manifold, branch, discharge, elevation, energy line, hydraulic grade line.

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# PRACTICAL EVALUATION OF THE HIGH-SPEED CATAMARAN RESISTANCE WITH HARD-CHINE FORMS

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## ABSTRACT

*Although the high-speed catamaran forms have been designed for a long-time, the accuracy of the numerical prediction for still water resistance is an important problem. Many authors have performed different methods in order to estimate the resistance of the round bilge or hard-chine catamaran forms. This paper presents the numerical results obtained on the basis of an in house computer code, developed to compute the hard-chine catamaran resistance. The catamaran wave resistance was determined using typical regression coefficients provided in the literature. A practical evaluation of the hard-chine catamarans resistance from the series proposed by Pham was presented. The new computer code may be used in the initial design stage of the hard-chine catamarans, to provide the powering performance.*

**Keywords:** resistance, catamaran, hard-chine, computer code

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# DETERMINATION BY MEASUREMENTS OF PARAMETERS OF TYPE 3212 LAUNCH TUGS

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## ABSTRACT

*The paper presents the results of measurements of acceleration and inclination to launch a tug hold 15,000 dwt type 3212 on the Damen Shipyard Galati. As was the site for the first time in history when such ships were launched by the transverse process of launching breasts for knowing fully release phenomenon of this type of vessel proceeded to determine acceleration and tilt. This knowledge contributes to determinate the forces that can produce overthrow ship or blocking the path to launch.*

***Keywords:*** *ships launching, acceleration measurement, work boat 3212*

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# YACHT DESIGN AND MODELLING

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## ABSTRACT

*Yacht design is an iterative, 'trial and error' procedure where the final result has to satisfy certain beforehand specified requirements. To achieve this, the designer has to start with a number of assumptions and work through the design to see whether , in the end, it meets the requirements. This will most certainly not be the case in the first iteration, so he will have to change some assumptions and, normally repeat the process several times.*

**Keywords:** yacht design, modelling, hull geometry.

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# ANALYSIS OF OIL DISPERSION IN CASE OF ACCIDENTAL MARINE SPILL

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## ABSTRACT

*The methods of combating the oil pollution with substances that control the dispersion in such a manner as to minimize the effects of pollutants on the environment and human health are different. The most important is to choose the correct method to use considering the type of pollutant and the affected zone. Many techniques and equipment used are affected by the environmental conditions of the affected zone (ocean currents, waves, wind intensity). When choosing the equipment or a method of intervention, we must take into account the type and proprieties of the pollutant, and the way these change in time but also we must consider how the pollutant will move in time and space. The effects of oil pollution are felt in a large area because of the dispersion at water surface, a process accentuated by climate elements. Nowadays pollutants,change their physical and chemical proprieties, and this leaves a greater impact on water surface as well as on a large variety of aquatic organisms that are components in complex trophic chains. This paper analyzes the oil dispersion in case of accidental spill using the program Automated Data Inquiry for Oil Spills (ADIOS2).*

**Keywords:** accidental marine spill, Oil pollution analysis, oil dispersion.

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# STATIC ANALYSIS OF CYLINDER LINERS FROM DIESEL ENGINES USING FEM

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## ABSTRACT

*Current compression ignition engines are characterized by an increasing level of demand based on the increase boost pressure and speed, reducing mass and gauges. Because of this, certain organs, such as the cylinder liners because of the intense damage washed cooling water and the inner surface in contact with the piston and combustion gases lead to the removal MAC of cylinder liner wear running outside cause its replacement before eating life, established mainly in relation to inner wear. It is very important to know which is the optimal composition of the material, how different concentrations affect constituents and how the optimal degree of participation in alloys is used in the manufacture of cylinder liners in the internal combustion engines.The mechanical vibrations that occur in the motor mechanism, especially in the cylinder liners, is a principal factor of wear with implications for the functioning of the various components of internal combustion engines used in the motor, rail and marine transport. Therefore, to design engines it is necessary to perform a static analysis for cylinder liners to see what the degree of deformation is, so that displacements and mechanical vibrations will not occur. These values must be correlated with the nodal displacements of the allowed values of the engine construction standards or the naval classification registry. The internal tension state has an important influence on the wear behaviour of cylinder liners. This tension state is generated by the mechanical vibrations which the cylinder liners is subjected to and cavitations bubbles collapse and through its surface . This paper presents an example for the static finite element analysis performed using the FEMAP software for cylinder liners made of two materials most commonly used in their construction and for four thicknesses.*

**Keywords:** finite element analysis, damages, wear, vibration, diesel engine, cylinder liner.

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