1

Metodologia de proiectare a unui angrenaj conic cu dantură eloidă cu aplicații la mecanismul de basculare al unei macara portic de 5 tone

**The projection methodology of an conical gear with eloid teeth and aplications**

**to the tipping mechanism of a 5 tones quay crane**

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**Abstract** The paper propose the use of a calculus program for the conical gears with eloid teeth. The calculus begins with the design data going trough all the steps: choosing the material, establish the proportions, the allowable resistance and the tensions and conducting the checks. The coefficients used in the presented calculus and the materials used for the machine parts manufacturing are both choose from the technical literature.

***Keywords:*** *design methodology, gear, eloid, tipping.*

2

Introducere în secvenţiere şi programare. Programarea flow – shop.

Introduction to sequencing and scheduling. Flow - shop scheduling.

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**Abstract** Typology of production is characterized by the combination of the amount of product produced and released at a time production flow. Knowing these concepts can be distinguished modes of production and we approached the main flow-shop scheduling and the problems involved therein.

***Key words:*** *production, programming, sequencing, flow shop*

3

Tendinţe şi perspective în fabricarea tubulaturilor navale

Trends and Perspectives in Naval Piping Fabrication

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**Abstract** This paper examines trends and prospects in manufacturing principle naval pipes. Flow manufacturing involves manufacture marine piping pipes with pipes and fittings according to the following process: sanding, cutting, assembly, welding, galvanizing, painting, storage, installation and piping to the ship commissioning of piping systems.

Traditional manufacturing technology of hydraulic piping is less profitable to the control for which assemble of these facilities greatly affects the production cycle of the ship. To shorten the time spent installing hydraulic systems are aimed mechanization main manufacturing operations of their assembling hydraulic and numerically controlled machines (robotic machines).

***Keywords*:** *tubing naval technological process, production line, mechanization, automation, virtual system, CAD, CNC, robotics.*

4

**Auditul energetic al unui apartament**

Apartment Energy Audit

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**Abstract:**  In this paper there is presented the algorithm for calculating the energy assessment of an apartment located in a block of flats, with S + P +4 levels, based on the data observations obtained from the analysis of the apartment in respect with heating, hot water and lighting consumption. The procedure of calculation of energy ratings is following the methodology MC001 Parts I-IV, consisting in calculating of corrected thermal resistances for thermal bridges, indoor temperature, heat loss and gains of the apartment, energy consumption for heating, for preparing hot water, and for lighting. The purpose of this calculation is the release of an Energy Performance Certificate that presents the energy efficiency of dwelling on a scale of A to G. The most efficient apartments that should have the lowest energy consumption are in band A. The certificate uses the same scale to define the impact that an apartment should have on the environment. Better-rated homes should have less impact through carbon dioxide (CO2) emissions. The certificate includes recommendations on ways to improve the home’s energy efficiency to save money.

***Keywords:*** *energy efficiency, energy audit, heat, thermal bridges, heat loss.*

5

Virtualizare, simulare şi procesare în proiectarea computerizată

Virtualisation, Simulation and Processing in Computerised Design

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**Abstract** This article aims highlighting the advantages of using 3D models to create virtual reality, of the simulation, processing and virtualization programs used in their modeling.

Using these options, model understanding processed is carried out easily, passing through several phases of creation and use of 3D.

Using specialized software for modeling can be used to create a simulator for teaching purposes. Students can use the comprehensive display of naval systems and equipment present on board the vessel, in the classroom, so the process of teaching becoming interactive and the quality of procedures and technical phenomena upgraded.

The model may also be going into the production, providing facilities to be used in the computers from the industrial field, taking advantage of modern means of design and construction.

***Keywords*:** *3D modeling, CAD, computer design, virtual reality, simulation, computer process production line technology*

6

Materiale și proprietăți necesare pentru construcția unui corp de navă

Materials and required properties for building a ship hull.

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**Abstract** Starting from antiquity to the nineteenth century, wood was the basic material for the ship hull. At the end of the nineteenth century, in England official and obligatory the steel is introduced as a replacement for wood. In the same time the aluminium is used for light craft begining from 1891. Because since the early of twentieth century were missing large amounts of steel, and aluminium was 35 times more expensive than steel, the people had attemted construction of barges and oil tankers from concrete reinforced with steel links, used only by the end of the 2nd World War. In 1942 in USA, were made-up the first GRP material, (fiberglass reinforced plastic or polymers), used for sailboats, this evolution was completed by descovery of the ”sandwich panels” in 1970. In this conditions at beginning of a project for a correct choice of material is good to know the main mechanical properties of them.The most important ones are (modulus of elasticity, density, yield point,and mechanical strength at breaking). After this step to compare with each other to highlight the strong points of each material. Then after a long analysis to try to use the advantages of different types of materials to achieve a synergistic effect in hull construction.

***Keywords:*** *materials, mechanical properties, synergistic efect, ship hull.*

7

**Realizarea planului de forme**

**Implementation of body plane**

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**Abstract** This paper aims is to present the body plane tracing shapes stages as support for the ship geometry chart. Plan forms is the instrument for proper working of the ship's water quality survey. For example, washe made the body plane for a trawler at 1:50 scale. This paper can be used by a novice student, as a guide for the execution of the ship forms, being a good learning tool.

***Keywords:*** *body plane, ship, trawler.*

8

**Modelul matematic al sistemului de cronometrarea a unei supape hidraulice**

**Mathematical model of the hydraulic valve timing system**

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**Abstract** The paper presents a conception and mathematical model of the hydraulic valve timing system. It describes the complex phisical phonomena that accur between system components and the hydraulic liquid. Basing on postulates liquid. The model was simulated in Matlab/Simulink program for different geometrical parameters of the hydraulic systemand electric control parameters in order to obtain required lift and timing of valves in YARIS SI 1.3l engine. The paper presents structure of Simulink model and results of calculation in Simulink. One represented the influence of various parameters and dimensions system on the character of valve lift. The relationship between the diameter of the rod and the liquid significantly affects the valve time-area parameter. The feeding liquid pressure in the system and the re-steering time have the biggest influence on course of valve lift. After preliminary tests the guidelines for the hydraulic valve timing system have been developed. The determined simulation results in Simulink were used to calculate of the device work in the engine computer model created in GT-Power program. The proposed solution was compared with the cam valve timing systems.On the basis of the simulations tests show a big superiority of the hydraulic valve timing system at higher rotational speeds.

***Key words:*** *hydraulic valve timing system; GT-Power program*

9

Creşterea eficienţei energetice a clădirilor prin folosirea diferitelor tipuri de izolaţii

Increasing energy efficiency of buildings by using different types of insulation

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**Abstract** The issue of using of thermal energy covers a wide range of aspects that fit with the concept of sustainable development. The concept of energy efficiency has the meaning of energy performance and is used as such for a long time. Therefore, the increasing of energy efficiency is leading to energy savings. Energy efficiency in a broad sense refers to the ways in which we can get the same benefit (light, heating, motion, etc.) using less energy, being linked to the requirement to reduce the size of the energy bill or the specific energy expenditure.The buildings have the highest potential for saving energy. This paper is presented the results of calculations of the heat demand for heating using several types of insulation materials. The results will be used published in order to to facilitate decision-making on the process of renovation of public and private buildings for improving the energy performance of their elements.

***Keywords:*** *ennergy efficency, insulation materials, sustainable development.*

**10**

Analiza şi verificarea liniilor de arbori cu element finit

**Analysis and verification of the shafts with finite element**

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**Abstract** The paper presents some aspects regarding the use of modern computer techniques in designing, choosing and checking motor-propeller system to 65,000 dwt ore carrier ship.

In the general section shafts and shafts specific vessel ship, then calculate drag the ship with Andersen and Holtrop methods.

Then is choosing the propulsion engine with Autoship-Autopower software by calculating the required propulsion power, and shafts shall be sized according to the rules of Lloyd's Register.

 After sizing, they examine the resistance of trees using mathematical formulas and Ansys finite element program.

 Finally it highlights the advantage of using finite element analysis.

***Keywords*:** *axial line propeller shaft, propulsion machinery, computing, finite element analysis*

11

**Studiul posibilităţilor de reducere a poluării mediului marin pentru instalaţiile de forţă cu turbine cu gaze**

**Study of the possibility of reducing marine pollution for the power-plants with gas turbines**

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**Abstract** In the context of ozone reduction, reduction of pollution of the marine environment is a necessity, with this point of view being in accord the machines and naval installations factories. In this paper we propose an analysis of several ways to reduce exhaust emissions used and recommended by the manufacturers of gas turbine in accordance with the provisions of international law.

***Keywords*:** *turbine, gas, pollution, combustion chamber, hydrocarbons.*

**12**

Un montaj virtual al stimulării sistemului pentru o structură de oţel pe baza datelor de măsurare 3-D

A virtual erection simulation system for a steel structure based on 3-D measurement data

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**Abstract** The virtual erection simulation system was explained for a steel structure including ship and ocean plant blocks. The simulation system predicted the erection state to optimize any gap or overlap of blocks based on 3-D measurement data. The blocks were modified (cut) on the basis of the simulation result on the ground before erecting them by crane. The re-cutting process was not required and the blocks were erected into a mother ship speedily. Therefore, the erection time is reduced, increasing the dock turnover.

***Keywords:*** *block erection; dimensional accuracy control of ship block; production planning and scheduling; ship construction; virtual simulation system; steel structure.*

13

Calculul asistat de calculator a unui angrenaj conic cu dantură curbă

Computer assisted calculation of a conical gear with bend teeth

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**Abstract.** The port crane is composed of a tower with an arm that rotates on a support, mounted on a platform wich is placed on a thrust bearing. Rotation is obtained using a circular pinion with a crown diameter of 2.5 meters. I have designed a program for the calculation of a conical gear with bend teeth that supports the designer, reducing working time.

***Keywords:*** *crane, bevel gearing, curved teeth.*

14

Studiul şi proiectarea unei instalaţii electrohidraulice de guvernare cu comandă proporţională. Modelarea matematică a unui sistem proporţional electrohidraulic

**Study and design of electrohydraulic systems of government with proportional control. Mathematical modeling of an electrohydraulic proportional system**

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**Abstract:** The paper deals with the study and design of electro-hydraulic systems of government with proportional control and modeling of an electro-hydraulic proportional system and is divided into eight chapters and several sections. The first chapter presents the main hull dimensions and their relationships. In chapter two are presented the main dimensions of the ship and several reference and installations in its endowment. The role of steering, the existing classification and types are presented in chapter three. Generality of the registry rules imposed to installed steering system on ships (Lloyd's Register), are presented in chapter four. Calculation time of the rudder stock and the choice of rudder’s machine is made in chapter five. Chapter six refers to the operation, from the point of view of the user, presenting issues such as instructions for commissioning, testing, operation and maintenance of hydraulic systems. The calculation and analysis of electro-hydraulic actuators mounted on power circuits are found in chapter seven. The special theme is found in chapter eight, which makes the study of efficiency in hydraulic systems. The paper ends with some conclusions drawn from the study conducted.

***Keywords:*** *governance, rudder machine, rudder stock, hydraulic proportional ditributor, hydraulic system.*

15

Metode şi tehnici utilizate în programarea producţiei

**Methods and techniques used in production scheduling**

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**Abstract** The purpose of this paper is to present the taboo research methods that have proven to be remarkably effective, leading to alternative techniques in a range of areas, ranging from full and nonlinear programming and programming and boundary sequences and production scheduling problems. This success was highlighted particularly in applications for scheduling production.

***Keywords:*** *- tabu search – programing – problems – delays - penalties – costs -*

16

Bilantul termic al unui cazan folosit pentru alimentarea cu apa calda si caldura a unui camin studentesc

**Heat balance of a boiler used to supply hot water and heat for a student hostel**

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**Abstract** In this paper will be presented the methods and the results of exergy and energy balance of a boiler used to supply hot water and heat for a student hostel, in order to improve energy efficiency. The heat ballance is based on measurements and analyzes of the energy consumption. The heat balance is an approach used to understand the efficiency of energy conversion. Mathematically, an energy balance is a relation of the conservation of energy, and a systematic accounting for energy flows and transformations in a system. The basis for the energy balance is the first law of thermodynamics that affirms that the change in energy for a system equals the heat transferred into the system minus the work done by the system plus the net energy input associated with mass flows. The exergy efficiency computes the efficiency of the boiler taking the second law of thermodynamics into account. A heat balance is expressed in the form of an equation, with one side giving the sum of the amounts of input heat and the other side giving the amounts of heat used or lost. Heat balances is also expressed in the form of a table or a diagram.

***Keywords:*** *heat balance, energy, exergy, efficiency*

17

Tenici moderne de separare a hidrocarburilor

**Modern techniques for hydrocarbons separation**

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**Abstract** For separation of accumulated water in the bilge tank, the ship is fit up with a separation gear.

The gear is double staged (separation + filtering) and is endowed with a measuring system of hydrocarbons percent with alarm and stopping equipment with for the electric pump at the rise up of 15 ppm percent in effluent. From the separator the water is cranked overboard and the residues in the separate on bilge tank. If the hydrocarbons percent from cranked water overpass 155 ppm, the discharging of water is displaced in bilge water.

***Keywords*:** *hydrocarbon residues, filtration, separation, ppm bilge separator.*

**18**

Stabilirea solutiei constructive a unui schimbator de caldura cu acumulare pentru acoperirea necesarului de apa calda menajera pentru un camin studentesc.Paper title

Establishing a constructive solution heat exchanger – heat accumulation boiler - to cover the hot water for a student hostel

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**Abstract** The heat capacity of the heat accumulatio boiler depends on the thermal capacity, on the consumption of heat energy for water heating, and on the duration as well. In this paper will be presented the constructive solution for a heat exchanger having the aim to decrease the heat losses through the accumulator surface.

***Keywords:*** *heat, heat exchanger*

**19**

Influenţa debarcării greutăţilor mici asupra flotabilităţii şi stabilităţii unei nave de aprovizionare a platformelor de foraj marin

The influence of small weights disembarkation concerning the buoyancy and stability of an Offshore Platform Supply Vessel

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**Abstract** The human tendency is to evolve and in the last century this evolution has had a remarkable sparkle in all areas. In the navigation field increasing the safety of people and goods on board was and still is a major problem. Due to this purpose studies are made continuous to improve ship qualities.

Weights embarkation/disembarkation operations are encountered frequently in this area. These operations are accompanied by complex physical phenomena whose theoretical aspects are not yet fully studied. Embarking/disembarking weights are classified into two categories: small and large.

This paper aims to study three cases of small weights disembarkation and their influence on the buoyancy and stability of a platform supply vessel. It will have in view the change of mean draft, the longitudinal and transversal position change, the longitudinal and transversal stability change.

***Keywords:*** *weights, disembarkation, buoyancy, stability.*

20

Proiectarea unui schimbător de căldură tip apă-apă, pentru purja generatorului de abur dintr-o centrală termică

Designing of a shell-and-tube heat exchanger for steam generator purge line from a thermal power plant

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**Abstract** This paper aims to design a heat exchanger for steam generator purge line. The horizontal tubular heat exchanger is water to water type, with floating head without head space vapor cell. This heat exchanger is for cooling the steam generator purge line. Through heat exchanger the circulation of thermal agents is countercurrent with one-pass shell. Based on structural characteristics, functional and physical properties of materials, thermal calculation will be made. This will facilitate to determine the surface for heat exchange or length of pipe needed for cooling of generator purge line and achieving of functional parameters. The calculation will be performed for both nominal and minimum flow rate of two thermal agents.

***Keywords:*** *heat exchanger, thermal agents, designing, steam generator, power plant*

21

Studiul complex de inundare a compartimentelor de marfă pentru o navă tanc chimic de 37000 TDW.

Cargo compartments complex flooding study for a 37000 DWT chemical tanker.

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**Abstract** Maritime navigation safety is currently one of the most debated policies at global level. Ship vitality is an important issue regarding the safety of navigation and therefore attempting to generate more efficient solutions for its provision in the context of the transformations that are in constant change undergone by maritime traffic. This paper presents information on the chemical tanker vessel stability and unsinkability  where a failure would have the outcome of the flooding of the cargo compartment. The results provide details on how the ship reacts when flooding a compartment or group of compartments. The work includes the study of the consequences of flooding category II type compartment or group of compartments. This study was conducted to observe the changes of draft, heel and trim arising from the flooding of one or more cargo tanks, data obtained can be further used for arranging cargo compartment from the design stage to avoid as much as possible endangering the safety of the vessel and the environment.

***Keywords:*** *ship vitality, stability, unsinkiability, flooding study, cargo compartments, chemical tanker.*

22

Proiectarea tehnologica a unui schimbator de caldura in placi. Bilantul termic de omologare

**Technological design of a plate heat exchanger. Heat balance for approval**

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**Abstract** Power supply to consumers at a high level of quality and safety, is a rational and efficient management of energy implies, on the one hand, the knowledge of the technical and economic performance of all components of the entire energy chain, from producer to consumer, and on the other hand, to ensure optimal conditions, in terms of energy for their operation. The primary means for achieving these objectives is the energy balance, which allows both the quantitative analysis and qualitative ones over the use of fuel and energy in all its forms within the limits of a system. Energy balance sheet constitutes an effective means of establishing the technical and organizational measures designed to lead to improved heat exchange of energy entered into a system, to reduce energy consumption and reducing maintenance costs. In this paper is presented the methodology for technological design of a plate heat exchanger and for heat balance for approval.

***Keywords*:** heat exchanger, efficiency,heat balance

23

Performanţe şi tendinţe ale sistemelor de propulsie Pod şi Azipod

Performance and Trends of Pod’s and Azipod Propulsion

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**Abstract** The paper presents aspects and trends in ship propulsion. Is about two propulsion systems: pod’s and azimuth thrusters. Pod – propulsion is an industry standard today in passenger cruise and has been applied also for product tankers, icebreakers and offshore vessels. An azimuth thruster is a configuration of ship propellers placed in pods that can be rotated in any horizontal direction, making a rudder unnecessary. These give ships better maneuverability than a fixed propeller and rudder system. They have a better use of ship space, and lower maintenance costs. Ships with azimuth thrusters do not need tugboats to dock, though they still require tugs to maneuver in difficult places. Big propulsion motors are moved from the tank top outside the ship. An azimuth thruster replaces a conventional propulsion and rudder steering system, which perform both the propulsion and steering function.

***Keywords*:** *naval propeller, axial line, azimuth system, Pod's, Azipod, Z-Drive.*

24

Calculul și proiectarea unui limitator de sarcină

**Calculation and design of a load limiter**

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**Abstract** In this article it aimed to calculate and design a load limiting device for a crane of 25 t being adapted to the characteristics of the crane.The device exists and is mounted on a crane operating at S.C.ALTEEA S.A. and it is located in the engine room.

***Keywords:*** *25t crane, jib crane, lifting mechanism, load limiter.*

25

Poluarea mediului marin

**Marine pollution**

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**Abstract** In 1973, IMO adopted the International Convention for the Prevention of Pollution from Ships, now known universally as MARPOL. Accidental discharge of oil into the marine environment has a significant economic impact on activities performed on both sides and you're mining resources for the sea. The presence of hydrocarbons on the surface of marine aper causes physical consequences, biologically and socially. This paper reviews the main sources of marine pollution from ships and prevention solutions

***Keywords:*** *ship, marine pollution, MARPOL.*

26

Planificarea unui proiect cu resurse limitate

Project scheduling with limited resources

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**Abstract** In general, any action aimed at achieving a goal should be planned and as it is larger and more complicated the more necessary it becomes to develop a plan. This is true for projects previously defined complex actions composed of a number of generally great activities that are interrelated. Project management in absence of a risk compromising his achievement even in cases deemed most "simple".

***Keywords:*** *project,management,limited resources,plan,Gantt.*

27

**Modelarea şi simularea sistemelor utilizând reţele neuronale**

Sistem’s design and simulation using neuronal networks

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**Abstract** An artificial network consists of a pool of smple processing units which comunicate by sending signals to each other over a large number of weighted conections.Each unit performs a relatively simple job:receive imput from neighbours or external sources and use this to compute an output signal which is propagated to other units.Apart from this processing,a second task is the adjustment of the wights.The system is inherently parallel in the sense that many units can carry out their computations at the same time.

***Key word****s: processing units; neural network*

28

Instalaţia de încărcare-descărcare a mărfurilor

**Facility for loading and unloading of goods**

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**Abstract** The paper presents the naval installations loading and unloading of goods. The paper present all major construction types with they components, functional characteristics, operation and maintenance.

***Keywords:*** *instalation, loading, unloading functional characteristics, maintenance.*

29

Rețelele Neuronale Artificiale

Artificial Neural Networks

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**Abstract** In [machine learning](http://en.wikipedia.org/wiki/Machine_learning) and [computational neuroscience](http://en.wikipedia.org/wiki/Computational_neuroscience), an artificial neural network, often just named a neural network, is a [mathematical model](http://en.wikipedia.org/wiki/Mathematical_model) inspired by [biological neural networks](http://en.wikipedia.org/wiki/Biological_neural_network). A neural network consists of an interconnected group of [artificial neurons](http://en.wikipedia.org/wiki/Artificial_neuron), and it processes information using a [connectionist](http://en.wikipedia.org/wiki/Connectionism) approach to [computation](http://en.wikipedia.org/wiki/Computation). In most cases a neural network is an [adaptive system](http://en.wikipedia.org/wiki/Adaptive_system) changing its structure during a learning phase. Neural networks are used for modeling complex relationships between inputs and outputs or to [find patterns](http://en.wikipedia.org/wiki/Pattern_recognition) in data.

***Keywords:*** *artificial neurons, neural network, mathematical model, inputs, outputs.*

30

Tehnici de ancorare specifice situaţiilor complexe de exploatare

**Techniques for anchoring specific complex operation case**

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**Abstract** Anchor installation is part of the ship’s facilities is operational during standing.

Regardless of operating conditions, the system must ensure the safety of the ship, its cargo and crew transported. The diversity of operation requires specific methods of anchoring according to hydro-meteorological conditions and the nature of the anchor place. Based on these conditions were imposed operating techniques and methodologies dedicated anchor explained in this paper.

Knowing the rules and methods of anchorage for various operating conditions on the one hand ensure safety of the vessel, cargo and crew transported and on the other vessel traffic safety. For these reasons, this paper provides a guide to good practice for operation anchorage system operating in various useful both for ship officers, and especially for shipbuilders.

***Keywords*:** *anchor, anchoret, anchor installation, steering, spring, moorage, ship safety*.

31

Studiul privind asigurarea calităţii în fabricaţia prin sudare a produsului eşapament

Study on quality assurance in welded construction of exhaust systems

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**Abstract** Quality is first and foremost about meeting the **needs and expectations** of customers.

**Quality management** is concerned with controlling activities with the aim of ensuring that products and services are fit for their purpose and meet the specifications.

Welding is the main focus of steel fabrication.  The formed and machined parts will be assembled and tack welded into place then re-checked for accuracy.

Mechanization of production promotes rational and economical use of raw and processed materials and power, reduction of prime cost, and improvement of product quality.

***Keywords*:** mechanization, production, MAG process, welding equipment.

32

**Management energetic in contextul actual**

**Energy Management in the current context**

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**Abstract** Romania supports the GHG emissions limitation and reduction objective in the form of commitment of the EU and the Member States to reduce GHG emissions by 20% until 2020 compared to 1990. In this context, the Romanian society and administration is seeking solutions given that the natural capital is more or less foreseeable of damage that can become ireversible. In this paper there are presented the strategic objectives on short, medium and long term, viewed from the perspective of current and modern principles, having the aim to use renewable energy, to reduce emission of CO2, and to improve energy efficiency. The energy management, applied to a energy consumer, targets ensuring efficient energy consumption, in idea of maximize profit by minimizing energy costs, thus increasing the profitability. Sustainable development aims sustainable growth quality of life and closer to the standard of civilization properly. Combining sustainable development strategy with modern principles of energy management, Romania can fulfill commitment as state of the European Union to increase energy efficiency by the year 2020 with 20%, and the share of renewable sources of raw materials to be 20%.

***Keywords:*** *energy management, energy efficieny, sustainable developmetn, GHG emissions.*

33

Propulsia electrică, o alternativă la propulsia clasică

**The electrical propulsion, an alternative to classical propulsion**

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**Abstract** This article presents the efficiency and advantages of electric propulsion systems developed in today's marine tehnology. The [electrical propulsion](http://marineinsight.com/tech/electrical-propulsion-system-in-ships/?utm_source=rss&utm_medium=rss&utm_campaign=electrical-propulsion-system-in-ships) system has got a lot of advantages over the conventional engine driven propulsion system, which is obviously increasing the demand for [electrical propulsion](http://marineinsight.com/tech/electrical-propulsion-system-in-ships/?utm_source=rss&utm_medium=rss&utm_campaign=electrical-propulsion-system-in-ships) for merchant vessels. With advancement in technology and research, [electrical propulsion](http://marineinsight.com/tech/electrical-propulsion-system-in-ships/?utm_source=rss&utm_medium=rss&utm_campaign=electrical-propulsion-system-in-ships) system is not limited to small [boats](http://marineinsight.com/news/headline/best-speed-boats-in-the-market-today/) and small vessels anymore. Precise and smooth speed control means less equipment stress resulting in lower maintenance costs. Putting advantages and disadvantages side by side, we can confidently say that the electric propulsion is a less-polutting alternative and slowly it will replace conventional propulsion systems

***Keywords*:** *naval propeller, axial line, azimuth system, Pod's, Azipod, Z-Drive.*