1. General Information
2. Structure of University
3. Education
4. International Cooperation
5. General Plan of Development
6. Science Researches
1. General Information
European integration is a strategy direction for Ukraine as maritime state. Ukraine has an access to the Black Sea and the Sea of Azov and its own civil and naval fleet, as shipbuilding and shipyard complexes. Admitting a Ukrainian Maritime doctrine determined our perspective for the next quarter of a century in direction of resources usage of the Black Sea and the Sea of Azov, as the other areas of the oceans, effective and safe sea economic activities and defending state maritime boundary. On 27 of June 2014 on the EU summit in the city of Brussels Ukraine signed economic and sectoral parts of agreement on association between EU and Ukraine. NUOS is one of the biggest and best universities on the South of Ukraine, so it is a strong and perspective center of shipbuilding sciences, which are now being adopted to European quality requirements. NUOS has a tradition of educating international students. Nowadays we are educating 1015 students from different parts of the World. NUOS science achievements are known worldwide, so it was certified by the «Bureau Veritas Certification», signed in the International registry of Europe Business Assembly and obtained European quality award in 2011 by the Great Britain and Northern Ireland office. We are glad to have a European direction in our development and will be happy to corporate with our European colleagues.

Rector of NUOS, Professor Serhiy Ryzhkov
The Admiral Makarov National University of Shipbuilding (NUS) was founded in 1920.

More than 85,000 specialists have graduated from the University and now work for the national and foreign shipbuilding industries.
By the decision of the Verkhovna Rada Committee on Transport Admiral Makarov National University of Shipbuilding (NUS) was chosen as the leader in solution of scientific and educational problems for marine industry in Ukraine.

NUOS has received Merit for services to the people of Ukraine from Head of Verkhovna Rada of Ukraine.
NUOS signed in international registry of Europe Business Assembly (Oxford, Great Britain) in 2013 and got a title “Best European enterprise”, in sphere of education with appropriate certificate and license for 5 years.


«Bureau Veritas Certification» conducted a certification audit of quality management in NUOS and verified the accordance to ISO 9001:2008 and Ukrainian state standard ISO 9001:2009
GENERAL INFORMATION

Strategical Partners

People’s Republic of China
- Jiangsu University of Science and Technology
- Zhejiang International Maritime College
- Harbin Research Institute of Marine Boilers and Turbines
- Jilin University
- Hainan Tropical Ocean University
- Sanya University
- Yangcheng University

European Union
- Damen Shipyards Group, Netherlands
- Riga’s Shipyard, Latvia
- Hogskolen Stord/Hagesund, Norway
- Gdanska Polytechnika, Poland
- Lodz Polytechnika, Poland

Georgia
- Batumi Educational Navigation University

Japan
- Oshima Shipbuilding Co., Ltd.

Ukraine
- Academy of Shipbuilding Sciences of Ukraine
- The International Academy of Marine Science, Technology and Innovation
- Marine Engineering Bureau
- Ship Design Ukraine
- Ukrainian shipyards and marine ports
2. Structure of University
STRUCTURE OF UNIVERSITY

INSTITUTES AND FACULTIES
• The Shipbuilding Institute
• The Institute of Computer, Engineering and Technological Sciences
• The Mechanical Engineering Institute
• The Institute of Automatic Control and Electrical Engineering
• The Institute of Humanities
• The Institute of Postgraduate Studies
• The Preparatory Faculty
• Maritime Economics Faculty
• Marine Infrastructure Faculty
• The Faculty of Ecological and Technogenic Safety
• The Institute of External and Distant Learning

SUBSIDIARIES, COLLEGES, EDUCATIONAL AND SCIENTIFIC CENTERS
• College of Shipbuilders
• Pervomaisk College
• Kherson branch of the NUS
• Pervomaisk Polytechnic Institute
• The Centre of Preuniversity Training
• Educational and Consulting Centers, including foreign ones

EDUCATIONAL AND SCIENTIFIC DEPARTMENTS, CENTERS OF COOPERATION AND OTHER DEPARTMENTS
• Educational Department
• Scientific and Research Department
• Educational and Scientific Center of International Cooperation
• Educational and Scientific Center of European Integration

• Science and Research Library
• Academy of Midshipmen
• The University Publishing House
Admiral Makarov National University of Shipbuilding is a leading higher educational institution in Ukraine training specialist for shipbuilding and related branches of industry and national economy.
STRUCTURE OF UNIVERSITY

- Institute of Computer, Engineering and Technological Sciences
- Humanitarian Institute
- Economic of Ocean Faculty
- Faculty of Environmental and Technical Safety
INSTITUTE OF AUTOMATIC CONTROL AND ELECTRICAL ENGINEERING

Studying at the Institute of Automatic Control and Electrical Engineering, students learn basic engineering subjects and such special subjects as Electrical Devices and Systems, Electronic and Computer Devices, Ship Electrical Equipment and Control Systems Development Methods.
The institute trains experts for the fields of design, production, ship power equipment operation, and other related industries.

Faculty trains experts for Sea Ports operation, logistics experts.
NUOS YACHT “ICARUS” MADE WORLD WIDE TRIP TWICE.

The first Yacht in Ukraine which made world wide trip
The Capitan and the Crew all were the stuff of the University
NUOS RESEARCH VESSEL DELTA IS USED FOR SCIENTIFIC RESEARCHES AND EDUCATIONAL INTERNSHIP FOR STUDENTS

Researches of Underwater vehicles developed by scientists of NUOS are made using University Research Vessel Delta

Delta also is used in educational purposes for study by teachers of Shipbuilding institute and Institute of Automatic control and electrical engineering
3. Education
THE SHIPBUILDING INSTITUTE

- The Ship Structural Mechanics Department
- The Fluid Mechanics Department
- The Hull Construction Department
- The Maritime Technologies Department
- The Ship Theory and Design
- The Shipbuilding Technology Department

THE INSTITUTE OF COMPUTER, ENGINEERING AND TECHNOLOGICAL SCIENCES

THE TECHNOLOGICAL FACULTY

- The Welding Engineering Department
- The Department of Design and Production of Products made of Composite Materials
- The Materials Science and Technology Department

THE FACULTY OF COMPUTER SCIENCE

- The Department of Software for Automation Systems
- The Project Management Department
- The Information Management Systems and Technologies
**THE MECHANICAL ENGINEERING INSTITUTE**

**THE POWER ENGINEERING FACULTY**
- The Ship Structural Mechanics Department
- The Conditioning and Refrigerating Department
- The Marine and Stationary Power Plants Department
- The Technical Thermal Physics and Steam-Generating Units Department
- The Turbine Department

**THE MECHANICS FACULTY**
- The Internal Combustion Engines Department
- The Marine Mechanical Engineering Technology Department
- The Mechanics and Mechanical Engineering Department

**THE INSTITUTE OF AUTOMATIC CONTROL AND ELECTRICAL ENGINEERING**
- The Computer-aided Control Systems Department
- The Ship Electrical Equipment and Information Security Department
- The Electrical Power Systems Department
- The Automatic Control Engineering Department
- The Theoretical Electrical Engineering and Electronic Systems Department
- The Impulse Processes and Technologies Department
- The Marine Instrument Engineering Department
THE INSTITUTE OF HUMANITIES

- The Philosophy and Cultural Studies Department
- The Department of Theory and History of the State and Law
- The Law Department
- The Applied Linguistics Department
- The Department of Social Studies and Humanities
- The Modern Languages Department
- The Design Department
- The Olympic and Professional Sports Theory Department
- The Physical Training and Sport Department

THE INSTITUTE OF EXTRAMURAL AND DISTANT LEARNING

THE FACULTY OF MOBILE TECHNOLOGIES
- The Theoretical Mechanics Department
- The Engineering Graphics Department
- The Life Safety and Civil Defense Department

THE FACULTY OF NATURAL SCIENCES
- The Higher Mathematics Department
- The Physics Department
- The Chemistry Department
4. International Cooperation
EDUCATIONAL COOPERATION

- More than 1000 students from 22 countries study at NUOS
- University is the leader in Ukraine for working double-diplomas programs

RECRUITMENT COOPERATION

- Graduates from NUOS works for international shipbuilding companies in China, Japan, Latvia, Netherlands, United Arab Emirates, Qatar and other
AMOUNT OF FOREIGN STUDENTS FROM 2008 TO 2015 YEARS

- Professors and teachers from NUOS are invited to make lectures in foreign universities of Europe and China.
- University is the leader in Ukraine for working double-credentials programs.
INTERNATIONAL COOPERATION

Graduates of double-diplomas program with Rectors of Universities, People’s Republic of China, 2016

Foreign students of NUOS, Graduation tradition, Ukraine, Mykolayiv, 2014
Head of Center of European Integration of NUOS with Graduate of University at OSHIMA Shipbuilding Co, Oshima Island, Nagasaki Pref, Japan, 2016

NUOS students on Internship at Riga’s Shipyards, Riga, Latvia, 2016
Opening ceremony of Joint Chinese-Ukrainian Scientific Research Center, Rector of NUOS, People’s Republic of China, 2016

Negotiation with Chinese Enterprises for Scientific Researches, People’s Republic of China, 2016
5. General Plan of Development
1. Electronic Library
2. Towing tanks
3. Hostel for students and post-graduates
4. Teachers and scientists apartments
5. Students Center of Recreation

For making general plan of development NUOS has received 10 hectares of land from City Council of Mykolayiv
GENERAL PLAN OF DEVELOPMENT

Interuniversity Electronical Library, the biggest in the South of Ukraine

Modern hostels for Ukrainian and foreign students and PhD students

Apartments for teachers and scientist of University
TOWING TANKS FACILITY
Investigated objects: vessel: hydroplane, hydrofoils, hovercraft, WIG vessels supplying drilling platforms, floating drilling platforms, submarines, torpedoes, underwater vehicles, aquatic, underwater work, ship Stern complexes propellers of all types.
The speed - up to 60...200 knots.

UNIVERSAL TOWING TANK
Length - 115 m;
width - 10 m;
depth - 5 m.
Towing system of self-propelled trolley speed - 15 m / s;
wave - 11 points,
length - 10m.
GENERAL PLAN OF DEVELOPMENT

Research Facilities

High Pressure Chamber

Aerodynamics Tube
5. Science Researches
2 RESEARCH INSTITUTES:
• Institute of Problems of Ecology and Power Saving
• Institute of Submersibles

3 RESEARCH AND ENGINEERING CENTERS:
• Applied Research in Power Engineering
• Prospective energy technologies
• Metrological Attestation of Polymetric Systems

AT THE UNIVERSITY DEPARTMENTS THERE ARE:
• 42 scientific contract teams
• 58 Doctors of science
• 262 Candidates of Science

Well-known scientists, doctors, professors, academicians and corresponding members and members of the Royal Institute of Naval Architects and Institute of Marine Engineers, Science and Technologies of Great Britain. Our scientists constantly become prize winners of annual national exhibition ‘The best goods of the year’.

7 INDUSTRIAL LABORATORIES:
• Intensification of Heat Exchange
• Soldering and Welding at Pressure in Vacuum
• Conditioning and Refrigerating
• Strength and Vibration
• Marine Instruments
• Marine Mechanical Engineering Technologies
• Project Automation

AT THE UNIVERSITY DEPARTMENTS THERE ARE:
• 58 Doctors of science
• 262 Candidates of Science
The biggest scientific research of University which received the Highest Governmental Award in sphere of Science and Technologies.

The Work includes:

- Theoretical basis of ship design
- Regulations on vessels construction
- Theory of vessel durability was developed
- Methodology on solving optimization tasks of ship design
- Ecological problems and gas purification methods
- Uninhabited underwater vehicles we developed

Scientific results of this research were published in 23 books, over 600 articles. The novelty of technical solutions protected by over 50 patents, including USA, Germany, France. On the subject defended 9 doctoral and 27 PhD theses.
The methodology offered contains an original approach to solution of the task of ship design. First of all, it concerns formulation of the task of vessels synthesis in the part of using the stochastic statement which corresponds to the proper target function and constraint system.

Assessment of the ship efficiency is held using the models of functioning and considering the loss on increase of reliability and safety, liquidation of emergency situations consequences and the risks of the ship operation.

Calculation of the level of the ship reliability is performed with using the theory of technical durability. This theory registers all the possible technical rejections which occur during operation and solves the tasks of local and non-local ship durability in the process of its motion and manoeuvring under medium or boundary severe weather conditions. The theory mentioned is based on using the set of random functions and operates duration probability criteria.
Implementation of the developed program complexes in terms of reorganization of the educational process of the NUS, in the Research Project Center of Shipbuilding, "Chornomorsudnoproekt", the Ukrainian shipbuilding company and other organizations of Ukraine, in the range of SB and organizations of Russia and Vietnam.

Use of the results of the developed theories during development of requirements to ship navigable qualities in the Register of Navigation of Ukraine, Russian Register of Russia, Navy organizations of Russia.
Theory of non-local vessel durability during constantly affecting random perturbation was developed.
EXPERIMENTAL BASE OF SCIENTIFIC RESEARCH WAS UPGRADED
A new approach to purification of waste of shipbuilding enterprises and ships into atmosphere, hydrosphere, lithosphere due to energy potential of waste itself. Two doctoral and five candidate dissertations have been defended, 30 patents have been obtained.

HIGH LEVEL OF ENVIRONMENTAL SAFETY WAS PROVIDED DURING SHIPS CONSTRUCTION AND OPERATION
SCIENCE RESEARCHES

Achievements

Scheme of complex intensification of work processes in the purification stages (a, b) and universal gas-cleaning device (c)

HIGH LEVEL OF ENVIRONMENTAL SAFETY WAS PROVIDED DURING SHIPS CONSTRUCTION AND OPERATION
SEPARATOR 3D MODEL RESEARCH

SEPARATION THEORETICAL BASIS

1 - start purification level
- coarsely dispersed particles sedimentation intensification under multi-flow surface flow at the expense of inertia forces.
- highly-dispersed particles sedimentation intensification in separated wall areas at the expense of turbulent diffusion.
- energy forces of thermophoretic forces.
- fluid film removal at the expense of gravitational forces.

2 - thin purification level
- highly-dispersed drops sedimentation intensification in multi-row grid evaporation at the expense of inertia forces, turbulent diffusion.
- coagulation into large droplets at the expense of capillary forces.
- large drops sedimentation intensification in one flow.
- capillary forces sedimentation in rectangular channels at the expense of gravitational forces.

3 - output purification level
- correct flow opening formation in output purification level before gas withdrawal nozzle.
- purified gas withdrawal from casing.

MEASURING EQUIPMENT FOR SEPARATOR

Technological properties separator structure provide a possibility to install:
- liquid phase indicator.
- liquid phase availability alarm.
- pressure difference relay for alarming of limited pressure drop achieving.
- gas temperature measuring sensor.
- flowmeter for gas expenses measuring by means of separator.

CHART FOR FLOW - 400-400 m3/h

Contacts

China
Address: 2, Mengxi Road, Zhejiang
Li Hong Xu Wenjia
Tel: 8618854465996
Email: 844006666@163.com

Ukraine
9, Genov Stadningrad Ave., Nikolaev
Ryzhov Sergey
Tel: 380693944477
Email: sergey.ryzhov@naua.edu.ua
Static oil-separators for GTE were developed which exceed world analogues, have advanced reliability. More than 800 marine GTE of the 3rd and 4th generations were developed by GTRPC Zorya-Mashproekt: DG 59, DT 59 GPA–10, GPA 12, GPA 16; GTG 12, GTG 16; M 80 GPA–25; DR 77 GPA–6 and GTG 6, GTE DP 73 – project "Singapur"; project "Aksamyt", M 29, DN 80 and DG 90, DG 80, GTG 110 for GTG and GPA with power of 16, 25 and 110 MW with the economy effect of more than 320 mln UAH

Calculation of production production pieces (c,d) of static oil separators for a GTE and ICE with the efficiency coefficient of 99.99 %.

The novelty was confirmed with A.S. of the USSR: No. 1071783; No. 1119713; No. 1731258; No. 1209261; No. 1192848; No. 1806824; No. 1768239; No. 1783292; No. 1101569; No. 349259, No. 1107888, patent of Ukraine No. 93308
Overall scheme of the exhaust gas purifier for marine engines (a) and gas-dynamic calculation of velocity in the flow part (b)
The novelty was confirmed by A.C. of the USSR No. 1119713; No. 1465085, No. 1662629, No. 1071783, No. 1806824, No. 1783292.

EXHAUST GAS PURIFIER FOR MARINE ENGINES, PATENT OF UKRAINE UA No. 10747
PROJECT CHARACTERISTICS

Separator construction is designed according to requirements of "Rules concerning devices and safe operation of centrifuges, operating under pressure" DN AOP 6.05-1.277-94.

MEASURING EQUIPMENT FOR SEPARATOR

- Technological properties: separator structure provides a possibility to install:
  - Liquid phase availability alarm
  - Pressure differences relay for alarming of limited pressure drop achieving
  - Monomer for pressure value control in separator
  - Gas temperature measuring sensor
  - Diameter for gas expenses measuring by means of separator

SEPARATION THEORETICAL BASIS

- Working fluid splitting intensification at the expense of hydrodynamic forces
- Particles sedimentation intensification on working fluid drops at the expense of inertia forces, turbulent diffusion at torpedpheres
- Small drops coalescing intensification of working fluid with large drops generation
- Drops sedimentation intensification under surface flow at the expense of inertia forces

Contacts

China
Address: 2, Mengxi Road, Zhejiang
12 Hong X, Wenzhou
Tel: 55511101098
Email: 844898945321.com

Ukraine
9, Center Street, Nikolaev
By Valerii Serum
Tel: 380544541477
Email: serum@serum.com.ua
They exceed world analogues in their parameters and are used at about 150 enterprises of shipbuilding and relevant industries, on the ships and in the GTE with the economy effect of 137 mln UAH.

Jet module (a); industrial module (b) and filter for technical air conditioning systems (c)

JET OIL-AND-MOISTURE SEPARATORS FOR POWER SYSTEMS WITH COMPRESSED AIR AND AIR CONDITIONING SYSTEMS WERE DEVELOPED
PARAMETERS

- density under normal conditions: from 0.60 to 0.8 kg/cm³
- working medium pressure at the separator input: 20 ± 3 kg/cm²
- input temperature: 20 ... 160 °C
- solid particles content at the input: not more than 80 mg/kg
- content of solid particles of the size more than 10 microns: not more than 6 mg/kg
- liquid fractions content (gas condensate, drop humidity): not more than 10 microns

SEPARATOR OPERATION

Separator operation mode: continuous maintenance frequency — once a year or according to separator condition.

Separator equipped with remote alarm device of liquid phase availability.

SOLID AND LIQUID PARTICLES SEPARATOR FOR HIGH PRESSURE FLOWS

Research and development

Working flows: from 300 ... 6500 kg/h
Fuel gas purification efficiency:
- liquid phase: 95...99.5 %
- solid particles of size more than 10 microns: 95...99.5 %
THE PLANT AND CONTACT DEVICE FOR EVAPORATION PURIFICATION OF OIL-CONTAINING WATER OF SHIPS, PATENT No. SU 1579520A 1 OF THE USSR, PATENT RU No. 2029197 OF RUSSIA
SPECIFICATION OF AUTOMATED UNIT

Type of raw materials:
- crushed thermoplastic polymers, polyethylene, polypropylene, polystyrene, polyethylene terephthalate;
- Automated control system;
- The loading mode is cyclic (a plunger system);
- The operating pressure in the reactor is atmospheric;
- The electric power is less than 1 kW;
- The energy carrier of reactor heating is natural gas, propane – butane, diesel fuel, proper fuel oil;
- The average operating temperatures of the reactor is 400 – 600 °C;
- The number of circulating water for chiller cooling is 20 mm³/h;

Output products, from 1 kg of raw materials we obtain:
- 0.7 - 0.85 kg of liquid fuel;
- up to 0.2 kg of pyrolysis gas (used for proper needs);
- up to 0.1 kg of fixed residue;

Unit dimensions, mm:
- width - 1700 mm;
- length - 4000 mm;
- height - 2270 mm

AUTOMATED UNIT OF CONTINUOUS PYROLYSIS OF ORGANIC WASTE WITH OBTAINING ALTERNATIVE LIQUID FUELS

Raw materials production of the unit is 500 kg / day.
Output of liquid commercial fuel:
- from 1 kg of raw materials we get 0.7 - 0.85 kg of liquid fuel
SCIENCE RESEARCHES

Achievements

Sphere of application of technology

- The unit is designed for heat, environmentally safe disposal of organic waste from cities, hospitals, airports, railway stations, etc.
- The technology allows creating mobile movable plants in the future which will provide the environmentally safe disposal of hazardous organic waste at the sites of their formation and accumulation.
- This unit is the part of the Complex on the heat utilization of the whole scope of the fixed household residue with obtaining alternative fuels.

Project implementation plan

- Development of the set of design documentation on the Customer’s Terms of Reference
- Preproduction
- Manufacturing of the preproduction model according to the raw materials of the Customer
- Mounting, starting-up and adjustment of the unit at the Customer’s territory
- Authors’ supervision of operation
- Organization of serial production of the number of units with different capacities

Mnemocircuit of Unit Control System

Fuel Specification

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>NCP Liquid Fraction</th>
<th>Petroleum/Diesel 2008/09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating value, °C</td>
<td>42.6</td>
<td>34.0</td>
</tr>
<tr>
<td>Hardness (%)</td>
<td>15-16</td>
<td>15-16</td>
</tr>
<tr>
<td>Specific gravity, °C</td>
<td>1008</td>
<td>1008</td>
</tr>
<tr>
<td>Moisture content, %</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Sulphur content, %</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Flash point, °C</td>
<td>50-52</td>
<td>60-80</td>
</tr>
<tr>
<td>Pour point, °C</td>
<td>18-25</td>
<td>30-75</td>
</tr>
<tr>
<td>Combustion value, MJ/kg</td>
<td>4.75</td>
<td>4.85</td>
</tr>
</tbody>
</table>

Contacts

China
Address: 2, Mengxi Road, Zhejiang
Li Hong Xu Wuxi City
Tel: 0510-3402899
Email: xuhong88@163.com

Ukraine
5, Genex Stalingradskaya, Nikolaev
Bakosh Energy
Tel: 380863944477
Email: vcbuwy@nau.edu.ua
The principles of operation modes and characteristics of output products were discovered theoretically and via the experiments. The environmental safety of the MCP of heterogeneous waste mixture and output products. Working drawings for plants and recommendations on MCP use for utilization of organic waste on ships and shipbuilding enterprises were developed.

EXHAUST GAS PURIFIER FOR MARINE ENGINES, PATENT OF UKRAINE UA No. 10747
### ROV SOPHOCLE TYPE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>100 m</td>
</tr>
<tr>
<td>Dimensions</td>
<td>960x600x450 mm</td>
</tr>
<tr>
<td>Average velocity</td>
<td>4 knot</td>
</tr>
<tr>
<td>Umbilical length</td>
<td>up to 300 m</td>
</tr>
<tr>
<td>Unit mass</td>
<td>35 kg</td>
</tr>
<tr>
<td>Power consumption</td>
<td>3x220 V, 50(60) Hz</td>
</tr>
<tr>
<td>Service staff, people</td>
<td>2</td>
</tr>
</tbody>
</table>

### DEVELOPMENT OF UNDERWATER UNMANNED VEHICLES

Research and development

Development of underwater vehicles on your requirement:
- Operating depth:
  - Minimum depth - 100 m
  - Maximum depth - 500 m
  - Maximum depth - 1000 m
  - Maximum depth - 5000 m
UNINHABITED UNDERWATER VEHICLES WERE DEVELOPED

“ATLESH”, 1991

“The North Star”, 1995

“AGENT-1”, 2004

“AGRO-BUY”, 2005

UNINHABITED UNDERWATER VEHICLES WERE DEVELOPED
UNINHABITED UNDERWATER VEHICLES WERE DEVELOPED

"SKARUS", 1990

"DELTA-P", 1991
Uninhabited underwater vehicles were developed.

- "MTK-200", 2007
- "Inspektor", 2008
- "Chornomor", 2009
- "Sofokl-M", 2010
UNINHABITED UNDERWATER VEHICLES WERE DEVELOPED
Underwater plasma cutting was implemented at Mykolayiv Shipbuilding Plant "Ocean" for specific pools which provide lack of heat deformations and hazardous emission. Optimization of the composition of water-vapour plasma by means of thermodynamic modeling provided efficient work of procuring production of PJSC Kherson Shipyard with using the method of air-plasma cutting with adding water into plasma, which provides lack of borders saturation with Nitrogen and Hydrogen and pores creation during welding.

Cutting quality corresponds to the international level. There is almost no deformations.
Microstructure of borders metal during air-plasma cutting (a), at the "TKhV-10200" plant upon underwater conditions (b) and air-plasma cutting with adding water into plasma (c)
The basis of the procuring technology during production of welded ship hull structures is thermal cutting. A new unit of thermal cutting was developed as well as a set of new high-dynamic units which includes 11 modifications accustomed for special needs of service equipment and production seriation which follows the requirements of the ACS of of TP-cutting, latest resources-saving processing methods, automation, sanitary and hygienic process characteristics. Modernization of existing units of thermal cutting.

The executive part of the developed system of the numeric program control (NPC) is based on the new generation of intelligent numeric servo drive which provide high dynamic reaction of super-fast positioning and adaptive vibration suppression (Patent No. 74967 of Ukraine). The controlling electric drive of machine units with NPC, NUS, V.F. Kvasnytskyi, Vereshchago Ye.M. and others. Published on June 15, 2005, Bulletin No. 12.
In applied mathematical software a logic analyser is used for distant control of programmed controllers and an oscillograph for analysis of dynamics of the controlling drive including the method of calculated frequency characteristics which allowed to provide a world-level cutting quality.

The units successfully work at the enterprises of shipbuilding and mechanical engineering, metallurgy and the building industry.
LATEST TECHNOLOGIES OF SHIP HULL CONSTRUCTION WERE DEVELOPED AND IMPLEMENTED

Welding of the set with the sheet in the combined production system

Scheme of welding of the internal coating of bottom sections
Ship hull formation is held in the dry dock and at the I and II shipbuilding platforms. Welded field joints are performed by the mechanical method in the mixture of protection gases Ar + 18% CO2 at the forming ceramic backup plates (PCBP).
Latest technologies of ship hull construction were developed and implemented.

1. Basic Semi-hull of the ship on the Support
2. Second Semi-hull on the Carriagies
3. Scheme of the Circular Field Stock between the Blocks: → – Welding Direction; 1, 2, 3...7 – Welding sequence
APPLICATION OF HYBRID PLASMA-ARC TECHNOLOGIES PROVIDES PRODUCTIVITY AND WELDING QUALITY INCREASE OF SHIP HULL STRUCTURES AND DETAILS FUSING
APPLICATION OF HYBRID PLASMA-ARC TECHNOLOGIES PROVIDES PRODUCTIVITY AND WELDING QUALITY INCREASE OF SHIP HULL STRUCTURES AND DETAILS FUSING
APPLICATION OF HYBRID PLASMA-ARC TECHNOLOGIES PROVIDES PRODUCTIVITY AND WELDING QUALITY INCREASE OF SHIP HULL STRUCTURES AND DETAILS FUSING
ORGANIZATION OF THE MODERN SHIPYARD USING NEW TECHNOLOGIES OF ASSEMBLING AND WELDING PRODUCTION, DETAILS PRODUCTION, WELDING IN THE GASES MIXTURES USING CERAMIC BLOCKS, POWDER WIRES AND PROPER EQUIPMENT (SEMI-AUTOMATIC AND AUTOMATIC UNITS)
Customers/Ship owners: Damen Shipyards Hoogezand, the Netherlands; Ukhrshiping Ltd., Cyprus; ASK "Ukrichflot", Ukraine; Briese Schiffahrt, Germany; Scheepswerf Damen Hoogezand, the Netherlands; Damen Shipyards Cargo Vessel, the Netherlands).

**tankers** (Damen Shipyards Bergum, the Netherlands; Scheepswerf Damen Hoogezand, the Netherlands; STX Norway Offshore AS, Norway; STX Pan Ocean, Korea; STX Norway Floro AS, Norway; Stolt Nielsen, Norway).

**offshore vessels** (Damen Shipyards Cargo Vessel, the Netherlands, Aker Yards Aukra, Norway; Damen Shipyards Gorinchem, the Netherlands), **other vessels** («Landfall» Transport & Towage B.V., the Netherlands; Bodewes Dinnenvaart, the Netherlands; LLC "Nibulon", Ukraine. More than 60 ships have been built since 2002 at the Vadan Yards Ocean.

**UNIVERSAL TRANSPORT VEHICLES HAVE BEEN DEVELOPED**
ОРГАНІЗАТОРИ

ІННОВАЦІЇ В СУДНОБУДУВАННІ ТА ОКЕАНТЕХНІЦІ
МАТЕРІАЛИ
У МІЖНАРОДНОЇ НАУКОВО-ТЕХНІЧНОЇ КОНФЕРЕНЦІЇ
8-10 жовтня 2014 р.

НАУКОВО-ДОСЛІДНЯ ЧАСТИНА
НАЦІОНАЛЬНОГО УНІВЕРСITYТЕТУ КОРАБЛЄБУДУВАННЯ
іМЕНИ АДМІРАЛА Макарова
54025, м. Миколаїв, просп. Героїв Сталинграда, 9
Тел.: (6142) 72-61-04; http://conference.nuos.edu.ua
e-mail: conference@nuuos.edu.ua

Миколаїв * 2014
THANK YOU FOR ATTENTION
Admiral Makarov
National University
of Shipbuilding
9, Heroiv Ukrayiny Ave.,
Mykolaiv, 54025, Ukraine

Tel/Fax: +380512-42-4811
Email: rektor@nuos.edu.ua
Site: http://nuos.edu.ua