

THE INNOVATIVE SYSTEM OF TRAINING SPECIALISTS IN STUDUING AND TECHNOLOGICAL OPENING UP OF THE WORLD OCEAN

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I. PRINCIPLES

The role and significance of an intellectual component in the inner structure of the scientific and technological progress (STP) has increased (basic notions have shifted from machinery to technology). The importance of scholars who would not only act as “generators of ideas”, but also ensure all the chain of technological applications and social changes of technological solutions has grown.

Structural stratification of STP means such a sphere of “High Technologies” in whose development material resources occupy an insignificant place as compared with intellectual resources including production organization and entering the market of innovations.

Realization of the Strategy of Development of the Far eastern Federal District regarding doubling the gross regional product before 2010 requires reorienting its economy to the innovative path of development. Evidently, it cannot be carried out without effective use of the current potential of professional specialists of sea, river and fishery fleets, all the branched shore-based maritime infrastructure of transporting, fishing and processing enterprises.

To make the economy of the transport complex efficient, specialists having only higher education in more than 60 specialties and specializations should be trained. High technologies and constantly developing education potential of personnel are the main driving forces of a stable economic growth.

Russian maritime education possesses a high potential. Together with traditional for marine training institutions system of education and training of highly qualified professionals, modern technologies of training being used now form future specialists’ skills to organize production of competitive items, to think in a non-standard way, to work in a team and with a team, to possess new innovative culture.

There are two main needs for education: the economic and social ones.

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In maritime education the economic need, first of all, is determined by the need of marine economic and naval complexes of the Far East for specialists in the number, quality and profile required.

The social need, on the one hand, is aimed at meeting growing spiritual demands of society that are not directly connected, but influence greatly the efficiency of the marine economic complex operation. On the other hand, social need directs higher school toward providing higher education to all members of society.

Sometimes the needs of a person and of a country are at variance. In particular, unrestricted need of members of society for higher education (even when abilities are lacking) conflicts with a limited possibility of economy to use qualified specialists or with necessity to finance economic and social needs and effectiveness of using means of a country budget for the benefit of all society.

A specific feature of reforming higher education in Russia is re-orienting it toward maximum satisfaction of social need at the expense of paid education in government-funded higher education institutions and a wide network of non-governmental education institutions.

During this process, the hopes for a market self-regulating mechanism in government-funded education institutions have been dashed, the quality of professional training of specialists in the majority of various non-governmental education establishments is low and the system of educational work has been in fact destroyed. Suffice it to remember how active reformers, while declaring the state of market demand, sharply decreased admission of students to engineering and technical specialties.

At present, global-scale upgrading of higher education adopts a rigid policy of government regulation of economic need. An idea of alleged excess of personnel is constantly instilled with reference to training of economists, lawyers and emphasizing that economic need is considerably lesser than the existent range of training specialists. But labor market dictates it. The best ones will find a situation in accordance with their specialty. But social need is not limited, an educated and trained person is always more helpful for society, the more so trained at the expense of his/her family budget.

Engineers and technical specialists are mentioned absolutely timidly, and specific features of training specialists in such spheres as marine transport are ignored.

Reforming of maritime education in the Far East has always been based on the mechanism of government regulation of economic need for marine specialists that increased significantly of late.

Thus, for the last two years the Maritime State University meets 60% of demand in engineers and technical specialists (crew members).

Objectively, under the conditions of adopted upgrading of education in Russia, it is necessary to use new opportunities in perfecting maritime education organization, to apply effective methods of a system planning of content of training specialists proceed-

ing from integration of activities of education, research and manufacturing institutions and diversification of curricula of purpose-oriented training of specialists.

2. STATE OF THE QUESTION

The Admiral Nevelskoy Maritime State University: navigation; maintenance of marine power plants; maintenance of marine electric equipment and automation means; maintenance of transport radio equipment; water transport and transport equipment management; ship's equipment; organization of transportation and transport management.

The Far Eastern State Technical Fishery University: navigation; maintenance of marine power plants; maintenance of marine electric equipment and automation means; ships' electric equipment and automation; organization of transportation and transport management.

The Far Eastern State Technical University: marine power plants; ships' electric equipment and automation; organization of transportation and transport management.

The Pacific Naval Institute: navigation; maintenance of water transport and transport equipment; maintenance of transport radio equipment.

The Nakhodka Engineering and Economic Institute (Branch) of the Far Eastern State Technical University: ships' power plants.

The Nakhodka Branch of the Far Eastern State Technical Fishery University: navigation; maintenance of marine power plants; organization of transportation and transport management.

The Nakhodka Branch of the Admiral Nevelskoy Maritime State University: navigation; maintenance of marine power plants; organization of transportation and transport management.

KHABAROVSK

The Khabarovsk State Technical University: organization of transportation and transport management; maintenance of water transport and transport equipment; maintenance of marine power plants.

The Khabarovsk Branch of the Novosibirsk State Academy of Water Transport: navigation; organization of transportation and transport management.

The Komsomolsk-on-Amur State Technical University: marine power plants; organization of transportation and transport management.

PETROPAVLOVSK-KAMCHATSKY

The Kamchatka State Technical University: navigation; maintenance of water transport and transport equipment; maintenance of marine electric equipment and automation means; maintenance of marine power plants; ships' electric equipment and automation; maintenance of transport radio equipment.

The Yuzhno-Sakhalinsk Branch of the Far Eastern Technical University: Organization of transportation and transport management.

KHOLMSK

The Sakhalin Branch of the Admiral Nevelskoy Maritime State University: navigation; maintenance of water transport and transport equipment; maintenance of marine power plants.

YAKUTSK

The Yakutsk Branch of the Novosibirsk State Water Transport Academy: navigation; maintenance of water transport and transport equipment; maintenance of ships and ships' equipment.

The Vladivostok Marine College: navigation; maintenance of marine power plants; organization of transportation and maintenance of sea transport operation.

The Vladivostok Marine Fishery College: navigation; maintenance of marine power plants; maintenance of ships' equipment and automation; organization of transportation and management of marine transport operation.

The Vladivostok Marine Technical College: navigation; organization of transportation and sea transport management; maintenance of transport power plants.

The Vladivostok Shipbuilding Technical College: mounting and maintenance of ships' machinery; maintenance of transport electric equipment and automation.

The Artyom Branch of the Far Eastern Power Engineering Technical College: maintenance and repairs of electric and electro-engineering equipment.

The Far Eastern Nautical College (town Nakhodka): navigation; maintenance of transport power plants; maintenance of ships' radio communication and electric radio navigation equipment; maintenance of transport electric equipment and automation.

The Primorsky Mining Technical College (town Partizansk): maintenance and repairs of electric and electro-engineering equipment.

The Kavalerovo Mining Technical College: maintenance and repairs of electric and electro-engineering equipment.

The Khabarovsk Shipbuilding Technical College: mounting and maintenance of ships' machinery.

The Shipbuilding Technical College (town Nikolayevsk-on-Amur): mounting and maintenance of ships' machinery.

The Polytechnic Technical College (town Komsomolsk-on-Amur): mounting and maintenance of ships' machinery; shipbuilding.

THE AMURSKAYA REGION

The Polytechnic Technical College (city Blagoveshchensk): mounting and maintenance of ships' machinery.

Vocational School No.5, Vladivostok: able seaman, motorman 2nd class; donkeyman, able seaman; ship's mechanic, able seaman; motorman 1st class, ordinary seaman; motorman 1st class, mechanic 2nd class; motorman 1st class, electrician 2nd class.

Vocational School No.7, Vladivostok: seaman, motorman (operator); seaman ships' carpenter; motorman (operator) of refrigerating plants; motorman (operator), mechanic-ship repairman; motorman (operator), ships' turner; ships' cook, baker, electrician.

Vocational School No.9, Vladivostok: electrician mounting electric circuits and electric equipment.

Vocational Lycee No.15, town Bolshoi Kamen: ships' hull builder-repairman; shipbuilder-repairman of metal ships.

Commercial Lycee No.18, town Nakhodka: ships' cook-baker.

Nautical Lycee, town Nakhodka: ships' electric navigation.

Vocational School No.14, town Nakhodka: ships' cook-baker; ships' metal worker-fitter; ships' joiner, carpenter; ships' electric radio fitter.

Vocational School No.34, town Nakhodka: ships' cook-baker; able seaman; operator of refrigerating plants, ordinary seaman; motorman 1st class, operator of boilers; ships' electrician, ordinary seaman.

Vocational School No.35, settlement Slavyanka: shipbuilder- ship repairman of metal ships.

Electro-Engineering Lycee No.7, town Khabarovsk: electric fitter of electric networks and electric equipment; electric fitter to repair and maintain electric equipment.

Vocational School No.5, town Khabarovsk: navigator-assistant engineer of river ships.

Vocational School No.17, town Komsomolsk-on-Amur: navigator, assistant engineer of river ships.

Vocational School No.21, settlement Okhotsk: navigator of small-size ships.

Vocational School No.19, town Sovetskaya Gavan: navigator of small-size ships, ships' cook-baker.

Vocational School No.11, settlement Vanino: ships' cook-baker.

THE AMURSKAYA REGION

The Officers' Amur Water Transport College, town Blagoveshchensk.

Vocational School No.4, town Blagoveshchensk: navigator, assistant engineer of river-going ships.

- reduction of real funding by the government;
- growth of scales of higher education and students' desire to obtain a person-oriented education;
- heightening consumers' requirements to the quality of education services and results of scientific research;
- need to raise productivity and quality of teachers' work;
- need to involve cadets and students in active creative activities, ensuring their effective activities in research and engineering work and entrepreneurship.

350 education institutions are engaged in training personnel for world navy and merchant navy. In 2000 shortage of officers was equal to 4% of the required (total requirement was approximately 420,000 persons), excess ratings amounted to 30% of the required (total requirement was 599,000 persons). Toward 2010, with the world tonnage growth of 1 %, shortage of officers can reach from 12 to 20% of the required.

An intensive process of aging seafarers is being observed in developed countries. In 1995 there were 5800 officers older than 55 in fleets of developed countries, in 2000, 26000. At the same time 28 industrially developed countries (OECD members – Organization of Economic Cooperation and Development) control over 64% of all the world fleet.

Vigorous acceleration of upgrading materiel and technical base of APR maritime universities due to intensive development of ships' systems of navigation and communications is observed. In particular, new projects of integrated bridge are being developed and put into operation; they include cartographic systems, automated control, situation evaluation and collision prevention systems, control over ships' life support systems.

Cardinal changes take place in the systems of telecommunication service of cargo transportation and fleet operation. A spectrum of telecommunication technologies when chartering ships, forwarding cargoes, settling accounts, making deals in buying/selling ships etc. is being expanded rapidly.

Transition to a new system of maritime education has come into being in compliance with requirements of international conventions, raising the quality of obligatory practical training as the basis of all training, operating modern equipment and having special practical training aboard training and production ships.

The present organization of maritime education and training in the Far Eastern Federal District embraces government-funded and non-governmental education institutions. Many of them, first of all non-governmental ones, do not ensure in fact high-quality training of specialists as per requirements of safe navigation and complying with require-

ments of international conventions and national standards. The budget, means from other sources are being wasted, which does not make it possible to handle tasks of forming and opportune upgrading of logistical base for training seafarers in accordance with the appropriate conventions in a consolidated way and up to high quality standards.

These problems should be tackled in a well-balanced way under the present conditions of fragmented organization of maritime education.

3. BASIC PRINCIPLES OF ORGANIZATION OF MARITIME EDUCATION

Are aimed at realization of mechanism of coordinating requirements of marine economic and naval complexes of the Far East and resources of maritime education institutions, increasing responsibility of all participants for violation of regulations of that mechanism.

The essence of applying the principles offered is understanding that specialists for marine transport are to be trained in specialized maritime education institutions, and maritime education is part of the basic sector of economy and promotes not only economic development, but also defensive capability of the Far East.

Technology of training and educating should be accompanied with forming a status of a statesman in a marine specialist. It is evident that since the country budget bears considerable expenses for training a marine specialist, a graduate should not take a position not related to a marine economic complex because he gets specialized education extremely important for continuous development of economy of defensive capability of the Russian Far East.

Ensuring maximum effectiveness of coordination between the government, maritime education institutions and a trainee. Realization of this principle is accompanied with conclusion of a tripartite contract.

The government undertakes to finance training of a specialist, find employment for him and has the right to require a graduate to work at least three years in enterprises of marine economic and naval complexes of the Far East.

A maritime education institution undertakes to train a specialist with high quality and has the right to get a government **budget oriented at certain results** and in compliance with standards approved by Russia's Government.

A trainee has the right to get education at the expense of a government budget (subsidy), undertakes to master knowledge and skills and to work during a certain period at an enterprise where government sends him. If a young specialist does not fulfill his obligations (including his attrition for lack of progress in studies or violation of discipline), he is to return a subsidy taking into account inflation during a period of not more than 10 years after graduation of a maritime education institution or his attrition.

Ensuring government regulation and control of functioning of the adopted mechanism envisages legal personal responsibility of all its subjects for violation of its regulations. Responsibility for violating the rights of young specialists when placing him in a job in accordance with the government order, rights to get payment for his job in accordance with his qualification, rights to provide him with housing. Non-fulfillment of these conditions by an employer makes it possible for a young specialist to find a job of his own choice, and the responsibility to pay back subsidies lies with an employer.

Expanding accessibility of obtaining a profession in the system of continuous maritime education according to the following stages of the education process: vocational primary, professional secondary, higher education, post-higher and additional education from positions of continuous training and unified requirements to the quality of training marine specialists.

Ensuring non-budgetary activity based on market-self-regulating mechanism to meet social need of citizens for higher maritime education. A maritime education institution establishes rules of admission and the level of entrance examinations (threshold barrier). Entering the maritime education system enables to satisfy personal need for higher education.

Ensuring multi-channel funding and tax preferences. At present government is funding 35% of means required by maritime education institutions. The founder is not funding expenses for major construction. Maritime education institutions cover a part of their expenses – for purchasing equipment, major repairs and many other items – by revenues from non-budget and other activities. Under these conditions, a unified approach to taxation of commercial organizations and government-funded institutions makes the situation for maritime education institutions unequal. The principle of just taxation is violated.

Differentiation of powers between the federal budget, budgets of Federation units, municipalities and enterprises of a maritime economic complex when they carry out orders to train, re-train and raise qualifications of specialists.

4. MAIN DIRECTIONS OF UPGRADING MARITIME EDUCATION AS PER THE “UNIVERSITY COMPLEX” TYPE

Forming the system of quality control of maritime education in order to train a competitive specialist of the 21st century is the main content of such work. Improvement of logistics, personnel, structure, organization and content of education, innovative and international activities of maritime education is being effected taking into account the requirements of both national and international systems of certifying in quality control of training specialists.

Ensuring conditions for meeting international requirements to training seafarers and safe navigation managers is an important direction of the University activity. Education standards, curricula, good seamanship training have been agreed upon, criteria of evaluating effectiveness of its results have been identified. Our objective is to make education more flexible to expand intellectual view of future specialists, upbringing their mobility and ability to social adaptation, responsibility and ensuring a high level of professional training.

Maritime education is being regarded in connection with general problems of development of Russian society that create quite certain conditions for education functioning, predetermine its mission, objectives, tasks, structure and contents.

Shipping is becoming more and more based on the system of open Registers and determined by intense price competition, rather than considerations of safe navigation, quality of service and environment protection. To rectify such a situation, reassessment of the future system of higher maritime education and associated with them systems of national and international certifications is required.

In effecting maritime education quality management, we proceed from the requirements of two groups of consumers: trainees and potential employers. Experience shows that conceptions of education quality that the said groups of consumers have got differ. The difference can be explained by the fact that while the students' motivation is to a greater extent oriented at the process of training itself and is determined by such factors as psychological comprehension of the material of a course and of a teacher, availability of innovative technologies of training, social and every-day conditions, leisure activities, sports facilities etc., potential employers are first of all interested in professional skills of a specialist.

A category of ensuring good quality of training a maritime specialist consumes a lot of resources, finances and high technologies. Under present-day conditions of Russia's socio-economic development its upgrading will be successful if the government, Russian shipping companies and those who in fact control fleets of open registers undertake a financial burden of developing the system of higher maritime education in the 21st century. Undoubtedly, the rules regulating the relations between an education institution and an organization that gets education services are required in such a case.

Wider involvement of students in the process of scientific research. Expansion of a spectrum of the University scientific research on the basis of integration relations with academic and industry science. Creation of a mechanism of introducing innovative, research and engineering developments to production as test samples.

Practical solutions of a competitive quality of maritime education are based on the use of standardization, metrology and certification as effective means of developing and improving standardizing, evaluating and controlling systems of ensuring maritime education quality. In particular, we are guided by series ISO 9000 international stan-

dards, principles of total quality management (TQM) and methods of self-assessment of organizations in compliance with the national requirements.

5. OBJECTIVE

Work at the Maritime State University according to the “University Complex” type (State University Maritime Complex – SUMC) is organized in order to form an education system to train a competitive specialist of the 21st century on the basis of principles of training and educating used at maritime state education institutions by means of implementing education, innovative, research and technological and manufacturing programs in compliance with the directions of the Russian Federation Marine Doctrine and strategy of Russia’s economic development.

SUMC being a government-funded education institution having the rights of a legal entity, is set up by attaching the institutions, organizations and enterprises to the Admiral Nevelskoy Maritime State University as its structural units by means of reorganizing as per the Russian Federation Government decision and is situated in the Far Eastern Federal District.

6. SUMC STRUCTURE AND CONTENT

Educational component (education institutions of various levels: maritime education institutions of primary, secondary and higher professional education; schools, gymnasiums and centers of pre-university upbringing and education);

Scientific component (research institutes, designing bureaus, diagnostic and test centers and enterprises);

Innovative component (industrial parks, innovative centers, small innovative enterprises and certification centers);

International component (the Department of International Activities, the International Center of Marine training as per Conventions and the Center of Marketing Studies);

Educational component (organization and education centers, youth centers, clubs, socio-psychological service, etc.);

Training and production component (training and production fleet, training and technological centers);

Facilities for retraining and raising qualification (regional centers of retraining and raising qualification, the Center of Marine Training as per Conventions)

Finance and economic service (the Department of Strategic Planning, auditing service, marketing service, financial service);

Social and every-day component (dormitories, medical centers, catering facilities, maintenance services);

Legal component;

Personnel.

Training maritime specialists at SUMC

The advanced development of maritime education as an intellectual sector of economy of the Russian Far East units, acquiring by future specialists of fundamental system knowledge in the sphere of natural sciences and humanities, as also professional skills in the field of sea transport, fishery and processing systems.

Integration, widening opportunities and versions of acquiring a profession in the system of continuous maritime education according to the following levels: vocational training – secondary specialized training – higher professional education – post-university education – additional professional education.

Optimization of the current network of receivers of budget funds at the expense of administrative and financial re-subordination of a number of receivers of budget means. This leads to removal of double training in specialties, which will make it possible not only to optimize a network of training institutions, but also economize budget and non-budget means and material resources for creating logistical and simulator base for training maritime specialists as per conventions.

The effective solution of the principal task of maritime education lies in raising the quality of training specialists at the expense of more complete use of the potential of highly qualified faculty, modern and prospective methods of training, purposeful and efficient use of expensive equipment, telecommunication equipment and simulators, timely upgrading and renewal of logistics.

Consolidation of resources in maintaining the leading role of Russian maritime education on the international labor market, development of fundamental and applied scientific studies, training and retraining on this scientific base of educated and qualified specialists in accordance with priorities of developing science and requirements of modern market of high technologies.

Purposeful use of scientific and technical, innovative and cultural potential when developing and fulfilling scientific and technical, humanitarian, social and other programs of federal and regional levels, solution of certain production, research and technological tasks of the Russian Federation Transport Ministry and organizations of the region.

7. CERTIFICATION AND ACCREDITATION

In 2004 the University successfully passed a complex procedure of licensing, attestation and accreditation. Its complex accreditation showing amounted to 97% of the highest university level ($K=0.97$). Index of conformity with accreditation criteria $J=1.60$

The University has got a Certificate of State Standard of Russia of conformity of the quality management system as applied to education activities and doing scientific research as per the System GOST R ISO 9001-2001 (ISO 9001:2000)

The University is an associated member of the International Association of Maritime Education and Training Institutions in the Asian Pacific Region (AMETIAP)

Classification Society DNV certifies the University for conformity of the system of training maritime specialists with international requirements.

8. PROBLEMS

8.1. PERFECTING THE NORMATIVE AND LEGAL BASE

The normative and legal base regulating economic, organizational and methodological aspects of SUMC functioning needs to be improved:

Development of standards of planning financial and material resources, ensuring optimal cost of training specialists;

Elaboration of a single method for calculating the number of faculty and staff in compliance with labor intensity involved in training maritime specialists;

Development of the state education standard of training as per integrated programs of vocational special secondary and higher maritime education.

8.2. FINANCING AND LOGISTICS

The main objects of investment are:

Construction of a library complex in **2005-2006**;

Annual allotment of budget funds for major repairs of the main means to the amount of not less than **Roubles 45 million**;

Annual allotment of budget funds for purchasing equipment to the amount of not less than **Roubles 50 million**;

Allotment of funds for participatory construction of housing for young specialists to the amount of not less than **Roubles 27 million** annually.

8.3. LOGISTICS SUPPORT OF TRAINING AND PRODUCTION SHIPS

The main articles of expenditures are:

Annual maintenance expenses (fuel, supplies, maintenance to the amount of not less than **Roubles 55 million**;

Financing classification and repairs of training and production ships to keep the class of the Russian Marine Register as per calculations;

Financing of actions aimed against terrorism activities not less than **Roubles 15 million** annually.