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THE DEVELOPMENT OF CHINESE-RUSSIAN RELATIONS AND STRENGTHENING CHINA’s POSITION IN THE ARCTIC

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Abstract: The present article covers issues of Chinese-Russian cooperation in the Arctic region. Geopolitical, economical and security problems are studied as well as prospects of legal provision of China activity in the region.

Keywords: Russia, China, Arctic cooperation, Northern Sea Route, legal provision

As the Arctic ice melts and new shipping routes open, international attention to the region grows. We can talk about the beginning of the “Great Game” in the Arctic. Until recently, there has been open struggle for spheres of influence among Arctic states only, or at least the members of the Arctic Council (AC). Situation changed on the 15th May 2013, when the 8th Ministerial Meeting of the Arctic Council was held in Kiruna and non-Arctic countries – China, South Korea, Japan, India, Italy, and Singapore – were granted observer status to the Arctic Council. These countries, seeking economic opportunities are expected to intensify their efforts in the sphere of Arctic resources development in addition to the research activity. The 8th AC meeting itself was focused on economic issues while the previous events were devoted to environmental problems.1

1 Thus, Kiruna Declaration states that the Arctic Council “Recognizes the central role of business in the development of the Arctic, and decides to increase
China seems to be the most active non-Arctic state promoting its interests in the region. The country has already undertaken active measures to consolidate its presence in the region, and would likely seek full membership in the Arctic Council.

**China and Arctic**

Although China has not yet articulated an official strategy for Arctic, country’s views and approaches to the region are expressed in a number of such documents as «China's view on Arctic cooperation»², «Medium - and long-term energy strategy of China in the period up to 2020»³, etc.

The Defense Policy Research Centre of the Academy of Military Sciences of the People's Liberation Army singled out the Arctic as one of the chapters of an annual strategic report. It stated: “The Arctic region has rich oil and gas resources and quick and convenient shipping conditions, which has important meaning for ensuring the sustained development of China's economy…The Arctic region could become an important supply base in the future for China's overseas oil. China will ... open cooperation with Arctic countries with energy supplies”.

As it was said, in addition to the Arctic energy resources China is interested in transport potential of the Northern Sea Route (NSR).

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² According to the document “China’s view on Arctic cooperation”, the first reason of China's interest in Arctic cooperation is influence of climate and weather in Arctic on China due to its geographical location, second reason is scientific research requirement, and third – opening of Arctic shipping routes, affecting global shipping, energy activities and trade (http://www.mfa.gov.cn/eng/wjb/zzjg/tyfls/tfzxw/t812046.htm)

³ China’s «Medium and Long-Term Energy Development Plan Outline (2004-2020)» envisages diversification of oil supplies from any region of the world, having hydrocarbons, including the Arctic. To enhance participation in international oil and gas cooperation as an active participant of global and regional organizations, China is committed to the financing of search and exploration work and development of overseas oil fields with the help of Chinese technologies and capital. This universal policy is also applied to Arctic region promising in terms of energy resources. (http://old.kazenergy.com/index.php?option=com_content&task=view&id=1840&Itemid=809)
Despite being a non-Arctic nation, China tries to get an access to the Arctic sea routes which would provide significant savings of time and money for cargo transportation and diversify supply routes, providing their increased reliability. Transit of Chinese export cargoes from large ports of Dalian, Qingdao, as well as from the ports of southern Primorye and DPRK via NSR would significantly reduce time of container cargoes delivery to Europe. For example, maritime shipping distance from the port of Murmansk to the port of Yokohama (Japan) is 12.8 thousand nautical miles through the Suez Canal, while it is only 5.7 nautical miles via NSR. In recent years the ice cover along the 7,000 kilometers route became one third less than a decade ago, which led to an increase of the navigation period. According to "Rosatomflot", 71 vessels sailed the whole route between the Bering Strait and the Barents Sea in 2013. In comparison, 46 vessels sailed the whole route in 2012, 34 vessels in 2011 and only four in 2010. 372 vessels have been given permission to sail via NSR in 2013 and more than 600 – in 2014. NSR is expected to take up to 15 percent of global traffic (40-50 million tons of cargo, including liquefied natural gas and oil) by 2020, and China is preparing for it in advance. For example, China has leased several berths in the North Korean port of Rajin to develop transport hubs on the route of prospective cargo transportation along the NSR. Concept of Maritime Silk Road, developed in China\(^4\), is based on the fact that controlling Arctic (including NSR) is controlling global economy and new approaches to global markets.

In order to promote its interests, China is developing bilateral and multilateral cooperation with Arctic countries and international organizations. Its continued cooperation with Russia plays an important role in strengthening China’s positions in the Arctic. Due to bilateral agreements with Russia China has become actively involved in the process of Arctic resources development.

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\(^4\) PRC leader Xi Jinping unveiled the idea of creating Silk Road Economic Belt (One Belt, One Road strategy) as a new form of cooperation between China, Russia and Central Asian states on September 16 2013. This megaproject implies creation of transport, energy and trade corridor between Central Asia and Europe and has two routes – land-based and maritime ones.
Russia – China cooperation

Cooperation between Russia and China is experiencing a period of rapid development recent years. Russia and China maintain ties in trade, energy, investment and other fields. At the moment, the trade volume between the two countries amounts to $100 billion and is expected to double in the next five years. One of the prospective directions of bilateral cooperation is energy. Two countries also cooperate in the spheres of defense and security and support each other at international organizations.

The development of bilateral relations encouraged by Russia’s “Pivot to Asia” and China’s “Westward March” creates favorable conditions for implementation of ongoing and further large-scale joint economic projects. One of the recent brightest examples of bilateral cooperation is the agreement between two countries to integrate China’s Silk Road Economic Belt (SREB) initiative with Russia’s plans under the Eurasian Economic Union (EAEU) framework.

The potential of Russian-Chinese trade and economic cooperation is far from being exhausted, and there are numerous preconditions for the further development of relations. One of the most promising points of growth in bilateral relations is cross-border and inter-regional cooperation between Northeast China and Russian Far East and Eastern Siberia. Arctic region is considered another prospective point of cooperation. A number of large scale documents were signed in 2013. In particular, "Rosneft" and the China National Petroleum Corporation (CNPC) agreed on joint projects in the Arctic shelf and East Siberia and signed 25-year 270 billion dollar oil contract. Last September the construction of one of the largest joint gas projects in the world – "Power of Siberia" pipeline – began. Natural gas from Republic of Yakutia (Chayanda field) and Irkutsk region (Kovykta field) would be transported via that pipeline to the Russian Far East and China. The first deliveries of gas to China via "Power of Siberia" are planned for the late 2018 - early 2019. This May "Gazprom" and China's CNPC signed a 30-year gas contract to supply 38 billion cubic meters of gas in 2018-2020. The contract value is $400 billion.

Cooperation between Moscow and Beijing helps Russia to diversify supplies of its energy resources (especially considering its

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current tense relations with Europe) and gives China access to Arctic resources capable to meet its growing energy demands.

**Legal provision of Russian-Chinese cooperation in the Arctic**

Cooperation with Russia in the Arctic is important for China not only from the point of its economic interests, but also security concerns and geopolitical objectives. During the Cold War Arctic region was an arena of rivalry between USSR and USA. Now US are trying to restrain Russia by establishing control over such strategic region as the Arctic. At the same time China is emerging as a new center of power and, accordingly, another target of US deterrence.

Arctic policy of Russia is in many respects determined by its economic interests. At the same time this region and NSR as a national transport artery have strategic importance for country’s security and defense. Security concerns push Russia to strengthening its military presence in the Arctic by restoring military bases and reequipping armed forces to ensure the security and protect sovereignty in this region.

Russia acts in the Arctic according to its "Strategy of the Development of the Arctic Zone and the Provision of National Security until 2020" and measures aimed at countering NATO missile defense in Eastern Europe. It creates bases along the Arctic Ocean coast, able to counter this threat and deter USA. Security is crucial for China as well. Therefore, China and Russia should expand cooperation and sign an agreement on security in the Arctic in order to jointly protect their interests in the region and in the world.

Russia is an Arctic state, bordering the Arctic Ocean and having half of the world's Arctic territory. Jilin Province bordering Russia is geographically located close to the Arctic region and thus China can be called “near Arctic state”. Russia and China are interested in providing non-traditional security and have great potential for cooperation, so they can sign an agreement on cooperation in rescue operations in the Arctic.

While military security was the most urgent in the aftermath of the Cold War, non-traditional security issues (environmental, climatic, and navigational) are becoming greater priority nowadays.

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6张瑞、杨柳《太平洋学报》2013.6，《中国北极安全法律保证研究》
As environmental protection is the most pressing issue for the Arctic region, many international organizations are involved in resolving these problems. There are many international treaties and organizations such as the International Arctic Science Committee, Arctic Council, the Nordic Council, the Barents Euro-Arctic Council and others. As China is located in the Northern hemisphere, the climate change in the Arctic region has a direct impact on weather and climate in China. So Russia and China should take advantage of opportunities for cooperation and sign an agreement on "Arctic climate (including joint actions to prevent natural disasters and deal with their consequences)".

Northeast China and Far East and Siberia regions of Russia also have great potential for cooperation. There is the Tumen River flowing in Russia, North Korea and China and serving as part of the boundary between three countries. In order to develop adjacent areas the Tumen project was launched (the "Plan of development of the Tumen River Area") at the initiative of the UNDP in 1992. It was joined by ROK, Japan and Mongolia and renamed as "Greater Tumen Initiative" in September of 2005. But even now Tumen subregion still remains underdeveloped if to compare with the "Greater Mekong" subregion, mainly for a number of geopolitical and geo-economic reasons. The other problem hindering development of logistics and trade and economic development of the region is that the Tumen River is not navigable and requires dredging and other infrastructure development. In order to promote development of the region, China, Russia and Korea should sign an agreement "Comprehensive management, use and navigation of the Tumen River area".

As Arctic climate changes, the navigation period of the Arctic Ocean increases, making the use of the Northern Sea Route an attractive alternative to the southern sea route through the Suez and Panama canals. The Chinese Hunchun city is located at latitude 42.8 degrees with respect to Arctic waterways, beginning at the mouth of the Tumen River. Using this route could save 5000-6000 nautical miles. Although the Tumen River is connected with the ports of Vladivostok, Vostochny, Zarubino, and Chongjin by transport network, these ports do not form one group and have their own features. Moreover, the river has not been used for transporting large amounts of goods from China to neighboring countries, which prevented development of the surrounding region. The opening of the
Arctic route would produce a huge positive impact on the development of the Tumen River Triangle, not only for Arctic states, but also for all countries of Northeast Asia. To promote this development, Russia and China should sign an agreement "Tumen River and the Northern Sea Route".

This May Russia and China agreed on joining projects of the Eurasian Economic Union (EEU) and the Silk Road Economic Belt (SREB). Far Eastern ports of Vladivostok, Nakhodka and Vanino connected with the Trans-Siberian and Baikal-Amur Railways form a transport hub. Russia is planning transport development of Chukotka, Arctic region and making NSR an international transport route. This goal can be achieved by combining transport potentials of the Trans-Siberian Railway and sea routes of Far East of Russia, China and North Korea. China, along with its strategy of land Silk Road is implementing maritime Silk Road as well. In order to promote interests of Russia and China, develop interaction between them and boost cooperation in trade and logistics, countries should sign an agreement on cooperation in Arctic Ocean research and development.

China's geopolitical interests, legal issues and the need for rational and safe use of Arctic resources urge to create and continuously improve safety and to develop appropriate legislation. Thus, such documents as "Rules of navigation along the NSR for China," "Regulations for the Chinese Arctic expeditions", "Chinese rules on environmental protection" should be developed in cooperation with Russia in order to carry out joint Arctic studies.

**Concerns of the West**

It is not a secret that some of Beijing official statements, rapid development of Sino-Russian relations and strengthening China’s positions in the Arctic cause various kinds of concerns in the USA and other Arctic states. In response, US leadership conducts information warfare against two countries by discrediting activities of Russia in the Arctic in the eyes of the international community and China's intentions in the region – in the eyes of Russia. Numerous articles in mass media are published and studies are conducted, all of them aimed at instilling "sinophobia" and hostility and mistrust between two countries. Other leverages – American and transnational oil and gas companies, claiming to conduct mining activities in the
Arctic, international environmental organizations, and other structures are also involved into information warfare.

When joining the Arctic Council, China stated that it respected Arctic states’ sovereignty, sovereign rights and jurisdiction according to international law. When receiving status of observer to AC, Beijing reaffirmed its respect for the sovereign rights of Arctic States. Today, Beijing's official statements are limited to underlining important role of the Arctic region for China in terms of environmental issues, scientific and economic interests.

However, some Chinese scholars and officials express views contrary to the moderate official position of Chinese government. It is these statements that are often cited in Chinese and foreign media and raise concerns of Arctic states in connection with China’s activities and intentions.

Some research institutes and organizations of Scandinavian countries, in particular, SIPRI, use these statements when attempting to inculcate "sinophobia". Authors of this Institute reports quote statements by representatives of military and scientific circles in China on Arctic, which, when taken out of context, could be perceived as threats. Statements by representatives of West became particularly alarming after China had received the AC observer status and increased cooperation with Russia amid rising tensions in latter’s relations with West.

According to some experts, territorial disputes in Arctic may lead to armed confrontation. Military buildup of Russia, Denmark, Canada, Norway and USA in the Arctic and increasingly frequent clashes between them in information field confirm growing military importance of the region. Even if there is no armed conflict, growing military presence in the Arctic is inevitable. But as for China, armed conflict on its initiative or even with its participation is very unlikely. China does not dispute territorial rights of Arctic States, while considering protection of sovereignty and territorial integrity as a

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basic principle of its foreign policy. This, as well as five principles of peaceful coexistence determine its strategy in the Arctic region.

Unlikelihood of China military presence in the region is also proved by the fact that China’s PLA Navy used to operate in the seas, quite different from the northern part of Atlantic Ocean and the Bering Sea, not to mention Arctic Ocean. Chinese Navy does not have experience of participating in operations in extremely low temperatures and Arctic pack ice. In contrast to Russia, USA and Canada having advantageous location for conducting air operations in the northern part of Atlantic Ocean, the Bering Sea and Arctic Ocean, China would face serious problems with carrying out air support to its Navy in these parts of the world. Moreover, any naval operations in the Bering Sea and Arctic Ocean would alert US and Russia, as well as NATO.

But the main argument against possible military conflict started by China is that it would be convenient for China to cooperate with any state of the Arctic region, regardless of final delination of Arctic. Therefore, China will rather continue bilateral cooperation with circumpolar countries and organizations than use force for promoting its interests.

**Conclusion**

Not only economic and scientific interests determine China’s attention to the Arctic region. There are also security considerations (both traditional and non-traditional) and geopolitical objectives. China’s growth has changed the balance of power in Asia-Pacific region and the whole world, making it multipolar. USA and the West are interested to prevent it by not countering Russia and China only, but also trying to rupture the Russia-China strategic nexus.

Interdependency and complementarity of the economies of Russia and China create favorable conditions for their cooperation in any region of the world, including the Arctic. Currently, cooperation between China and Russia is experiencing its best period, not only in sphere of economy but also in many other areas, particularly in maintaining international order and protecting peace on the planet, as well as other broader aspects of cooperation. Since China and Russia are developing not geopolitical only, but also geo-economic relations,
the conflict between them is excluded, especially given the fact that official position of China coincides with Russian interests.

Concerns of Western countries related with the growth and strengthening of China's positions are groundless: there will be no military conflict on the initiative or with the participation of China. China will cooperate with each state of the Arctic region regardless of the final delineation of the Arctic territory. To promote its interests it will rather use bilateral cooperation and agreements than military power.

Undoubtedly, Russo-Chinese cooperation will strengthen positions of China and Russia not only in the Arctic region, but also in other regions of the world. However both countries as usual will obey international law and follow the principles of non-interference in the affairs of other states.

REFERENCES

A REVIEW OF MARITIME ENGLISH EDUCATION AND TRAINING IN CHINA IN COMPARISON WITH OTHER TOP SUPPLIERS OF SEAFARERS

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**Abstract:** As a compulsory subject for seafarers’ certification of competency in China, Maritime English is designed to ensure Chinese seafarers’ maritime English proficiency. However, the outcomes of maritime English education and training are not perceived to be satisfactory by the shipping industry. Research on maritime English education and training in China is relatively sparse and unsystematic. This paper will first review publications on maritime English education and training in China to present a clear picture of existing studies and their findings. A comparative review will then be made between China and other world top suppliers of seafarers to investigate their similarities and differences in maritime English education and training. Due to limited number of journal papers available on the topic, the review mainly focuses on the International Maritime English Conferences Proceedings published from 2004 to 2014. A review of related articles identified five themes: maritime English assessments, maritime English teaching materials, maritime English learning and teaching methods, maritime English teachers and maritime students. Issues corresponding to the five themes are compared and analysed before some suggestions for improvements are made in line with the Manila Amendments 2010.

**Key words:** maritime English; non-English speaking countries; education and training;
1. Introduction

Effective communication plays an increasing role in many work contexts (Huang, 2004; Mircea, Anastasia, & Corina, 2012). A report by the UK’s Maritime Coastguard Agency (MCA) to the Maritime Safety Committee (MSC) 2006 identified a lack of English language competency of seafarers as one of the major factors contributing to maritime incidents. The International Maritime Organisation (IMO) meetings (IMO MSC, 2006) identified a compelling need for a higher level of working maritime English language skills (Ziarati, Ziarati, & Çalbaş, 2009b). As a result, the Manila Amendments 2010 proposed new and amended requirements related to maritime English. In this document, much emphasis is placed on the competency-oriented approach instead of purely knowledge-based maritime English education and training (MEET) (Trenkner & Cole, 2012). Consequently, it is imperative to update existing or develop new curricula, teaching materials, and assessment tools for maritime English courses in all relevant nations to meet the new requirements specified in the Manila Amendments 2010 (Trenkner & Cole, 2010).

MEET is of great importance and challenge for non-native English speaking countries. An increasing number of seafarers are recruited from the Far East, Indian sub-continent and Eastern Europe. Among the world top eight suppliers of officers, China, Turkey, Ukraine, the Russian Federation, Japan and Indonesia share the similar challenge of improving their seafarers’ communicative competence in English. With English as one of their official languages, India and the Philippines have no such big challenges. Generally, Chinese seafarers find it difficult to communicate in English with Port State Control Officers (PSCO) or the multinational crew on board, and this may affect the safe operations of ships (Huang, 2004). For example, many seafarers cannot understand the questions from PSCO or answer their questions correctly (Kang et al., 2013). Language deficiency is one of reasons why Chinese crew rarely work on foreign vessels with multilingual and multicultural environment (F. Li, 2008). The quandary has not changed much for the previous decades despite much effort has been made on MEET in China. The market share of Chinese seafarers in
the international maritime labour market decreased slightly from 8.5% in 2000 to 8.3% in 2010 (Fan, Fei, Schriever, & Fan, 2015). Chinese seafarers are losing their job opportunities in the global maritime labour market due to their maritime English deficiencies (Dirgayasa, 2014; Eadie, 2000; Magramo, Ramos, & Gellada, 2013; Xiao-niu, 2009; Zhang, Gao, Chun, & Weiguo, 2008).

In contrast, the outcomes of the MarTEL project implemented in Turkey are found quite satisfactory (Demirel & Ziarati, 2010). Given their smaller populations, Turkey and Ukraine saw an increase in their market shares by 2.4% and 0.9% respectively from 2000 to 2010 while other top suppliers with larger populations experienced a decrease to various degrees (Fan et al., 2015). To help improve the competitiveness of Chinese seafarers in the global maritime labour market, this paper will first analyse the MEET in China. A comparison will then be made with the MEET in other top suppliers of officers, especially Turkey and Ukraine. With experiences learned from other nations, suggestions for improvements in communicative competence of Chinese seafarers will be put forward in line with the newly amended requirements on maritime English as specified in Manila Amendments 2010.

2. Maritime English education and training

Due to limited number of journal papers available on this topic, the review mainly focused on the International Maritime English Conferences Proceedings (2004-2014) in which most papers related to the MEET are published. A review of these papers found the following five themes: 1) maritime English assessments, 2) maritime English teaching materials, 3) maritime English learning and teaching methods, 4) maritime English teachers, and 5) maritime English students. Based on the five themes, the focus was first placed on the situation in China and a comparison of MEET was then made among the top five non-English speaking nations that supply ship officers in the international maritime labour market: China, Turkey, Ukraine, the Russian Federation, Japan and Indonesia (Fan et al., 2015).

2.1. Maritime English Assessments

In China, much attention, for a long period of time, has been paid to the testing of maritime English reading instead of speaking and listening (Zhang et al., 2008). The content in the reading exam covers many aspects of maritime professional knowledge, such as
regulations for collision avoiding (COLREG), ship handling, ship structure and equipment, cargo handling, firefighting and lifesaving, first aid, the international maritime conventions, etc. (Zhang et al., 2008). The maritime English test focuses on testing the subject knowledge rather than the English language itself. Consequently, the purpose of maritime English test is misleading. Moreover, the maritime English test is dominated by multiple-choice questions. If all the questions are of multiple-choice type and selected from promulgated test banks, it demotivate the enthusiasm of test candidates to improve their maritime English ability (Chen, 2010). Answering questions from the test banks does not allow for improvement of language performance skills because candidates cannot take their initiatives to answer questions but only passively choose from limited answers. This testing model which ignores language performance no longer meets the aim of a maritime English test.

Japan, Indonesia and Russia take similar approaches in maritime English assessment. Generally speaking, assessments are more of knowledge-based than of skill-centred. For Example, the majority of the test content in Indonesia is grammar (28.88%) and vocabulary (22.22%) (Dirgayasa, 2014). The maritime English test in Japan is also dominated by the multiple-choice format (Takagi et al., 2007).

In contrast, Turkey adopts the EU funded Leonardo MarTEL (Maritime Test of English Language) project to measure the English language level of maritime students. The highlight of the MarTEL Project is that it incorporates language skills into maritime content (Ziarati, Ziarati, & Çalbaş, 2009a). The MarTEL project focuses on the test of the language skills used in maritime content rather than the English test of maritime knowledge. Two main response formats are used in the MarTEL project, selected-response format and constructed-response format. Selected-response format provides response items for students to choose from (such as multiple-choice, true-false, and matching items), while constructed-response format asks students to develop a response, create a product, or conduct a demonstration (Pierce, 2002).

In Ukraine, the use of non-multiple-choice format to assess maritime student performance has been a significant part of the MEET reform movement across the nation (Khattrei, Reeve, & Kane,
2012). Similar to Turkey, a performance assessment has been emphasised in Ukraine to demonstrate maritime students’ abilities to perform a real-life task (Zeifrid, 2011), for example, English communication during a boat drill, English communication with stevedores on shore, etc. Unlike common English tests, Maritime English tests should emphasise the performance of English instead of the knowledge of English. The multiple-choice format is suitable for testing factual subject matters but not for testing language skills. The multiple-choice format can result in ‘rote standardization’ which dissuades intellectual thinking (Drown, Mercer, & Jeffrey, 2006). In this case, constructed-response format should be introduced and emphasised in the maritime English assessment in China.

2.2. Maritime English teaching materials

Until now, there is no widely accepted maritime English textbook in China. Although the textbooks are more standardised than before, their contents are exam-oriented and ignore the practical use of English (Xie & Ruan, 2007). This is not surprising in a strong exam-oriented education culture in China. Furthermore, the contents of the teaching materials are quite often obsolete and lack relevance (Xie & Ruan, 2007). For example, few textbooks related to the Standard Marine Communication Phrases (SMCP) can be found in libraries or bookstores (Liu, 2008). The lack of relevance is often caused by a lack of need analysis of textbook users. The need analysis is an essential part when designing courses of English for Specific Purpose (Basturkmen, 2010; Dudley-Evans & St John, 1998; Hutchinson, 1987). Maritime English is a particular kind of English for specific purposes (Pritchard, 2003). In fact, it is essential to involve both academics and industrial professionals in the design and development of maritime English courses (Dirgayasa, 2014; McDonough & Shaw, 2012). The traditional textbooks do not keep pace with the fast-changing shipping industry, and other forms of teaching materials such as multimedia resources should be considered. In addition to the disadvantage of the lead time of printing, the content of a textbook cannot be updated in time. Some maritime English textbooks have been used for nearly 10 years in some colleges (Fan & Shi, 2012a).

The maritime English materials in Japan and Indonesia share their similarities with China. In Japan, maritime English database of
multiple choice questions is established as the maritime English resource (Takagi et al., 2007). In Indonesia, the existing maritime English materials are featured by a lack of relevance, availability and accessibility from maritime students (Dirgayasa, 2014). Before the MarTEL project, similar to the case in Indonesia, the maritime English textbooks used in Turkey were also irrelevant (Demirel, 2013). Nearly 70% of the textbook users believed the traditional textbooks were not helpful in understanding the OOW (officer on watch) training program (Demirel & Ziarati, 2010). The MarTEL project however provides a comprehensive and up-to-date MEET resource. In Ukraine, the teaching materials, in contrast, focus on simulating the real situations on board in the forms of cue cards, activity cards, student-interaction practice booklets, multimedia, etc. (Demchenko, 2014). Due to insufficiency of maritime English textbooks for ship cadets in Russia, maritime English teachers need to compile their own maritime English books which prove to be helpful in making cadets more motivated in maritime English learning (Alexei Strelkov, Liudmila Anufrieva, & Olga Kazinskaya, 2010).

2.3 Maritime English learning and teaching methods

Maritime English learning and teaching at maritime colleges and universities in China has been substantially dominated by the exams for the Certificate of Competency (CoC) (Fan & Shi, 2012a). The exam-oriented MEET allows little time for teachers and students to carry out communication activities in class. Consequently, the MEET in China has not functioned effectively in improving Chinese seafarers’ English communicative competence (Y. Li & Pyne, 2013; Zhang et al., 2008).

Maritime English teaching in China has also been focusing on linguistic knowledge, such as grammatical features and vocabulary, with little attention to the practical use of the language for communication (You, 2012), although many scholars and educators (Ellis, 1990; Rivers, 1987; Tway, 1987) have highlighted learners’ active involvement in using language. You (2012) reveals that teaching time is mainly spent on giving maritime English lectures, explaining vocabulary and grammar. Consequently, there is little group work in the language classroom (You, 2012). In general, the teaching mode is a typical teacher-centred rather than student-centred one.
Most maritime English teachers have to face a class of around 50 students. It is self-evident that large class teaching poses a great challenge in terms of teaching techniques, classroom management and particularly teacher-student interactions (You, 2012). It is a common scene in many classrooms that the teacher is lecturing while students are passively taking notes. When teachers do encourage student participation by asking questions or designing interactive programs, there are at best a few responses or only a couple of ‘top’ students participating while the others keep silent throughout the class (You, 2012). Research shows that large class size may adversely affect students’ motivation to participate (McConnell & Sosin, 1984; Ur, 2008). In addition, students’ peer interactions rarely take place (You, 2012). Moreover, due to the learning and teaching culture in China, Chinese maritime students tend to pursue ‘perfection’ when speaking English (Jin, 2005) by paying too much attention to grammar, thus putting themselves under pressure to formulate proper expressions. The ultimate purpose of the language as a means of communication is largely ignored in the MEET in China. As a result, students cannot practise what they have learned.

Similar to China, the teacher-centred teaching method implemented in Indonesia does not encourage students to actively participate in class either. The traditional chalk-and-talk teaching approach is still dominant in the maritime English learning and teaching (Dirgayasa, 2014). The chalk-and-talk teaching mode might not be applicable to the new generation of maritime students who are submerged in an E-technology era. Russia also follows a similar traditional teacher-centred class pattern with the instructor lecturing and the students watching and listening (Chanysheva & Vasilenko, 2010). Consequently, maritime students tend to simply memorise the studied material, which will discourage them from formulating their own ideas. The problem in Turkey is slightly different in that excessive criticism on students’ grammar mistakes by Turkish maritime English teachers discourages students from speaking English (Demirel, 2013). Due to a shortage of qualified maritime teachers in Turkey, maritime English teaching and training programmes were not successful until through international collaborations and in particular with the support from the EU (Demirel & Ziarati, 2010). Some native-English-speaking teachers from maritime institutions were invited to join the teaching teams to support the programmes, which provided a good
mix of different cultures. The programmes helped both Turkish students and lecturers improve their maritime English proficiencies. Moreover, the mixed culture environment strengthened students’ cultural awareness which is beneficial to their future careers. In Ukraine, it is a priority to implement a competence-based approach in the MEET (Demchenko, 2014). The communicative learning and teaching approach has been implemented in the MEET in Ukraine since last decade (Zeifrid, 2011). It shifted from a teacher-centred teaching model to a student-centred learning model.

2.4 Maritime English teachers

Maritime English teachers play a significant role in guiding students to improve their maritime English ability. There has been a lack of qualified maritime English teachers despite the fact that there are a large number of English majored graduates and experienced mariners in China. There are two sources of maritime English teachers: general English teachers and experienced mariners (Shi & Fan, 2012). The former normally do not have sufficient knowledge about the maritime industry and the latter may not have adequate linguistic knowledge. Both types of teachers have advantages and disadvantages. The experienced seafarers may explain maritime knowledge better than the general English teachers (F. Li, 2008). However, the difficulty of English sentence structure in the textbooks poses a challenge for experienced mariners. The lack of training for maritime English teachers and the absence of cooperation between these two sources of maritime English teachers may explain the lack of qualified maritime English teachers in China. It is hoped that the maritime English teacher training centre based at Dalian Maritime University can solve the problem.

The problem is overcome in Turkey by inviting the native-English-speaking teachers from maritime institutes to deliver lectures with the assistance of Turkish lecturers (Demirel & Ziarati, 2010). This can be understood as a collaborating teaching strategy. In Ukraine, Indonesia, Russia and Japan, most maritime English teachers are sourced from general English teachers (Borodina, 2006; Takagi et al., 2007; Zeifrid, 2011). The majority of maritime students express that maritime English teachers need maritime English training and it is preferable to have collaborative teaching between English lecturers and maritime lecturers (Dirgayasa, 2014).
2.5 Maritime English students

It is not surprising that Chinese maritime students always communicate in Chinese at school when there are few foreign students in class (Fan & Shi, 2012b). The problem can be solved by encouraging Chinese maritime students to study in English speaking nations or attracting foreign maritime students to study in China, for example, in the form of student exchange programs. Moreover, the English foundation of most maritime students in China when enrolled in colleges is relatively poor. The main source of maritime students in China is from rural areas where their English learning and teaching is less effective. Consequently, maritime students are many and heterogeneous in terms of background, English level, motivation and attitude towards learning (W. Wang, 2008). Similarly, the motivation, spirit of competition, and learning independence of maritime students in Indonesia are found unsatisfactory since most students have relatively poor English foundation and come from remote villages that lack good quality education (Dirgayasa, 2014). Unlike China and Indonesia, both Turkey and Ukraine have international maritime students, creating a multilingual and multicultural class environment. It can prepare students better to deal with language and cultural issues when they work on ships with multilingual and multicultural crew after graduation. The multilingual and multicultural class environment can hardly be formed if there are few international students in a maritime class (like in Indonesia, Japan, Russia and China). The class model of maritime students of different nationalities should be encouraged and advocated. On the other hand, teachers need to improve themselves to meet the challenge of the multicultural classroom setting (Ircha, 2006).

3. A summary of the MEETs in some world top suppliers of seafarers

The world top suppliers of seafarers can be classified into three general groups: Far East, Indian sub-continent and Eastern Europe. Due to their geographic distributions, Europe (West) and Asia (East) share their distinct cultures which lead to their different education cultures. This can be reflected in their different MEET. Having adopted the EU-founded MarTEL project, the MEET in Turkey and Ukraine is different from that in China, Japan, Russia and Indonesia.
Table 1 shows that Turkey and Ukraine emphasise English performance in reality while the other top suppliers of seafarers, such as Indonesia, highlight English knowledge aspects. Such difference is also reflected in their different maritime English assessments. For example, Turkey and Ukraine adopt skill-based MarTEL project while China chooses the knowledge-based multiple-choice format question bank. A comparison of the MEET for top suppliers of seafarers is shown in Table 1.

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<tr>
<td><strong>Teaching materials</strong></td>
<td>Maritime knowledge content based MarTEL</td>
<td>Cue cards, activity cards, student-interaction practice booklets, multimedia</td>
<td>Obsolete, irrelevant and ineffective maritime English database</td>
<td>Self-complied course book based on SMCP and IMO Model Course</td>
<td>Lack of relevance</td>
<td>Maritime English Database</td>
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<td><strong>Teaching method</strong></td>
<td>Fusion of content and skill in MarTEL</td>
<td>Student-centred instruction (Communicative approach)</td>
<td>Teacher-centred instruction and examination-oriented</td>
<td>Teacher-centred instruction</td>
<td>Teacher-centred classroom model</td>
<td>Teacher-centred classroom</td>
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<tr>
<td><strong>Assessment</strong></td>
<td>Language skill based MarTEL</td>
<td>Performanc e assessment</td>
<td>Ignore language performance or practical use (multiple choice)</td>
<td>Knowledge-based test</td>
<td>Grammar &amp; vocabulary-centred</td>
<td>Test of Maritime English Competence (multiple choice)</td>
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### 4. Recommendations

Despite the effort devoted to the MEET in China, English learning and teaching outcomes are not optimal. The notoriety of Chinese seafarers’ poor communicative competence in English has been persistent. Based on the comparison with some world top suppliers of ship officers in the world maritime labour market, some measures are suggested to mitigate the problem regarding the MEET in China.

Firstly, a shift should be made from the subject-knowledge-based maritime English assessment to a language-performance-based one. The current multiple-choice-dominant maritime English tests in China are not appropriate for the testing of actual language performance. The constructed-response formats, such as developing a response, creating a product, or conducting a demonstration should be adopted. Some maritime English tests, like Marlins and MarTEI, can be referred to when designing maritime English test questions.

Secondly, a performance-based teaching method is recommended in order to develop the communication skills of maritime students in China. Given the poor English foundation of maritime students, it would be ideal to divide the learning and

<table>
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<th><strong>Students</strong></th>
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<th><strong>Single nationality (Poor English foundation)</strong></th>
<th><strong>Single nationality (uneven English foundation and low motivation)</strong></th>
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<td><strong>Lecturers</strong></td>
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<td>General English background</td>
<td>General English background with a little maritime English training or ship officers without sufficient linguistic knowledge</td>
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teaching process into two, general maritime English and specific maritime English, with the former as a preparation stage for the latter (Cai, 2014; Xie & Ruan, 2014). In maritime English teaching, since linguistic incompetence (mainly listening and speaking) is the main factor leading to communication failures (Y. Wang & Fu, 2007), emphasis should be placed on the training of learners’ linguistic competence including building up their phonetic competence (Y. Wang & Fu, 2007). Moreover, attention should be paid to other aspects of communicative competence including intercultural, psychological, strategic and practical competences (Fan et al., 2015) as far as the maritime learning and teaching is concerned.

Thirdly, a large team of maritime lecturers need to be trained for the effective implementation of these measures, for example, by initiating teacher exchange programs or employing English speaking lecturers (experienced seafarers). In recent years, Japan has been hiring more English-speaking Filipino teachers for English teaching (Carleon, 2015) and China may learn some experience from Japan.

Fourthly, maritime English lecturers need to take their initiatives to keep teaching materials updated in the fast-changing shipping industry. As a supplement, self-compiled teaching materials are necessary due to the heterogeneous nature of students in terms of backgrounds, English levels, motivations and attitudes to learning.

Despite the fact that changing the teacher-centred and examination-oriented culture is the greatest challenge of all, the focus should always be on the quality of MEET in China. Much more research is needed in this area in order to help improve Chinese seafarers’ communicative competence. Safe shipping, to a great extent, depends on the ability of seafarers who act together by communicating effectively. It is hoped that more Chinese seafarers can work with multilingual and multicultural crew on board in the near future.
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PSYCHOLOGY AS A TOOL FOR EFFECTIVE UNIVERSITY TRAINING OF ENGINEERS ON MARINE FISHING FLEET

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Abstract: Basing on the analysis of theoretical material and the results of their own empirical studies the authors explain the necessity of implementation of the skills (special professionally significant psychological competencies) of marine psychology in the university education of future sailors – the engineers of the fishing fleet.

Keywords: educational training, Amendments of the Philippines, marine specialist, professional maritime psychology, competencies

The problem’s actuality

The change of the socio-economic situation in the world, accelerating pace of scientific, technical and socio-cultural progress update for the entire world community the problem of improving the quality of modern education.

Today the society in every developed industrial state, regardless of its political structure, presents a number of new requirements to the educational training of professional personnel. Everywhere there is a need for highly educated, professionally mobile and competitive workers who can provide high performance of professional work in the conditions of market economy.

In particular it applies to the educational training of technical specialists, who directly affects the efficiency of public production development and economical innovations. That determines the steady
demand for them on the labor market as well as more stringent requirements to the quality of their educational training.

According to world public perceptions, the higher engineering education in Russia was always of high quality, therefore up to now it continues to be the most important element of country’s innovative development. But, of course, today there is still a number of problems in Russian technical higher education, caused by continuous renewal of country’s economy and culture, improvement of science, engineering and technologies [1, p. 54, 55]. All this highlights the task of application the new methodological concepts and technologies in university training of technical specialists. These new methods are aimed at development of intellectual and spiritual potential of personality of a future professional and are closely intertwined with the now growing trend of humanization of technical education due to the global socio-cultural transformation in the direction of humanism.

It is with this purpose there was provided the inclusion at the state level of humanitarian and socio-economic disciplines [2, p. 4, 5] in educational programs of non-humanitarian universities. In this regard, Russian system of higher education in general, and thus, the universities that train professionals in different fields, deal with a number of specific tasks, formed under influence of current time.

Undoubtedly, this also applies to higher educational institutions that produce engineers for the offshore fishing fleet. Objective content of the educational training of future seafaring specialists for country’s fishery complex is determined by the professionals in this field and is expressed in the system of original rules and regulations. These rules include qualification requirements, lists of functional responsibilities and job descriptions where there are work tasks for each particular type of professional activity of navigators and specialists in exploitation of ship’s electric or transport equipment.

In the main document regulating work of seamen on the transport and fishing fleet – the International Convention STCW-78 “Amendments of the Philippines” in July 2010, the real level of their professional competence is assessed in accordance with knowledge, skills and other standards and abilities, required for Maritime professions. The range of requirements to the specialists in navigation, formulated by this document, essentially determines the
level of their professional training, which provides the abilities for proper performance of working functions on the ship.

Thus, the requirements of the International Convention indicate the need for inclusion of psychology in the educational training of Maritime specialists, which ensures the effective communication on Board and ashore. As well it raises such personal qualities as persistence and leadership, which in essence are psychological categories [3, p. 230].

In other words, the normative document for training and certification of seafarers defines the need for compulsory inclusion of psychological disciplines in educational programs of Maritime technical universities.

Such situation is mostly determined by special position of psychology in the system of sciences. Reflecting the biosocial and dual human nature, this area of scientific knowledge is closely connected with both natural and humanitarian sciences.

The connection of psychology with the knowledge of natural environment is based on the reflection of reality by the mechanisms of human creature as the representative of biological species “Homo Sapience”, which have the anatomical and psychological nature.

But, being a person and unit of social consciousness, the individual brings to the picture (created on the basis of biological structures and functions) of the world the elements of understanding and explanation. In other words, as the subject and the object of processes, reflected by existing reality, the person is definitely exposed to natural and socio-cultural factors [4, p. 36].

An example of this is the socio-psychological concept of "professional level". The specialist of any profile (including a sailor-fisherman) determines this characteristic, which reflects the contractor’s degree of skill, not only by such genetical feature of human psychology as individual “makings of abilities”. But also by his peculiar socio-psychological qualities, known as individual “abilities”, which are not given to the man from birth, demand the special training for their development and come from individually typical properties of personality - temperament, character, as well as the social conditions for the formation of personal values, goals, orientation of psychological positions, motivation, and so on [5, p. 62, 82].
On this basis, analysis of this article’s main problem would remain incomplete if it does not specifically consider the content and conditions of professional work, made by fishing fleet specialists.

**Specific character of professional work made by fishing fleet specialists in the sea**

For example, let’s briefly disclose the essence of theoretical positions about specific features of the work done by marine specialist-navigator, which professional activities are the most complicated.

First of all, there is a need to say, that all seafarers with various levels of training perform activities within the system “person-ship-person”. And, in this regard, the work of marine engineer - navigator today, under conditions of automated systems for operating the ship traffic, is by professional content the work of an operator within the system "person-machine".

Therefore, the navigator has to solve problems caused by specificity of system’s functioning. The performance criterion of the working operator is the reliability, i.e. accuracy and timeliness of work due to a certain expenditure of energy potential of the organism [6, p. 9].

These criteria have the temporal, psycho physiological characteristics of sensory motor actions, thus reflect the subjective, psychological views and the perceptual world of the specialist. [7, p. 284].

On the one hand, the navigator: captain or his assistant should perform the functions of manager, who leads operators and other crewmen and must solve mostly educational and organizational tasks.

And in this case, the criteria of efficiency in navigator’s special activity are his personal qualities including communication and organizational skills. Some authors believe that the management actions are the main part in navigator’s work [8, p. 394].

If we talk about the working conditions of maritime engineers in the fishing industry, we should admit the following: undoubtedly, the general conditions existing on fishing ships have much in common by its factors - climatic, sanitary-hygienic, socio-psychological – with the work on cargo ships. But there are also differences due to specific content of activities on the both kinds of vessels.
Thus, the workload of fishermen is mainly associated with the necessity of intense search for the fishing objects, maneuvering with great trawl in areas with large concentrations of ships, frequent moorings in the open ocean and many other factors, leading to mental and physical stress.

In this regard, the following factors of the working conditions on fishing ships get the priority:
- rigid psychological dependence on instability of fishing conditions;
- uneven workload intensity;
- excessiveness of monotone noises and actions (noise of vessel equipment mechanisms, considerable amount of monotonous manufacturing operations on fish-processing conveyor);
- high intensity of work in complex meteorological and navigational conditions in the case of fishing luck;
- long-lasting isolation of crewmen from usual life conditions and communicating with family members [9, p. 71,83,84].

All of these factors negatively affect the physical health of fishermen as the persons working in the sea, greatly reduce the energy potential of the human body and upset the normal functioning of his perceptions.

Experts in the field of professional and labor psychology consider such factors as "stressors", due to the widely known concept of "stress" – a term introduced into scientific literature by Canadian scientist H. Selye.

According to the author, the stress is always the same complex of gradual adaptive reactions in response to the difficult environment conditions, or temporary functional tension the life of the person [10, p. 34-35, 105-106].

Russian psychologist F.B. Berezin has considered the mechanisms of human mental adaptation under stress conditions and physiological mechanisms that determine person’s behavior and set close correlations between:
1 – mental adaptation and micro-social processes in groups;
2 - adequate mental adaptation and professional success;
3 - violations of mental adaptation and the development of certain acute and chronic pathological conditions [11, p. 131, 157, 236].
From this standpoint, there are the following stressors in the professional activities of fishermen:

- threat of accidents and injuries;
- isolation;
- lack of information and the monotony of the situation;
- domestic problems;
- difficulties in establishing contact with the new crew members;
- economic and commercial factors.

The significance of the socio-economic stressors in the work of Far Eastern fishing fleet seafarers (under the conditions of market economy) was widely considered in the monograph by R.D.Minina. Based on the rich empirical material of own sociological researches the author makes a deep analysis of adaptation processes with regard to fishing work. Moreover, she examines in complex way the socio-psychological characteristics of the individual in the conditions of changes in the social environment [12, p. 11, 34, 98].

The work of R.D. Minina has been made in the classic methodological way of dialectical materialism and reveals the essence of person’s mental adaptation from the positions of synthesis of biological, psychological and social sciences. On this basis, the author interprets the term "adaptation", including in it the implementation of human life in a particular environment and socio-spiritual development of the individual on the basis of its biological features, in accordance with the scientific-technical and social progress.

As for traditional (outside the framework of specific professional activities) mental, physiological and medical aspects of adaptation there is an urgent need for a deeper qualitative analysis of their specificity for the fishing fleet due to the emergence of new market economy.

On the one hand this is due to the fact that the extreme conditions of human activities at the sea reduce the mental and physiological adaptive capacity of human organism thus leading to violation of the health, to the development of various industrial and professional somatic diseases. On the other hand, such conditions, reducing the possibilities for psychological individual adaptation, may cause mental disorders among the personnel of fishing ships.
This is confirmed by empirical studies performed by the staff of Far Eastern State Technical Fisheries University (Dalrybvtuz) on fishing ships in the Far Eastern region.

In particular, during the fishing voyages and recreation onshore the specialists in psychology and medicine conducted a study about the specific manifestations of psychoneurotic disorders among the personnel of fishing ships and the necessary forms of their prevention. On the basis of multifactor comparative analysis of survey data on typology, syndromes, structure and dynamics of mental disorders occurring among the crew members of various fishing professions it was revealed that the most frequent are neurotic reactions and disorders, neurotic conditions and forming of personality in this way [13, p. 16, 24, 72].

Based on the facts of clinical and psychological analysis considered in above mentioned work, and on the basis of information available in the literature, one may conclude that the mental disorders of the persons from administrative personnel of fishing ships have a negative impact on production efficiency and quantity of sea accidents.

According to world statistics, about 60% of all sea accidents are caused by “human factor”, i.e. by errors committed by man. While navigation is an activity where a person has no right for error, since he is responsible for the safety of the ship, the health and life of people, entrusted to him.

In this regard, marine engineer, performing the functions of the navigator, must be able to solve independently professional tasks concerning management of the ship, be prepared for an objective assessment of safe navigation, to use effective measures for preventing navigational accidents. In addition, carrying out managing functions he must acquire the skills of psychology, self-government and management of ship's crew in difficult navigational situations. Only if marine engineers have developed aptitude for interpersonal communications they may lead the team, organize the people for collective work and therefore to ensure the trouble-free operations and the safety of navigation.

Undoubtedly, professional knowledge, skills and abilities of a person of any profession are acquired during practical experience, which is accumulated over the years. However as for marine engineers, studying in universities, this process can be accelerated
through specially organized training courses in the field of marine psychology.

**Professional psychological competence of mariners-fishermen**

Since 1993, long before adoption of “Amendments of the Philippines”, Far Eastern State Technical Fisheries University (Dalrybvtuz) provided the discipline “professional maritime psychology”. Its real introduction in the educational process is carried out by university teachers, who are experts in navigation, medicine, physiology, and psychology. At the Department "Management of the ship" there was developed a unique program of the discipline that included lectures, practical classes and independent work of cadets/students on medical, psycho-physiological and socio-psychological aspects [14, p. 50 - 52].

The theoretical basis of the program material is not only information from published sources, but also the results of own research on the identification and study of professionally important personal qualities that determine the reliability of maritime specialists, included in the crew of fishing boats [15, p. 63-64].

The essence of program’s material is based on the principles of synergetics - theory of self-organization of nonlinear, complex, open, non-equilibrium systems (and specific subsystems, for example, parts of technical devices, animals, people) of any nature, in its development seeking balance and transition to a qualitatively new phase with an ordered structure [16 pp. 8 – 9, 11].

At the lectures cadets/students get acquainted with theoretical concepts of maritime psychology. These concepts are based on single ergonomic unit of knowledge about the working man from the fields of maritime psychology and physiology, medicine, hygiene, pedagogy, management, sociology, economics and the scientific organization of labor.

In practical classes future fishermen acquire available knowledge: how to make express-diagnostics of personal characteristics, as well as individual mental conditions in extreme situations of maritime work – stress, frustration, panic and many others.

The discipline “professional maritime psychology” includes active forms of education aimed at the development of independent
thinking and the ability to solve on level expert the nonstandard professional tasks.

The aim of active learning methods among marine specialists is not only the development of abilities or skills to solve such problems in a traditional way, obtaining as a “reserve” automatic stereotype of actions that must be performed. It is also the development of personal abilities in every individual to think and to understand their actions at every moment of time, because the problems, circumstances and situations of human life and activities in the sea are subject to frequent changes.

The most widely used method is auto psychological diagnosis, when cadets/students learn under the supervision of a teacher their own psychological characteristics, which after that are compared with some standard set (list) of professionally significant personal characteristics of fisherman, defined on the basis of expert assessment in the course of empirical research [17, p. 11, 45, 85]. Statistical processing of the research data was collected by means of rank correlation.

When there is a discrepancy between the personal psychological portrait of a marine engineer and the "normative" model of a professional navigator, then due to the qualitative changes in the dynamic characteristics and according to the laws of synergetics the personal activity of a trained person is aimed at the correction of psychological qualities, if they differ from standard norms.

Therefore the data received from the cadets/students during individual psychological testing with blank tests for rapid diagnosis makes it possible to assess the personal level of mental qualities: stability of attention and flexibility, speed memory, quick thinking, accuracy of psychomotor reactions, necessary for future marine specialists.

In the similar way, with the help of test-questionnaires, observation and interviewing the subject under test shows his qualities of leadership, responsibility, the level of organizational and communication skills, the ability to unite the team.

These qualities are necessary for the expert of vessel’s command personnel in order to perform successfully the management functions. With a purpose of their development as well as adaptation of future navigators to modern stressful conditions of market
relations, there are conducted socio-psychological trainings, which are based on vital experience of individuals and specific semantic field of cooperation. These trainings help to form the skills of interpersonal interaction, flexibility in communicating with other people.

In practical trainings the students learn such personal qualities as temperament and character, values, needs and motives that define the individual features of behavior in conflict and stressful situations. Their training and development are implemented at the request of the trainee/student with the help of corrective techniques and exercises based on subject-subjective relationship between teacher and student [18, p. 209-212].

We offer a professional and person-oriented methodological approach to the development of psychological knowledge by future marine engineers. This approach provides with non formal and axiological attitude towards psychology as a practical tool for upcoming activities. This ratio significantly affects the whole course of students’ training and education, helping to improve their level of integrated competence, determining the appearance of dominant interests in the field of marine psychology, and focuses on solving urgent personal and professional issues by psychological means.

We have developed methodological foundation used in the work since 2011 by the “Center of psychological training and rehabilitation of seamen” in the Far Eastern State Technical Fisheries University (Dalrybvtuz). This Center is involved in the programs of retraining and advanced training of marine specialists, and, in addition, provides psychological and psycho-hygienic assistance to the sailors who are preparing to leave in the sea.

In our view, taking into account the requirements of “Amendments of the Philippines", the level of deceases and specifics of marine working conditions during the stay in the sea, peculiarities of market relations in a global society, the educational training of marine engineers, which forms their specialized professional competence, must include professional psychological component aimed at the formation of specific psychological competence.

This refers to such competencies, which will be able to provide for any specialist of maritime profession the ability of optimal adaptation to unusual, sudden and extreme conditions of working
activities during stay in the sea. Such competencies, in our opinion, are, at least, the following:

1) **Extreme psychological**, as the readiness of marine specialist to act quickly, accurately and reliably in unusual situations. The work at the sea is accompanied by these situations due to the unpredictability of hydro-meteorological factors, accidents and breakdowns in the work of crew members and ship’s equipment, terrorism, personal crises, etc.

2) **Management psychological**, as the readiness of marine specialist to perform the leader functions in the ship’s crew and to manage effectively the actions and relationships in the sphere of production, using the laws of the management psychology.

3) **Communicative**, as the ability of marine specialist to interact effectively in social and industrial environment on the vessel, based on the communicative knowledge, skills and professional qualities required from marine engineer.

The effective tools for university training of marine cadets/students include, as can be seen from literature and empirical material of this article, the training of psychological knowledge in the framework of the program of discipline "Professional marine psychology" [19, pp. 2 - 6].

In conclusion, I would like to add that on international level the question about teaching the basics of marine psychology for future seamen has been raised for the first time in June 2010 within the frame of diplomatic Conference for the adoption of amendments to the International Agreement 78STCW and Code. At the same time there were introduced the new standards for professional training of marine specialists in psychological knowledge, skills and abilities, which develop the leadership qualities, abilities to command crew members, unite the team, as well as to understand the situational environment and associated risks.

The adoption of "amendments of the Philippines" required the revision of programs and educational plans on the subject "Professional maritime psychology" introduced in Far Eastern State Technical Fisheries University. Our experts have prepared the programs of psychological training, including training on basic and advanced educational competencies, required by Manila amendments.
Today, the topics of working program on the discipline "Professional psychology" cover almost the entire list of issues falling within the competence "Use of leadership and management skills" (section A-II/2). However there is a need to correct the number of hours and the name of the discipline in order to make similar with the terminology adopted in STCW 78 [20, p. 149-152].

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Abstract: The priority direction of modern science about healthy nutrition of the population is the development of principles of technology of functional food products, allowing quick and effective correction of nutritional status. Functional foods should be consumed regularly as part of the normal diet, while improving physical and mental health, preventing or reducing the occurrence of diseases. The value of products from aquatic biological resources in the organization of functional nutrition is that they contain complete proteins, fats – natural sources of unsaturated fatty acids, various biologically active substances, necessary for the body. Accordingly, they are able to retain their functional activity in the finished product in case of differentiated approach to the composition and rational treatment of aquatic bio resources.

Keywords: healthy nutrition, functional products, alginic acid, biological resources, biopolymer, fishing industry
modern science about healthy nutrition of the population is the development of technological principles of functional food products that let to correct nutritional status quickly and effectively.

Functional products designed for a wide range of consumers, have the appearance of ordinary food. They can and should be consumed regularly as part of normal diet while improving physical and mental health of the person as well as to prevent or reduce the occurrence of diseases.

For the first time the term "functional food" has been used in Japan since 1984. Initially, the concept of functional foods was developed by Japanese and later American and European scientists.

For European countries the concept of positive nutrition is a fairly new and reflects the latest trends of development of food industry. According to "Scientific Concepts of Functional Food in Europe” the food industry has a unique opportunity to improve the health of the population through the organization of production and market launch of a new category of food – products of functional nutrition.

In recent years, Russian manufacturers are also focused on manufacturing products that are useful for health. In our country the market of functional foods is being gradually formed.

Status of functional foods is defined in the Russian Federation GOST R 52349-2005 and amendments to GOST No. 1 of 2011.

The development of manufacturing of functional products in our country will be a result of the implementation of the Concept of state policy in the field of healthy nutrition for the period until 2020, adopted by the Russian Government. As priority task the Concept proposes the creation of conditions for development of domestic products for healthy nutrition.

Value of sales of functional products in Russia is constantly growing. From 2006 to 2010, the market turnover increased by 60%. According to the forecast of the company “Business Stat”, value of sales of functional products will grow in 2015 by 36% comparing to 2011.

Dairy, breads, porridges and cereals are most actively growing segments of functional products in domestic market. In other segments the fortified foods, including made of aquatic biological resources, are still slightly presented (table).
It is known that aquatic biological resources - fish, invertebrates and algae, are physiologically valuable food raw materials which include ingredients with functional properties.

The value of products from aquatic biological resources in the organization of functional nutrition is that they contain complete proteins, fats - natural source of unsaturated fatty acids, various biologically active substances, necessary for the body.

Accordingly, in the case of differentiated approach to the composition of aquatic bio-resources and their rational treatment they are able to maintain their functional activity in the finished product.

An example of such approaches is manufacturing of products from raw materials with obvious physiological value: seaweed, sea cucumbers, cartilaginous body parts of fish, skin, liver, milk, eggs, etc.

So, for instance, the seaweed, as a source of dietary fiber, microelements and alginic acid is capable of binding in the body the ions of heavy metals, radionuclides and is widely used in technology of manufacturing culinary products, preserves and canned goods developed by Far Eastern scientists.

This technology has been developed by Far Eastern scientists and implemented in manufacturing of bio-gel derived from seaweed, products that have a gel as the basis, as well as gelatinous and emulsion products from red algae and sea grass, which are recommended for a treatment and prevention of gastrointestinal diseases.

Now there are some recipes of jams on the basis of laminaria intended for nutrition of persons with cardiovascular diseases and hypertonia.

<table>
<thead>
<tr>
<th>Product</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>8.9</td>
<td>11.0</td>
<td>13.64</td>
<td>16.37</td>
<td>15.58</td>
</tr>
<tr>
<td>Breads</td>
<td>27.78</td>
<td>33.39</td>
<td>44.62</td>
<td>36.74</td>
<td>40.56</td>
</tr>
<tr>
<td>Porridges</td>
<td>0.4</td>
<td>0.32</td>
<td>0.45</td>
<td>0.49</td>
<td>0.61</td>
</tr>
<tr>
<td>Other functional products</td>
<td>4.12</td>
<td>5.02</td>
<td>7.07</td>
<td>7.51</td>
<td>9.06</td>
</tr>
</tbody>
</table>
While examining canned seaweed it has been determined that after sterilization the amount of alginic acid is maintained on a fairly high level (up to 12-18 %) that lets to recommend their use in functional nutrition.

Specialists of TINRO-center have developed technology of manufacturing canned sturgeon, which contains biologically active components involved in the restoration of cartilage tissue when the joints are affected. Canned anadara and spisula (kinds of mollusc), sea cucumbers and fish are a source of macro- and micronutrients, vitamins B2, C and E, sea cucumbers and fish help to improve antioxidant protection of the body. It has been determined a therapeutic and preventive action of canned herring sardines in the prevention of cardiovascular diseases.

The recipes developed for new emulsion products – mayonnaise with hypocholesterolemia, antioxidant, adaptogenic properties include laminaria, sea cucumber, milt pollock.

Modern technologies of manufacturing functional products from aquatic biological resources also imply achievement of functionality through compilation and optimization of recipes.

Chopped semi-finished products containing seal meat, fish component and the plant component from a beet are designated as functional due to presence of biologically valuable fish fats and proteins.

Scientists have developed the technology of biochips on the basis of protein mass, made of little-valuable fish raw with the addition of corn and oat flour that meets the daily requirement for the indispensable amino acids, polyunsaturated fatty acids and minerals.

It should be noted that during storage and while cooking native properties of aquatic biological resources are being partially lost. In this case, in order to reimburse valuable substances destroyed during processing or storage it would be appropriate to use a different technique for getting functional foods - targeted application of functional ingredients.

In order to impart additional useful properties to the products made of aquatic biological resources there have been developed technologies to include vitamin and mineral premixes and other biologically active substances in the composition of traditional products.
As a promising approach to the problem of creating functional products you can consider using chitosan - a multifunctional additive which is non-toxic, harmless, widely used in medicine and promotes physiological activity.

This biopolymer derived from the shells of crustaceans can be applied simultaneously as a functional ingredient and as a technological component to regulate the structure of food items, protect them from damage as well to increase their biological value.

Scientists of Far Eastern State Technical Fisheries University (Dalrybvtuz) have developed technology of manufacturing wide range of food items using chitosan: salted and dried products of salmon, laminaria, canned crab, canned fish and vegetable of roll type, similar products (crab sticks, analogue of caviar).

In the separate products chitosan was used in conjunction with sodium alginate, which provided a high organoleptic properties, biological value and durability in storage of finished products.

In all cases, this biopolymer shows clear medico-biological effect, which is equivalent to lipotropic action, confirmed in experiments on biological objects. That lets to designate new products as functional.

Work in this direction is going on.

The most promising are technologies of manufacturing chilled products from aquatic biological resources with the use of barrier properties of chitosan, culinary products and application of polyelectrolyte biopolymer complexes in combination with other functional ingredients.

Further search of the most effective and reliable ways of processing of water biological resources, ensuring the safety of food products, increasing their nutritional value and excellent functional properties is an important technological problem in the fishing industry.
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MARINE SECURITY IN ASIA-PACIFIC
AND MODERN RUSSIAN INTERESTS IN ASIA

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Abstract: This article deals with the problem of marine security in Asia Pacific and modern Russian interests in this region. Author pays attention to the economical, political and military cooperation in the region and counteraction of such threats as international terrorism, piracy, territorial contradictions at sea, developing of Russian image in the region.

Keywords: marine security, Asia-Pacific region, economic cooperation, terrorism, piracy, navy, Russian image

The problem of international terrorism rose in 2015 all over the world and now marine communications need to be protected from piracy threats and terrorism [2]. Now in Asia-Pacific such threats are not very urgent, but in nearest future are apt to increase and be amplified. Russia as one of regional biggest countries can play a significant role in the processes of marine safety. The quality of Russian role in international marine safety depends on several factors.

At present Russia strives for developing economical relations with key countries of the region. The main goal is to realize the foreign policy conception of «Eastern turn», declared in 2014. Another goal of the Russian government is to develop the so called “territories of outstrip economics and social development” in the Russian Far East by initiating “free port” regime in Vladivostok and in South areas of Primorsky region. All these economical projects are internationally oriented and their implementation directly depends on the security of free trade communications.

Russia has adequate military means and enough experience necessary for providing such security. For example, some years ago light missile cruisers of Russian Pacific fleet “Marshal Shaposhnikov” and “Admiral Panteleev” performed security escorts of trade vessels on the routes near African Horn and North-East
Africa. Also Russia regularly conducts joint marine exercises with fleets of India, China and other Asian countries. They often imply opposition to the threats of terrorism and are successfully carried out [1].

Now, Russia has two main opportunities in this case. First, the real economical development in Asia-Pacific. Unfortunately, today Russian trade exchanges with Asian economics almost have no rise. There are several causes of this problem. High electricity costs, high prices on heat supply, weak transport infrastructure within Russian Far East, lengthy customs procedures for declarants etc.

Nevertheless, Russia goes ahead and develops the above-mentioned and similar projects, aimed at the development of transit cargo traffic.

For example, the project of “free port” in Vladivostok must promote the plans for transit transportation from North-Pacific Asia to Asia-Pacific and from Europe to Asia. The main part of these cargoes is expected to be containers. Nevertheless, there are projects of grain, coal and bulk cargoes transcontinental transportations also. By the way, Russia has stable oil and gas transporting routes from seaports of the Far East to the Asia-Pacific. For example, oil and gas output from island deposits on Sakhalin and exporting to Japan, China, Korea and other countries of the region. Also Russia has gas and oil transporting routes from Siberia to Primorsky Region seaports [4].

Another theme is Russian Arctic projects aimed at the creation and maintenance of transit sea routes through the north seas from Europe to Asia-Pacific. Such ways as well need to be protected.

Second, Russian military influence on the security in Asia-Pacific, fundamentally based on Navy forces [3]. Along with the economic development of the Far East such possibilities need to be widened in order to exclude terroristic and piracy threats.

In nearest years Russia will have to strength political and economic influence in Asia-Pacific. For this it must take part in peacekeeping processes in the region. Most of them come from territorial contradictions between countries of Asia-Pacific and North East Asia. For example, there is territorial dispute between China and Japan about so-called Senkaku (Jaojuidao) islands in South China Sea. The dispute is based on economical and political causes and regularly leads to deterioration of Japanese-Chinese relations [7].
Though such regional contradictions are rather stable they need to be reduced.

One more problem in Asia-Pacific today is the strengthening of military potentials in the key countries. China, South and North Koreas, Japan, Vietnam, India and others gradually increase their forces, first of all missile systems and Navy potential, warships and so on. Taking into account the existence of territorial and other contradictions, such circumstances may lead to the local war conflicts on the seas.

In that case, Russia now needs to have Pacific policy based on two main strategic ways.

First, there is a need to develop political influence in the region. This goal can be achieved by ensuring the marine security and modernization of Russian sea forces consisting of Pacific fleet and border troops.

Second, it is necessary to develop in the region serious economic projects, which must also be protected.

Another permanent menace is international terrorism. Russia has good experience to avoid such problems and solve them.

It seems that the most perspective way is to develop Russian cooperation in Asia-Pacific in both ways: political and economical. It will provide wide opportunities for regions and may assist to develop Russian Far East with the help of investments from Asian countries.

The first Russian steps in this way must be following.

First, more close cooperation with China, Vietnam, Japan and both Koreas. All military exercises and projects must be related to maritime security, because this problem is important to all key Asian countries.

Second, Russia may use its counter-terroristic experience in the process of collaboration with above-mentioned Asian partners. Marine security plays very important role in this case because of many potential terroristic threats on sea communications in Asia-Pacific.

Third, Russia may develop its military potential in the region, based on regular marine trainings, modernization of warships and other Navy means.
Fourth, Russia may play the role of peacekeeper in regional and territorial conflicts in Asia-Pacific, including disputes around islands, archipelago and maritime space.

Fifth, Russia must ensure a guarantee of protection for its international economic projects in Asia-Pacific. Such initiatives as “free port”, transit container lines, Arctic trade ways, oil and gas transportation routes from Russian Siberia and Far East to Asia-Pacific recipients need to be defended from terroristic attacks, piracy and similar threats.

Sixth, Russia needs to maintain its image in Asia-Pacific as strong and open country, oriented on cooperation with Pacific neighbors [6]. Information about Russian projects in the Far East and other initiatives may help to improve relations on the key issues with the partners in Asia-Pacific [8]. Russian image in Asia-Pacific may affect on economical cooperation and multilateral security in the region, including naturally marine security as well.

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ORGANIZATION AND REGULATION OF SHIP TRAFFIC IN THE EASTERN BOSPHORUS STRAIT (PORT OF VLADIVOSTOK) DURING CONSTRUCTION OF THE BRIDGE TO RUSSKY ISLAND IN 2008-2012.

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Abstract: The author was directly involved in the implementation of project’s marine component during construction of the bridge to Russky Island in Vladivostok. He proposed unique solutions, which assisted to overcome the natural and technical difficulties, made the construction process much more efficient and allowed to meet its deadline. The article also examines the process of interaction between state and public structures for solving issues related with the bridge construction, for example, maintaining the intensity of ship traffic in the surrounding marine environment.

Keywords: Eastern Bosphorus Strait, marine component, general contractor, mooring ring, “dead anchors”, Ships Traffic Control Center, bridge span beams

The events depicted in the article, took place on the stage of preparation and construction of a span bridge over the Eastern Bosphorus Strait since March 2010 till April 2010.

During this time 5123 ships with the sizes 50 – 340 meters in length visited and left the port. In total it is 10246 operations. To this we must add another 5454 inland port operations (data of the Ships Traffic Control Center). The port worked day and night, the works on bridge construction were also conducted in the same regime.

Obstacles

Closing of the port or the stopping of the ship traffic are inexpedient because the port of Vladivostok is international and it handles not only the tram vessels but also linear ones, having hard regular schedule. Foreign cargo owners, whose goods are transported
by ships, did not care about our concerns regarding the construction of the bridge. Thus, the determining factors are the hard deadlines of the construction of the unique bridge, designed for the first time in Russia. The conditions for implementation of these multi-purpose problems were based on the fact that all traffic in the port of Vladivostok is determined and governed by the naval base, for which the warships and their exercises have the paramount importance.

The next important obstacle that could really disrupt the schedule of the bridge construction is heavy ice cracked by the ships and moving to the open sea due to the Strait current and wind action. For this reason, mooring rings (rafts) were turned over and went under the ice, and at the top layered ice hills and frozen ice floes have been formed.

The construction of the bridge did not stop even after the interruption of the working process in the port when the wind is over 17m/s.

It should be noted that with the start and during the construction of the central span of the bridge over the Strait it became necessary to formulate the concept of integration of its marine component in the complex scheme of the varied port activities, which is strictly regulated in accordance with international and national law. The port rules, regulations and instructions developed on its basis define a clear interaction of all port departments, including naval ships.

During construction of the bridge to Russky Island millions of tons of cargo, including concrete, inert cargo, construction materials and metal structures, as well as the builders of the bridge were transported across the Eastern Bosphorus Strait.

**General contractor**

General contractor – JSC “UCC MOST” faced with the situation – to prevent malfunction of the port. It means that the port should function as usual, since all participants in economic and commercial activities are strictly connected with contractual obligations. Even storms, fog, ice conditions and the change of navigation channel due to the constant shifting of up to eight 30-ton dead anchors were not taken into consideration.

It became clear during very first discussions organized by state contractor that conventional methods will not work to solve the
problem, and there is a need to find new methods for organizing port traffic and ways for their implementation. The successful solution of the task demanded to change the marine component of the project in favor of practical ways. This work had been completely performed.

Since 2010 the preparation for solution of a next problem began: the removal of bridge beams (with weigh up to 180-370 tons and an area greater than basketball field) for installation on the seaside of the Eastern Bosphorus Strait.

First of all, the following tasks were posed and being solved:
- Development of marine component of the project of bridge construction with multiple ways to deliver beams for installation in the channel;
- Selection of optimal floating vehicle for transporting metal beams of the bridge span to the place of construction.

![Fig.1. Map of operational zone of the bridge construction to Russky Island](image)

The general contractor, JSC "UCC MOST", was obliged not only to build a bridge, but also in maximal extent to save allocated budget money. Therefore, after choosing between new and old types of floating facilities for supplying metal beams of the bridge span to the place of installation in the Strait, stopped at the old pontoon
formerly used under floating crane. Institute “Giprostroymost” performed a project of reinforcement and arrangement of pontoon’s deck for loading and transportation of steel beams, both single and double.

In the end of April 2011 the floating facility was ready for exploitation. Simultaneously, the development of project’s marine component was being continued, in other words how to transport the floating facility to the navigable part of the Strait, put it on a dead anchor and use for installation of beams.

![Fig. 2. Towing of pontoon with dual beam aboard](image)

The Institute (its Moscow branch) for the first time had to do project for the marine environment with complex hydro-meteorological components including the effect of wind, variable currents and water storm acting against or in the direction of water currents.

The Institute has not conducted study of these factors, including the most important one: the influence of ice conditions in the Strait on transportation, setting of “dead” anchors and positioning of floating facilities in the channel. Obviously, it happened due to stereotype developed by Institute in the projects for river conditions. The advices of marine professionals having a good knowledge of local conditions, especially the Strait’s hydrology, had been ignored.
Marine component

The meeting of 26 January 2011 in Administration of Vladivostok seaport can be considered as the starting point in the process of solving of project’s marine component.

The meeting was held at the initiative of General contractor (JSC "UCC MOST") in connection with Institute’s persistent request to coordinate the project’s variant and technology of positioning of floating facilities with the bridge metal beams on board at the operational water area of the construction zone.

The view was expressed that this project is unacceptable for successful implementation in our environment due to the proposed stretching cable length of 710m and section - 27mm. The work with cables of such length in ice conditions would have been impossible, considering the ice motion and heavy frost on mooring rings, including their turning upside. Also it would have necessary to block the traffic in the port.

It was decided to establish a working group consisting of representatives from organizations, which ensure the safety of navigation and construction works in the port waters and in the area of bridge construction: "Administration of Vladivostok seaport, JSC "UCC MOST", JSC "Norfes", pilots of "Rosmorport" (federal state enterprise) and LLC "Port fleet". The working group was required to make a comprehensive assessment of the proposed project and give out recommendations for its implementation by January 31, 2011.

The next meeting of Vladivostok seaport working group was scheduled on February 09, 2011, considered questions about approval of the Working group and obligation of JSC “UCC MOST” to finalize the preparation of draft scheme for the works on construction of bridge slabs over the Eastern Bosphorus Strait. When ready it had to be submitted for a comprehensive assessment by February 15, 2011.

The meeting of February 15, 2011 had one question in the agenda: approval of the newly proposed scheme of arrangement of floating facilities in the place of construction of bridge slabs across the Strait. Institute “Giprostroymost” added only one change to the project - truncated mooring winch cables up to 300 meters. It hesitated to answer how to work with floating rings and mooring barrels in ice conditions with the removal of ice.
Mooring (floating) ring may be described as a “raft” consisting of metallic cylinders with pulpit railing and wooden deck, connected by two buoy ropes with “dead anchor”. According to project three specialists in mooring disembark at the “raft” and connect the winch cable of floating system with mooring barrel linked with the same “dead anchor” by a separate buoy rope of 60 meter length.

Its representative drew attention to the fact that according to project traverses of lifting device when connecting with metal beams shall not deflect by more than 35 cm from the vertical. Therefore, the representative of construction company “Mostovik” calculated deflection of hoist winch cables (their length is 70m) from the vertical in case of floating device’s displacement on one meter to the side. The calculation showed that this value is equal to 1 degree.

It became clear that in case of reducing the load on the floating device during partial lifting, you should ease off mooring ropes attached to the “dead anchors”. So the central part of the beam will shift just under the vertical. Further on the problem will not occur as it had been proven by experience during sea flights when loading cargo aboard heavy barges and bulldozers by vessel’s boom, even in the conditions of storm excitement. The testing of floating device in the Strait, including putting and removing of “dead anchors”, was scheduled for mid-May of 2011.

The next regular extended meeting of the working group with the participation of representative of Russian Ministry of Transport and agenda: approval of the scheme concerning setting boats on “dead anchors” during construction of channel span of the bridge to Russky Island was held on March, 29, 2011. After the speeches of participants, the Director of Federal Public Administration for construction of roads proposed to be based on the opinion of the Adviser on Maritime security of JSC "UCC MOST": to begin work on development of Regulations for the organization and regulation of shipping in Vladivostok seaport with the subsequent completion of the project schemes concerning arrangement of boats on navigable channel during winter period.

Even more so, designers of JSC "UCC MOST" developed an alternative project on transportation, mooring and positioning of floating system. The company also got instructed to work together with “Administration of seaports in Primorye Region” and JSC “Norfes”, to develop and agree in the period up to March 31, 2011 the
draft procedure for interaction of JSC “UCC MOST” with all organizations of Vladivostok seaport. The interaction is necessary during performing works on installation of metal panels of the stiffening beam span in the waters of the Eastern Bosphorus Strait, providing the regulation and safety of ships, including those under command of the Headquarters of Pacific Fleet and Ministry of Emergencies. The participants of the meeting again agreed on only principal scheme of organization, transportation and positioning of floating system.

Fig. 3. Development of Regulations for the organization and regulation of shipping in the Eastern Bosphorus Strait

The general contractor JSC “UCC MOST” expressed an opinion that there is no need to expect the finalization of the project. This opinion had to be taken as a basis and then to be modified in a working order during construction depending on the circumstances and the captain’s experience as the chief of naval operations. At present moment it is important to prepare Regulations and to formulate the concept of actions defined in it, because there is no time.

The meeting discussed also a fallback option – a passage through Tokarevsky channel from Amursky Bay, but this option caused the increase of costs for ship owners by 30-40% for port access due to the use of icebreaker. Besides, the working group was instructed to develop proposals for the introduction of the ban on sailing of small boats in the area of beams’ installation for the entire period of these works and to inform small boat owners about that through television and mass-media. During lifting of each beam the
patrol of operational working zone had to be performed with the participation of fast boats of Ministry of Emergencies.

Рис. 4. Scheme of organization of small fleet movement in the Eastern Bosphorus Strait (the area of construction)

In order to ensure the construction safety there had been established the scheme of navigation in the Strait. Then it was handed on to all organizations engaged in shipping within Vladivostok seaport and published also on TV and in mass-media.

The scheme has specially marked route for small boats from the Bay of Uliss, exactly along the leading marks (green and red dotted lines).

For reference: small size fleet in Vladivostok seaport consists of 11 thousand registered units. Their main place of moorage is the Bay of "Uliss". There had been decided also to approve the working group with expanded membership, including representatives of Primorsky Krai (Primorsky Region) Administration, regional Administration of seaports, Headquarters of Pacific fleet, and regional Department of the Ministry of Emergencies.

As a rule, the principles of organization and traffic control in seaports are standard in Russia and abroad. They are defined
(formulated) in accordance with international standards of maritime safety and national legal standards and have prescriptive character (are imperative), i.e., governed by the "principle of unconditional implementation" during their application.

Under the monitoring of the Ships Traffic Control System

We were interested in the main component of the system for providing security – Ships Traffic Control System. The control center enables or disables the entry and exit of vessels depending on weather conditions, emergencies or orders of the Navy duty officer, regulates the movement of vessels through the fairway by giving advices etc. Such is the situation while the port is operating normally. But in case of difficult situations concerning shipping in the fairway the above mentioned advices become prescriptive orders.

Regulations on coordination were prepared and became effective since May 10, 2011, when 10 metal beams began to be exported across the Eastern Bosphorus Strait to Russky Island, for mounting them from the shore pylon No. 7 to a height of 70m by special crane with a capacity of 1200 tons. The Regulations were needed for prevention of further interruptions of shipping within the seaport or any inconsistencies while transporting the beams for the mounting on the Strait’s shore.

In accordance with the bridge construction schedule and articles of Regulations all the works concerning transportation and installation of the beams at the sea side of the pylons began on June, 25, 2011. The works were being done in normal mode until the moment when “dead anchors” for fixing the floating system approach the line of navigational buoys, which limit the area of navigable channel (fairway). By this time, the Regulations on coordination were elaborated and all details of procedures in terms of time, sequence and accuracy were being performed smoothly and without comments.

Particularly it is related to the Ships Traffic Control Center, which regulates the flows of entering and leaving vessels in the Eastern Bosphorus Strait in accordance with the schedule of transporting beams for installation. The Center notified all ships about beginning and manufacturing of works on installation of bridge span beams as well as about the choice of the fairway passage due to
rearrangement of the “dead anchors” or mounting of beam from floating system.

Safe process of transportation and putting floating system on “dead anchors”, its utilization for the mounting beam were provided, in accordance with the Regulations, by two speedboats of Russian Ministry of Emergencies.

The problems with providing bridge span beams for installation appeared with increasing of winter cold (as a result the fast ice began to extend from the shore of Russky Island), as well as the lengthening of the bridge consoles from opposite sides during process of construction.

In order not to disrupt the schedule of the bridge construction Advisor on Maritime security of JSC “UCC MOST” raised the question in front of the captain services of Vladivostok seaport about changing of the fairway due to the lengthening of the bridge consoles.

Up to this moment navigational green buoys from the shore of Cape Nazimov and the red ones from the shore of Cape Novosilsky (Russky Island) were installed parallel to the direction of Shkotovo input alignment, fencing the side lines of the fairway in the area of operational zones of the bridge construction. Now it was necessary to orientate them in the direction - perpendicular to the axis of the bridge. Thereby, the passages under bridge deviated from Shkotovo alignment to the right, about 15 - 20 degrees and entering ships at the distance of nearly 7 cables before the bridge had to move away from alignment, to go parallel the line of green buoys in order to cross the bridge axis at an angle of 90 degrees, and then, after going 5 cables forward to turn back again to Shkotovo alignment. The lines of movement on entry and exit from the port were now designated by exposed mooring buoys, which were clearly seen on the radar screens even in night time. Of course, information about these temporary changes was being regularly delivered to Maritime hydrographic service for notifying mariners about alerts and dangers.

Due to extension of fast ice until the fairway from the side of bridge pylon #7 on the shore of Novosilsky Cape the alternate passage for vessels was blocked by fast ice up to 60 cm thick. While mounting the beam at the exit passage the leaving ships were guided through entry passage, and entering ships used a spare one heading into the port. And while mounting the beam from the shore of Cape Nazimov at the main entry passage – entering vessels used a
spare one for the entrance to the port, and leaving vessels used the main exit passage.

Due to the increased traffic during the day, the Ships Traffic Control Center needed a clear diagram of the radar operational zone with designation of navigation marks and positions of mooring buoys. Two of them are depicted below. This so-called **innovative method** let to exclude completely the inconsistencies and errors of the operators in Control center as well as the captains of entering and leaving ships especially at night and during fog, helping them to have the clear vision of situation in the fairway of the Strait.

Fig.5. Radar diagram of vessel traffic in Vladivostok seaport (computer processed) at the intermediate stage of erection of the bridge central span
Fig. 6 Radar diagram of vessel traffic in Vladivostok seaport at the final stage of erection of the bridge span

Figures 5 and Figure 6 show the scheme of organization and regulation of shipping in the process of erection of the bridge to Russky Island.

They are also working schemes and are used as chart-boards during towing operations of floating system with the beam on board, its installation (mooring) on a “dead anchor” and positioning as a lifting device for installation. This working paper has been the source of information for clear realization of the task. The schemes were being updated after each transformation of the “dead anchors” (as the consoles of the bridge were lengthened), which was made after installation of five span beams on each side of the bridge.

The computer-processed radar picture, made in the scale of the map of the East Bosphorus Strait № 68072 depicts the following items:

1. In the right upper angle – Cape Nazimov, in the lower left angle – Cape Novosilsky
2. There are artificial mounds of soil going from the cape shore, ending with the pylons of the bridge. After that the consoles of the bridge crossing range along.

3. The operational construction zones of artificial mounds of soil and pylons designated for construction period are indicated with a dotted line with green point from the side of Cape Nazimov and with red point – from the side of Cape Novosilsky.

4. Shkotovo input alignment is marked by dark cherry color going from the lower right angle to the upper left one, direction 299,5 – 119.5 degrees.

5. Double dotted lines of the same color right and left from the alignment line designate the boundaries of the fairway.

6. The sector of the fairway, limited by green dotted line, is the operational zone of actions on transportation and installation of bridge beams.

7. Red arrows point at the distance to mooring buoys, fixed with the “dead anchors”.

8. Thin, dashed black arrows show the distance to the outermost buoys diagonally.

9. The blue dotted two-sided lines show the main and spare pass when the beam installation was done on the fairway. As well it was used during the period of considerable fast ice from the side of Cape Novosilsky.

Navigators, pilots and operators of the Ships Traffic Control Center, who possessed these schemes, could assess the situation in the Strait and react quickly on changes that occur in heavy traffic on the fairway where at the same time up to 10 moving targets were being concentrated.

Conclusion

The goal of this article is to introduce the maritime community with a new way of solution of difficult task on organization and control of ship traffic in the Eastern Bosphorus Strait of Vladivostok seaport during construction (in extreme climate conditions) of the bridge to Russky Island. This way has been used for the first time as in domestic as in foreign practice. The other goal of the article is to introduce briefly with methods and ways of practical implementation.
of all procedures in marine component of unique bridge construction project when the construction schedule is busy and the conditions are extreme.

All probable details, which might have a negative effect on the schedule of bridge construction, were carefully considered, so there happened no breakdowns and inconsistencies during realization of the project marine component and the schedule has been implemented. Also, one of the basic principles was to have in any time a backup plan in case of a bad maneuver, the failure of the tugs, the breakage of mooring ropes or errors of anyone involved in the production process.

The success was achieved due to efficient organization, to exact performance of all procedures included in Regulations on Coordination and cooperation of all port services, for example, the office of harbor master, pilotage services, Navy Headquarters and the Ships Traffic Control Center. That is to say all persons who are responsible for ensuring the navigation safety in Vladivostok seaport.

Especially great contribution was made by Ships Traffic Control System “Norfes” by their professionalism and efficient organization of navigation in the port, including the transportation of the bridge span beams for installation on navigable fairway in the Eastern Bosphorus Strait.

The question of better organization and regulation of ships traffic was put acutely, particularly in the winter season due to fairway narrow caused by fast ice from the side of Cape Novosilsky (Russky Island) and to the need for temporary change of ships traffic in the area of bridge construction operational zone. Now the navigation was carried according to direct orders of the operators in the Ships Traffic Control Center, with a mandatory orientation to sections of mooring buoys, oriented perpendicular to the axis of the bridge. The basic idea was to keep the width of the passes even in the case of fairway narrow. It could be achieved when the passes are oriented perpendicular to the axis of the bridge leaving aside the Shkotovo alignment.

The head of all operations, Adviser on Maritime security of JSC "UCC MOST" Valentin V. Sergienko (at the same time he was complied with all operations connected with transportation, putting on a “dead anchor” and positioning) had the purpose: to use the maximum potential, i.e. the resource of radar center. Together with the head of Ships Traffic Control System N.N.Vishnevsky he made
requests and recommendations, according to which computer-processed radar schemes were created for managers responsible for safety in the port, including pilots and ship captains.

This innovative method is one of the main factors, which contributed to the 100% performance in due time of the bridge construction schedule. It also revealed the unlimited possibilities of the Ships Traffic Control Center when solving complex problems in extreme situations.

The Author of the article, Valentin Vasilyevich Sergienko is a labor veteran and honorary worker of Russian Fleet. He has 25 years of trouble-free operation in the position of sea captain in the Far Eastern Shipping Company, for which he was awarded professional badge and got several awards. Also he has 14 years of working experience as a senior pilot both abroad and in Vladivostok seaport, rich experience of ice navigation.

He was a key figure in the practical implementation of marine component in the bridge project, including the development of Regulations for cooperation of port services, responsible for safe navigation in Vladivostok seaport.

He also personally managed all operations for removal of bridge metal beams for installation, carried out pilot operations and reinstallation of “dead anchors” in the fairway.

He changed the marine component of the project developed by the Institute “Giprostroymost” and used the new-type mooring buoys of ice class made according to his designs. These buoys have a
special method of fixation, which lets to reduce the time of transport operations for mounting of bridge beams from 6 - up to 2 hours. Because of this the bridge construction schedule was strictly kept.

For his services he was awarded high government awards – the medal of the Order for merits before Fatherland of the second degree.

He is currently a fellow-researcher of the Center for investigations of marine accidents and incidents in Admiral Nevelskoy Maritime State University, Vladivostok.
MODERN WAYS OF PROTECTING HYDROBIONTS
FOOD PRODUCTS FROM DAMAGING FACTORS

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Abstract: The article considers the technology of secure preservation of aquatic raw materials with the aim of obtaining high quality products. Conservation must preserve the product’s biological value, characteristic aromatic properties and consistency, the ability to maintain stability during the storage period. One of the ways is the production of lightly salted products based on modern technologies such as the use of chitosan.

Keywords: aquatic raw materials, consumer properties, lightly salted products, barrier technology, chitosan

Fishes and invertebrates are food sources, which are the least resistant to storage. Safety food products from hydrobionts as their most important property is ensured in modern production by maintaining microorganisms in a state of anabiosis or by creating conditions for their death.

Guaranteed conservation of aquatic raw materials by heat sterilization, freezing, heavy salting, smoking and level control of water activity can not allow producing high quality of products as it is accompanied by decrease of their biological value and, importantly, specific flavor and texture properties. In addition to the mentioned above, the food products produced with using hard technologies, despite their microbiological safety and ability to remain stable over a long period of storage, in many respects do not meet the requirements of healthy foods[1, 2].

It should be noted that in the course of release of salted and smoked products the problem of salting strength becomes more topical nowadays. Conducted biomedical studies show adverse effects of elevated level of sodium ions in blood on human organism. This is
indicated by numerous publications of national scholars. Therefore, the central focus of scientific researches in the field of salting is the development of technologies of lightly salted production, which is currently recognized as optimal and promising as it helps to obtain a product containing strictly specified amount of salt distributed equally throughout the product [3-5].

At the same time, products made with using saving mode and having high consumer properties, are unstable to storage. When the salt concentration in the product does not exceed 4 - 5%, the storage is accompanied by discoloration, deterioration of consistency and microbial spoilage. Therefore, technology of lightly salted products is based on the usage of sodium benzoate and antioxidants in salt mixtures as well as packaging of the finished product in gas impermeable and waterproof film and storing at a temperature -18°C. At the same time dilemma "quality – resistance to storage" of the finished product arises.

One of the most appropriate methods of increasing product stability is the use of barrier technology, which is known to be based on the simultaneous usage of several means protecting from damaging factors.

The barriers include both traditionally known and new compounds and means of external impact on the products microflora, including preservatives, bactericides, cooling, soft thermal processing, some types of radiation, vacuum packaging etc. [2, 6-9].

One of the new barrier trends in the production of lightly salted products is the use of sterilization for processing lightly salted fish placed into transparent polymer package. Application of vacuum packaging for the given fish production and its subsequent sterilization allow storing ready product up to use in normal conditions, without refrigeration. American Speciality Seafoods Company uses this method for processing salmonids [10].

Another method of manufacturing salted salmonids is based on finished dry salting at temperature -2 - -5°C and using salt mixtures containing sodium benzoate and antioxidants. Finished products are packaged in gas impermeable and waterproof film, frozen and stored at -18°C [11].

Choosing barrier means and compounds, despite their constantly growing variety, presents certain difficulties connected with their low efficiency, lack of indifference to the product and
hygienic properties. Therefore, our independent task was looking for new barriers, in particular natural polyamino-saccharide chitosan.

In our proposed technology of lightly salted salmonids production with the use of chitosan, the natural biopolymer has an intended purpose - barrier (antimicrobial and antioxidative) and film forming. It results in increased and improved shelf life of the salmonids production without loss of their quality.

The use of chitosan in the technology of lightly salted fish production not only extends shelf life by 1.5 times, but also improves biological value and hygienic safety of the product, which can be seen as a substantial and independent effect of applying polymers in food technology [12].

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USE OF BIOLOGICAL TESTING FOR ECOTOXICOLOGICAL ASSESSMENT OF ENVIRONMENTAL OBJECTS

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Abstract: The article presents an overview of the objects for biological testing, used in the process of ecotoxicological assessment of contaminants in the environment. For example, the results of studies of surfactant influence on the activity of the tested object - the ciliate Tetrahymena pyriformis are showed.

Keywords: biological testing, test objects, surfactants, Tetrahymena pyriformis

Biological methods of determining ecotoxicants in the natural environment objects attract attention of researchers due to their high sensitivity, descriptiveness and profitability. Using microorganisms as analytical indicators is often the only reliable method of determining small quantities of substances, as it is based on the direct impact of chemicals on living cell [2].

In recent years biotesting became indispensable element of control of water objects with toxic substances in many countries, and numerous techniques were standardized [5].

Methodological Biotesting Guide includes methods for determining toxicity with usage of crustaceans (Daphnia), algae and fishes as test objects.

Under various impacts, exceeding the limits of tolerant zone biological system exhibits temporary instability, fluctuations of its characterizing parameters increase (both average values and values of their variability fluctuate). At the same time the complex of changes called "non-specific reaction", "stress reaction" or "nonspecific adaptation syndrome" is developing in organism or cell [1].
For characterizing response of the test object to the damaging effects of environment the toxicity criterion is used as a test function in biotesting.

In recent years there was accumulation of experience in this field in Russia.

Thus, for biological testing of waste, surface and underground waters, and toxicity of bottom sediments of water objects with high level of toxicity *Photobacterium phosphoreum* is used. Toxicity criterion is photobacteria luminescence level of 50% for 30 minutes as compared to the control. The technique is provided by using special device - bioluminometer - and lyophilized bacteria culture [10].

O.F.Vyatchina and G.O.Zhdanova proposed to use *Saccharomyces cerevisiae* (fermented) culture for biological testing of objects, contaminated by petroleum products, salts of heavy metals, pesticides and detergents. Toxicity criterion is the intensity of foaming after adding glucose to the yeast suspension [3,4,5].

For determining genotoxicity of environmental objects *Drosophila melanogaster* flies are used as test objects. Drosophila has a small number of chromosomes, short life cycle, and high fecundity. It has the same metabolic activation of substances entering the body as a human. Data obtained with this test organism may be used for forecasting risks of environmental pollution for human health [10].

Zh.V.Markina, N.A. Aizdaicher suggest using *Dunaliella salina*, and *Plagioselmis* unicellular algae for determining toxic effects of detergents. Toxicity criteria are the number of microalgae, content of chlorophyll, carotenoids, and oxygen productivity [7].

For biotesting of toxicity of waste water, forages, and biological assessment of food *Tetrahymena pyriformis* infusoria is used as test object.

The advantage of the method of biotesting with using *Tetrahymena pyriformis* infusoria is connected with peculiar features of the test object: infusorians exhibit high sensitivity to a wide range of toxicants, have relatively short development cycle, combine features of a single cell and whole organism; they have acid-base type of digestion similar to that of animals, analogous enzyme system, well developed mitochondria and universal code of nucleic acids, similar to that of the higher animals [6]. Toxicity criteria are: death of cells, change in the number of cells in culture, cell fission coefficient,
the average rate of growth, daily gain of culture; character and speed of the infusorians, changes in cell shape.

We studied the influence of different concentrations of detergent solutions (AOS, Pril Balsam dishwashing liquids and Amway L.O.C universal detergent) on the vital activity of *Tetrahymena pyriformis* infusorians.

For the analysis a number of successive ten-fold dilutions of detergents in ratio from 1:10 to 1:10⁷ were prepared. The prepared solutions were dispensed into 2 ml sterile tubes. Then, 0.05 ml of nutrient media containing infusorians culture was added to the detergents solutions.

Every day specimen’s record was kept with usage of Goryaev counting chamber. Microscoped material was observed in 10 fields of view, with monitoring mobility, changes in shape of cells, and number of fissionable specimens. The time of exposure was 9 days.

When introducing *Tetrahymena pyriformis* culture into Amway detergent solution with dilution ratio 1:10, an instant death of culture was observed. In the case of 1:10³ dilution the death of cells occurred within 20 minutes of exposure. In 1:10⁴–1:10⁵ dilutions deceleration of motor functions of protozoans was observed.

1:10⁷ dilution of Amway detergent had no significant impact on the vital functions of *Tetrahymena pyriformis*. There were no deviations of infusoria motor functions. When microscoped infusoria culture, cell shape changes were not detected in all dilutions of Amway detergent.

At the same time the introduction of *Tetrahymena pyriformis* cells into solution of AOS dish detergent, with dilution ratio 1:10³ resulted in instant death of culture. It the case of 1:10⁵ dilution the death of cells occurred on the second day of exposure. Motor activity of infusoria was low. When microscoped, the deformation of protozoans was observed.

It found that the presence of investigated detergents diluted in ratios from 1:10 to 1:10⁷ in the environment leads to inhibition of vital functions of *Tetrahymena pyriformis*. AOS and Pril Balsam dishwashing liquids have a greater inhibiting effect on test-object (as compared with Amway L.O.C universal detergent), causing deformation of cell membranes.

Obtained data correlate with those of other authors studying the problem of detergents effects on protozoans.
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8. Методические указания по разработке нормативов качества воды водных объектов рыбохозяйственного значения, в

THE NORTHERN SEA ROUTE
AND ITS IMPACT ON ASIA-PACIFIC

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Abstract: Global climate changes open new prospects for economic activities in the Arctic. Transit navigation between North-Eastern Asia and Europe via the Northern Sea Route (NSR) is maybe the most promising option for export oriented economies of China, Japan and Korea. But, we should not be overly optimistic and take into account positive and negative factors influencing the progress of Arctic exploration and commercial exploitation. To avoid unnecessary risks and confrontation all interested parties should clearly understand the interests and priorities of each other, coordinate and collaborate in mutually beneficial economic and humanitarian projects.

Keywords: Arctic transit system, Northern Sea Route, ice melting, oil spill fast response, navigational incidents

The issue of bright new opportunities for Asia-Pacific economies opened by ice melting in the Northern Polar Ocean has effectively become a fashion trend today. The dominant point of view is that a new strategic sea route will be available in the nearest future, and that major East Asian nations will start wide scale commercial navigation between Asia and Europe, delivering millions of TEU (containerized cargo) to Europeans and receiving immense loads of oil and gas from the Arctic continental shelf. The concept of New Arctic Transit Route combined with images of Arctic as the “Treasure Cave” full with natural resources deposits attracts many Asia-Pacific countries, including geographically situated very far from the Arctic Circle.

As it usually happens, the real situation around Arctic and prospects for its commercial exploration and development is not so optimistic. A number of factors and tendencies tend to inhibit the
human advancement in the Arctic. It is necessary to thoroughly analyze and evaluate them to prevent possible mistakes which can have grave consequences for regional security and stability. In particular, to avoid unnecessary confrontation among Asia-Pacific nations eager to join the “Arctic Race” by all means.

Firstly, about the ice melting phenomena opening ‘clean water option’ for both shipping companies and ocean engineers constructing industrial facilities on the Arctic shelf. True, the ice was steadily melting for two decades (Rothrock at al., 2008), and melting tempo in ocean areas adjacent to Siberia coast was much higher than in Canadian sector. As a result, ice-free navigation via the NSR waterways was possible for almost four consecutive months in 2012. But, the ice situation in Laptev, East Siberian and Chukchi Seas became more complicated in 2013 and 2014. And the real problem is that scientists do not have a reliable model of climate change on the Earth in general and in the Arctic in particular. The number of research and monitoring sites in the Extreme North is insufficient, while weather and ice monitoring satellites alone cannot provide adequate coverage. For example, the major natural ozone generator in the Northern Hemisphere which is located within the boundaries of Lena River estuary was not duly monitored until recently. But, the hypothesis of direct correlation between ozone ratios in atmosphere over Arctic and weather / ice conditions on the surface (Syvorotkin V.L. 2012) is very promising as it explains the yearly fluctuations of ice cover and possibly, will be able to assist in preparing near term predictions.

Summarizing these facts and observations we must note that the effects of global warming in the Arctic are unclear at least; it would be imprudent to plan large scale commercial projects without thorough consideration and, without close cooperation with Arctic states – which have historical and geographical advantages in dealing with the extremities of the North.

Secondly, about the political dimension of the Arctic issue. In May, 2013 a backdoor to Arctic has been finally opened for Asians when five Asia-Pacific countries got permanent observer status at the Arctic Council. Three of them, China, Japan and South Korea persistently attempted to join Arctic Council for a long time as they are deeply interested in Arctic for economic reasons. At the same time, Singapore has less obvious reasons for joining the Arctic Club,
mostly connected with potential market share of shelf facilities and equipment construction. The Arctic interests of India have been articulated even less clear – in fact, it is a desire to expand research and scientific activities in polar areas (India and the Arctic, 2013) and maybe something else. Hence, we cannot exclude some kind of shrewd political game connected with different stances of ‘genuine’ Arctic states towards admittance of Asians to their “Area of Sacred Rights”.

The events of 2014 further complicated the political situation around the Arctic urging some newcomers to look for peculiar ways of providing their national / business interests in the region (special relations between China and Iceland are worth special mentioning…). Moreover, we cannot discount the possibility of jealous rivalry between the major Asia-Pacific actors, when ‘Not-To-Be-Late’ notion tends to be superior to ‘What are we going to get out of Arctic?’ question. Political competitiveness driven by economic expectations of powerful corporations may result in security implications as well – extending naval and Coast Guard operations to the North, building ice-class warships and establishing new military alliances, which is hardly in the interests of Asia-Pacific.

Different priorities and views on the Arctic among ‘genuine’ Arctic states, semi-Arctic and non-Arctic states represent another aspect of political landscape. Russia with its immense Arctic coastline (more than 40% of world total) and nearly two million people inhabiting Arctic territories (Smirnov et al., 2012) regards this region not only as a giant natural resources treasury. True, a large portion of Russian energy resources export originates there, and Arctic share of the market will evidently grow. But the urgent need to guarantee the physical existence of hundreds of aborigine people settlements along the Arctic coastline as well as of people living and working in remote and isolated territories of the Arctic and Far East is a matter of top national priority for Russia. Insufficiency of infrastructure, especially in transport and logistics spheres is probably the most serious challenge. Half of provinces in the Far Eastern Federal District do not have railway or road connection with the “Continent”. Arctic coast, Chukotka and Kamchatka towns, factories and settlements heavily depend on maritime and air transport – and on weather conditions, too. That is why the NSR connecting dozens of seaports and sites
from Murmansk to Vladivostok is first and most a key strategic artery for Russia, which has to be supported and protected by all means.

To the contrary, NSR waterways are a valuable asset for China, Japan and Korea due to its huge commercial potential. Oil, LPG and LNG extracted at Arctic drilling rigs can be delivered to North-Eastern Asia twice faster than from Persian Gulf. Export commodities bound to Europe via the NSR reach destination in exactly the same period of time or slightly faster than by the traditional Indian Ocean route, but overall shipping cost is 30-40% lower due to fuel economy and lesser freight and insurance rates (Jian Min Shou, 2014). The shipping time can be reduced by the same 30-40% if cargo is carried by ice-class vessels without icebreaker support and at higher cruising speed. Estimations show that overall effect for transport – logistics chains can be measured in tens billion dollars annually.

But, international business considerations do not necessarily coincide with strategic priorities of a national state. In our case the interests of transnational exporters and shipping companies demand the minimization of operational costs and increase in transit speed of merchant ships. It naturally elevates the risk of navigational incidents. Such incidents happen from time to time in various areas of the World Ocean, sometimes with tragic consequences like 2012 ‘Costa Concordia’ in Italy and 2014 ‘Saewol’ in Korea incidents. In both cases the ships ran aground and sank in sea areas with intense shipping and adequate navigational aids and rescue systems, but many people died and fuel leaked in both cases, too.

The Northern Ice Ocean has been explored and equipped with navigational aids much worse than any other ocean on the Earth. The lack of oil leak fast response capacity, insufficient search-and-rescue capabilities, rapidly changing weather and ice conditions and unreliable communications due to polar magnetic interference must be added to this equation. In the end we must admit that a lot has to be done prior to the start of NSR commercial exploitation as a major international transit route. Because the cost of any incident with oil spill in the icy waters of Northern Ocean can be extremely high. We can guarantee neither the timely rescue of human lives in remote Arctic areas, nor the mitigation of oil leak consequences there today; the latter is especially threatening because the fragile natural environment of polar ocean can be irreversibly damaged by even minor oil spill accidents.
According to International law, the coastal state is responsible for environment protection in its territorial sea and EEZ. This responsibility includes the obligations to mitigate consequences of sea, air and land pollution caused by accidents of any scale. Failure to fulfill this obligation could severely hurt the prestige and authority of sovereign nation. Russia will not let it happen. Actually, Canada and USA will hardly risk such developments in their Arctic EEZ, too. And that is one of primary reasons for introducing strict safety and security policy measures in the Arctic. A creation of reliable search and rescue system, fast response capacity, combined satellite / shore communications, monitoring and positioning network, a chain of port facilities along the NSR is a costly, but mandatory course of actions.

One more remark concerning the above. Russian Federation has already started a number of wide scale infrastructural and support projects in the Arctic basing on its Arctic strategy (Rodionova, Romanyuk, 2014). This work will be continued regardless of complicated economic and political situation. It is also clear that we are not altruistic; when any foreign party expresses an intention to benefit from what has already been done for safe and secure economic activities in Russian EEZ, it will have to partly compensate our expenses. But, we can make it using a ‘win – win’ approach instead of bargaining, conspiracy and speculations.

There is a plenty of job to be done in Russian Far East and Arctic coast, especially for port infrastructure modernization, construction of research and monitoring sites, introduction of advanced communications technologies for polar region, training specialists for Arctic transport system and industry. Active cooperation and collaboration with Asia-Pacific economies in these fields is welcome and mutually beneficial. A new vision of the NSR commercial exploitation model can well be developed on the basis of common activities in Arctic – a model that will best suite all participants and prevent unwanted consequences.
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Развитие китайско-российских отношений и усиление
китайских позиций в Арктике

В данной статье рассматриваются аспекты российско-
китайского сотрудничества в Арктике. Анализируются
внешнеполитические факторы и проблемы безопасности и
предлагаются меры по юридическому обеспечению деятельности
Китая в регионе
Ключевые слова: Россия, Китай, сотрудничество в Арктике,
Северный морской путь, юридическое обеспечение

Лидун Фан; Цзинган Фэй; Ульф Шривер; Си Фан
Обзорный очерк образования по морскому английскому
языку в Китае в сравнении с другими наиболее известными
центрами подготовки моряков

В Китае курс морского английского языка был задуман в
качестве дополнительного предмета, отраженного в морском
квалификационном свидетельстве, для обеспечения китайских
моряков навыками его владения. Однако, плоды образовательной
подготовки в области английского языка не воспринимаются в
судоводительской области как удовлетворительные.
Исследования по обучению и подготовке морскому английскому
в Китае можно назвать редкими и несистематическими. Ясная
картина существующих исследований и достижений в этой
области впервые приводится в данной статье. Далее делается
сравнительный анализ ситуации в Китае и других центрах
подготовки моряков для исследования сходства и различий в
образовании и подготовке по морскому английскому языку.
Акцент сделан в основном на опубликованных с 2004 по 2014
года материалах Международных Конференций по английскому
языку. Обзор соответствующих статей сосредоточен на пяти
темах: оценки значения морского английского; учебные
материалы по язык; методы изучения и преподавания морского
английского; преподаватели и студенты, изучающие язык.
Относящиеся к этим пяти темам моменты сравниваются и анализируются с целью формулировки предложений по внесению улучшений, в соответствии с Манильскими поправками 2010.

Ключевые слова: морской английский; страны не английского языка; образование и подготовка; STCW 2010; коммуникативные способности; китайские моряки

Митракова, Ольга Константиновна; Белокобыльский, Николай Дмитриевич; Карпушин, Иван Сергеевич

Психология как инструмент эффективной вузовской подготовки инженеров морского рыбодобывающего флота

На основании анализа теоретического материала и результатов собственных эмпирических исследований авторами сформулировано предложение о необходимости внедрения в процесс вузовского образования будущих моряков - инженеров рыбодобывающего флота - знаний в области морской психологии, в форме специальных профессионально значимых психологических компетенций

Ключевые слова: образовательная подготовка, «поправки Филиппин», морские специалисты, профессиональная психология моряка, компетенции

Максимова, Светлана Николаевна; Суровцева, Елена Викторовна; Полещук, Денис Владимирович; Панкина, Анна Валерьевна

ВОДНЫЕ БИОЛОГИЧЕСКИЕ РЕСУРСЫ ДЛЯ ПРОИЗВОДСТВА ФУНКЦИОНАЛЬНЫХ ПРОДУКТОВ

Приоритетным направлением современной науки о здоровом питании населения является разработка принципов технологии функциональных пищевых продуктов, которые позволяют быстро и эффективно осуществлять коррекцию пищевого статуса. Функциональные продукты должны потребляться регулярно в составе нормального рациона питания, при этом улучшать физическое, психическое здоровье человека и предотвращать или уменьшать возникновение заболеваний. Значение продуктов из водных биоресурсов при организации
функционального питания заключается в том, что они содержат полноценные белки, жиры — природные источники ненасыщенных жирных кислот, различные биологически активные вещества, необходимые для организма. Соответственно при дифференцированном подходе к составу водных биоресурсов и рациональной обработке они способны сохранить свою функциональную активность в готовом продукте.

Ключевые слова: здоровое питание, функциональные продукты, альгиновые кислоты, биологические ресурсы, биополимеры, рыбная отрасль

Самойленко, Петр Юрьевич
Морская безопасность в АТР и современные российские интересы в Азии

В статье рассматриваются ключевые современные интересы России в АТР применительно к аспектам морской безопасности. Автор связывает основные российские интересы в регионе с аспектами экономического и военно-политического сотрудничества и противодействия таким общим угрозам как международный терроризм и пиратство, урегулирование морских территориальных споров, имидж России.

Ключевые слова: морская безопасность, Азиатско-тихоокеанский регион, экономическое сотрудничество, терроризм, пиратство, военно-морские силы.

Сергиенко, Валентин Васильевич
Организация и регулировка движения судов в проливе Босфор Восточный (порт Владивосток) в процессе строительства моста на остров Русский в 2008-2012

Автор принимал непосредственное участие в реализации морского компонента проекта моста на остров Русский во Владивостоке. Им были предложены уникальные решения, которые позволили преодолеть природные и технические трудности, сделали строительный процесс значительно более эффективным и позволили выдержать установленные сроки. В
Статье рассматривается также процесс взаимодействия государственных и общественных структур по решению сопутствующих проблем, в частности при поддержании интенсивности судового движения в окружающем морском пространстве.

Ключевые слова: пролив Босфор Восточный, морская составляющая, генеральный подрядчик, плавучий рым, "мертвые якоря", Центр управления движением судов, балки пролета моста

Суровцева, Елена Викторовна; Панкина, Анна Валерьевна
СОВРЕМЕННЫЕ ПУТИ ЗАЩИТЫ ПИЩЕВЫХ ПРОДУКТОВ ИЗ ГИДРОБИОНОВ ОТ ПОВРЕЖДАЮЩИХ ФАКТОРОВ

В статье рассматриваются технологии безопасной консервации сырья водного происхождения с целью получения продукции высокого качества. Консервирование должно способствовать сохранению биологической ценности, характерных ароматических свойств и консистенции продукта в течение срока хранения. Один из способов для этого – производство слабосоленых продуктов, основанное на современных технологиях, таких как использование хитозана

Ключевые слова: сырье водного происхождения, потребительские качества, малосоленые продукты, барьерные технологии, хитозан

Журавлева, Светлана Валерьевна; Панкина, Анна Валерьевна
Использование биологического тестирования для эколого-токсикологической оценки объектов окружающей среды

В статье представлен обзор объектов биологического тестирования, используемых для эколого-токсикологической оценки загрязняющих веществ в окружающей среде. Приведены результаты исследований влияния детергентов на жизнедеятельность тест – объекта инфузории Tetrahymena pyriformis.
Журавель, Юрий Григорьевич; Смирнов, Сергей Маратович.
Северный морской путь и его воздействие на Азиатско-Тихоокеанский регион

Глобальные изменения климата открывают новые перспективы для экономического проникновения в Арктику. Транзитные маршруты между Северо-Восточной Азией и Европой через Северный морской путь (СМП) являются, судя по всему, самыми многообещающими для экспортно-ориентированных экономик Китая, Японии и Южной Кореи. Но нам не следует впадать в излишний оптимизм и принять во внимание как позитивные, так и негативные факторы, влияющие на прогресс в исследовании и коммерческой эксплуатации арктических регионов. Чтобы избежать ненужных рисков и конфронтации всем заинтересованным сторонам следует ясно понимать взаимные интересы и приоритеты, осуществлять координацию и сотрудничество в реализации взаимовыгодных коммерческих и гуманитарных проектов.

Ключевые слова: Арктические транзитные пути, Северный морской путь, таяние льдов, быстрое реагирование на разливы нефти, морские происшествия