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**APPLIED ASPECTS OF INTERNATIONAL SHIPPING
IN THE CONTEXT OF "GREEN" ECONOMY**

**ПРИКЛАДНЫЕ АСПЕКТЫ МЕЖДУНАРОДНОГО СУДОХОДСТВА
В КОНКТЕКСТЕ «ЗЕЛЕННОЙ» ЭКОНОМИКИ**

Alina Kodzhebash

Коджебаши А.П.

В статті розглянута міжнародна судноплавна діяльність в контексті «зеленої» економіки. Виокремленні основні джерела забруднення та наслідки їх впливу на морську екосистему. Проаналізована нормативно-правова база, в рамках якої здійснюється контроль за екологічною безпекою міжнародної судноплавної діяльності.

Statement of the problem

The international shipping industry is essential to world trade. It responsible for the carriage of about 90 per cent of world trade by volume and is vital to the functioning of the global economy. There is therefore a direct correlation between the growth of world trade (and global GDP and population) and the expansion of shipping activity which has the potential to impact on the environment. Also it operates effectively in a context of international regulations aimed at ensuring safe, secure and efficient shipping, which also generates employment opportunities both onboard and ashore. This creates the opportunities for shipping to make a contribution to green growth and the transition to a green economy.

Results

Shipping plays a crucial role in international trade and the global economy. Without shipping, intercontinental trade, the bulk transport of raw materials and the import/ export of affordable food and goods would simply not be possible. The world merchant fleet is registered in over 150 nations, and manned by over a million seafarers of virtually every nationality. The structure of the shipping industry is very international: a ship may be registered in one country, while the beneficial owner of the vessel may be located in another. The cargo carried by a ship will be of economic benefit to a variety of different nations. The crews of most ships comprise more than one nationality, which are, quite commonly, different to that of the flag State and the beneficial owner.

Shipping is an inherently international industry which depends on a global regulatory framework to operate efficiently. If a ship trades from Brisbane to Buenos Aires, the same rules need to apply at both ends of the voyage, for example, concerning construction, navigation or atmospheric emissions. Otherwise, there would be chaos and serious inefficiency. Today, there are about 60 000 merchant ships trading internationally, transporting every kind of cargo. These ships are operated by about 10 000 shipping companies [7]. However, there are variety of sectors and trades with different characteristics:

Container ships carry most of the world's manufactured goods and products, usually through scheduled liner services.

Bulk carriers are the work-horses of the fleet, transporting raw materials such as iron ore and coal.

Tankers transport crude oil, chemicals, petroleum products and natural gas.

Ferries usually perform short journeys for a mix of passengers, cars and commercial vehicles. Most of these ships are Ro-Ro ferries, where vehicles can drive straight on and off, making it a speedy and easily accessible way to travel.

Cruise ships expanded rapidly during the 1980s, leading to a new generation of large and luxurious 'floating hotels'.

Specialist ships include anchor handling and supply vessels for the offshore oil industry, salvage tugs, ice-breakers and research vessels.

The worldwide operation of ships generates an estimated annual income in freight rates of over a trillion dollars or almost 2 per cent of the total GDP for the global economy. It is the availability, low cost and efficiency of maritime transport which has made possible the major shift towards industrial production in Asia and other emerging economies which, in turn and in large part, has been responsible for dramatic improvements in global living standards.

Maritime transport operates in a very unrestricted trade environment. With the exception of cabotage restrictions (trade between two ports in the same country), international shipping enjoys relatively free trade without restrictions to market access. The majority of companies are small and medium-sized enterprises, and shipping is characterized by markets with very high levels of competition [4].

The shipping industry has two strong economic motivations for maintaining and improving its environmental performance. The first concerns the financial benefits of ensuring full compliance with widely enforced international environmental regulations; the second concerns the indirect economic benefits derived by companies which have a progressive and proactive approach to implementing environmental improvements. Shipping also has the potential to become greener and initiatives such as the Sustainable Shipping Initiative are looking at a 'beyond-compliance' sustainability framework.

Among the plurality of regulatory organizations, such as European Maritime Safety Agency, The Institute of International European Affairs, Lloyds Register, The Marine Stewardship Council, United Nations Framework Convention on Climate Change, United Nations Environment Programme, which are engaged in developing and introducing measures to minimize all impacts of international shipping on environment the main is International Maritime Organization (IMO). This special unit was created by United Nations by means of adoption of the convention in 1948, based in England, has 170 Member States. Its mission – to develop and approve a regulatory framework for shipping, especially in the field of maritime safety and environmental protection. IMO has developed an Integrated Technical Co-operation Programme (ITCP) designed to assist Governments which lack the technical knowledge and resources needed to operate a shipping industry safely and efficiently.

Also there are three main Conventions adopted by IMO – SOLAS, MARPOL and STCW, dealing, respectively, with safety and security, environmental protection and seafarers' training standards – have all been ratified by virtually all Member

States of IMO. Since its inception, IMO has developed and adopted no less than 52 conventions dealing with all facets of ship operation and protection of the environment from such operations. Indeed, no less than 21 of those instruments deal exclusively with environmental protection, with two other treaties (on salvage and wreck removal having environmental benefits also). In the 1970s governments working through IMO developed the International Convention for the Prevention of Pollution by Ships (MARPOL) which contains comprehensive requirements to prevent pollution which may be caused both accidentally and in the course of routine operations. In response to more recent shipping incidents, MARPOL now contains many additional provisions such as those which require oil tankers to have double hulls. Significantly MARPOL also includes provisions covering the prevention of other forms of potential marine pollution from bulk chemicals, dangerous goods, sewage and garbage [5].

Since the 1990s, increased environmental awareness amongst maritime transport operators and their seagoing employees has, in part, been a consequence of the adoption, implementation and enforcement of the International Management Code for the Safe Operation of Ships and for Pollution Prevention (the ISM Code), adopted in 1993 by IMO. In effect, this introduced a requirement for shipping companies to have a 'licence to operate' which is only obtained after they demonstrate, through rigorous internal and external audits, that they have adequate management systems in place, at sea and ashore, to prevent recognized sources of marine pollution, and to identify and rectify any deficiencies. In short, the ISM Code embraces the concept of 'continuous improvement' with regard to the management of pollution prevention by ships, in addition to the management of safety [8].

The international shipping industry is essential for world trade, but it also creates emissions and pollutants at maritime ecosystem:

1. Oil, chemical spills. The most important in terms of developing effective measures for the prevention and elimination of emergency situations related to oil spills is information about the cases that led to the emergence of these situations. These reasons fall into three groups: manufacturing operations at the port, during which there was a leak (loading, unloading, bunkering, etc.); accidents involving the transportation of oil (collisions, groundings, holes, fires); unknown, spills, the cases of which are not known reliably. During major tanker accidents involving oil spills in the tens of thousands of tons, inflicted damage on the economy, often commensurate and even exceeding the income from marine transportation of petroleum products.

2. Transfer of invasive species through ballast water. To ensure stability a ship needs to take on water to adjust the balance of the ship. Water that is typically taken on (thousands of tons) in one port can then get discharged in another port and carries various non-indigenous species that can become invasive in their new environment.

3. Anti-fouling Pollution. Fouling is when unwanted barnacles and waste appear on ships. Every 2 to 5 years they need to be removed from the ships hull. An alternative to this is to apply a coat of tributyltin which kills sea life and to know to cause deformities in shellfish. Many waters around shore have high concentration levels that make all seafood unfit for consumption and also reduce the sustainability of the eco system.

4. Dredging. Digging trenches in the water to create new land and deeper routes for larger ships disturbs not only the sea life eco system but also land eco systems when the material is relocated. The noise and disruption to laying grounds, plant life and various animals can cause a total breakdown in a highly sensitive biological life form that may be only found in that area.

5. Ship Disposal. When it's time for a ship to go to a graveyard the potential waste and leakage increases. They are no longer a ship that is running and regulated and since the ship is decomposing the chance of chemicals being released into the ocean is increased. The actual breakdown of the ship for scrap and disposal is in question too as not all materials are removed safely and recycled efficiently [6].

In respect of reducing atmospheric pollution and CO₂ emissions which presents the most obvious opportunities with regard to the transition towards a green economy, shipping is already the most environmentally-friendly form of commercial transport and, with the lowest CO₂ emissions per tonne/km also, there are significant opportunities for a modal shift towards maritime transport – especially short sea shipping and coastal shipping, away from other land-based transport modes or, even, aviation.

To prevent the more traditional sources of marine pollution by ships – or mitigate their effects following the unfortunate occasion when pollution still sadly occurs – governments at IMO have adopted a comprehensive international regulatory framework, which is widely enforced. This is made up of no less than 21 global treaty instruments which are augmented by technical codes and guidelines also adopted at IMO and by well-established industry guidance on best practice, developed by the industry's highly organized international trade associations [9].

A major concern for the shipping industry, and its regulators, is the maintenance of high standards of ship construction and inspection. Significant improvements to construction, maintenance and survey standards, relevant to environmental protection, have been underwritten by frequent amendments to the International Convention on the Safety of Life at Sea (SOLAS) 1974. In this regard, in 2010, IMO adopted important amendments to that Convention to implement new Goal-based Standards (GBS) for the construction of bulk carriers and oil tankers [10]. As a consequence, it is expected that shipbuilding standards will be enhanced so that, with an appropriate level of maintenance and adequate margins for corrosion, future ships will be built to remain 'fit for purpose' throughout their typical 25-year life spans.

The shipbuilding industry, together with classification societies (international maritime survey organizations and depositories of industry's technical knowledge, which oversee the construction of ships), is constantly seeking to develop new, safer and improved ship designs [11]. In combination with more vigorous maintenance and survey standards, and improvements to areas such as navigation systems and seafarers' training standards, this has made catastrophic structural failure – and the substantial pollution which can result – far less likely. Continuing improvements in shipbuilding standards clearly represent major opportunities with respect to the green economy.

Concerning the discharge of oily water from machinery spaces, and accidental spillage of oil cargoes and ships' bunkers, opportunities also exist for the further improvement of equipment designs [12].

Similarly, opportunities are also created by the need to develop equipment which treats a ship's ballast water in order to meet the requirements IMO's International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004, which includes technical standards and requirements to prevent the import of alien marine organisms into local ecosystems. Furthermore, radical recent amendments to Annex VI of the MARPOL Convention (governing atmospheric pollution) require ships to reduce the sulphur content of fuel dramatically, to just 0.1 per cent in Emission Control Areas (ECAs) from 2015, and to 0.5 per cent elsewhere (from the current level of 4.5 per cent outside ECAs) [14]. However, these new IMO requirements to reduce emissions of air pollutants and consequent impacts on the environment and, in particular, on the health of populations living on the coastline, also create opportunities for the development of new exhaust scrubbing technologies as a legally permitted alternative to the use of low sulphur fuels.

Another very important factor in the environmental performance of shipping is the role of the shipyards which build the ships used to conduct world trade, with about 90 per cent of new shipbuilding capacity now located in Asia (China, Japan and Republic of Korea) [15]. Shipyards clearly have an important part to play in introducing new technologies which will further improve ship construction standards (for example, to help prevent oil spills caused by accidents), or which will radically improve fuel efficiency to reduce CO₂ emissions.

Closed warehouses in ports for bulk cargoes and closed their technology overload are becoming more popular in the world, as well as other technical and technological methods for reducing impact on the environment – cargo containerization, hydromechanization of overload processes etc.

Lloyd's Register joints industry project “Green Ship of the Future” and issue a Green Passport, which defines the parameters describing the effect of the vessel on the environment. The project offers a framework within which technologies capable of obtaining a 30% reduction in CO₂ emissions and a 90% reduction in NO_x and SO_x emissions can be developed and demonstrated.

Born in Rotterdam, the world was embraced by movement of Green Award Foundation. Experts of this international organization estimate the technical condition of the vessels, the team readiness for emergencies and other factors, from which the safety and environmental exploitation is depended. During the vessel call certified vessel receives discounts on port charges. Each port installs the size and type of discounts by itself. An example of this is the Riga port - the port with the highest proportion of green areas among all the ports of European countries as a percentage.

Conclusion

A comprehensive international regulatory framework, which is widely enforced on a worldwide basis, has already done much to reduce various sources of pollution by shipping. Nevertheless, through a better understanding of the enormous economic losses being sustained and the enormous opportunities from investing and re-investing in marine ecosystems, perhaps the balance can be tipped away from degradation and destruction to sustainable management for this generation and the ones to come.

The economic, societal, environmental and reputational case for further greening of the sector is clear and is espoused by both the sector's global regulator, and the industry itself, with the aim of:

promoting greater energy-efficiency of ships, including through the development of market-based measures, and, as a consequence, reductions in fuel consumption and in emissions of both air pollutants and greenhouse gases;

developing global standards to ensure that the operation of ships using alternative sources of fuel is both safe and environmentally sound;

promoting implementation, or development of global standards to prevent and control the transfer of invasive aquatic species through ships' ballast water and the fouling of ships' hulls, thereby contributing to protecting and preserving biodiversity and enhancing human health and the quality of the environment;

addressing, through existing and/or future treaty and other instruments, the technical, operational and environmental aspects of the ever-increasing size of ships;

maintaining international shipping's widely-acknowledged position as the most environmentally sound mode of transport.

From an environmental perspective, shipping operations have the potential for significant damage and the role of international organizations, with the collaboration of industry and civil society interests, is the development and introducing measures to minimize all such impacts. The concept of 'continuous improvement' with respect to environmental importance is a significant driver toward the achievement of a fully sustainable maritime transport industry operating within the green economy.

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Аннотация

Порты являются ключевой составляющей транспортной инфраструктуры страны. Кроме того, морские порты являются ключевой составляющей государственной системы обеспечения безопасности мореплавания в территориальном море и внутренних морских водах, субъектом многочисленных международных экономических и правовых взаимоотношений, закрепленных конвенциями и другими международными договорами, стороной которых является и Украина. Поэтому система функционирования и управления морским транспортным комплексом должна основываться на эффективных экономических и организационных мерах, которые позволили бы достигнуть гармонии экономических, технических и экологических интересов и потребностей общества, а также отвечать современным требованиям, которые установлены для портов в международной транспортной системе.

Объем товаров, перевозимых судами, составляет более 90%, а значит обеспечение устойчивого развития мировой экономики невозможно без эффективного функционирования международного судоходства. Учитывая то, что существует прямая связь между ростом мировой торговли (глобального ВВП и населения) и деятельностью судоходства, которое непосредственно оказывает влияние на окружающую среду, возникают потенциальные возможности осуществления положительного «зеленого» вклада в развитие судоходства.

В настоящее время судоходная деятельность функционирует в контексте международных и внутригосударственных норм и правил, которые обеспечивают безопасные, надежные и эффективные перевозки, а также создают благоприятную среду для трудоустройства как на борту судна, так и в портовой зоне.

Основными постулатами устойчивого развития являются:

- развитие экономики не должно сопровождаться опасным загрязнением и разрушением природной среды;
- признание единства и разнovidности вариантов социально-экономического и экологического развития различных стран и народов;
- гармонизация отношений в системе «общество – природа»;
- основой социально-экономического развития должны быть идеи гуманизации.

Следуя им, международное судоходство обладает потенциалом непосредственного перехода к «зеленой» экономике, - направлению в экономической науке, сформированного в последние два десятилетия. В рамках нее считается, что экономика – зависимый компонент окружающей среды, в рамках которой она существует и, одновременно, является ее частью.

Международное судоходство неизбежно оказывает негативное влияние на окружающую среду. К основным источникам загрязнения морской экосистемы относятся:

1. Нефтяные, химические разливы с судов. Наиболее важной с точки зрения выработки эффективных мер по предотвращению и ликвидации аварийных ситуаций связанными с утечками нефтепродуктов является данные о причинах, приведшим к возникновению данных ситуаций. Эти причины делятся на три большие группы: технологические операции в порту, во время которых произошла утечка (погрузка, разгрузка, бункеровка и т.д.); происшествия при перевозке нефти (столкновения, посадки на мель, пробоины, пожары); неизвестно, сюда попали разливы, причины которых достоверно неизвестны. Во время крупных танкерных катастроф, сопровождающихся разливом нефти в десятки тысяч тонн, причиняется ущерб экономике, нередко соизмеримый и даже превышающий доходы от морской перевозки нефтепродуктов.

2. Перенос инвазивных видов с балластными водами. Технология перевозки грузов морским транспортом предусматривает наличие на борту судна определенного количества балласта. Забортная вода с различными загрязняющими веществами, а также живыми организмами, взятая в одном порту, выгружается в другом, тем самым закрепляясь в новой среде, нарушая ее экосистему.

Также негативное влияние на морскую экосистему оказывают антиобрастающие вещества, применяемые к корпусу судна, дноуглубительные работы, проводимые на судоходных маршрутах, мусор, отходы и др. В отношении сокращения загрязнения атмосферы и выбросов парниковых газов судоходство уже сегодня является самым экологически чистым видом коммерческого транспорта с самыми низкими выбросами CO₂ на тонну/км, что способствует перераспределению перевозок в пользу морского транспорта - особенно каботажного судоходства и прибрежного судоходства, в отличие от других наземных видов транспорта, или авиации, и тем самым представляет очевидные преимущества в отношении «зеленой» экономики.

Важную экологическую роль в судоходной деятельности играют судостроительные верфи. Около 90 процентов новых судостроительных мощностей в настоящее время сосредоточено в Азии (Китай, Япония и Республика Корея). Внедрение новых технологий (например, для предотвращения разливов нефти в результате аварий или эффективности использования топлива для сокращения выбросов в атмосферу) способствуют дальнейшему повышению стандартов строительства судов. В 2010 году концерн «Samsung Heavy Industries» представил общественности свою новую «зеленую» политику, включающую строительство судов, дружественных к окружающей среде, создание «зеленых» рабочих мест и организацию «зеленой» сети. В связи с объявлением о создании «зеленых» рабочих мест концерн намеревается создать верфь, которая получит статус «экологически дружественной» с большой экономией энергии.

В развитых странах отношение к охране окружающей среды в портах находится на высоком уровне. В связи с ужесточением природоохранного законодательства и усилением требований по охране и защите грузов в портах всё более популярными в мире становятся закрытые склады для навалочных грузов и закрытые технологии их перегрузки, а также другие технические и технологические способы снижения воздействия на окружающую среду – контейнеризация грузов, гидромеханизация процессов перегрузки и т. д.

Среди множества организаций, таких как European Maritime Safety Agency, United Nations Framework Convention on Climate Change, The Institute of International European Affairs, Lloyds Register, United Nations Environment Programme, вовлеченных в разработку и внедрение мер по минимизации последствий влияния международного судоходства на окружающую среду, основной является Международная морская организация – International Maritime Organization (ИМО) – специализированный орган ООН, созданный путем принятия конвенции в 1948 году. Базируется в Англии, имеет 170 государств-членов, в их число входит и Украина (Постановление ВРУ от 04.02.94 р. № 3938). Задачей такого органа является разработка и утверждение нормативно-правовой базы для судоходства, прежде всего, в области безопасности на море, защиты окружающей среды, предотвращения и борьбы с ее загрязнением. Основопологающими конвенциями являются SOLAS, MARPOL and STCW, а также программа Integrated Technical Co-operation Programme (ИТСР), предназначенная для оказания помощи правительствам, которые не имеют технических знаний и ресурсов, необходимых для безопасной и эффективной работы судоходной отрасли. Кроме этого, ИМО также является главной международной организацией, занимающиеся вопросами управления судовыми балластными водами и контроля за ними, в результате чего была принята конвенция International Convention for the Control and Management of Ships' Ballast Water, первый этап работы которой проходил и в Украине, Одесском морском торговом порту.

Таким образом, охрана окружающей среды в международном судоходстве на макроуровне регулируется международными конвенциями ООН, разработанными отраслевыми межправительственными организациями, которые занимаются непосредственно проблемами экологической безопасности, осведомлены положением дел и идут на шаг впереди, а на региональном – директивами Европейского Союза. Существуют также национальная законодательная база, отраслевые или общественные регуляторные, нормативные акты. Важным аспектом является согласованность региональных и национальных норм закона.

С точки зрения регулирования, международная нормативно-правовая база, которая широко применяются в мире, уже многое сделала, чтобы сократить негативное влияние различных источников загрязнения, оказываемое судоходством. Однако считаем, что концепция «постоянного совершенствования» по отношению к окружающей среде является значительным движущим фактором на пути достижения устойчивого развития морской транспортной отрасли в рамках «зеленой» экономики.