BALLAST WATER IN THE BLACK SEA GEORGIAN COASTAL ZONE

БАЛАСТНЫЕ ВОДЫ В ЧЕРНОМОРСКОЙ ПРИБРЕЖНОЙ ЗОНЕ ГРУЗИИ

, Dr. eng. Shotadze A., Prof. Dr. Kochadze T., Assoc. Prof. Dr. Kamkamidze N.
– Akaki Tsereteli state University, Kutaisi, Georgia
ashotadze@hotmail.com , Temko1954@mail.ru,, natia.kam@yandex.com

Abstract: *Today global shipping transports over 90% of the world's commodities in intercontinental traffic. Within the EU,waterborne traffic accounts for more than 90% of foreign and approximately 40% of domestic trade, transfers around 12 billion tons of ballast water across the planet each year. While ballast water is essential for safe and efficient modern shipping operations, it may pose serious ecological, economic and health threats. Trends anticipate an increasing role for global and local shipping in the future Apart from harmful effects such as consequences of shipping disasters, shipping activity exerts other negative influences on the environment; e.g. sea pollution through the discharges of oily water and sewage water from vessels, air pollution from exhaust gases emitted from the vessel's machinery, pollution of water and marine organisms from toxic protective underwater hull coatings(antifouling paints), and one of the most recent water born concerns – the translocation of harmful organisms and pathogens via ballast water and sediments inside ballast water tanks.*

Ballast water is absolutely essential to the safe and efficient operation of modern shipping, providing balance and stability to unla-den ships. However, it may also pose a serious ecological, economic and health threat for sea nature life.The introduction of invasive marine species into new environments by ships ballast water is an issue that does not always receive the public exposure that it merits.

Despite the serious degradation that has already occurred in the Black Sea, studies have indicated that concerted action can both restore and protect the environment. But the problem clearly requires a multi-lateral approach .The introduction of invasive marine species into new environments by ships' ballast water attached to ships' hulls and via other vectors has been identified as one of the four greatest threats to the world's oceans. The other three are land-based sources of marine pollution, over exploitation of living marine resources and physical alteration/destruction of marine habitat. Quantity of ballast water is change depend of ship's type. The release of ballast water may introduce non-native organisms into the port of discharge.

Black Sea geography contributes to the manifestation of additional environmental risks: these sea or do not have access or have a very limited relationship with the oceans. Pollution from land-based sources is one of the main causes of environmental degradation of rivers and, as a consequence, seas and coastal areas. Pollution from ships and other activities in the seas are another factor contributing to the deterioration of the environmental status of marine waters and coasts.Much of Georgia's coastal zone is subject to significant anthropogenic pressures, that could be reason of causing the pollution of marine environment.

KEY WORDS : *COASTAL ZONE, MARITIME TRANSPORT, BALLAST WATER MANAGEMENT, MARINE POLLUTION.*

1. Introduction

Today global shipping transports over 90% of the world's commodities in intercontinental traffic. Within the EU,waterborne traffic accounts for more than 90% of foreign and approximately 40% of domestic trade, transfers around 12 billion tons of ballast water across the planet each year. While ballast water is essential for safe and efficient modern shipping operations, it may pose serious ecological, economic and health threat. Trends anticipate an increasing role for global and local shipping in the future
What is ballast water?

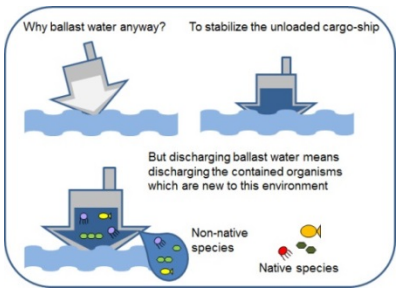

Figure 1.

Ballast water provides stability and manoeuvrability to a ship. Usually ballast water is pumped into ballast tanks when a ship has delivered cargo to a port and is departing with less or no cargo. Large ships can carry millions of gallons of ballast water.

Ballast water discharged by ships can have a negative impact on the marine environment. Ships use a huge amount of ballast water, which is often taken on in the coastal waters in one region after ships discharge wastewater or unload cargo, and discharged at the next port of call, wherever more cargo is loaded. Ballast water discharge typically contains a variety of biological materials, including plants, animals, viruses, and bacteria. These materials often include non-native, nuisance, exotic species that can cause extensive ecological and economic damage to aquatic ecosystems, along with serious human health issues including death.

The ballast water inside a ship can be seen as an onboard aquarium full of microscopic life forms. That's because small organisms living in the sea water are pumped into ballast tanks along with the water. Moreover, coastal sediments and any associated organisms may be pumped into ballast tanks.

The ballast water is taken from coastal port areas and transported inside the ship to the next port of call where the water may be discharged, along with all the surviving organisms. This way, ballast water may introduce organisms into the port of discharge that do not naturally belong there. These introduced species are also called exotic species. Populations of exotic species may grow very quickly in the absence of natural predators. In that case they are called 'invasive'.

Only few species are successful invaders, because most species are not able to survive in new surroundings, because temperature, food, and salinity are less than optimal. However, the species that do survive and establish a population are very hardy species that have the potential to cause major harm (to ecology, economy or human health).

Ballast is defined; "ballast is any material used to weight and balance an object. It is the additional weight necessary to bring the vessel to a suitable draft and trim and reduce stresses and improve stability." In the ship's terminology ballast is divided two types: clean ballast and dirty ballast. Clean ballast, if discharged from vessel that is stationary into clean,calm water on a clear day would

not produce visible traces of oil on the surface of the water or on adjoining shore lines. Dirty ballast, to seawater introduced into cargo tanks upon completion of cargo discharge (Huge, 2001).

Ships have carried solid ballast, in the form of rocks, sand or metal, for thousands of years. In modern times, ships use water as ballast. It is much easier to load on and off a ship, and is therefore more efficient and economical than solid ballast. When a ship is empty of cargo, it fills with ballast water. When it loads cargo, the ballast water is discharged. Shipping moves over 80% of the world's commodities and transfers approximately 3 to 5 billion tones of ballast water internationally each year.

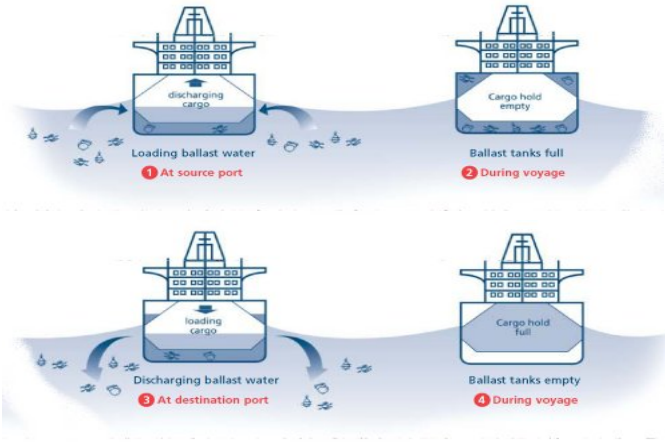

Figure 2. Ballast exchange between ports (IMO GloBallast)

There are thousands of marine species that may be carried in ships' ballast water; basically anything that is small enough to pass through a ship' ballast water intake ports and pumps. These include bacteria and other microbes, small invertebrates and the eggs, cysts and larvae of various species. The problem is compounded by the fact that virtually all marine species have life cycles that include a plank tonic stage or stages.

2. Preconditions and means for resolving the problem

The release of ballast water may introduce non-native organisms into the port of discharge. These introduced species, or bioinvaders, are also referred to as exotic species, alien species and no indigenous species. Typically, very few organisms are able to survive in new surroundings because temperature, food, and salinity are less than optimal; however, the few that do survive and establish a population have the potential to cause ecological and economic harm. Populations of bioinvaders may grow very quickly in the absence of natural predators. In turn bioinvaders may displace native organisms by preying on them or out competing native species for food and habitat space. Economic damage may occur when a bioinvader displaces species that are harvested for food or other goods, or when bioinvaders damage structures.

Apart from harmful effects such as consequences of shipping disasters, shipping activity exerts other negative influences on the environment; e.g. sea pollution through the discharges of oily water and sewage water from vessels, air pollution from exhaust gases emitted from the vessel's machinery, pollution of water and marine organisms from toxic protective underwater hull coatings(antifouling paints), and one of the most recent water born concerns – the translocation of harmful organisms and pathogens via ballast water and sediments inside ballast water tanks.

Ballast water is absolutely essential to the safe and efficient operation of modern shipping, providing balance and stability to un-laden ships. However, it may also pose a serious ecological, economic and health threat for sea nature life.The introduction of invasive marine species into new environments by ships ballast water is an issue that does not always receive the public exposure that it merits.

But the problem clearly requires a multi-lateral approach .The introduction of invasive marine species into new environments by ships' ballast water attached to ships' hulls and via other vectors has been identified as one of the four greatest threats to the world's oceans. The other three are land-based sources of marine pollution, over exploitation of living marine resources and physical alteration/destruction of marine habitat. Quantity of ballast water is change depend of ship's type. The release of ballast water may introduce non-native organisms into the port of discharge.

Black Sea geography contributes to the manifestation of additional environmental risks: these sea or do not have access or have a very limited relationship with the oceans. The Black Sea region presents a most unusual environmental problem. Of all the world ís inland seas, it is the most isolated from the world ís oceans. Its only link with other seas is with the Mediterranean, through the narrow channel so for the Bosphorus strait, the sea of Marmora and the Dardanelles. Relative to its size, this is indeed a tenuous link.Yet almost a third of Europe and huge areas of Asia drain into the Black Sea and more than 160 million people live in the overall Black Sea catchment area. The Black Sea coastal zone is densely populated. In the summer season, the permanent population of around 16 million swells to around 20 million with the influx of tourists.

During the last 30 years, the Black Sea environment has been transformed by the harmful effects of
modern industry, agriculture and fishing. The add aditional damage caused by exotic marine species and pathogens in ships ballast water is another major contributor to the degradation of the environment, Pollution from land-based sources is one of the main causes of environmental degradation of rivers and, as a consequence, seas and coastal areas. Pollution from ships and other activities in the seas are another factor contributing to the deterioration of the environmental status of marine waters and coasts.Much of Georgia's coastal zone is subject to significant anthropogenic pressures, that could be reason of causing the pollution of marine environment, and should be adopted the measures that will represent a significant step forward in the battle to reverse those harmful effects.

The introduction process of alien species is still ongoing in the Black Sea and it needs to be monitored at the national, regional and international level. A special monitoring programme is requested for key areas, in order to understand better the dispersion patterns of alien species. The impact of the alien species is complex and most of the time unpredictable due to lack of monitoring and the lack of scientific knowledge about those species. Experts on alien species, such as taxonomists, should be trained and encouraged. Capacity building for riparian countries is essential for the monitoring of alien species. Initiatives for the database management on Mnemiopsis and other jellyfish should be continued by an international organization like the Black Sea Commission. The International Convention for the Control and Management of Ship's Ballast Water and Sediment (BWM Convention) within the International Maritime Organization (IMO) system was adopted in 2004. This convention has not come into force yet but in some countries like, the Russian Federation,

Turkey and Ukraine the port authorities request the reporting of ballast water and follow ships to their ports. In a port Novorossisk, ballast water is monitored for chemical contamination. Ukrainian authorities sample ballast water to assess possible chemical contamination (Matej and Gollash, 2008). Turkish authorities conduct a project for the impacts of the ship ballast waters on the

Turkish Seas. This kind of implementation should be encouraged to prevent alien species to enter local seas. To control alien species via incoming ships, a defined concerted area for discharging ballast water should be established in the Black Sea. Some of these national or local Ballast Water Management legislations are generally consistent with the IMO Convention but others impose different and often more stringent requirements on ships. Inevitably this leads to confusion amongst owners, operators and seafarers.

There may be conflicting requirements at different parts of a voyage which inevitably increase the risk of regulations being breached. Most introductions of non-indigenous species result from ballast discharge and sediment from vessels after ocean crossings. Georgia is an exporting country. Most vessels arriving in Georgian ports discharge ballast and then load oil. According to the Convention on the Protection of the Black Sea emptying segregated, un-contaminated ballast water is allowed. But different countries of the region enforce the Convention differently. For example, vessels calling for the port of Odessa have to change their ballast water immediately upon entry into the Black Sea area. This has to be recorded in the ship logbook. This policy is not a viable solution, since ballast waters are emptied upon arrival in the Black Sea.A synopsis of known national and local ballast water management regulations for Georgia .

Figure 3.

According to the National ballast water management requirements (January 2014) ,Lloyd's Register Marine
2.8 Georgia .
Authority: Georgian Environmental Protection Ministry;
Ports affected: All Georgian ports;
Ships affected:All;
Implementation:Mandatory;
Start date: No information;
Acceptable methods: Ballast water exchange (BWE): BWE must be conducted in the
Black Sea;
Unwanted organisms and pathogens: No information;
Uptake control:No information;
Sampling:No information;
Ballast Water Management Plan: Required ;
Records and reporting:No information;
Alternatives to en route management procedures: No information;
Procedure for unacceptable ballast water: No information;
Notes: No information.

3. Conclusion

Despite the serious degradation that has already occurred in the Black Sea, studies have indicated that concerted action can both restore and protect the environment, and should be adopted the measures that will represent a significant step forward in the battle to reverse those harmful effects.

4. Literature

1.Development of common security management, maritime safety and ship pollution prevention for the Black Sea and Caspian Sea (SASEPOL). 2010. p.22.
2.Georgian Ballast Water Decree, 2002. The order on approval of the regulations on
ballast waters management procedures in Georgia. Based on the decree of the
president of Georgia No. 227 ''On Ship Ballast Waters Management Control" of
June, 2001. Ministry of the Environment and Natural Recourses of Georgia and
Ministry of Justice of Georgia State Register of Normative Acts.p. 5.
3.IMO, 2004. International Convention for the Control and Management of Ships'
Ballast Water and Sediments, London, 2004. International Maritime Organization.p. 38.
4. National ballast water management requirements,January 2014,lloyd's Register Marine
5. GLOBALLAST MONOGRAPH SERIES NO.3 ,4
6. International Convention for the Prevention of Pollution from Ships (MARPOL),
Consolidated Edition, London, 2002.
7. IMO, International Conference on Ballast Water Management for Ships, London, 2004.
Ballast Water Research Series Report No.4, www.globalast.imo.org