

THE NEWLY DEVELOPMENT IN LARGER VESSEL'S SIZE CREATING IMPACTS TOWARDS GLOBAL ENVIRONMENT

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ABSTRACT

The shipping industry is one of the most important and most frequently used means of transportation in the world of export and import trade involving the shipping of goods between countries as the shipping industry holds 90 percent of the world's consumers. Demand for the use of shipping industry services is increasing every day as many advantage factors are offered such as the cost of shipping goods which is much cheaper than air transport and offering shipment with a larger capacity of goods such as bulk cargo which creates competition between shipping industry owners. Meanwhile, containerships currently face various challenges due to Covid-19 pandemic such as excess container delay, low shipping rates, increasing fuel costs, and eco-efficient policies to restrict virus spread where a good business strategy is needed to ensure logistics movement keep running. The ship size is getting bigger and new generation of container ship are made in order to fully optimize the operation and bring more profit to the company. They can support capacity in excess of Twenty-foot equivalent unit (TEU) per single load for instance is OOCL Hong Kong which is the latest upgraded container ship where it can carry up to 21,413 TEU full capacity. For sure the increase in the size of ships used in the international shipping industry will provide more endurance, save operating costs and lead to a greater economic result when interacting with a world of trade where economies of scale are achieved especially during this lockdown period. However, for some reason the bigger the ship size, the more problems it caused towards environmental pollution. Larger vessels will increase competition in the shipping industry as this means less consumption rate of the ship, but this is the trend in the industry, and soon larger vessels built and into service. There is something to consider in advance. The goals of this paper are to identify impacts created by Mega ships that are widely used nowadays in shipping industry towards environments health, its consequences in future and finding solutions to overcome it. Obviously once ships size grown bigger it will bring more pollution towards environment and that is the solid reason of why this paper need to be done. This paper will solely be focused on secondary data which is relying on journals, articles and internet references. Data collected will be summarized in order to give clear understanding to the reader regarding the impact of ship size towards environment. The finding of this study is expected to be a good reference for all researcher and logistic industry players.

Keywords: *Mega-vessel, negative impact, marine transportation, environment & ecosystem*

1. INTRODUCTION

Along with global economic growth faster than its predecessor, it is inevitable for the shipping industry other than to follow the current changes. Over the years, high demand for international trade has led to an increase in the size of the ship, such as cruise ships, container ships, mega-ship ship even ultra-size to be used. In the last few years, there were various mega-ship media coverage

and their inaugural debut call. In general, its size is longer than four football fields, and it is made of steel more than the amount used to build various massive buildings in the world. This maximizes benefits for economic scale. Increasing the size of container vessels is not a new phenomenon. The past few decades, there was a trend of the continuous increase in the size of container carriers or vessels, driven by container delivery lines to find economies of scale where this is largely facilitated by the discovery of container delivery which creates cargo handling much more efficient and allows for increased ship size. Containers undoubtedly have contributed to the decline in maritime transportation costs. Therefore, an increase in the size of ships has been facilitating global trade, which has brought many benefits for many people. In the past, mega-ships were built to meet the demands of larger container vessels. However, with rapid economic growth, generation of container ships will be required and that are ultra large container ships.

Since year 2000, container shipments have grown dramatically due to China's rapid economic growth. Increasing trade facilitates with the expansion of container carrier transport capacity. The maximum capacity of container vessels remained around 4,500 TEUs for 10 years right after 1984, the proportion of container vessels exceeding this size increased from 9.6% in 1994 to 58.7% in 2000 and with Ocean Oriental Container Line (OOCL) Hong Kong was the largest ship ever built (Khanna, 2000). Currently, the capacity is 21,400 TEUs. Ultra large container ship capacity at this time ranged from 14,000 TEUs to 21,000 TEUs. This capacity is almost double that of the most commonly used vessels. Increasing the capacity of container carriers has led to group of shipping alliances between liners organisations. Because mega container carriers cause CAPEX (capital expenditure) higher, shipping liners companies began to share business risks through the formation of group alliances shipping. Such combined alliances initiated to bring three benefits: firstly, the reduction of costs incurred by the joint or combined services, the sharing and exchange of transmission capacity, and created joint investment in transportation infrastructure; secondly, the development of new servicing areas and avoidance of excess capacities, which can cause the competitiveness of transport; third and lastly, coalition members tendency can access and provides low-cost containerize transportation market and by working with partners to respond quickly to the demand of market changes.

One might wonder if larger container carriers still relevantly having a positive contribution to environment issues. Many stakeholders are puzzling with the effects of bigger ship's size toward the environment. It would be difficult to admit if there is no effect at all. In regards of shipping industry, there are problems such as the contribution toward marine pollution and it continues to threaten the marine environment. The shipping industry, which meets more than 90 percent of worldwide trade with the help of about 90,000 vessels sailing yearly, contribute significantly to global pollution and climate changes. Among the adverse effects on the environment caused by the shipping industry, including air pollution, air pollution and oil pollution, including greenhouse gas emissions related to global warming. The International Maritime Organization (IMO) estimates that emissions of carbon dioxide used is the same with man-made emissions of 2.2% in 2012 and expects it to increase by 50 to 250 percent by 2050 if it does not happen. This fact will correlate to the larger size of container ships.

Mega vessels have resulted in cost savings for shipping lines, sea freight costs were reduced and facilitating positive towards global trade in the past. However, larger vessels require adaptation of port infrastructure, equipment and cause large peak in container traffic in the port. Consequently, it comes with disadvantages. Due to the size of the ship twice, the time required for the entire transmission is much slower than usual. Newer ships are designed with the consideration of safety and the technology of slow steaming. On the other hand, the increase of ship's size has reduced the total number of operating ships in the world. The new generation of mega ships are products left behind high oil prices and low interest rates between 2004 and 2014 and they have been optimized

to save fuel by sailing more slowly. It makes sense because the fuel consumption related to the cube of the vessel's speed - boats that move twice as fast as the fuel will take eight times as much based on comparison between these two categories. Of course, the longer time the vessel spent at sea, the more the threat of pollution carried into the environment and tendency of contaminate marine life preservation. There is no doubt that the risk of supply chain of big vessels rose at the same time.

There are other concerns such as the safety of the vessel and ships' crew, and rescue costs in case of vessel's accident occurred. Larger ships also lead to on-board capacity concentration and cargo services, the options are reduced and the durability of the supply chain more limited, especially for vessels larger coincides with the increased cooperation of the leading cruise line in the form of shipping alliances. Insurers are worried about the cost if the mega ship sank or suffered mechanical problems. Insurance company Allianz has warned that the industry must prepare for losses of more than \$1 billion, or even up to \$2 billion in the event of a collision between two ships. In short, ship's size has become one of the most burning issues in maritime transport, with repercussions for the whole transport chain. Although widely debated in specialized press and journals, there is currently no comprehensive overview of impacts and possible ways to deal with these; this article aims to fill up this gap.

2. THE DEMAND FOR MEGA-SHIPS

The development of increasingly large ships is driven by the search for economies of scale by shipping liners. Given that the container shipping industry is mainly driven by price war and market competition - and not very distinguished in relation to other aspects - the decision by a cruise ship to increase the size of the ship led to a wave of results similar to compete with the delivery path in order not to "stay behind" by not reap scale the same economic. the result was a wave of investment in new container vessels are very large, which may make sense from the perspective of an individual company against its major rivals, but of course less for the industry as a whole, as a results in fleet capacity growth that does not comply with the request. There are various methods for measuring large ships. Regular size is the maximum number of twenty-foot container that can be carried by ships: maximum capacity of TEU. Underlying this is a TEU capacity vessel characteristics and dimensions that allow this capacity. Container ships often qualified in the "generation" that varies according to the dimensions. A large number of other actors in the transport network is not necessarily preferred by large ships. Shippers interested in maritime transport links frequent and reliable, but the larger vessels will reduce the frequency of services, except cargo flow growth in the rate of growth of the same ship; moreover, large shippers may have the option to cover risks by separating the delivery of the vessels that are different from centralizing everything in a single vessel. Terminal operators are faced with the need to adjust the equipment and handle a challenging peak in the current configuration. Stories similar to port faced with new conditions on the infrastructure and transport ministry associated with port-related infrastructure and hinterland connectivity port. Freight forwarders and logistics operators will be concerned and facing with the interruption or holding back of large vessels which has led to additional transaction costs and coordination expenditures. Finally, the peak associated with large ships can cause congestion and other environment pollution effect. A more detailed analysis of the impact of large vessels to environmental health is provided throughout the study.

3. IMPACT TOWARDS ENVIRONMENTS

Over the past 20 to 30 years, maritime shipping traffic in the global oceans has risen dramatically increasing the risk of pollution caused by shipping (Tournadre, 2014). The use of ships and boats Mega Ultra Large reduce traffic statistics are not efficient because it requires more time sailing and more time is necessary to put services operate in the harbor. Pollutants directly discharged into the sea, often illegal (EMSA, 2012) While environmental regulations are strict, especially under the MARPOL Convention (International Convention for the Prevention of Pollution from Ships). There is no denying that the use of larger size vessels in shipping industry did give a lot of advantages to the world trade, economic of scale and reducing operation cost however it doesn't seem that environmentally friendly. The larger the vessels size, the more pollutant it brings to the environment and it affects the world's climate change, greenhouse gas emission, global warming and contaminated the marine ecosystems. In this section there are several impacts due to the developments of mega ships and ultra-size vessel that can be discusses and analyze it consequences in future and ways to overcome the issues arise.

a) Air Pollution

As we all know, one of the biggest global health hazards at the moment is deteriorating air quality. According to the World Health Organization, 4.2 million people die as a result of air pollution. Just as an exhaust tank in a wheeled vehicle emits dangerous exhaust fumes and causes air pollution on land, ship engines also emit contaminated smoke into unwanted air. The scope of gas emitted from the discharge of vehicles on the road and the discharge of ships at sea is very different and much worse, causing pollution to a very large environment in the ocean area. In a recent study also found that the air in the stern area, particle pollution in detail, is just as polluted as the air in major polluted cities in the world, such as New Delhi, India. Many research also shown that more than 18 percent of some of the air pollution that occurs on this earth is the ship responsible for? Air pollution from vessels are produced by the engine of ships that burn diesel oil as a fuel with high sulfur content, also known as bunker oil, producing sulfur dioxide, nitrogen oxide and particulate matter, in addition to carbon monoxide, carbon dioxide, and hydrocarbons which are much worse than pollution which is done by a wheeled vehicle on land. Ship engines using diesel oil have been classified by the EPA as human carcinogens and adversely affect local air quality. Carcinogens is a substance capable of causing cancer in living tissue. In addition to contributing to the depletion of the ozone layer, the EPA recognizes that gas emissions from marine vessel's diesel engines contain carbon monoxide (i.e., failure to meet air quality standards), as well as causing adverse health effects related to eutrophication and water nitrification, ambient concentrations and visibility, deposition acid rain and thus causing haze to occur. Marine diesel engines from large vessels are estimated by the EPA to account for about 1.6 percent of portable source nitrogen oxide emissions and 2.8 percent portable source particle emissions in the United States in 2000 and may be higher based on specific ports visited. Much lower sulfur content can be determined using ultra low sulfur diesel fuel (ULSD) standards. In 2006, almost all Europe and North America's vessels used petroleum-based diesel fuels are ULSD type. Ship cargo's gas emissions are far greater than we can imagine because of its annual tonnage and shipping distance that are often large due to crossing seas over the world. The facts that the numbers of larger ships are increasing each year which are now over 100,000 transport ships at sea of which about 6,000 are container ships should rise a concern to authorized authority to take immediate initiative.

In the other hand, the world's climate is extremely changed worst with the increasing of global warming and caused depletion of the ozone layer. This is not only dangerous for the balance of the environment such as marine life but human life on earth will also be affected. The effects of the covid-19 pandemic outbreak further boosted the shipping industry's reliance on using mega ships and large container vessels to ship cargo shipments to save operating costs, while reducing the

sanitation costs needed to curb the spread of the covid-19 epidemic worldwide. More dangerous gases are emitted by large vessels and the longer the sailing period is expected to further increase the effects of air pollution in the future. The effects may not be felt right now because the world is busy fighting to deal with the threat of this pandemic. Cases of deaths are on the rise worldwide but logistics movements must continue to be carried out to ensure adequate food supply throughout the country and ensure the movement of exports and imports of goods runs smoothly. In addition, during this pandemic season, the whole world carries out total lock down orders and most of them sit at home / work from home thus increasing the rate of purchase of goods online involving shipping in and from abroad. A sharp increase in the percentage of online purchases or e-commerce increases supply chain movements and at the same time more mega-sized ships are needed to meet customer demand so that goods can be delivered on time.

b) Sewage Pollution

Sewage at sea in general is waste generated from the toilet, urine, and a broom closet. Every container ship, bulk cargo ship especially cruise ships deliver goods with their crew or passengers and of course in the long run at sea it produces large piles of sewage. The rules say that the sewage can be discharged into the sea only after being treated, and a boat is 4 nautical miles from the nearest land. What happens when someone is cleaning toilets at the cruise ship? The answer is very simple. Ships remove our human waste into the ocean (after passing the effluent treatment plant) and we have a larger yacht that can accommodate up to 6680 passengers and 2200 crews at a time. This is not a surprise as it is a common norm for those who always sail on ships. The bacteria produce in human waste, such as E. coli, can infecting the water and causes disease. Other harmful substance from solids and chemicals in sewage can indirectly causes damage bodies of water that support seabed wildlife, flora and fauna as well. The health status of seawater will be affected due to uncontrolled sewage discharge and disability of the marine life ecosystem. And furthermore, this does not include the risk of shipwrecks carrying chemicals such as agriculture based product such as fertilizers, nitrogen and phosphates, encourage algae growth, which blocks sunlight and tremendously affects the quality of the water. Bacteria can use up oxygen in the water as they decompose the organic material in the wastewater, and the resulting lack of oxygen in the water kills the fish. The solids in sewage causes sea water to appear in dark brown and murky condition, which also affects the ability of fish to breathe and swim around them. Apart from that, the next huge pollution cause especially by cruise ships is from sewage waste. Every element of sewage thrown does damage to the environment, whether it has a direct effect on wildlife, on the ability of the environment to support aquatic life forms, or maybe on our water supply. Sewage needs to be treated so that it doesn't impact the eco system and sea environment. The solely idea of having treatment plants for wastewater and laws against pouring untreated sewage directly into the environment are meant to prevent this from happening. Disposal of untreated raw sewage waste into the sea can pose a health hazard. Sewage waste can also cause a shortage of seawater oxygen, affecting marine ecosystems and the effects of pollution can be seen through the viscous foam and dirty seawater that is clearly stranded in coastal areas and this is a major problem for countries known for their tourism industry.

The main source of human wastewater collected on the ground is like a sewerage system in the municipality or treatment plant while the ship is a major contributor to pollution of the sea by dumping wastewater into the sea. Disposal of sewage into the sea is prohibited because it can pollute the water quality of the sea, except for vessels operating in the sewage treatment plant as appropriate or when ships dump sewage processed after disinfection using a system that meets the standard at a distance of more than three nautical miles from the nearest land. Sewage unprocessed, dried or disinfected can be disposed at a distance of more than 12 nautical miles from the nearest land when the ship is at the end of the cruise and travel a distance of not less than 4 knots but must get approval

from the Administration for the disposal of untreated sewage. Disposal of sewage from passenger ships in a designated area generally prohibited under the new rules, except when the ship operates sewage treatment plant which has been approved by the Administration. Sewage treatment plants are installed in a passenger ship which intends to remove effluent in Special Area should also meet the standards of the removal of nitrogen and phosphorus when tested for Type Approval Certificate by the administration. This is one of the factors or the effects of an increase in the size of the vessel, especially for cruise ship passengers sail. Strict monitoring needs to be done by the local authority to ensure that the existing rules are complied with by the ship's captain and ensure the cleanliness of the sea water. In addition, the authorities must also ensure the cruise ship passenger rate during this lockdown period is controlled to control the spread of Covid outbreaks -19 among passengers, especially tourists from affected countries. This will temporarily reduce cruise ship operations temporarily and ensure reduced sewage disposal statistics.

c) Ballast Water Pollution

Ballast water is very important for safe ship operations let alone when it involves a very long voyage. It provides stability to the ship and maneuverability during navigation as well as during loading and unloading operations of cargo from ship to port. The vessel was indeed designed and built to move through water-fetching cargo, such as oil products, agricultural commodities, multiple types of seaborne containers, machinery and carrying passengers. If the vessel is moving without cargo or has unloaded at one port and on its way to the next port of call carries no adequate load, heavy water may be loaded on board to achieve optimum resistance and ensure the ship can operate in the required conditions. Among other things, this includes ensuring that the ship's depth is deep enough in the ocean waters to overcome the rough sea and allow the captain of the ship to navigate smoothly and efficiently. Ballast water is very important for safe and efficient modern shipping operations, but heavy water also affects serious ecological problems due to the large number of marine species brought into the ship's ballast water. Major threats to the environment and public health can easily affected due to improper handling in the process of loading and unloading operation in untreated ballast water, as ballast water can causes organisms transferred between ecosystems, from one part of the world to another areas. The ballast water includes bacteria, microbes, small invertebrates, eggs, cysts and larvae of various types of species meant to be grown. Negative impact on the marine environment can occur caused by ships discharge ballast water when the ballast water of ships loaded into the tank to provide an appropriate load, many foreign and sediment microscopic organisms' invisible to the naked eye is inserted. Most of these foreign organisms can survive in a tank of the ship and wait time for the release of the new environment. Ballast water would pose a threat to the region last voyage when the ballast water is no longer needed and released into the sea, and when these foreign organisms that are stored in the tank will be released into the environment. The situation will grow worse if the event of appropriate conditions in the vicinity of this release, this species will survive and reproduce rapidly and becoming an invasive species. The problem of invasive species in ballast water of vessels mainly due to the increase in economic trade and seaborne traffic volume over the last couple of decades and, as the number of sea trade continued to increase, this problem may not have peaked but we would never know what would happen in the future, is such situation going to be prolonged. Furthermore, is the increment in Mega built vessels uses and development of ultra-size vessel would further worst the situation. The effect in many areas of the world is tremendous. Actually, aquatic invasive species is one of the four greatest threats to the world's oceans. Quantitative data showed that the rate of bio-invasions continues to increase at an alarming stage and new area being attacked all the time. Species from ballast water is considered foreign if it does not come from a particular ecosystem. Research also referred to as non-native species. Invasive alien species are considered when identity causes, or may cause, harm to the environment, economy, or human health. The introduction and spread of alien invasive species are a serious global threat to marine and freshwater ecosystems. The new species can completely transform the local community, resulting in the

extinction of species and cause economic damage as a nuisance species. Cruise ships, supertankers and cargo ships bulk using a large amount of ballast water, which is often taken in coastal waters in the region after the vessel discharge wastewater or unloaded cargoes, and released at the port on next call, wherever more cargo is loaded. Removal of ballast water usually contains various biological materials, including plants, animals, viruses, and bacteria. Fresh or saltwater, sometimes containing sediments, held in tanks and cargo holds of ships to increase stability and maneuverability during transit. These materials cause damage to the ecology and economy of the aquatic ecosystem that extends along with serious human health problems. The yacht, like other large vessels, using large amounts of water ballast to stabilize the ship when traveling. Because these vessels are engaged in a longer period of time, often filled with ballast water from one area to another area and removed when it is needed. The amount of ballast water released is usually more than 1,000 metric tons. Another research also determined that the discharge of ballast water from a yacht sailing is another main cause of pollution. Due to such smaller ships, the ballast water containing even higher in microbes and micro-organisms, other than plants and other marine animals, especially the aspect of pollution caused by the species and the local marine life.

One example of a very good ecological damage is the large number of jellyfish in the Black Sea. One can imagine how much foreseeable damage can be caused by the increasing numbers of mega ships operated legally within the shipping industry nowadays. The sea ecosystem will be more harmful for the marine life and disturbing sea catch for fishermen. Ballast Water Treatment System (BWTS) is a system designed to remove and destroy/inactive biological organisms (zooplankton, algae, and bacteria) from ballast water. There are three approaches to treating ballast water; mechanical, physical or chemical. Mechanical methods would include separation and filtration; physical methods include ozone, electrical currents, or UV radiation, while chemical solutions are biocides or a form of chlorination.

d) Chemical Pollution

Refers to chemical compounds or materials that have been purified or produced by man. It does not include many substances produced by marine plants, animals and microbes as part of their normal life processes. More than 100,000 chemicals in commercial use (Daly 2006), and many are entering the marine environment through atmospheric transport, the flow of water into waterways, or direct discharge to the sea. Chemical pollution is the introduction of harmful contaminants. Common man-made pollutants that reach the ocean include pesticides, herbicides, fertilizers, detergents, oil, industrial chemicals, and sewage. Many ocean pollutants are released into the environment far upstream from coastlines. Ocean-based chemical contamination ascribed to commercial vessels and recreational activities, especially container vessels that ship dangerous goods such as chemicals and steel products. Entry chemicals from a cruise to the ocean through the gray water or black water channel is another threat, it has also creating damages on ocean ecosystems. Cruise ships emit toxic chemicals via many types of batteries on board, dry cleaning and industrial products, chemicals for daily operations, and numbers of other chemicals after it expires, polluting waters through vessels. Over the years, environmentalists argue that these chemicals have a grave threat to the lives of sea creatures and forms of life species. It is estimated that about 2000 chemicals used by humans regularly transported via marine transportation, either in bulk or in packaged form, and commercial marine chemicals is estimated at 215 million tons in 2015 (Purnell, 2009). Stated in the data collected by the European Maritime Safety Agency (EMSA), which resulted in the release of HNS incidents occur regularly in European waters (EMSA, 2010). Ecological dangers involved in this spill is less known and understood than those involving oil pollution (neuparth et al., 2011). The effect of chemical hazards at the level of cleanliness of sea water must be studied in depth as the effects of pollution will cause mutations affecting marine life and marine catches and jeopardize the quality of coastal water quality. Marine ecosystems will be severely affected because of the contaminated water quality and cause acid rain in some areas. In

addition, incidents such as hail and increased global warming caused by the evaporation of water vapor contaminated sea. All this is basically caused by the movement of the ship in the ocean causing chemical spills or incidents of damage to marine vessels causing chemicals leaking ship. Mega-sized cargo vessels carrying dangerous goods must ensure that the ship is properly maintained to prevent damage in the middle of the ocean and spills of contaminants into the sea.

e) Physical Damage to Marine Life

Meanwhile, container ships, mega yachts and ships contribute to the pollution of air and water, the ships also cause, marine mammals, such as whales and manatees, risk vessels, causing injury and death. Smaller size fishes may be able to avoid the crash by a large ship, but not bigger marine life. For example, a collision with a vessel moving at 15 knots only have 79% chance to kill a whales. Research discovered that whales and dolphins nowadays are the main victims of an increase in traffic of these vessels. This large ship tendency of responsible for wounding, often kills, marine life, particularly fin whales, killer whales and humpback whales. One can only imagine the mammal carcasses left behind after an accident or worse skin, fins removed and sold illegally on the black market.

Larger size vessel poses threats to marine life to live happily in the ocean and disrupt the ecosystem such as marine life mammal who need to get up to the surface to get some air. Given the risks and damage caused to the marine environment, the right resolution set by countries around the world to protect the ocean environment. Slowly and steadily, even cruise shipping conglomerates have begun to understand the importance and the need to conserve marine ecosystems. Currently, the browsing experience better browsing with caution and care necessary for marine life forms is still a dream to be realized and achieved. Hopefully, in the days and years to come.

f) Oil Pollution

The most frequently associated with ship pollution is oil spills. Oil is a general term for any thick liquid, viscous, usually inflammable insoluble in water but soluble in organic solvents. Plants and animals produce a variety of natural oils, but the goal of clean water is mainly related to oil derived from geological storage of petroleum (crude oil) for use as fuels or lubricants. Original oil comprising 47% oil in the ocean. Approximately 600,000 tons of oil into the ocean naturally each year through seepage through the many cracks in the seabed (NRC, 2003), but input from each typically slow (Wells 1995) and natural seepage is not considered a pollutant. The other half of the oil derived from anthropogenic sources, including ships, land runoff and, at lower levels, the oil spill. These sources pose a greater threat to the marine environment when oil enters the ocean in the area focused on high flow rate. Oil pollution from the shipping industry is considered as the main reason for rising levels of marine pollution. Cruise ships, mega-sized vessel compared to other ships, eventually burning heavier fuel oil, one of the dirtiest fossil fuels on the market. This oil contains sulfur and heavy metals and other dangerous. It is estimated that cruise ships use, on average, 150 tons of heavy fuel oil per day. Bilge oil by mixing with sea water, oil consumption has caused serious pollution of the sea. The damaged engine and improper repair work are two areas where oil can leak into the ocean water. Collisions and accidents also act as a cause of such oil pollution. Marine pollution caused by accidental spills are famous global concerns. Oil tanker accidents account for 10-15% of all oil entering the oceans worldwide each year. Although there is evidence of a decrease in the number of maritime incidents, unintentional oil tanker spills such as the recent incident on the islands in the Indian Ocean involving MV Wakashio have already injured the Mauritian ocean. The island of Mauritius is facing an environmental crisis as the sunken ship releases a lot of diesel and oil into the Indian Ocean. Japan's MV Wakashio has leaked about 1,000 tons of fuel into a marine ecosystem rich in biodiversity. The ship split in two over the weekend and the bow of the ship was pulled away from the reef. But the rear remained stranded on the reef with about 90 tons of fuel to use on board. Even rarer than the contamination of daily operations, oil

spills have an adverse effect. While being toxic to marine life, polycyclic aromatic hydrocarbons (PAH), a component of crude oil, it is very difficult to clean, and survive for years in the sediment and marine environment.

Marine species are always exposed to PAH can show developmental problems, susceptibility to disease, and abnormal reproductive cycle. Oil pollution can kill marine life through ingestion, inhalation and ingestion because the oil attached to the hair and fur seals, seals and birds lose insulation is usually provided by the structure. Oily birds also cannot fly. This indirectly has a very bad effect on marine life and birds fly because its effects can spread to other living beings, and human beings, decisive action must be taken to address this issue such as ship maintenance periodically to make sure the ship is always in good condition. The report said the captain of the ship that spilled hundreds of tons of oil off the coast of Mauritius was captured, Nandeshwar Sunil Kumar, an Indian man, aged 58, was charged with endangering the safe navigation, police said.

g) Land Development for Bigger Port Areas

Due to the increasing size of ships larger than the previous, larger port areas should be developed to provide more facilities to support and develop the infrastructure so that the port can serve requests ship larger size and thus can compete with other ports. To be honest, emphasizing mega ship port where large investments have to be allocated again to increase the capacity of the port. Continuously improving infrastructure is critical to the success of the port on the market right now. Ports face the possibility of a reduction in benefits as they continue to prepare the larger vessels, while yacht combines partnership, makes more competitive port to handle cargo and cruise passenger capacity is greater. Port must adapt its infrastructure to accommodate large ships and ensure that berths can support large ships coming in. Port of Panama is the best example where they rebuild the port between 2015 and 2017 but was not able to host the OOCL Hong Kong and COSCO Universe with a capacity of more than 21,000 TEU. Extensive coastal with land areas must be developed and ultimately can reduce the survival of coastal cliffs against extreme weather. Furthermore, when vessels and cargoes capacity increase, the port will need more cranes and facilities to accommodate with the services requires, the staff is more skilled to operate quickly, more spaces required in the port area such as bigger container yards, and the ability to handle more trucks, trains and barges to move containers inland and certainly will contribute to more energy consumption, pollution of the environment with the port to increase the operating time. Parties involved in the operation of the terminal should work together more closely to prevent time change, congestion and high demurrage & detention charges. The need to build a bigger port area will affect other ports around the world to do it and improve the development of coastal regions around the world. Can you imagine how bad the situation is for the smaller ports that cannot keep up with the current demand? They may be left behind by the competition or need to find a new business model for generating profits, the worst scenario, shut down the port for good, indirectly affecting man-power's livelihood for that particular area.

4.0 CONCLUSION

There is no doubt that the use of mega-sized vessels and plans to increase the size of the vessels used in the shipping industry to bring significant reductions in operating costs and may also increase the carrying capacity of the ship's cargo. Each container carried by the ship will fill up every so cargo space and can be optimally utilized. This is also clearly will reducing the number of small vessels that sail in the ocean, especially boats that run shipping services to reduce ship traffic on the sea. But does it impact on the health of the ocean, the marine ecosystem and also reduce

environmental pollution? The answer is not at all. The use of mega-sized ships and ultra large ship did not reduce the effects of pollution on the environment at all but can invite more questions and problems in the future as discussed.

The ship's contribution to environmental pollution will be greater due to the size of the ship which can bring more chemicals or hazardous substances to the environment and in turn increase the risk of damage in the event of unforeseen events such as oil spills, leaking tanks or shipwrecks in the middle of the ocean. This will only have a very bad effect if it happens and will affect the level of environmental health, especially the level of seawater quality and marine life. Maybe we humans only care about the world economy in addition to the adverse effects of the covid19 pandemic that is affecting the economy of the entire country now. Efforts or awareness on this issue should be made by the appropriate parties in elaborating the laws related to the use of large ships in the ocean and its impact on the environment. So, could ship size be regulated? It is theoretically possible to regulate the maximum size of vessels. The whole body of rules, which dealt with ship design and features, required for safety, security and better performance environment. It is unlikely there is a rule that presents the size of the ship that would never be accepted by the IMO, dominated by the largest shipping nations, but it is possible that the other rules cannot be used as a brake on the development of larger vessels. In the past, the rules on tanker double-body not only for the abolition of the super single hull tankers, may also be for stabilization tank size. Although the new super-mega container vessels that are now potentially have a problem of safety, security and the environment is limited, the possibility of concern regarding the impossibility of a rescue operation of these vessels in some circumstances. Given the special rules reflex after maritime disasters, future accidents with mega container ships can change the dynamics of the current environment condition. There are some instances where large vessels are prohibited in certain ports: Huge cruise ship in Venice and Valemax ore carriers at most of the Chinese ports.

As already discussed, the adverse effects of the use of these large vessels cause a lot of pollution and risk in the future if no firm action is taken. As is the case in the islands of Mauritius due to the adverse effects of the Mega ship and this situation has affected the adverse coastal environment. This is definitely not something planned, but we never know what will happen in the future so that the proper guidelines must be enforced.

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