



# Daily Running Costs

ΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ

ΣΥΚΙΩΤΗΣ ΔΗΜΗΤΡΙΟΣ

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Α.Ε.Ν ΜΑΚΕΔΟΝΙΑΣ**

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**ΕΠΙΒΛΕΠΟΥΣΑ ΚΑΘΗΓΗΤΡΙΑ: ΠΑΝΑΓΟΠΟΥΛΟΥ ΜΑΡΙΑ**

**ΘΕΜΑ:**

***DAILY RUNNING COSTS***

**ΤΟΥ ΣΠΟΥΔΑΣΤΗ: ΣΥΚΙΩΤΗ ΔΗΜΗΤΡΙΟΥ  
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## **ABSTRACT**

Cost. The main concern of a shipping company is to increase revenue and reduce costs for its rise. In this dissertation we will analyze the daily running costs of a company for its ships. These costs are related to the crew, the ship, the respective port, the charterer and the ship-owning company. It is not always easy for a company to reduce the costs related to the functionality of each ship and this is due to many factors. Some factors are the age of the ship, because the constructional and operational requirements differ from a new-built ship to an old one, ship's flag, because the taxation differs from flag to flag and other factors that will be analyzed later in the dissertation. Moreover, in this dissertation we will also see ways of how officers can reduce those costs.

I would like to thank my supervising professor for this dissertation Mrs. Panagopoulou Maria for her great help and support during my research. I would also like to thanks all those people who are involved in the shipping industry and they published articles, thesis and e-books and gave me the chance to take information about maritime economics and the functional way of a shipping company.

# **Introduction**

## **1.Explanation and meaning of the word “Cost”**

### Meaning of the word “Cost”

In business and accounting, cost is the monetary value that has been spent by a company in order to produce something. In a business, cost expresses the amount of money that is spent on the production or creation of a good or service. Cost does not include a mark-up for profit.

### Explanation

The cost of producing transport services performed by sea, inland rivers and lakes, is the shipping costs. We will refer to the direct cost of shipping services which is almost always economical and the shipping company is obliged to pay it in order to obtain the necessary inputs for the production of shipping services.

## **2.Direct costs**

Direct cost is categorized into fixed and variable costs. In economics, fixed cost is defined as the cost that does not change and remains constant, while variable cost is defined as the cost that varies, depending on the change in production. This separation is significant, as variable costs can be avoided by freezing production, while the fixed must be paid regardless of whether the ships are underway using engine or not.

The costs, which are fixed in a shipping company and are proportionally borne by its ships are the following:

1. Administrative expenses such as rent or maintenance of offices, staff salaries and employer contributions, maintenance of equipment and use of telecommunications, fees of third parties (inspectors, consultants, technicians), subscriptions to trade unions and international organizations, voyages and superintendents.
2. Crews' fees and expenses, conventional and not staff costs, extra work and insurance, travel tickets, etc.
3. Ship insurance (hull machinery, self-insurance).
4. Ship maintenance and repair costs (maintenance and repairs program)
5. Depreciation of the initial purchase capital of the ship and its equipment
6. Amortization, if there is borrowing
7. Ship maintenance consumables (deck and engine)
8. Four-year inspections and annual inspections.
9. Operational forecasts, such as unexpected ship accidents (collisions), where in addition to insurance, a fixed cost percentage is provided to cover such events
10. Provisions for the crew
11. Radiocommunications

Costs that are included in variable costs, are:

1. Voyage expenses of the vessel (freight supply, supply to the laytime, ports, mooring, untying, navigators, tugs, agents, canals)
2. Fuel and lubricants' value (main and auxiliary engines, for the needs of cargo)
3. Water value (used for the needs of cargo)

### 3.Manning costs

Manning costs range between 25-50% of operating costs and depend on 2 factors:

1. The manning policy governing the nationality of the crews in relation to the ship's registration flag. Keep in mind that a Community-flagged ship may have up to 40% higher manning costs than a flag-of-convenience ship if the wage level is much lower, working hours are increased, overtime pay is low, ship charges for social insurance limited.
2. The minimum required crew number determined by the ship's registration flag, by the shipowner's policy of safe navigation and maintenance of the vessel with its technical equipment.

Manning costs is budgetary and immediate. It includes regular wages, overtime, Sunday allowances, special surcharges, long-service payments, extras, medical care, catering and waiting salaries.

<b>Expected increases by cost type</b>		
Cost type – mean	2017	2018
Crew wages	1.7%	1.7%
Other crew	1.6%	1.5%
Lubricants	1.6%	1.6%
Stores	1.5%	1.7%
Spares	2.0%	1.9%
R&M	2.0%	2.0%
H&M	0.5%	1.0%
P&I	0.7%	1.1%
Management fees	0.7%	1.0%
Drydock	1.7%	1.8%

Source: Moore Stephens, 2017 Future operating costs survey

**Picture 1- Expected increases from 2017 to 2018**

# UNIT 1

## Vessel's liquid Gold

### 1. Marine Fuel Oil and Diesel Oil Consumptions

#### Fuel oil – Meaning

Fuel oil (also known as heavy oil, marine fuel, bunker, furnace oil, or gasoil) is a fraction obtained from petroleum distillation. It includes distillates – the lighter fractions, and residues – the heavier fractions.

The term *fuel oil* generally includes any liquid fuel that is burned in a furnace or boiler to generate heat, or used in an engine to generate power. However, it doesn't usually include oils burned in cotton- or wool-wick burners. In a stricter sense, the term *fuel oil* refers only to the heaviest commercial fuels that crude oil can yield, that is, those fuels heavier than gasoline (petrol) and naphtha.

#### Uses of Fuel Oil

Fuel oil has a variety of uses; It can be used for central heating in homes, businesses and thus, supply road vehicles and ships. Residual fuel oil is no longer useful, because of its viscosity (it must be heated with a special heating system before use) and contains high amounts of sulfur, which emits sulfur dioxide upon combustion. On the other hand, its unpleasant properties makes it the cheapest liquid fuel available. Since it needs heating before use, boats and small ships are unable to utilize it, due to unavailable space for the heating equipment. However, large ships and power plants are able to use residual fuel oil.



Picture 2- Fuel oil

#### Fuel oil crisis

Due to the fuel oil crisis of 1973-1985, fuel costs in maritime transport increased as much as up to 950%, which brought about a change in the balance of costs. During that period shipyards invested in the building of more economical vessels. Changes in hull characteristics and driving engines had a substantial effect on improving fuel efficiency and decreasing fuel consumption. In relation to the prices of marine fuels and the formation of their prices, fuel history has shown that they follow the course of fares. This means that factors affecting fare prices also seem to affect fuel prices.

#### Fuel calculation per voyage

Fuel costs include fuel for the main engine and auxiliary machinery, which range from 15% - 85% of the total voyage cost. The main engine is powered by fuel oil while the auxiliary engines are fueled by diesel oil, which is lighter and more expensive. When calculating the voyage, the quantity and cost of fuel oil and diesel oil differ, as the consumption of fuel oil depends on the distance of the voyage and the days at sea, in contrast to diesel oil which depends on the total days of travel but also from the stay of the ship in the port. It is known that hull roughness after drydocking, can save up to 5-10% of Fuel oil cost.

Note that in the calculation of the amount of fuel, an additional percentage of 5% is calculated for safety due to bad weather conditions that the ship may encounter (Safety margin). Fuel consumption depends not only on the design of the ship and the engine, but also on how it is managed. Important factors in the total cost of fuel are:

1. Price at the port of loading and unloading the ship
2. Price on a special pier, paying for shifting
3. Fuel receipt price via barge (ship-to-ship), since their prices differ.

### Heavy Fuel Oil as a part of the International Maritime Organization (IMO)

Heavy Fuel Oil (HFO) is a fuel oil category of a tar-like consistency. HFO is also known as bunker fuel or residual fuel oil. Furthermore, HFO is primarily used as a fuel source for marine vessel propulsion because of its low cost, in comparison with cleaner fuel sources, such as distillates. In spite of the fact that its budget cost, use and carriage of HFO on-board has raised several environmental concerns, specifically the risk of oil spill and the toxic compounds emissions. Nowadays, HFO's use is banned for vessels travelling in the Antarctic, as part of the IMO's International Code for Ships Operating in Polar Waters (Polar Code).

### Heavy Fuel Oil in Shipping Industry

Since the early of 19<sup>th</sup> century, HFO has been established as the primary fuel of the shipping industry, due to its low-cost contrary to all other fuel oils, with a percentage up to 30% less expensive, as well as the lax regulatory emissions requirements of nitrogen oxides and sulfur dioxide by IMO. For those reasons, the heavy fuel oil is the most widely used engine fuel oil



**Picture 2.1 - M/T Exxon Valdez Oil Spill**

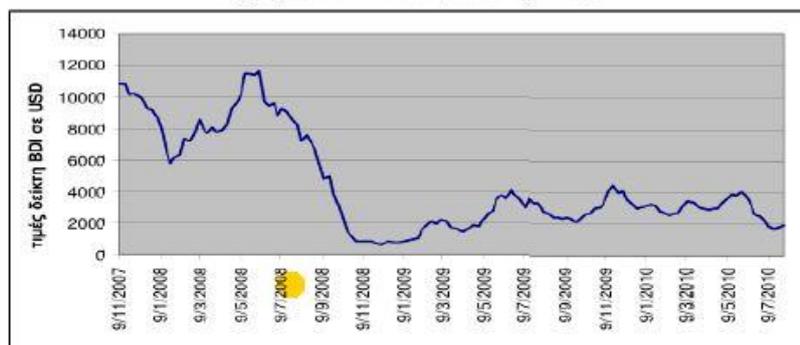
on-board ships. Data available until 2007 for global consumption of HFO at the international marine sector reports total fuel oil usages of 200 million tonnes, with HFO consumption accounting

for 174 million tonnes. Data available until 2011 for fuel oil sales to the international marine shipping sector reports 207.5 million tonnes total fuel oil sales with HFO accounting for 177.9 million tonnes.

*Διάγραμμα 2: BWI index (Bunkerworld index)*



*Διάγραμμα 3: BDI index (Baltic dry index)*



Looking these two charts we see that fuel prices had the same increased course as fare prices in July 2008 and a sharp decline in January 2009 and a steady course to date with small fluctuations.

## 2.Lubricants And Greases

### Meaning of “lubricant”

Lubricant is called a substance that helps in friction reduce between two surfaces that are in mutual contact and, yet to decrease the heat generated when the surfaces move. It also has the role of transmitting forces, transporting foreign particles, heating/cooling the surfaces. The property of reducing friction is known as lubricity.

### Lubricants on vessels

Every type of machines needs proper and sufficient lubrication between their moving parts, so as to avoid heat build-up and wear. In the majority of equipment such as pumps, compressors and winches, lubricant levels need regular checks and change, if needed. Nevertheless, engine lubricants on-board vessels are a challenging area, quite different than common lubricants and require constant attention, frequent adjustments and special attention to the choice of lubricant, depended on fuel that is being used. Engine lubricating oils can also be used as a means of ascertaining the health of an engine and proper analysis can give early warning of possible failures long before an incident occurs, allowing preventative measures to be taken. Used and waste lubricating oils also pose a problem with regards to their disposal and unless some means of reducing their volume is available on board, there will inevitably be a large cost involved for disposal ashore.

- A research from The Swedish Club, indicates that wrong maintenance and repair seems to be the most likely cause of main engine damage. The report investigated more than 1,000 Hull and Machinery claims relating to over 5,400 vessel years of statistics and its findings make interesting reading. Main engine damage makes up nearly 35% of machinery claims costs and is the most expensive category of claim with an average cost of over US \$500,000 per claim. And with an average cost per claim of US \$926,000 lubrication failure is still the most extravagant cause of damage to the main engine, due to consequential damage to expensive parts such as crankshafts etc. Moreover, crew with insufficient experience and lack of training in major overhauls contaminated lubrication oil and contaminated bunkers. Vessels with low-speed engines still suffer proportionally fewer claims than those with medium and high-speed engines, with 57% of club entries in this category responsible for only 40% of main engine claims cost.

### Meaning of “Grease”

Grease is a semisolid lubricant which consists of thickening agents diffused in a liquid lubricant. In other words, grease is formed as a soap intermixed with mineral or vegetable oil. Grease is divided into 3 types of lubrication: boundary, mixed and full film. Each category poles apart, but the common thing is that all of them are relying both on a lubricant an oil’s additive in order to protect from wear.

### Marine grease

Marine grease is a marvelous water – resistant grease and can be used as a protector against wear and corrosion in areas exposed to dirt and water. Marine grease has a vigorous job. Not only it lubricates and saves parts from rust, but also it must resist under tough conditions, especially when moving parts or the area that must be lubricated, are submerged into water. Both regular and marine grease may have the same adeptness, without marine grease’s special composition, regular grease

would be washed out of parts, leaving them exposed to danger. Cost of greases are included in lubricant costs.



Picture 3-Greasing deck machinery

## UNIT 2

### Ship's maintenance costs

#### 1.Maintenance

##### Meaning of “maintenance”

The concept of maintenance is attached to human since he started using tools. As a definition of maintenance, we consider the function of an organization that is in charge of: maintenance of facilities/equipment according to manufacturer's specifications, the protection and safety of equipment operators, environment's protection, while keeping costs in a low level. Condition-based maintenance procedures that help identify and troubleshooting in the early stages, can improve equipments' reliability and reduce costs significantly. The benefits of monitoring and scheduled maintenance, are as follows:

1. Cost reduction
2. Increased equipment reliability and predictability
3. Maximum availability of spare parts and equipment
4. Simplified classification process
5. Safer environment for the workforce
6. Reduced environmental impact, through equipment's good condition.

- Subsequently, we will refer to a variety of methods of maintenance, which have been developed until today.

### Reactive maintenance

It is the first method of maintenance. In obedience to this method, the machine in a production chain that operates constantly, until it fails. By the time it happens, production stops, the damage is repaired and the production is immediately restored. Objectives of reactive maintenance are:

1. Minimization of the recovery time of damage
2. Maintaining the characteristics of the damaged equipment, at the limits specified by the manufacturer.

It is a pretty safe statement that reactive maintenance is a cost-effective approach upfront, but ends up becoming more costly and more trouble than it's worth

### Preventive Maintenance

This method was innovative, due to the possibility of standardization it offered and managed to rapidly decrease the number of failures and increase the machine's reliability. Its purpose is the fault prevention by performing maintenance, as per manufacturer's instructions, based on either machine's operating hours, or specific interval times. Preventive maintenance has two stages:

1. Preventive maintenance stage 1: It constitutes the daily control and maintenance performed by equipment users and relating to maintenance and their safety.
2. Preventive maintenance stage 2: It is the existence purpose of this maintenance method. It is also performed by established equipment intervals as stated by the manufacturers. Preventive maintenance must be done long before the equipment breaks down, because then the repair cost is high and the equipment ceases to operate until repaired. It is usually by specialized technicians.

Objectives of preventive maintenance, are:

1. Minimizing accidental damage and downtime equipment
  2. Maintaining the characteristics of the equipment, within the specifications of the manufacturer.
  3. Protection of environment and crew operating the equipment.
- ❖ The goal of preventive maintenance is to extend the life of assets, increase productivity, improve overall efficiency and reduce maintenance costs. While preventive maintenance may be more cost-effective than reactive maintenance strategies, it can also be more difficult to justify.

### Opportunity maintenance

This method of maintenance is a combination of preventive and reactive maintenance, without being a autonomous maintenance strategy by itself. It aims to avoid additional costs for the procedures of an upcoming preventive maintenance.

### Improving maintenance

During this maintenance, the existing equipment or facilities is/are upgraded or replaced. The objectives of improving maintenance, are:

1. Minimize downtime of equipment and reactive maintenance
2. Minimizing the cost of preventive and reactive maintenance
3. The prosecution of spare parts supply by the manufacturer
4. The improvement of the produced product or economy while vessel is underway using engine doing maneuvering

## Predictive Maintenance

As predictive maintenance, we consider the maintenance that is consistently performed monitoring the condition of equipment through periodic inspections and measurements of various equipment factors and replacement of components just before their failure. Predictive maintenance aims to reduce its replacement cost proposed by the precautionary method without them showing obvious signs of wear, failure or damage.

## Proactive Maintenance

The previous method's weakness is covered by proactive maintenance, which studies the behavior of the machine based on the timing of a fault.

## **2.Maintenance cost**

The cost of maintenance - repair occupies a percentage of 15-25% of operating costs depending on the policy of the shipping company, the type and age of the ship. Maintenance and repairs concern the hull of the ship, the main and auxiliary engines such as the generators, the navigation instruments (RADAR, ECDIS, AIS, GPS) the telecommunication instruments (GMDSS INMARSAT) and the other equipment, such as VDR, ISPS equipment etc. Work performed on board by crew members shall be considered as routine maintenance work. Private crews are called by the company for on-board repair in cases of specialized work / repair that cannot be performed by crew members. During the stay of the ship in the port, during the loading and unloading, works are carried out that affect the seaworthiness of the ship and the proper management of the cargo. During the ship's drydocking, major repairs / alterations are carried out. Repairs and maintenance are distinguished by those imposed by the technical service of the company, the Master and the Chief Engineer, as well as those prescribed by the manufacturer.

Vessel shall be in a seaworthy condition and must be kept in the same good order and condition during the charter period for ordinary cargo service. With hectic onboard operations, proper maintenance of machinery or equipment is becoming difficult day by day, leading to these failures. Such things not only delay the ship but at times are very costly to repair, resulting in huge cost and set back to owners, not to mention the loss of reputation in this ever increasingly competitive industry.



## 3.Drydocking

### What is Drydocking?

A drydock is a narrow basin or vessel that can be flooded to allow a load to be floated in, then drained to allow that load to come to rest on a dry platform. Drydocks are used for the construction, maintenance, and repair of ships, boats, and other watercraft.

### Types of drydocks

- **Graving.** A graving dock is the traditional form of dry dock. It is narrow basin, usually made of earthen berms and concrete, and closed by gates or by a caisson. The keel blocks as well as the bilge block are placed on the floor of the dock in accordance with the "docking plan" of the ship. Routine use of dry docks is for the "graving" For instance, the cleaning, removal of barnacles and rust, and re-painting of ships' hulls.
- **Floating.** A floating dry dock is a type of pontoon for dry docking ships, possessing floodable buoyancy chambers and a "U"-shaped cross-section. The walls are used to give the dry dock stability when the floor or deck is below the surface of the water. When valves are opened, the chambers fill with water, causing the dry dock to float lower in the water. The deck becomes submerged and this allows a ship to be moved into position inside. When the water is pumped out of the chambers, the dry dock rises and the ship is lifted out of the water on the rising deck, allowing work to proceed on the ship's hull.



**Picture 4-Graving drydocking**



**Picture 5-Floating drydocking**

### Drydocking costs

It varies in different parts of the nation and according to your boat's size. To get a general idea of the potential costs, you can figure on spending somewhere between \$50 and \$200 per foot of boat indoors and 20\$ to 50\$ per foot of boat for outdoor storage, per season. Every vessel is required to dry dock at least once every 5 years. The duration of a normal drydocking project is 10-14 days. If dry dock is poorly managed, the expenses and time can escalate and important defects may not be identified and corrected.

### Drydocking maintenance costs

Between intermediate surveys and drydocking there are huge variations in the actual costs provoked by shipowners can only be treated as indicative. Owners with extra crew on board for daily maintenance may sustain lower costs and no allowance for this type of activity.

## **4.Port costs**

Mooring and port charges are part of voyage estimation. Such charges cause problems to the costs prediction, due to lack of full aware of port charges at anytime worldwide. The costs that a ship will incur when approaching a port of destination, a shipping company is very likely to be informed from its archive in the accounting department, since the vessel has repeatedly approached this port in the past. BIMCO (Baltic & International Maritime Council) offers specialized versions for port charges and local holidays. However, the most valid information will be given by a local port agent.

Dividing the port costs, they are defined as follows:

1. Port dues, relating to the amount of money saved up by the Authority and based on the provided services by the port, ship's tonnage as well as the needs for maintenance and future port expansion.
2. Pilot fees, the fee to which the pilot is entitled for the assistance he provides to the respective ship for the safe entry at port, but also the mooring / unmooring procedures and safe exit from it. Pilots have extensive experience and knowledge of the specifics of the port in which they work, about the shallow waters of the port and the existence of shipwrecks and problems due to bad weather conditions within the port
3. Dockage, an amount of money paid by the ship according to the duration of time it remains alongside.
4. Mooring / unmooring / shifting costs, referring to the costs of mooring / dismantling the ship and re-mooring at the loading / unloading port facilities
5. Tug fees, payment of tugboats which assisted in the mooring / unmooring / re-mooring maneuverings of the ship. In many ports around the globe, a specific number of tugs are required, regardless Master's wish and the amount of the charge depends on the type of assistance offered by the tug on the ship.
6. Canal dues. This cost includes the costs incurred by the ship when crossing canals or ferries. The Panama Canal and the Suez Canal are great hubs. For instance, Suez transit charges are calculated on the net capacity of the ship crossing the canal (SCNT or Suez Canal Net Tonnage) and are paid in a special currency, the special towing rights (SDRs) so as to avoid losses from exchange rate fluctuations, as the value of the rights is linked to all the major national currencies of the world. Most channels charge different charges for unloaded and loaded ships, and sometimes charge for cargo.
7. Agency fees, for general services, such as formalities with the Authorities, correspondence, repatriation, transfer of a new crew onboard, money for crew needs, departure, arrival, sanitary procedures

## **UNIT 3**

### **Consumables/Sewage**

#### **1.Supplies**

Every vessel during its voyage often needs supply with provisions in order to serve the needs of the crew and also its maintenance. The shipping company supplies the crew on a regular basis with the necessities for their living and entertainment inside the ship for the duration of the voyage. Not only food but also spare parts are included in provisions.

## Supply expenses

Although supply expenses are a major part in shipping, the shipowner categorizes them as fuel and greases for the main engine and auxiliary machines of the ship. In supply expenses communication, catering and entertainment are also included.

Supplies include:

1. Provisions for the crew and ship
2. USD daily per person
3. Supervision to the ship chandlers
4. Quality of food
5. Consumables
6. Wires and ropes
7. Lubricants and greases



- The costs are rapidly increasing according to vessel's age and form up to 20-30% of total operating expenses.
- Seafarers at work hard in bad environmental conditions which often require good amount of physical and mental strength. The food for seafarer thus needs to be of the best quality with all the necessary ingredients required to support a healthy body and mind. Most companies provide victualing allowance on a per person per day basis, the amount of which varies from one company to another and ranges from \$6.00 to \$8.50 as per current price.

## 2.Spare Parts

### What are spare parts?

Spare parts is a general term for all parts that can be used as replacements. For instance, door, mirror, bumper, etc. Spare parts are kept in storage for emergency use or replacement. These are not essential service parts to keep the vehicle running smoothly but need to be used when the current part is no longer in good working order.

### What are the differences between consumables and spare parts?

Consumables are those which are not replaced or which are finished during process. For instance, oil, hand gloves, coolant etc. Spares are those which are replaced and don't vanish from the machine during process. For instance, lead screw etc.

### Use and ordering of spares

Spares accounts for a major chunk in the operational cost of running of ships. Although the procurement of spare parts is expensive, management is a major part of overall costing in displacement of spares for ships. It is commonly known there are some ports where logistical costs are remarkably less. For example, Amsterdam, Rotterdam, Singapore, Fujairah, Houston etc. It is common sense to ask for the greatest amount of required spares at these ports, reducing the logistical charges, helping shipowners save money.

### 3.Wastes/garbage

Marine litter and pollution put the marine environment at risk. While a great proportion of marine litter originates from land-based sources, limiting waste discharges from ships also plays an essential role in efforts to preserve marine and coastal ecosystems. Based on international law, EU legislation requires vessels to bring the waste they generate on voyages to waste-reception facilities in port, and obliges EU ports to provide such facilities to ships using the port

#### Wastes: Definition

Wastes are unwanted or unusable materials. Waste is any substance which is discarded after primary use, or is worthless, defective and of no use.

#### Types of wastes/garbage

1. Liquid waste (such as fats, oils greases, sludges etc.)
2. Hazardous waste (noxious liquids)
3. Medical waste (painkiller pills etc.)
4. Electrical waste (E-waste)
5. Recyclable waste (paper, foil etc.)
6. Green waste

#### How do ships dispose of waste?

The ship has an incinerator, as well as a compactor for processing plastic waste. An incinerator is generally defined as any furnace used in the process of burning solid waste for the purpose of reducing the volume of the waste by removing combustible matter. Emissions of concern include particulates and potentially harmful pollutants depending on what is being burned. The compactor crushes approximately 528 gallons of water bottles. Once the ship returns to port, it can then transport plastic, aluminum, paper, and glass for recycling through a third-party vendor.

#### Garbage scow

A garbage scow is a large watercraft used to transport refuse and waste/garbage across waterways. It is often in the form of a barge which is towed or otherwise moved by means of tugboats; however, many are also self-propelled.



Picture 6- A tug pushes garbage scows

#### Medical Waste Disposal & Management

Hospitals in vessels include yellow biohazard containers that can safely contain

- ✓ Sharps (glass, scissors etc.)
- ✓ Needles
- ✓ IV Catheters

Medical waste may include:

- ✓ Paper towels or wipes
- ✓ Gloves used in procedures
- ✓ Syringes without needles
- ✓ Bandages with small amount of blood
- ✓ Any other material from medical care

These kinds of wastes are forbidden to be burned in the incinerator but they can be transferred by barge.

The system has to reflect the 'polluter pays' principle and should not encourage ships to discharge waste into the sea. The indirect fee has to cover at least 30 % of the cost of the waste-disposal installations and can be differentiated on the basis of ship size, type and category. Ports can offer reduced fees to ships with good waste management, producing less waste.

A think-tank, listed the factors acting as incentives – for a ship entering a port of call – to deliver waste, as follows:

1. The price for waste collection services at the port and the applied cost recovery system (the degree of indirect fee)
2. The efficiency and user-friendliness of waste collection (one waste operator provides a 'one stop shop' service or the ship's agent has to deal with several waste operators)
3. The design and efficiency of the waste notification system
4. The involvement of the port authority in ship waste-handling (taking responsibility, control and monitoring)
5. The inspection regime in the port, checking on waste delivery.

## **UNIT 4**

### **Administration**

#### **1.Freight or Fare**

##### Meaning of “Freight”

Freight or Fare, is defined as the price at which a certain type of cargo is delivered from the loading port to the discharging port. In other words, freight is called the price paid by the charterer to shipowner for the use of the vessel so as to carry goods. The factors that will determine the freight's price are: type of vessel (liners, tankers, bulk carriers etc.) the size and weight of the cargo, the distance of transportation, loading and delivery points and the real goods transferred. All above have a unique and significant role in determining the price and shipping rate of the cargo, but synchronous they are all linked together.

##### How fare is calculated

The four elements required to calculate shipping fares are shipping point and origin, package weight, package dimensions and expected delivery times. Taking into account all these factors we come to the final price of the fare, however some charterers prefer to pay a certain amount per day rather than chartering a ship, where the price will be calculated per ton. A number of vessels will be eligible to take a cargo and the broker (who has been mandated by the cargo owner to find a vessel

to carry the cargo) will over the course of several rounds bring down the number of potential ships. This process will also be driven by the ship owners themselves as some will voluntarily drop out of any potential bidding for a range of reasons (logistics, price, other cargo to bid on etc.).

## 2. Chartering

### Chartering: Definition

Chartering is a pact between two people/ companies for the use of a ship carrying people or things with exchange. Chartering is divided into two categories based on the time of use of the ship by the charterer.

### Voyage charter

A voyage charter is the hiring of a vessel and its crew for a voyage between a specific loading and discharging port. The charterer pays the shipowner on a per-ton or lump sum basis. This payment is called “freight”. Port costs (excluding stevedoring), crew and fuel costs are paid by the owner. In this type of chartering, a specific period of time is determined for loading and discharging cargo, known as “laytime”. If laytime is exceeded, the charterer must pay demurrage. In case of laytime is saved, the charter party may require the shipowner to pay despatch to the charterer. Furthermore, one of the terms (clauses) that are observed, is the clause referred to the amount and method of freight payment to the agents, as well as the clauses set refer to the Bill of Lading. Among others, clauses are included referring to arbitration (arbitration clause) and to the broker’s commission (brokerage clause).

### Time charter

In a time charter, the shipowner leases his ship to the charterer for an agreed period of time for a fee, known as “hire”. Time charters, depending on the purpose of ship’s employment, place and delivery / re-delivery time, include three main forms: a) trip time charter, b) round voyage time charter and c) period time charter. Trip time charter looks similar to voyage charter, whereas the vessel must execute a specific voyage. The noticeable difference is that in trip time charter, the shipowner earns hire per day instead of lump sum or per-ton as it happens in voyage charter. In round voyage time charter, the charterer charters the ship for the execution of a round trip and therefore, undertakes to deliver the vessel to the same port/area of which he received it. In the period time charter, which is the most common, a vessel is chartered for a period of time and employed in boundaries of a specific area or worldwide. Period time charter varies from a short period of time (days) or years. After the completion of charter, the ship is delivered to an agreed port / place.

The costs that are covered by the shipowner in this charter are the following:

1. Operating / running costs: Including manning costs, salaries, crew transfer medical care costs, supply costs, lubricants and spares, insurance premiums, maintenance and repair costs, management costs
  2. Capital costs: Includes payoff loan and interest payment.
- Shipowner must also pay the fuel costs during ship’s delivery to the agreed port.

On the other hand, costs covered by the charterer are costs of the commercial operation of the ship. Such costs include:

1. Voyage costs, which are fuel costs, port costs canal passage costs, pilot costs tugboat costs, cargo handling costs, as well as loading / discharging & stowage costs.

### Bareboat charter

This kind of charter is different from the mentioned above. The bareboat charter includes the lease of the ship by the shipowner to charterer without crew. This implies that the charterer bears all costs of the ship, including maintenance costs, crew costs, insurance, but excluding capital costs. Due to its diversity, this particular form of charter is the most unusual. However, in the field of trade and shipping industry, developments are rapid and investment trends are constantly changing, bareboat charter becomes more and more usual. Many investors take the opportunity and in the end of the charter, they purchase the vessel, so as to avoid taxation. Period of charter is defined in the charter party with both sides agreed. There is no limit to the duration of charter, but when the duration is quite long, it is linked with a management agreement. As mentioned above, in the end of this period of charter or during chartering, there is the option of purchasing the ship.

## **3.Freight Indexes**

### Freight Indexes as financial instruments

Freight indexes are financial instruments which observe the freight market's condition and its trend. Freight market consists of numerous sub-markets whereupon are neither strictly divided, nor interdependent, which form various nonuniform trends among general entire freight market. This assortment of the freight markets enhanced the need of creating such indexes.

### Types of freight indexes

According to the type and nature of the cargo concerned freights indexes are divided to two types, dry cargo index which are based on dry cargo ships and liquid cargo index, which refers to liquid cargo ships. Among this distinction of freight indexes, a new specialized categorization concerning the vessel's size. For instance, there are indexes referring to "Handy" size ships, "Panamax" size ships, "Cape" size ships and "Supramax" size vessels.

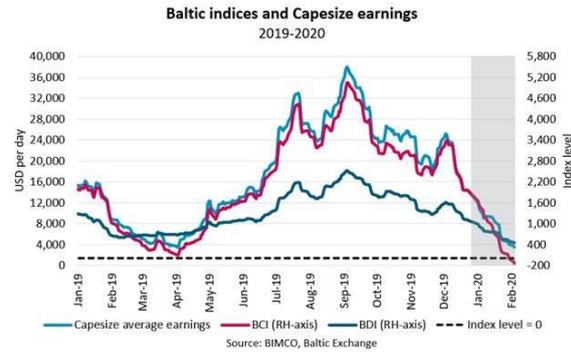
### Baltic Freight Index (BFI)

This index was one of the most important freight rates in the Baltic Exchange and tried to reflect the level of fares on ships dry cargo transport from 1985 to 1999, where he was replaced by BDI indicator. It was a weighted average, based on 11 international routes in all three commodities, coal, iron ore and 25 in wheat. The prices of these cargoes and fares are linked to these itineraries. This index worked as follows: the changing mean of the fare of each route was multiplied by the weighting factor, which was fixed and thus the final contribution of each route was given to configuration of the index value. The sum of the contribution of the individual gave the daily value of the BFI.

## 4. Dry Cargo Indexes

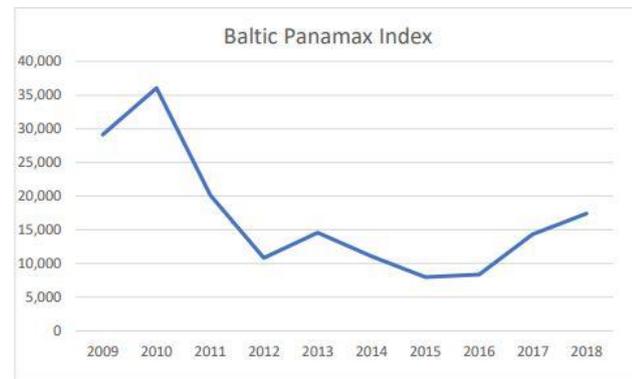
### Baltic Dry Index (BDI)

BDI index is a shipping index, created by the London-based Baltic Exchange and it indicates average prices paid for dry bulk materials transportation since 1/1/1999. This index replaced the old one, known as BFI (Baltic Freight Index) which was active from 1985 until 1999.



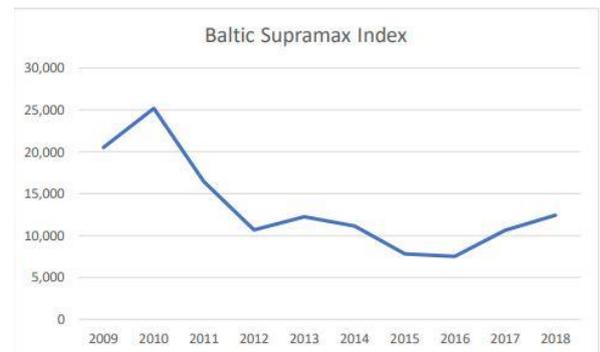
### Baltic Capesize Index (BCI)

BCI index was created by the "Baltic Exchange" to monitor the individual dry cargo freight markets for Capesize vessels. This index is composed of 4 standard time charts and 6 standard travel charters for iron ore and coal transport. The time charters are measured in \$/day (dollar per day), travel charters in \$ / ton of cargo (dollar per ton of cargo), index is counted in index units. The index appeared on 01/03/1999 and its initial price was set at 1,000 units.



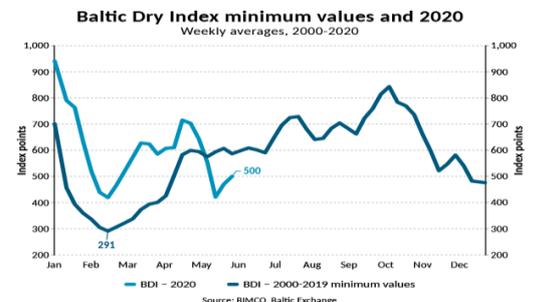
### Baltic Panamax Index (BPI)

The BPI Index was established on May 6, 1998 and its purpose is to monitor the freight market Panamax dry cargo ships (60000-80000dwt). This index consists of 4 typical short-term charters and 3 standard ones spot charters for grain transport, with the same weighting rate for dry cargo ships transportation. Time charters are measured in \$/day (USD per day), travel charters in \$/tonne (dollar per tonne), while the index in "index units"



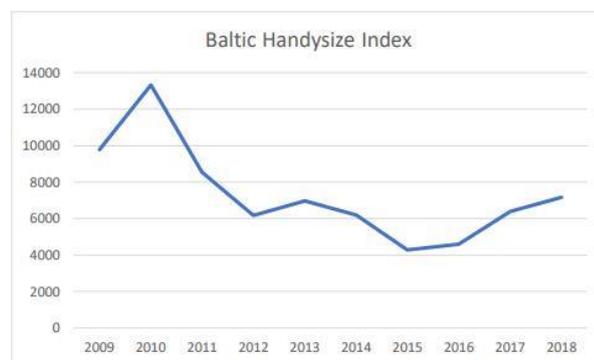
### Baltic Supramax Index (BSI)

The BSI index monitors the freight market of dry cargo ships, Supramax type (52,500dwt) with maximum age 10 years old and includes 4 time charters and 2 travel charters with different weights. Time charters are measured in \$/day (USD per day), travel charters in \$/tonne (dollar per tonne).



## Baltic Handysize Index (BHSI)

The BHSI index consists of six charters with different weighting rate, the ones that are depicted in the following table for handysize vessels (28.000dwt) with maximum age 15 years old. Time charters are measured in \$/day (USD per day).



## Comparison of a Capesize's and Panamax's operating costs

In this subchapter, the annual operating cost of two Bulk Carriers aged five (5) years, type Panamax, 92000 dwt, which belongs to the shipping company of the company Omega Navigation based in Athens, is analyzed.

Omega Navigation Ltd is a listed company of the shipowner Mr. George Cassiotis, which operates with Bulk Carriers and Tankers. It is worth noting that for 2008, the company's total revenue amounted to \$ 16.7 million and net income reached \$ 3.4 million, or \$ 0.23 per share. However, the company ultimately had a net loss of \$ 1 million, or \$ 0.06 per share, because it canceled a contract to buy a ship and lost revenue from derivatives. The drop in profits reaches 54%, while the decrease in revenues was of the order of 7%.

Another ship that will be analyzed in terms of operating costs. In the present work, it is a Capesize with a capacity of 121,000 dwt of the shipping company Star Bulk Carriers which is an international shipping company for dry cargo and especially iron ores, coal, grain, bauxite, fertilizers and steel products. Star Bulk, a company of the Marshall Islands based in Athens, manages a fleet of 12 ships consisting of four (4) Capesize and eight (8) Supramax with a total carrying capacity of 1,106,250 dwt.

According to company officials, the drop in fares that began in 2008 for capesize ships averaged 55% in 2008, while ship prices (used) fell by 18%. The corresponding sizes for panamax are estimated at 50% and 35% respectively. However, despite the decline in fares, the profit margins of the companies that are active, especially those with a young fleet, remain excellent.

For the year 2006, the two specific ships mentioned above had a total of:

- Crew costs: USD 931,012.00 \$ for both ships
- Storage costs: USD 302,687.50 \$ (Panamax) and USD 323,875.63 (Capesize) difference approximately USD 20,000.00 \$
- Maintenance costs: USD 354,060.00 \$ (Panamax) and USD 378,844.20 \$ (Capesize) difference approximately equal to USD 24,000.00 \$
- Insurance costs: USD 480,900.00 \$ (Panamax) and USD 601,125 \$ (Capesize) difference approximately equal to USD 120,000.00 \$
- It is worth adding that the general expenses in total, which include communications, port fees and small expenses for both types of ship are USD 90,300.00 \$.
- In the management fees for both ships the amount was USD 180,600.00 \$ while the bonuses including drydocking (calculated), each year the amounts were: USD 105,000.00 \$ (Panamax) and USD 112,350.00 (Capesize) difference approximately equal with USD 7350.00 \$
- The total operating cost, plus bonuses was USD 2,444,559.50 \$ (Panamax) and USD 2,618,406,83 \$ (Capesize), difference approximately equal to USD 190,000.00 while the

daily cost, plus bonuses amounts to USD 6,697,42 \$ (Panamax) and USD 7,172.40 \$ (Capesize) difference approximately equal to USD 400.00 \$.

- The above analysis of total costs shows that the largest differences between the two ships for the year 2006 were in insurance and maintenance costs.

The same analysis then applies to the year 2007. During that year, the following observations are made:

- Crew costs: USD 977,562.60 \$ for both ships
- Storage costs: USD 317,821.58 \$ (Panamax) and USD 340,069.41 \$ (Capesize), difference approximately equal to USD 22,000.00 \$
- Insurance costs: USD 505,945.00 \$ (Panamax) and USD 631,181.25 \$ (Capesize), difference approximately equal to USD 125,000.00 \$.
- It is worth adding that the general expenses in total, which include communications, port fees and small expenses for both types of ship, are USD 94,815.00 \$.
- In the management fees for both ships, the amount was USD 189,630.00 \$, while the allowances, including drydocking (calculated) each year the amounts were: USD 110,250.00 \$ (Panamax) and USD 117,967.50 (Capesize) difference approximately equal to USD 7500.00 \$
- The total operating cost, plus bonuses was USD 2,566,787.48 \$ (Panamax) and USD 2,749,012.47 \$ (Capesize) a difference of approximately USD 190,000.00 \$ while the daily cost plus bonuses amounts to USD 7,032.29 \$ (Panamax) and USD 7,531.54 \$ (Capesize) difference approximately equal to USD 500.00 \$.

- The above analysis of total costs shows that the largest differences between the two ships for the year 2007 were in insurance and maintenance costs.

Moreover, the same analysis then applies to the year 2008. During it the following observations are made:

- Crew costs: USD 1,016,665.10 \$ for both ships
- Storage costs: USD 330,534.75 \$ (Panamax) and USD 353,672.18 \$ (Capesize) difference approximately equal to USD 22,000.00 \$
- Maintenance costs: USD 386,633.52 \$ (Panamax) and USD 413,697.87 \$ (Capesize) difference approximately equal to USD 23,000.00 \$
- Insurance costs: USD 525,142.80 \$ (Panamax) and USD 656,425.50 (Capesize) with a difference of approximately USD 125,000.00 \$

- ✚ It is worth adding that the general expenses in total, which include communications, port fees and small expenses for both (2) types are USD 98,607.60

- In the management fees for both ships the amount was USD 197,215.20 while the allowances including drydocking (calculated) each year the amounts were: USD 114,660.00 \$ (Panamax) and USD 122,686.20 \$ (Capesize) difference approximately equal to USD 8,000.00 \$

The above analysis of total costs shows that the largest differences between the two ships for the year 2008 were in insurance, maintenance and storage costs.

Similarly, the same analysis concerns the chronological year 2009. During it the following observations are made:

- Crew costs: USD 1,077,665.10 \$ for both ships
- Storage costs: USD 350,366.84 \$ (Panamax) and USD 374,892.51 \$ (Capesize) difference approximately equal to USD 24,000.00 \$
- Maintenance costs: USD 409,851.53 \$ (Panamax) and USD 438,519.74 (Capesize) difference approximately equal to USD 29,000.00 \$
- Insurance costs: USD 556,651.37 \$ (Panamax) and USD 695,814.31 \$ (Capesize) with a difference of approximately USD 140,000.00 \$.
- In the management fees, the amount was USD 209,048.11 (Panamax) and USD 193,242.00 \$ (Capesize) higher compared to the previous dates for the Panamax ship, while the allowances in which drydocking included (calculated) each year were: USD 114,660.00 \$ (Panamax) and USD 122,686.20\$ (Capesize) difference approximately equal to US 8,000.00\$
- The total operating costs plus bonuses, were USD 2,669,458.97 \$ (Panamax) and USD 2,858,972.50 \$ (Capesize) a difference of approximately USD 160,000.00 \$ while the daily cost-plus bonuses amount to USD 7,313.59 \$ (Panamax) and USD 7,832.80 \$ (Capesize) difference approximately equal to USD 500.00 \$.

The above analysis of total costs shows that the largest differences between the two ships for the year 2009 were in insurance, maintenance and storage costs.

Costs incurred in connection with the drydocking of ships, are recorded in the multi-year depreciation costs and are amortized until the date of the next drydocking.

The above costs include the cost of repairs, which are required for the ships to meet the seaworthiness standards, which have been established by various classification societies.

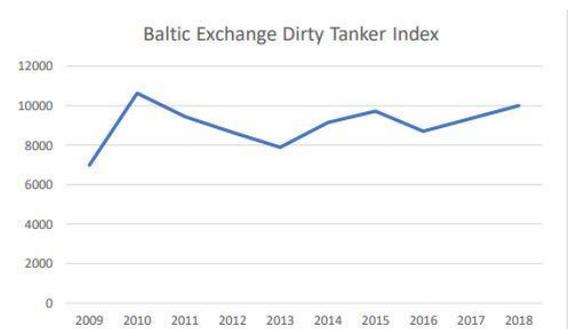
## 5.Liquid Cargo Indexes

### Baltic International Tanker Routes (BITR)

The Baltic International Tanker Routes (BITR) was created in 1998 for the “spot” fare fluctuation monitoring, in selected liquid cargo transportation routes. Since 2001, this index was divided into two sub-indexes for better information receiving. Baltic Dirty Tanker Index (BDTI) is the one index that monitors evolution of crude oil fares on standard routes and Baltic Clean Tanker Index (BCTI) is the other index which monitors the evolution of clean product fares oil on standard routes.

### Baltic Dirty Tanker Index (BDTI)

In 2008, the international financial crisis, when USA mortgages’ crisis had appeared in 2007 had a recession. On April 15, 2009, the index fell into a closing level of 453 points, which is the lowest level in history. The loss that recorded on July 23, 2008 (2347 units) was 80.7 percent. On January 11, 2010, the index was higher than on April 15, 2009 at 1216 units, an increase of up to 168.4 percent.



## Baltic Exchange Clean Tanker Index (BCTI)

The BCTI index consists of 7 transport routes of clean petroleum products with each route to participate with equal weight in determining its price index. As unit of measurement, we use the Worldscale index.



- Worldscale index is the modern scale for measuring tanker fares. Annual worldscale lists include over 60,000 percentages based on \$ per MT (USD per Metric Tonne). Worldscale rates are called Flat Rates and are expressed in \$ per MT (USD per Metric Tonne) for a trip between two ports.

## 6.Cargo Handling Costs

Cargo handling costs include the costs ensuing from both loading and unloading cargo which comes along with any claims that may arise relating to the cargo. Cargo handling costs are excluded from voyage charter costs but have to be paid off by the owner operation.

### Cargo handling features

Cargo handling time can be reduced as well as the costs of this operation, by the provision of good cargo handling features such as:

1. Large hatches giving good access;
2. Shiplside doors where appropriate;
3. Hatch covers which can be speedily opened and closed;
4. Fork lift trucks to speed stowage;
5. Cargo handling cranes or derricks on the ship with a lift capacity optimized to the cargo carried and a speedy cycle time;
6. In appropriate cases by providing the ships with self-discharging facilities.

Where the trade is based on a small number of specific ports there is the alternative of minimizing the ship cost and using shoreside cargo handling facilities.

### Terminal Handling Charges (THC)

Port handling charges per container. This cost is calculated according to the number of containers. For the purpose of paying for cargo handling at the port. Meanwhile, the shipowners will have to pay a loading and discharging fee to the port to compensate for this charge. THC includes the summary of the terminal's local charges and hence vary from port to port. THC may differ between several terminals of the same port. That occurs because different terminals may have different technology and advanced equipment for handling the various types of cargo. Shipowners recover from the client the THC additional charge. Terminal handling charges are usually settled by ports on an annual basis. Some shipping companies may also charge THC based on the quantity of cargo.

### Handling charges

The handling charge is an important fee in the field of logistics established by forwarders to collect shipper or consignee fee to equalize the cost of taking care of your shipment. For example,

transaction fees between shipping agents, manifest costs, delivery order (D/O) costs, telephone costs, depreciation costs, etc.

### Handling fee

Handling fee is a processing fee, which is used to pay and maintain a worldwide agent network. In order to maintain the link between transport units in the world into a common information network, it is necessary to help the exchange and receipt of goods to take place quickly and smoothly. The transport unit that pays several charges, such as phone charges, documents, papers and other costs. In order to cover these costs, shipping companies are required to collect handling charges from customers.

### Compare handling charge with THC charge

The THC is the fee collected per container to cover the costs of cargo handling activities at the port. Specifically, as the costs:

1. Charges for loading and discharging containers.
2. Shipping fees from container wharf to container yard.
3. Forklift truck loading and discharging container.
4. Port labor fee.
5. Parking charges.
6. Port management fee.

## **7.Operation cost**

Operation costs include costs related to cargo handling at the port, for example:

1. Loading
2. Discharging
3. Stowage
4. Trimming
5. Lashing
6. Unlashing

Depending on the shipowner 's requirements, we may also have costs related to the cost of preparing for holds, the cost of cargo claims, the cost of refrigerating cargo etc. The following relation gives the total cost of handling the load.

$$CHC_{VS} = L_{VS} + D_{VS} + C_{VS} + O_{VS}$$

1. CHC stands for Cargo Handling cost
2. L stands for Cargo loading cost
3. C stands for Cargo claims
4. O stands for Other cargo handling costs
5. V is for the Voyage
6. S is for the Ship

Operation cost is very important for the cost of the voyage, because in some vessels' categories the cost of cargo handling represents a high percentage of the cost of travel, but also of the cost of the

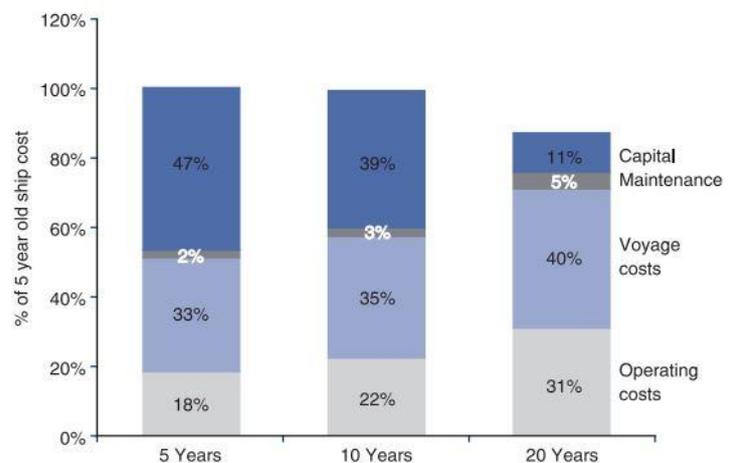
ship, so the division of the cost of cargo is not subject to the rule that the shipowner bears the cost of travel in this form of charter.

According to a research in 2013 published on maritimeprofessional.com by Richard Greiner, a member of shipping industry group “Moore Stephens” « *Total operating costs for the tanker sector were up in 2013 but down in the bulker and container ship sectors. The tanker index was up by 2 points, or 1.1 percent, while both the bulker index and the container ship index were down by 2 points, or 1.2 percent, on a year-on-year basis. The corresponding figures for 2012 showed falls of 5 points, 7 points and 3 points respectively in the tanker, bulker and container ship indices. Daily operating costs in 2013 were up for all categories of tanker included in operating costs*» About tankers, he continued by saying « *The following are the daily operating costs for certain categories of tanker, with the corresponding reported average time-charter rates for the year, as reported by Clarksons, shown in parentheses. Handysize product tankers: \$7,964 per day (\$13,063 per day); Panamax: \$8,482 (\$14,981); Aframax: \$8,272 (\$13,288); Suezmax: \$9,378 (\$16,014)* » Meanwhile, concerning bulker trades, he stated « *Operating costs were down in 2013 for all categories of vessel. The daily operating cost for Handysize bulk carriers was \$5,222 (with an average time-charter rate for the year of \$8,106 per day). Other figures were those for Panamax bulkers: \$6,118 (\$10,099); and Capesizes: \$7,303 (\$15,760)* ». To sum up, he referred to container ships «*The operating cost for a Feedermax container ship in 2013 was \$4,491 per day, as against average time-charter earnings for the year of \$4,842. The corresponding figures for 1,000-to-2,000 TEU container ships were \$5,300 and \$7,096, and for main liner vessels of between 2,000 and 6,000 TEU, \$7,389 and \$7,021*».

- Ship age and the supply price of freight

If we ignore capital costs and periodic maintenance, the modern vessel can survive at freights which are way below the lay-up point for older ships.

[Source: Clarkson Research Studies, Capesize Quality Survey (1993)]



Picture 7- Capesize bulk carrier cost and age

# Unit 5

## Marine Insurance

### 1.P&I Insurance

It is known that when a vessel is underway there exist perils of the sea. For those menaces shipping companies insure their ships. P&I insurance protects the shipowner against third-party claims and relates to actions against third parties with a typical example being the loss or damage to cargo. Except these two insurance types the company can optionally insure the vessels for piracy, loss of profits, strikes, monetary fluctuations.

#### Protection and Indemnity Clubs

P&I clubs stands for Protection & Indemnity clubs which are non-profit associations, self-insuring organizations that in mutual insurance way, covers risks that are not covered by insurance companies.

#### Advance and additional calls

The vessel prepares a sum of money called “advance calls”, the amount of which depends on a rate, arising from its capacity and insurance management of the year (i.e. The expenses of the P & I Clubs) in the year the ship is registered. Every February, when the insurance period ends, the ship is required to pay an additional contribution (additional calls). The amount of the contribution is again related to the management situation of the previous year, i.e. The balance sheet of the P & I Clubs (expenses and income).

#### Factors that affect the cost of insurance

The cost of insurance is not fixed for every vessel but there are some factors that define it. Those factors are:

- The age of the vessel
- The type
- The size
- The machinery
- The flag
- The class

Also, the insurance cost varies depending on the value of the ship and of course the area it is travelling. For instance, the cost is more expensive when the vessel is travelling in high piracy areas.

#### Marine Insurance costs

Marine insurance costs of a vessel, covers about 20% - 40% of the operating costs. Most of these costs, derive from Hull & Machinery insurance which protects the shipowner against damage to the ship, physical loss, fire, collision, grounding, crew and captain's negligence, general/partial explosion or any kind of damage listed in the insurance policy. Hull & Machinery insurance premium covers  $\frac{3}{4}$  of the compensation to be paid by the insured vessel for damage caused to another vessel after a collision. In case of sinking/grounding, if the hoisting costs exceeds the insured value, then the shipowner is entitled to claim the full insurance compensation instead of

claiming the costs for the above case, leaving the ship to the insurer. Hull & Machinery insurance is obtained through insurance brokers.

Insurance costs depends on the ship's insured value, shipowner's insurance requirements and to a large extent, on the accident history. The insured value of the ship depends on the age, condition of the ship, as well as the freight rates. The voyage area of the ship, the cargo and the nationality of the crew significantly affect the cost of insurance, as well as the number of ships insured by the same shipowner in the same insurance company. The ship is charged with the cost of additional insurance, when after the approval of the insurers it is on a specific voyage to violate the geographical employment limits provided by its insurance policies. The insured may incur additional insurance costs of the interests of the bank from which he has received the financing of the ship. Furthermore, some other types of insurance are the following:

- **Freight insurance premiums** cover the loss of the agreed fare.
- **Loss of higher insurance premiums** covers the loss of lease in the event of time charter of the ship and for reasons not provided.

Thus, the insured are not compensated when:

1. The damage caused is not mentioned in the insurance policy.
2. The ship has changed its flag.
3. Premiums have not been paid.
4. The ship has been involved in illegal activities.
5. In case of limitation of the claim
6. in case of bankruptcy.

### Self-insurance organizations

Self-insurance organizations cover the following risks:

1. Loss or damage to the cargo of the insured ship.
2. Damage caused by the insured ship after pollution.
3. Damages at the dock.
4. The 1/4 of the compensation for damage or loss caused after a collision on another ship.
5. Compensation for salary losses due to shipwreck.
6. Compensation for injuries, illnesses and other medical expenses of the crew members.
7. Infringement costs imposed by the respective port authorities.
8. Expenses for repatriation of sick crew members, as well as their replacements.
9. Court costs.

## 2.Registration

### Ship's certificate of registry

Registration is the mandatory entry of the ship in a special book called "Registry" and is observed by all Port Authorities, by a specialized officer called "Registrar" and exists in each port. After the entry of the ship in the registry, the Ship's certificate of registry is issued and granted.

## Certificate of Registry

The Certificate of Registry is issued from the registrar in which the ship had entered, and lists the general characteristics of the ship, the details of the ship owner and various technical characteristics.

### The 10 biggest registries in the world

<b>Flag</b>	<b>Number of vessels</b>
Panama	8.162
Japan	5.338
China	4.110
Singapore	3.621
Liberia	3.202
Marshall Islands	3.031
Hong Kong	2.531
Malta	2.127
Bahamas	1.460
Greece	1.391

	Type of registry		Bareboat Charter	Time charter	Every dry cargo voyage	Every liquid cargo voyage	Line travel
	Cost						
<b>Fund</b>	Ship acquisition cost						
	Interest				Κόστος	Πλοιοκτήτη	
<b>Operational</b>	Management		Κόστος	ναυλωτή			
	Marketing						
	Maintenance						
	Repairs						
	Insurance						
	Provision- Spares						
<b>Voyage</b>	Fuel		Κόστος	ναυλωτή			
	Port						
	Canals						
	Discharging						
	Loading						

**Ship owner and charterer costs depending on the type of registry**

Source: Cambridge Academy of Transport

## Registration Flag

The main factor of a shipping company is the strategic decision of the choice of their ships' registration flag. It is a strategic decision because it is directly linked to the business costs and benefits of making a decision.

Shipping companies in order to make the most appropriate decision for the selection of the flag must take into account a number of factors in combination with other data to make the best decision. Those factors are:

1. The registration cost
2. The ease of registration/fast registration procedures
3. The direct communication shipowner-register
4. The avoidance of bureaucracy and malfunction of the administration
5. The maximum age of the ship from the flag/acceptance of the ship
6. The restrictions based on ship's characteristics (type, size, age etc.)
7. The possibility of temporary or parallel registration
8. The speed in setting up a company and at the same time, maintain the cost at a low level
9. The legal and institutional issues (ship mortgage)
10. The restrictions on the nationality of directors and shareholders
11. The minimum share capital and percentage to be paid
12. The tax regime
13. The manpower flexibility / crew nationality limitation / lack of seafarers training.
14. The manning and corresponding supporting documents.
15. The labor relations
16. The cost of compliance with the regulations of the flag.
17. The laxity of controls / inspections by the competent services of the flag state
18. Flag reliability
19. The Port State Control (PSC - Port Authority Control).
20. White list of Paris MoU. (The flag should be among the commonly accepted valid registers).
21. Registry that is a member of the EU
22. The receipt of a flag from the international shipping community
23. The crew preference
24. The lack of crews and officers of selected flag
25. The manning costs
26. The attitude of financial Institutions / Banks / Insurers.
27. The charterers preference
28. The area of ship's activity
29. The trade restrictions
30. The possibility of employing a ship on domestic lines
31. The regime of freedom of trade in time of war
32. Government / political stability and
33. Historical reasons.

A ship may initially be registered in a national or international register, however during its life it may change its flag several times. A ship under a particular foreign flag may have a special tax exemption or pay less tax than other flags. Some more factors that affect the choice of a flag are:

1. Security standards
2. Law enforcement
3. Port state controls
4. Organizations and employment
5. Costs
6. Restrictions
7. Safety
8. Financing

### **3.Pricing policy of classification societies**

The pricing policy of the classification societies regarding the inspections is complex. It is divided into two separate parts: the hull and the engineering installation and the calculation is achieved by a type that includes in the case of the hull:

1. The age of the ship
2. The capacity
3. The size

And in the engineering part it involves:

1. The main engine's power
2. The auxiliary machines' power

Then these types are reduced to the pricing scale of each classification society where results the amount that corresponds to the inspection.

#### **How the amount of money comes about?**

The amount of money that comes about, corresponds to some points. The purpose of this correspondence of the amount, is due to the difference in its price inspection in the respective ports. For instance, if in Europe this amount is equal with 1 point of main engine inspection, in Asia (and more specific in China) it may be equal to 1,3 points.

In these cases, the ship-owning companies and especially their technical department have a list of places where they are most financially to conduct a general inspection. Also, in that case the cost and the tanking of the ship should be included with equal weight in the decision, whenever it is necessary. The cost of the inspection is significant less than the cost of running a tank.

#### **Costs and budget management**

The cost factor is very important for choosing the general method inspection. In terms of ongoing inspection costs range from \$100,000 to \$150,000 for a VLCC depending on the classification society. Also, for a bulk carrier of 70,000 tons DWT costs from \$ 30,000 to \$ 40,000 adding \$ 20,000 for ultrasonic thickness measurements. In the case of a container ship with a capacity of 30,000 DWT a total contract for all five-year inspections costs up and down \$ 200,000. Finally, to see the proportions of the sizes, one drydocking for class inspection costs from \$ 250,000 to \$ 300,000 for a vessel of 70,000 DWT.

### **4.Surveys**

#### **Annual survey**

It is aimed to prove that the ship sufficiently meets the conditions of class retainment, as well as to check the operation of mechanisms, devices and installations, to which the requirements of the Rules for the Classification and Construction of Sea-Going Ships are applied.

#### **Bunker survey**

This survey concerns the receipt of fuel on a ship. So Bunker survey is the supervision of the fuel receipt of agreed quality and quantity of fuel. The ever-increasing value of marine fuels have

lead charterers and shipowners to the solution of fuel surveillance that they receive, the procedures are similar to those of loading or discharging but they differ in safety issues.

### Statutory survey

Inspections concerning the ship's flag may be carried out by the class in case the flag State recognizes the class and has approved it. These requirements relate to international contracts' satisfaction such as SOLAS, MARPOL, Load line Convention and other certificates.

### Damage survey

Damage inspections are carried out on behalf of many stakeholders such as shipowners, classification societies, insurers and possibly P&I Clubs. These inspections are required as a result of an accident that may be caused by grounding, collision, storm or any other structural damage and defect that may damage the construction strength and tightness of the hull.

### On hire survey

The charter inspection is intended to investigate the condition of the ship so that it can be chartered. The points that the inspection focuses on are:

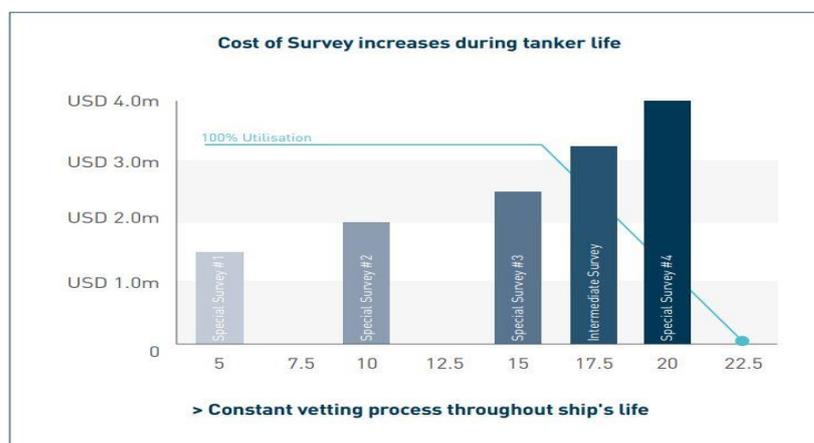
1. Metal construction condition
2. Vessel's documents
3. Fuels on board
4. Loading/Discharging means

### Condition Surveys

These surveys are limited depth and have duration. Their main goal is to locate any constructional damage or corrosion problem and give a general view of the structural integrity. The general condition inspection is usually done on behalf of P & I Clubs or on behalf of banks. The P&I Club maintains, based on the findings of the petition, the right to demand from shipowners repairs, before the ship is accepted for insurance coverage.

### Purchase survey

The purchase inspection is not intended to determine the market value of a ship. It is done to determine if the sales specifications are met, to identify the additional work that are required to meet these specifications and to cost conversions required by buyers. The price that will be agreed with the transaction is estimated based on the current supply and demand, it is purely a matter of the ship market.



## 5. Passage planning

### Passage plan/Voyage plan

Passage planning or voyage planning is a procedure where the 2<sup>nd</sup> officer is obliged to develop a complete description of vessel's route (a voyage from the loading port to the discharging port). The plan includes the route "from berth to berth". That means when leaving the dock, the en route portion of a voyage, approaching the destination, and mooring.

### How passage planning saves money via bunkers

The main contributing factor with respect to running cost of a ship is consumption of bunkers. It is generally the duty of the second officer on a ship to plan passage from port A to port B, while safety accounts the main contributing factor in determining which route to be taken, it is also important to consider a route which consumes the least amount of bunkers. For this, one has to take into account not only distance but also expected weather patterns, current, tidal streams etc.

Proper planning is required before the beginning of the voyage which includes but not only limited to information from weather charts, wave height data, proximity to tropical revolving storms (TRS) or temperate latitude depressions (TLD), wind force and ocean currents etc. Taking all these into consideration, the best possible route should be taken, which not only is primarily safe but also saves money via bunkers.



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*"The math is simple. If one can save about 50nm worth of distance in an average voyage of a week, with present bunker rates a vessel can save about \$1600 (considering a typical handymax type of a vessel). If the same result can be achieved throughout the year, then it means huge saving for the company"*

Marine Insight

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### How officers can reduce daily running costs

Deck and engine officers should be in constant communication so that machinery can stop from being in operation mode for saving bunkers. However, the correct use of machinery can also reduce the number of bunkers consumed. Furthermore, educating junior officers and cadets about how to properly use ship's stores is very crucial. Juniors and ship's crew must have a responsible behavior while handling ship's property with persistence. It's worth mentioning that as long as shipping companies are making profits and their expenses are low, seafarers' jobs are secured since their pennyworth matters and keeps the company afloat.

## Conclusion

The purpose of this dissertation was to mention the daily running costs of a vessel. All the costs surrounding a merchant ship are detailed above, as well as how they are calculated and what each cost includes. Depending on the type of ship as well as its age, the ship's operating costs may vary, depending on its needs

Taking into consideration the budgets that shipping companies have and the profits they make, it is easily to understand that global merchant shipping has a great impact on the development of international trade, provided that most of the international trade in terms of volume is transported by sea.

Shipping companies focus more on operations that have been performed and on transactions that have already been completed. The flow of any information, is not considered to be the best while the competition between the departments such as between the operational and the technical department exists to a significant degree, thus preventing any requirement for cooperation.

## BIBLIOGRAPHY-LINKS-SOURCES

- An overview of engine lubricants on ships | ShipInsight  
<https://shipinsight.com/articles/an-overview-of-engine-lubricants-on-ships/>
- www.Wikipedia.com  
[https://en.wikipedia.org/wiki/Main\\_Page](https://en.wikipedia.org/wiki/Main_Page)
- Οικονομική εκμετάλλευση πλοίου Ευαγγέλου Α. Σαμπράκου, Ιωάννη Γ. Γιαννόπουλου | Βιβλίο AEN Β' έκδοση Ευγενιδείου Ιδρύματος  
[https://www.eef.edu.gr/media/3759/e\\_j00084.pdf](https://www.eef.edu.gr/media/3759/e_j00084.pdf)
- Ναυτιλιακό Δίκαιο Μαρίας Μ. Βρανίκου, Ευαγγέλου Π. Δεμεστίχα | Βιβλίο AEN Γ' έκδοση Ευγενιδείου Ιδρύματος  
[https://www.eef.edu.gr/media/5899/nautiliako\\_dikaio\\_book.pdf](https://www.eef.edu.gr/media/5899/nautiliako_dikaio_book.pdf)
- Maritime English Παρασκευή Α. Παπαλεωνίδα | Βιβλίο AEN Volume 2 Ευγενιδείου Ιδρύματος  
[https://www.eef.edu.gr/media/6168/maritime\\_english\\_volume\\_2.pdf](https://www.eef.edu.gr/media/6168/maritime_english_volume_2.pdf)
- Ship operation management chapter 5 by Dr Konstantinos Galanis | Coursehero.com  
<https://www.coursehero.com/file/33607635/ShipOperationManagementChapter5pdf/>
- What costs are included in running costs or vessel operating expenses | Ship Inspection  
<http://shipinspection.eu/what-costs-are-included-in-running-costs-or-vessel-operating-expenses/>
- Πτυχιακή εργασία Ινδούπουλου Χαράλαμπου Βίκτωρ | Α.Ε.Ν. Μακεδονίας | Costs and freight rates  
<https://maredu.hcg.gr/modules/document/file.php/MAK265/Dissertations%20in%20English/Cost%20and%20freight%20rates.pdf>
- Πτυχιακή εργασία Τουλάκη Παρασκευής | Α.Ε.Ι. Πειραιά | Ναυλώσεις πλοίων  
[http://okeanis.lib.puas.gr/xmlui/bitstream/handle/123456789/3050/%CF%80%CF%84%CF%85%CF%87%CE%B9%CE%B1%CE%BA%CE%AE\\_%CF%84%CE%BF%CF%85%CE%BB%CE%AC%CE%BA%CE%B7.pdf?sequence=1&isAllowed=y](http://okeanis.lib.puas.gr/xmlui/bitstream/handle/123456789/3050/%CF%80%CF%84%CF%85%CF%87%CE%B9%CE%B1%CE%BA%CE%AE_%CF%84%CE%BF%CF%85%CE%BB%CE%AC%CE%BA%CE%B7.pdf?sequence=1&isAllowed=y)
- Πτυχιακή εργασία Σουρβίνου Νικολάου | ΠΑ.ΠΕΙ. | Μείωση κόστους ανταλλακτικών συντήρησης σε ναυτιλιακή εταιρία  
[https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/9146/Sourvinos\\_Nikolaos.pdf?sequence=1&isAllowed=y](https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/9146/Sourvinos_Nikolaos.pdf?sequence=1&isAllowed=y)
- Πτυχιακή εργασία Παπανικόλα Αντώνη | ΠΑ.ΠΕΙ. | Επίβλεψη ναυτιλιακών φορτίων στην ελληνική αγορά  
[https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/8229/Papanikolas\\_Antonis.pdf?sequence=1&isAllowed=y&fbclid=IwAR0J26HTS-kXyMllkoDaNcgrdxaRPGWQYFEzLBDtajVQC3qifcgljUXDLGI](https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/8229/Papanikolas_Antonis.pdf?sequence=1&isAllowed=y&fbclid=IwAR0J26HTS-kXyMllkoDaNcgrdxaRPGWQYFEzLBDtajVQC3qifcgljUXDLGI)

- Πτυχιακή εργασία Εμμανουήλ Κούκιου | ΠΑ.ΠΕΙ | Ανάλυση κόστους λειτουργίας πλοίων χύδην φορτίου  
<https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/4686/Koukios.pdf?sequence=2&isAllowed=y>
- Πτυχιακή εργασία Μπρουζιούτη Χρήστου | ΑΕΝ Μακεδονίας | Τιμές καυσίμων και η επίδρασή τους στην ναυτιλία  
<https://maredu.hcg.gr/modules/document/file.php/MAK263/%CE%9D%CE%B1%CF%85%CF%84%CE%B9%CE%BA%CE%AC%20-%20%CE%9D%CE%B1%CF%85%CF%84%CE%B9%CE%BB%CE%B9%CE%B1%CE%BA%CE%AC%20%CE%B8%CE%AD%CE%BC%CE%B1%CF%84%CE%B1/%CE%A4%CE%B9%CE%BC%CE%AD%CF%82%20%CE%BA%CE%B1%CF%85%CF%83%CE%AF%CE%BC%CF%89%CE%BD%20%CE%BA%CE%B1%CE%B9%20%CE%B7%20%CE%B5%CF%80%CE%AF%CE%B4%CF%81%CE%B1%CF%83%CE%AE%20%CF%84%CE%BF%CF%85%CF%82%20%CF%83%CF%84%CE%B7%20%CE%BD%CE%B1%CF%85%CF%84%CE%B9%CE%BB%CE%AF%CE%B1.pdf>
- Πτυχιακή εργασία Ραφτάκη Κωνσταντίνου | ΠΑ.ΠΕΙ | Νέα σύνθεση και δομή του κόστους της ελεύθερης φορτηγού ναυτιλίας (Tramp)  
[https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/9089/Raftakis\\_Konstantinos.pdf?sequence=1&isAllowed=y](https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/9089/Raftakis_Konstantinos.pdf?sequence=1&isAllowed=y)
- Πτυχιακή εργασία Καραχρήστου Ζωής | ΠΑ.ΠΕΙ. | Διερεύνηση αγορών και ναυλοδεικτών σε χύδην ξηρά και υγρά φορτία  
[https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/12375/Karachristou\\_moes1720.pdf?sequence=1&isAllowed=y&fbclid=IwAR2fU9IJyWFHJuGgLIInq1gPlzjX5dx-tLz3bt2aFq2WEY6oBsecxrAGmuPM](https://dione.lib.unipi.gr/xmlui/bitstream/handle/unipi/12375/Karachristou_moes1720.pdf?sequence=1&isAllowed=y&fbclid=IwAR2fU9IJyWFHJuGgLIInq1gPlzjX5dx-tLz3bt2aFq2WEY6oBsecxrAGmuPM)
- Πτυχιακή εργασία Κίτσιου Ευάγγελου | Πανεπιστήμιο Αιγαίου | Οικονομοτεχνική ανάλυση γενικής επιθεώρησης πενταετίας και συνεχόμενης περιοδικής επιθεώρησης σε εμπορικά πλοία  
[https://hellanicus.lib.aegean.gr/bitstream/handle/11610/13118/file0.pdf?sequence=1&isAllowed=y&fbclid=IwAR2tNkBy\\_ZkQuv4kt2SCamI8ZY7tEekKoiC0wgNz7vuQp\\_8jFkfoFSjG9o](https://hellanicus.lib.aegean.gr/bitstream/handle/11610/13118/file0.pdf?sequence=1&isAllowed=y&fbclid=IwAR2tNkBy_ZkQuv4kt2SCamI8ZY7tEekKoiC0wgNz7vuQp_8jFkfoFSjG9o)
- Ship Operating Costs, Annual Review and Forecast, Annual report 2016/17 | Drewry Maritime Research  
<http://www.drewry.co.uk/AcuCustom/Sitename/DAM/006/Table%20of%20Contents%20Ship%20Operating%20Costs%202016-17.pdf>
- 9 Ways Ship Navigating Officers Can Help In Reducing Ship's Running Cost  
[9 ways ship navigating officers can help in reducing ship's running cost | Marine Insight](https://www.marineinsight.com/9-ways-ship-navigating-officers-can-help-in-reducing-ship-s-running-cost/)
- Cargo handling-an overview | Science Direct Topics  
<https://www.sciencedirect.com/topics/engineering/cargo-handling>
- Shipping under pressure | Maritimeprofessional.com  
<https://www.maritimeprofessional.com/magazine/story/201503/shipping-under-pressure-488172>

- Maritime economics 3<sup>rd</sup> edition |Martin Stopford  
[https://logistics.nankai.edu.cn/\\_upload/article/50/93/1cf2097840e8af90af4b19979773/9ce547df-a3e1-493c-a4a3-0ebbf0669b9.pdf](https://logistics.nankai.edu.cn/_upload/article/50/93/1cf2097840e8af90af4b19979773/9ce547df-a3e1-493c-a4a3-0ebbf0669b9.pdf)
- Who Should Take the Responsibility of the Food Provision Supply On Merchant Ships – the Master or the Company? | Marine Insight  
<https://www.marineinsight.com/careers-2/who-should-take-the-responsibility-of-the-food-provision-supply-on-merchant-ships-the-master-or-the-company/>