

SETTING THE PRODUCTIVITY OF A TYPE 2 CHEMICAL TANKER ON A PARTICULAR ROUTE AND EMPLOYMENT TERMS

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ABSTRACT

Through this paper we do analyze productivity of a chemical tanker – IMO type 2, on a specific route and under specific employment terms. Within the introduction chapter will be shown technical differences between those three IMO types of chemical tankers that impose certain limitations on their use for chartering; further, a short definition will show us that productivity is one of the way of measuring the efficiency of any element, in our case the chemical tankers fleet. Due to the business environment which in changing dynamically in the shipping industry, beside the financial instruments that every shipping companies have to use in order to survive on this market, the type of contract in which the ships are involved are very important in raising the productivity of the entire company. Depending on the ship's employment situations based on two types of contracts, time charter and voyage charter, we tried to determine the productivity of each other, using a voyage in which the vessel was hired to transport a quantity of 35,000 m³ MTBE (methyl tertiary butyl ether). In each case the two participants have different interests, but one of them is common, releasing a satisfactory profit. Striking conclusions were drawn from the calculation of productivity and also cover solutions have been proposed to achieve optimum productivity in this sector.

Keywords: *productivity, voyage charter, time charter, ship-owner, charterer, Certificate of "On-Hire"*

1. INTRODUCTION

In the global economy, an extremely important element is international shipping with the purpose to create connections between areas, regions and countries in terms of business, economic, social and political activities. The importance of this sector is the economic development of the society by creating jobs in shipbuilding, port industry and of course on board.

Shipping also contributed to people migration in order to meet the needs of commercial, economic or social knowledge related to tourism or scientific research, facilitating relationships between maritime transporters and ship owners, suppliers, intermediaries and authorities. This area is largely influenced by political factors, state authorities, who, thru their measures can stimulate this activity and also when necessary may introduce restricting measures.

So shipping took a significant contribution to the evolution of humanity since ancient times, geographical discovery era, modern era and especially the present era. Shipping has an important international role by contributing to world trade; it transports the necessary materials for agriculture, industry, finished products, goods and also people. Shipping increases exchange of goods in terms of quantity and effectiveness, it reduces costs relating to those goods, due to the fact that transport costs are included in the final cost of a product.

Shipping' evolution is very important when referring to the world trade, the performance of shipping companies being a vital component that should be checked thru efficiency and productivity analysis. Given its complexity we can easily say that treating this subject can be constantly a hot topic. Considering the current technical level we can say that ships are the only means of transport that can provide traffic of billions of tons in the annually circuit of goods

So the shipping industry is rather seen as a business, given the large number of stakeholders in achieving these exchanges, including ship-owners, charterers, sea-brokers, ship builders and financiers, working together to achieve almost 4 billion tons of freight per year by maritime transport.

Referring to the types of chemical tankers, there are two Codes that provides details for the construction and equipment of three types of chemical tankers, varying from the ships presenting the greatest overall hazard: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code, ships built after 1986) and the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code, for older ships).

Due to MARPOL, Annex II, the three types of IMO Ships are defined as:

- IMO Ship Type 1- a chemical tanker intended for the transportation of products considered to present the greatest overall hazard. The quantity of cargo required to be carried in a Type 1 ship should not exceed 1,250 m³ in any one tank.

- IMO Ship Type 2 - a chemical tanker intended to transport products with appreciably severe environmental and safety hazards which require significant preventive measures to preclude escape of such cargo. The quantity of cargo required to be carried in a Type 2 ship should not exceed 3000 m³ in any one tank.

- IMO Ship Type 3 - a chemical tanker intended to transport products with sufficiently severe environmental and safety hazards. These products require a moderate degree of containment to increase survival capability in a damaged condition. There is no filling restriction for chemicals assigned to Ship Type 3.

In brief, IMO Ship Type 3 doesn't have void space, so in case collision happen, the cargo will leak out directly to sea, while for type I and II, the cargo won't leak out directly to sea, due to the double hull. Nowadays there are some countries, like Singapore, that reject IMO Ship Type 3 to call their port.

Due to the fact that in order to build a IMO Ship Type 1, the owner need to spend a lot of money and due to the fact that our product, MTBE, is perfect to be transported with a IMO Ship Type 2, the best designated IMO type for Chemical Tankers and for this calculation right now is IMO Ship Type 2.

2. PROBLEM FORMULATION

According to David (1994) productivity is concerned with the efficient utilization of resources (inputs) in producing goods and/or services. Shipping is a highly competitive capital-intensive transportation service industry where the ship owners compete by their ability to undercut their competitors and by the record of efficiency and performance as a profit earning reputed carriers or fleets.

Productivity depends upon three main factors:

- Mean Operating Speed, which determines the time a vessel takes on a voyage. The mean operating speed is important because it determines the amount of cargo that can be delivered during a fixed period and hence the revenue is earned. Sometimes it is better to operate the ship at full speed in a high freight rate market whereas in low freight rates a reduced speed may be more economic because the cost of fuel saving may be greater than the loss of revenue.

- Deadweight Utilization, which refers to the extent to which a vessel travels with a full load of cargo. In practice, the deadweight cargo capacity of a ship represents a physical maximum, and it is commercial decision whether this capacity is fully utilized. The ship owner has always the option to accept a part cargo depending on the market condition.

- Loaded Days at Sea which is a vessel's time divided between loaded at sea (steaming days) and the unproductive days (in port, off hire, in ballast etc.).

The existence of different types of ship chartering contracts in the bulk shipping industry provide charterers greater flexibility to secure their sea transportation requirements, while minimizing their costs.

The contracts vary depending on the terms of agreement and the type of service that shipowners agree to provide to charterers. Broadly speaking, chartering contracts can be classified into five different types: Voyage Charter (VC), Consecutive Voyage or Contracts of Affreightment (CoA), Trip Charter (TC), Time or Period Charter (PC), and Bareboat Charter (BC) contracts. The main differences among these contracts are the: duration of the contract, method of freight rate calculation, cost allocations and commercial and operational responsibilities¹.

To determine the productivity of a ship will use two employment situations of the ship on a voyage

charterparty and under a time charterparty.

Voyage Charterparty is the contract between shipowner and charterer; the shipowner, in exchange for an amount of money called freight that depends on the quantity of goods, promises to transport it, from one port to another on a vessel, the charterer, that promises to provide goods and pays the freight.

Time Charterparty is the contract between shipowner and charterer, the shipowner, in exchange for a payment called rent, make available to the charterer, for a period of time, the ship and crew services. For this period, charterer will exploit commercially the ship, he chartered ending future contracts and supporting a series of voyages specific costs incurred.

In the first case, hiring the ship on a voyage charterparty, the vessel was hired to transport a quantity of 35,000 m³ MTBE (methyl tertiary butyl ether), during the voyage (TC 04-t), from April 27 year t, profit is divided equally between the owner and the charterer due to their common interest in ship's efficiency through a better coordination of trips, reducing waiting times and travel to the next port of loading. Under this type of contract the charterer is directly interested in voyage's efficiency and a better coordination between the port of unloading and loading. Also known quantities of heavy fuel oil for main engine (HFO) 950 t, diesel, light fuel oil for auxiliary engines (DO) 70 t and freshwater (FW) 120 t, the ship was loaded in Port Shepstone (South Africa), destined Hamriyah (UAE), as figures 1 and 2.

Between the two ports the ship's passage plan was in the southwest Indian Ocean as Figure 1 and 2.



Fig. 1. Passage plan in the southwest Indian Ocean
Source: www.maps.google.ro

¹ Stopford, M. (2009) "Maritime Economics" Routledge, London



Fig. 2. Passage plan in the southwest Indian Ocean
Source: www.maps.google.ro

After routing you must perform economic calculation and you can begin with determining the costs as seen in Table 1.

Table 1: Determining costs

Total goods cost:	35.000m ³ x 60USD= 2.150.000 USD
Fuel cost:	347.100 USD
- Loading port expenses (duration 24 hours)	5t x 650USD= 3250 USD
- Cost of theoretical march (duration 12 days)	31t x 12days x 650USD= 241.800 USD
- Additional cost due to piracy area (duration 3 days) ²	33t x 3days x 650USD= 64.350 USD
- Discharging port expenses (duration 24 hours)	28 t x 108 USD = 18.200 USD
- Cost of moving the ship in ballast to the next port of loading (duration 2 days)	2days x 29 t x 650 USD= 37.700 USD
Maneuvering cost:	34.000 USD

² Occurs because the additional generator is started to improve transport safety (moving in convoy), leading to increase consumption (2t more fuel than normal consumption of 31 tons)

-Mooring in loading terminal	3.500 USD
-Unmooring from loading terminal	1.900 USD
-Pilotage from loading terminal	8.000 USD
- Mooring in discharging terminal	5.800 USD
- Unmooring from discharging terminal	3.800 USD
- Pilotage from discharging terminal	11.000 USD
The cost of preparing the tanks for the next loading operation (tank cleaning operations)	10t x 650USD= 6.500 USD
Crew wages³	19days x 2.730 USD= 51.870 USD
Provisions costs	19days x 7USD/day x 23 person= 3.059 USD
Drinking water cost	8 t/day x 19days x 2 USD= 304 USD
Ship's maintenance cost	11.450 USD

Thus charterer will realize a profit of 687.400 USD (50% x total freight cost - fuel cost – maneuvering cost – tank cleaning operations cost) and Ship-owners profit is U.S. \$ 1,008,317 (50% x total freight cost- crew wages- provisions costs- drinking water cost- ship's maintenance cost).

In the second case, hiring the ship under a time charterparty, you will use the same ship, but this time the ship was engaged for a period of 12 months, from January 10 year t, to transport the same amount of MTBE, with the same loading and discharging port. Ship has issued Certificate of "On-Hire" on January 10 year t, and if this type of contract, profit commodity returns in a higher percentage of owner (by contract agreement 60% + the ship's rent 30.000 USD/day 40%), just to compensate (partially) losses due to the so-called downtime.

In this case the charterer will realize a profit of 472.400 USD⁴ (40% of total freight cost - fuel cost – maneuvering cost – tank cleaning operations cost) and ship-owner profit of U.S. \$ 1,793,317 (60% of total freight cost- crew wages- provisions costs- drinking water cost- ship's maintenance cost).

In order to compare both profits, they were pooled in Figure 3.

³ The crew consists of 23 people, whose total monthly wages reached 81.900 USD, which means a daily cost of 2.730 USD

⁴ According to data revealed by Table 1

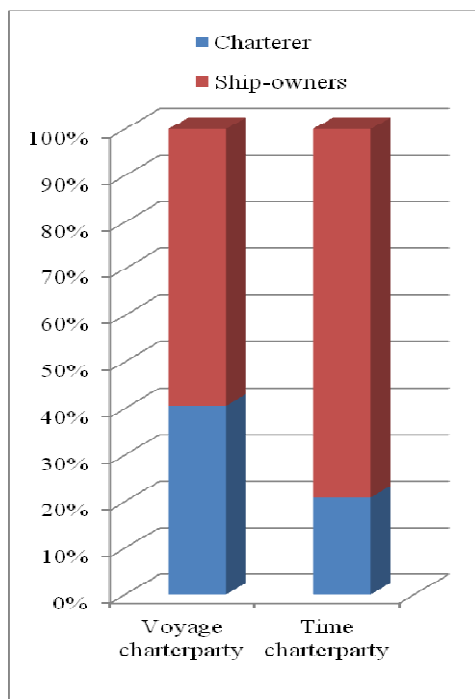


Fig. 3. Shipowners and Charterer profit for both voyage types

The vessel's description is particularly important for the charter on a time charterparty, using the details received from the owner, he estimates the contract's efficiency and establishes a certain rent. Thus data provided to charterers are closely related to the period the vessel is chartered and its intentions regarding the operation. Unlike the case when concluding a voyage charterparty the level of ship's details depends largely on the particular voyage. Thus, the owner has the right to substitute the vessel only if there is no such provision, and it is also necessary to mention if one can just substitute a right or an obligation, and if it can be done once or several times.

3. CONCLUSION

It is clear that shipping has an important role in connecting "time-space" between geographical areas, continents and countries from all over the world, representing numerous services that influenced the evolution of many economic activities, a sector that contributes in increasing the added value of a product or a service. Productivity is a key that differentiate companies' profits, companies that have the same number of ships and the same capabilities. Thus the results obtained in this work can be extrapolated to all shipping works as the core of maximizing efficiency results is given by merchant ships.

The analysis revealed that for the ship-owner, hiring a vessel for a defined period of time is more advantageous than the voyage charter. Generally voyage charterparty is used when transporting small quantity of cargo and on a relatively short distances or when the ship owner is unwilling to assume the risk of bad weather and delay in loading or discharging. Time charterparty is usually used in larger companies, which have a considerable number of ships.

Thus we offer to companies which are interested in maximizing their results to maintain their vessel in time charterparty and also to reduce the number of crew members from a number of 20-21 to a number of 17 or less, without jeopardizing the safety of navigation, complying with standards of the International Maritime Organization; those having an immediately effect in reducing ship's operational costs.

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***<http://www.maps.google.ro>