

Operating Cost 2017

*“Could you count both of
right and thing ?”*

OpCost, Benchmarking vessel running costs some questions ...

*-Which of the following can you manage easier?
vessels' earnings or vessels' expenses?*

- Are your "vessels' reported OpCost", trusted?

*- Are Moore Stephens reported "Mean Level of
OpCost", trusted?*

*If yes, everything is ok and thank you for your
participation*

But, If not ..

*- How Owners / Managers and/or Bankers will be
able to trust them?*

Some truths for Shipping.... between us

Is the real cause of failures or accidents the “Human Errors”, or a Disharmonized Operation, which is coming from existing irregular interdepartmental efforts?

- This may be called as "Management without common goals" and “Operation with mismatched instructions and misunderstandings on declared duties and/or responsibilities”.*
- In these companies, it is customary for this situation to use creative accounting.*

My thought:

The depiction of reality in the Financial Statements, presents the level of company’s management and strategy status.

The theory ... “Shipscraft Method”

“Shipscraft” is an “art” which combined both Management and Leadership. This can readjust Company’s processes in order to achieve synchronization of processes with the stated “Shipowner’s Order”.

Harmonized Operation means

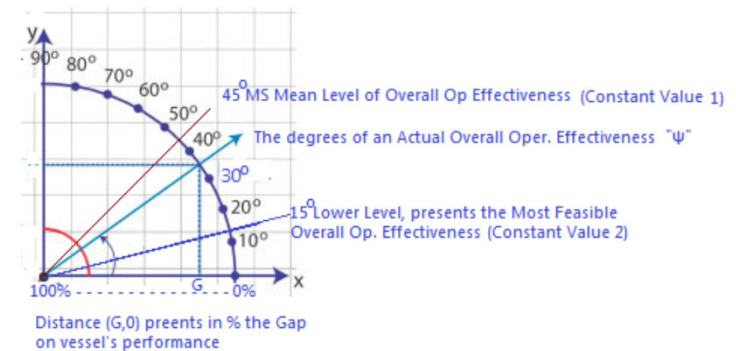
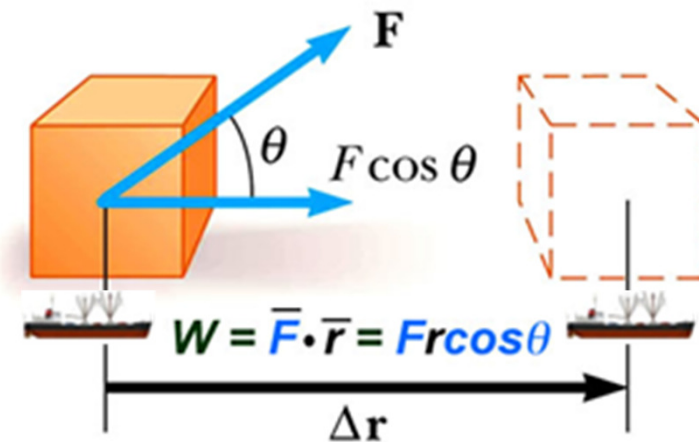
- Shipowner in cooperation with members of BoD : **To Decide***
- Managing Director in cooperation with shore based Managers: **To Instruct***
- Shore based officers with Masters in cooperation with staff and ships’ officers & Crew: **To Perform***

The overall of above actions can be expressed as “Co (W) Work”

The theory...definition of Co (W) Work

- The term (W) Work is closely to term Energy* and it can be expressed as :
- **The ship's ability to convert Energy into Movement at a (t)ime equal to a calendar day.**
- According to **Science of Physics** theory* as **Energy** can occur the Resultant Force (F) of forces and efforts of both humans and machines.
- **The conversion of this kind of Energy* to positive economic effects can be consider as an essential element for firm's growth.**
- The **work (W)** as resultant force (F) is equal to this force (F) for the movement (r) and the cosine of angle (θ) at a time (t)
- (Δr) **Displacement** by default is equal to 100 & (t) the time equal to a calendar day
- (F) **at 0 degrees** is a range of either the **ideal daily OOE** or the **daily most feasible OOE** of the Market.
- (θ) **Angle presents the Lack on Response or Gap on vessel's Performance**
- The Vertical projection of resultant Force (F) on the axis (Δr) can express the % of **Overall Effectiveness** of tested vessel.

Work = Force x Displacement



$$\alpha^2 x_1 + \alpha x_2 = \psi$$

The theory .. efficiency or effectiveness?

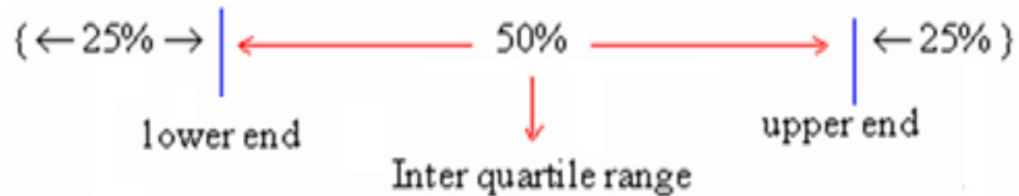
- **Efficiency** means the Operational performance e.g fuel consumption
- **Effectiveness** means the degree to which objectives are achieved and the extent to which targeted problems are solved.
- **Overall Operational Effectiveness** could be presented as the measurement of vessel's **Holistic Operation Cost**.

**Efficiency means "doing the thing right,"
Effectiveness means "doing the right thing."**

**Overall Operational Effectiveness means
"counting both of right and thing"**

Research method: what are the Quartiles?

- The available data divided to three (3) main categories.



MS total operating costs in US\$	Panamax	Capesize
Min	195.858	276.987
Lower quartile	1.629.738	1.744.791
Inter quartile	1.826.003	2.039.650
Upper quartile	1.987.436	2.291.122
Max	3.441.105	3.439.780
Average (Mean)	2.072.805	2.449.042
Sample size	295	152

- The first one, contains the 25% of selected by MS data, which are the lower value data for OpCost and they are below to the reported number of “Lower end quartile”.
- The second one, contains the 25% of selected by MS data, which are the highest value of data for OpCost and they are upper to the reported number of “Upper end quartile”.
- The remaining area presents the 50% of selected by MS data which can be considered as more valid.
- Each Mean Level presents the average cost of selected by MS data and not from the 50% of data between the Lower and quartile and Upper end one. This is the cause that most of Average Costs are higher than the cost of “upper quartile” respectively.

That's for the theory... Now let's go to the practice

Note: For more convenience of our presence, we will choose just two types of vessels, Panamax & Capesize

There are two different fleet managers, with two different type of vessels.

The Fleet Manager of Panamax Vessel “One” and the Fleet Manager of Capesize Vessel “Two”.
According to Shipmanagement Co Financial Reports compared to MS OpCost,

Which vessel is the “best” ? Which is their status, individually, against to the market?

From 6 elements both of OpCost & D/D cost, we will use only the three ones. The Mean level, the Lower and the Upper level. Mainly, and according to shipping practice, either a ShipCo will spend more money for the day to day ship's operation/maintenance and less for the D/D or they will spend more money during the D/D and less for the day to day maintenance / operation.

For that reason, in our study, we will use the elements at Lower & Upper levels of OpCost and D/D cost in an opposite direction. It means that in order to calculate the Overall Operational Effectiveness in the Lower level, we will much the lower level of OpCost with the Upper level of D/D Cost and v.v.

<u>Moore Stephens Report</u>	<u>Panamax</u>	<u>Capesize</u>
<u>Operating Cost in US\$</u>		
Average (Mean)	2.072.805	2.449.042
Min	195.858	276.987
Lower quartile (25% of sample)	1.629.738	1.744.791
Inter quartile (50% of sample)	1.826.003	2.039.650
Upper quartile (75% of sample)	1.987.436	2.291.122
Max	3.441.105	3.439.780
Sample size	295	152

<u>MS - Drydock cost</u>	<u>Panamax</u>	<u>Capesize</u>
<u>Average (Mean) in US\$</u>	717.215	931.624
Min	423.181	630.447
Lower quartile (25% of sample)	523.853	779.043
Second quartile (50% of sample)	606.817	898.761
Upper quartile (75% of sample)	901.290	1.080.502
Max	1.197.431	1.333.317
Sample size	25	15

<u>MS - Drydock days</u>	<u>Panamax</u>	<u>Capesize</u>
<u>Average (Mean) in US\$</u>	19	20
Min	10	10
Lower quartile (25% of sample)	13	16
Second quartile (50% of sample)	19	17
Upper quartile (75% of sample)	23	24
Max	37	43
Sample size	25	15

<u>Age Factor</u>	<u>1 -7 years old</u>	<u>8-15 years old</u>	<u>16 -25 years old</u>
Panamax	0,97	1,00	1,03
Capesize	0,98	1,02	1,04

Ref to age factors, either we will adjust MS figures with multiplication or ours with division

Overall Operational Effectiveness

The numbers

MS Details of Lower Level

<u>Moore Stephens OpCost</u>	<u>Panamax</u>	<u>Capesize</u>
expressed in US\$		
1st (Lower) Quarterly OpCost (a)	1.629.738	1.744.791
Daily Cost (366 days)	\$4.453	\$4.767
Total 3rd (Uper) Quarterly for D/D Cost (C)	901.290	1.080.502
Days of Idle Period due to D/D	23 days	24 days
1 year Average T/C (\$6,740 and \$8,236)	2.466.840	3.014.376
Loss of Net Income (Hire less 6% Brok Comm etx, less OpCost @ the days of idle period due to D/D (D)	43.304	68.346
Total Average Actual Cost (c+d)	944.594	1.148.848
Daily cost of D/D Expenses (Divided to 913 days) (e)	\$1.035	\$1.259
Daily cost of Most Feasible Overall Operational Effectiveness (d+e)	\$5.488	\$6.026

MS Details of Mean Level

<u>Moore Stephens OpCost</u>	<u>Panamax</u>	<u>Capesize</u>
expressed in US\$		
Mean Level OpCost (a)	2.072.805	2.449.042
Daily Cost (366 days)	\$5.663	\$6.691
Total Mean Level for D/D Cost (C)	707.215	931.624
Days of Idle Period due to D/D	19 days	20 days
1 year Average T/C (\$6,740 and \$8,236)	2.466.840	3.014.376
Loss of Net Income (Hire less 6% Brok Comm etx, less OpCost @ the days of idle period due to D/D (D)	12.779	21.009
Total Average Actual Cost (c+d)	729.994	952.633
Daily cost of D/D Expenses (Divided to 913 days) (e)	\$800	\$1.044
Daily Mean Level cost of Overall Operational Effectiveness (d+e)	\$6.463	\$7.735

Details of tested vessels

<u>Management Company</u> expressed is US\$	<u>Panamax</u> <u>Vessel One</u> <u>5 years old</u>	<u>Capesize</u> <u>Vessel Two</u> <u>14 years old</u>
Age factor	0,97	1,02
Operating Cost (actual)	2.141.359	2.443.483
<i>OpCost Adjusted by the age factor</i>	2.207.587	2.395.572
<i>Daily Cost US\$</i>	\$ 6.032	\$ 6.545
Aver. (Actual) Interm & S/S D-D	250.639	478.543
Average days needed for D/D	7 days	12 days
Aver. (Actual) Loss of Income* due to D/D	14.511	47.290
<i>Total of Average D/D exps (Adjusted by age factors of vessel's age at the D/D periods)</i>	273.351	524.342
<i>Daily cost of D/D Expenses (Div. to 913 d)</i>	\$ 299	\$ 575
Daily Overall Operational Effectiveness	\$ 6.331	\$ 7.120

The Problem

The Problem:

Which of the vessels “One” or “Two”, is the best Co’s vessel ?

*In order to achieve a common presence of dissimilar elements in the same Chart, (e.g. results of difference type of vessels), we should found a fixed framework with **two constant values**, which we will consider that there are at the same position, no matter what kind result of elements, they are.*

Therefore, we choose, instead of quadrant, as proposed by theory, with a range 0° to 90° , to present it in a straight line, ranging from 0 to 90.

Considering the Most Feasible Overall Operating Effectiveness (a) at point 15 and the Mean Level of Overall Operating Effectiveness (b) at point 45, as the two required constant values, we will try to find the position of Vessel One & Vessel Two results and which of these two vessels is the best one for the Shipping Co.

Solution – System with two equations (x_1, x_2)

Considering for all types of vessels the 1st Quartile, as the Most Feasible O.O.E at 15 point (a) and the Mean Level, at 45 point (b), we can create the following system of two equations.

$$\begin{cases} a^2 x_1 + a x_2 = 15 \\ b^2 x_1 + b x_2 = 45 \end{cases} \quad \begin{cases} x_1 = \frac{15b - 45a}{a(ab - b^2)} \\ x_2 = \frac{-\frac{15b^2}{a} + 45a}{ab - b^2}, a \neq 0 \text{ and } b - \frac{b^2}{a} \neq 0 \end{cases}$$

Finding from the above system (x_1, x_2), we create the following equation

$$\text{solve}(\{a^2 x_1 + a x_2 = \psi\}, \{\psi\})$$

For the solution of this equation, we replace the (a) with the actual daily O.O.E of each of two vessels and (x_1, x_2) with the values which we found from the system's solution.

The result of this equation will present the vessel's position (ψ) in the mentioned straight line.

For the theory, the solution of above equation represents the vessel's position (ψ°) in the quadrant. The cosine of resulting angles (ψ°) represents as %, the gap of vessel's Overall Operational Effectiveness to an Ideal Ones.

The result in practice

The results

Panamax Comparison of Overall Oper. Effectiveness	\$6.331 (Vsl One)	\$5.488 Most Feasible (a)	\$6.463 Mean Level (b)
Capesize Comparison of Overall Oper. Effectiveness	\$7.120 (Vsl Two)	\$6.026 Most Feasible (a)	\$7.735 Mean Level (b)

The solution of the mentioned system creates the following results:

For Panamax vessels

$$\begin{cases}
 5488^2 x_1 + 5488 x_2 = 15 \\
 6463^2 x_1 + 6463 x_2 = 45
 \end{cases}
 \begin{cases}
 x_1 = \frac{10001}{2305481360} \\
 x_2 = -\frac{48584063}{2305481360}
 \end{cases}$$

For Capesize vessels

$$\begin{cases}
 6026^2 x_1 + 6026 x_2 = 15 \\
 7735^2 x_1 + 7735 x_2 = 45
 \end{cases}
 \begin{cases}
 x_1 = \frac{31029}{15931677398} \\
 x_2 = -\frac{147323409}{15931677398}
 \end{cases}$$

The best vessel & her gap on performance

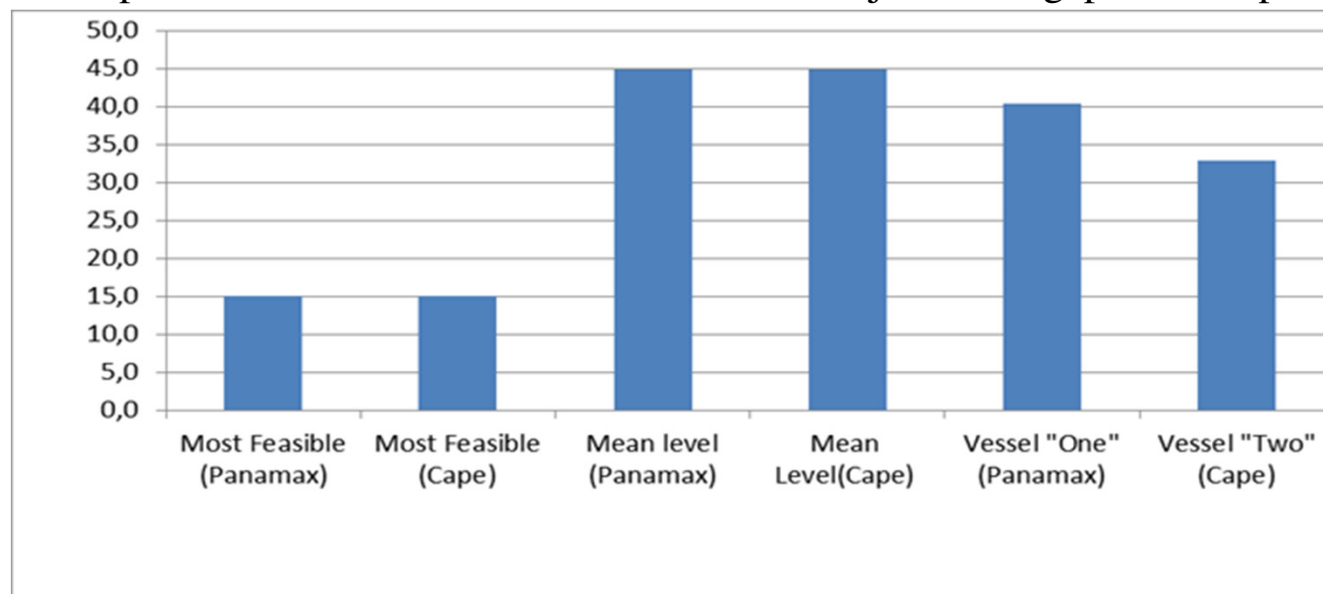
Replacing in the equation ($a^2 x_1 + a x_2 = \psi$) the (a) with each vessel's result and for x_1, x_2 the mentioned numbers accordingly, we will find the requested position of vessel's effectiveness.

According to the theory and reference to the method of "Shipscrafting", in order to count the % of vessel's gap on vessel's performance, we will use the XL formula "1-COS(RADIANS(45))"

e.g for a result "45", we have 29% gap on vsl's performance in relation to ideal one.

Then, with replacement of "45" with any other of the existent results, we could find for any other vessel the % of her gap on performance.

- Most Feasible (for any type of vsls) : 15 (constant value) 3% gap on vsl's performance
- Mean Level (for any type of vsls) : 45 (constant value) 29%
- Vessel "One" Panamax : 40,5 24%
- Vessel Two" Capesize" : 32,9 "Winner" with just 16% gap on vsl's performance

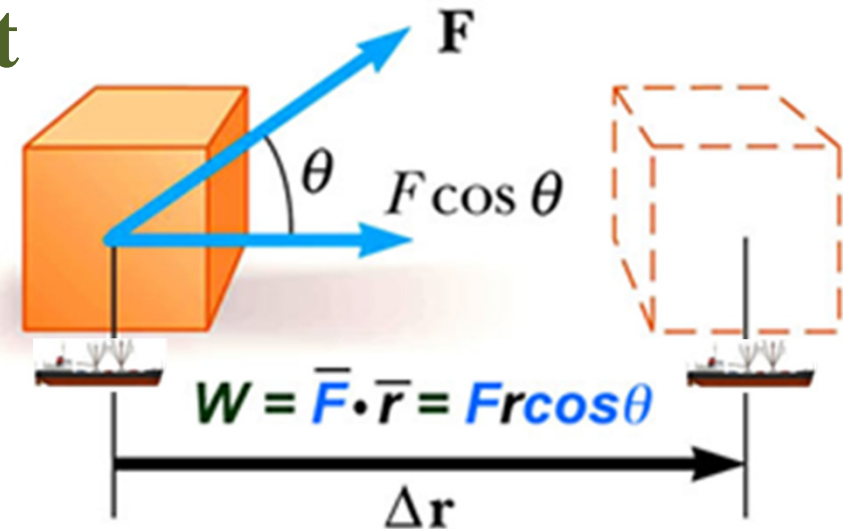


“Shipscrafting”

The way to meet the “Shipowner’s Order”

Trying to count both of Right & Thing, don't forget that the effectiveness and positive or negative ship's movements are due and depend to Resultant Force of both Human & Machinery Forces.

Work = Force x Displacement



Thank you

For any kind of question do not hesitate to send me an email to: ioannis@patiniotis.com