Ashraf Ragab

Navigation in Suez Canal

Rules of Navigation and Passage Procedures in Suez Canal

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Impressum/Imprint (nur für Deutschland/ only for Germany)
Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

Coverbild: www.ingimage.com

Verlag: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG
Dudweiler Landstr. 99, 66123 Saarbrücken, Deutschland
Telefon +49 681 9100-698, Telefax +49 681 9100-988
Email: info@vdm-verlag.de

Herstellung in Deutschland:
Schaltungsdienst Lange o.H.G., Berlin
Books on Demand GmbH, Norderstedt
Reha GmbH, Saarbrücken
Amazon Distribution GmbH, Leipzig
ISBN: 978-3-639-28516-1

Imprint (only for USA, GB)
Bibliographic information published by the Deutsche Nationalbibliothek: The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

Cover image: www.ingimage.com

Publisher: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG
Dudweiler Landstr. 99, 66123 Saarbrücken, Germany
Phone +49 681 9100-698, Fax +49 681 9100-988
Email: info@vdm-publishing.com

Printed in the U.S.A.
Printed in the U.K. by (see last page)
ISBN: 978-3-639-28516-1

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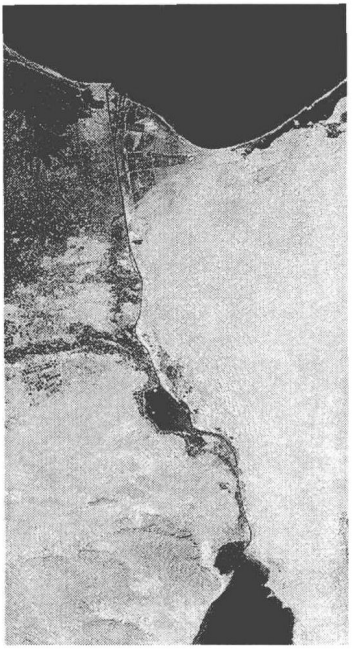

- The **Suez Canal** is a canal in Egypt. Opened in 1869, it allows water transportation between Europe and Asia without circumnavigation of Africa or carrying goods overland between the Mediterranean and the Red Sea.
- The opening of the Suez Canal in 1869 created the first salt-water passage between the Mediterranean and Red seas. The Red Sea is about 1.2 m higher than the eastern Mediterranean, so the canal serves as a tidal strait that pours Red Sea water into the Mediterranean.
- The canal is 192 km long. It is single lane with 4 passing places north and south of the Great Bitter Lake, and links the Mediterranean Sea to the Gulf of Suez on the Red Sea.
- The canal is owned and maintained by the Suez Canal Authority (SCA) of the state of Egypt.
- The canal allows passage of ships up to 150,000 tons displacement. It permits ships up to 16 m (53 ft) draft to pass, and improvements are planned to increase this to 22 m (72 ft) by 2010, allowing passage of fully-laden supertankers.
- Some supertankers are too large. Others can offload part of their cargo onto a canal-owned boat and reload at the other end of the canal.
- The main alternative is travelling around Cape Agulhas. This is the route for ships which are too large, and was the route in the past before the canal was constructed, and when the canal was closed.
- Also, before the canal's opening in 1869, goods were sometimes offloaded from ships and carried overland between the Mediterranean and the Red Sea.
- The canal has no locks due to the flat terrain, and the sea level difference between each end is inconsequential.
- There is one shipping lane with several passing areas. On a typical day, three convoys transit the canal, two southbound and one northbound. The first southbound convoy enters the canal in the early morning hours and proceeds to the Great Bitter

Lake, where the ships anchor out of the fairway, awaiting passage of the northbound convoy. The northbound convoy passes the second southbound convoy, which moors in a bypass near El Qantara. The passage takes between 11 and 16 hours at a speed of around 8 knots (15 km/h). The low speed helps prevent erosion of the canal banks by ships' wakes.

Timeline of Suez Canal development:

- Circa 1799 — Napoleon I of France conquered Egypt and ordered a feasibility analysis. This reported a supposed 10 meter difference in sea levels and a high cost, so the project was set on standby.
- Circa 1840 — a second survey found the first one incorrect. A direct link between the Mediterranean Sea and the Red Sea would be possible and not be as expensive as expected.
- Circa 1854 — The French consul in Cairo, Ferdinand Marie de Lesseps, created the "Companies Universally du Canal Maritime de Suez".
- 25 Apr 1859 — The French were allowed to begin canal construction (Said Pasha acquired 22% of the Suez Canal Company, the remainder controlled by French private holders).
- 16 Nov 1869 — The Suez Canal opened; operated and owned by Suez Canal Company.
- 25 Nov 1875 — Britain became a minority share holder in the Suez Company, acquiring 44% of the Suez Canal Company. The remainder was controlled by French syndicates.
- 25 Aug 1882 — Britain took control of the canal.
- Mar 1888 — The Convention of Constantinople guaranteed rite of passage of all ships through the Suez Canal during war and peace.
- Nov 1936 — Suez Canal Zone established, under British control.
- Jun 1956 — Suez Canal Zone restored to Egypt.
- 26 Jul 1956 — Egypt nationalized the Suez Canal.
- Nov 1956 to 22 Dec 1956 — French, British, and Israeli forces occupied the Suez Canal Zone.
- 22 Dec 1956 — Restored to Egypt.
- June 1967 to 10 June 1967 — Canal closed and blockaded by Egypt, against Israel, sparking the Six-Day War.
- June 1975 — Suez Canal reopened.

Suez Canal advantages considering in being:[1]

- Longest canal in the world with no locks
- Compared with other waterways, the percentage of accidents is almost none.
- Passage proceed day and night
- Liable to be widened and deepened when required coping with the expansion in ship sizes.

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[1] http://www.suezcanal.gov.eg/sc.aspx?show=10

Chapter 1: General

1. Suez Canal Technical Future:

*"**The Suez Canal** is the water channel to the west of the Sinai Peninsula, a route length of 163 km in Egypt between Port Said on the Mediterranean and Suez on the Red Sea. The channel is divided into two parts, north and south of Lakes Time. It allows ships to cross the canal from the Mediterranean countries of Europe and Asia without access to the long road - via the Cape of Good Hope on Africa. Additionally, during digging of the canal some movement was discharged through the tonnage of ships and transfer of land to the Red Sea."*

1.1. Development of Suez Canal:

After the construction of the Suez Canal, which took 10 years, it opened in the year 1989. The canal was anything other than what we know today.
During years, the development of the canal alters due to the demands of the shipping market.
The table below shows the development of Canal until today.[2]

ITEM	UNIT	1869	1956	1962	1980	1994	1996	2001	2008	Percentage increase (1869-2001)
WIDTH AT 11M DEPTH	M	44	60	90	160	210	210	210	210	477%
MAX DRAFT OF SHIPS	FEET	22	35	38	53	56	58	62	68	282%
OVERALL LENGTH	KM	164	175	175	190.25	190.25	190.25	190.25	190.25	116%
DOUBLED PARTS	KM	-	29	29	78	78	78	78	78	269%
WATER DEPTH	M	10	14	15.5	19.5	20.5	21	22.5	23.5	225%
CROSS SECTIONAL AREA	M2	304	1100	1800	3600	4300	4500	4800	4800	1579%
MAX. TONNAGE (DWT)	TON	5000	30,000	80,000	150,000	180,000	185,000	210,000	210,000	4200%

[2] http://www.rafimar.com/homepage/suez_canal.html#transit

1.2. Characteristics of the current canal:

The Canal properties serve today nearly the needs of all types of vessels. However, this does not mean that the development of the Canal has stopped. Every day the authorities are working together with many investors on the improvement of the Canals properties to facilitate the use of the Canal.

In the table below, the current characteristics of the Canal are described:[3]

Overall length	**193 km**
From the fairway buoy to Port Said lighthouse	**22.5 km**
From the waiting area to the southern entrance	**15 km**
From Port Said to Ismailia	**78.5 km**
From Ismailia to Port Tewfik	**83.65 km**
The length of doubled parts	**68 km**
Width at water level	**300/365 m**
Width between buoys	**180/205 m**
Maximum permissible draught for ships	**68 ft./20.73 m**
The canal depth	**21m**
Maximum permissible air draft	**68 m**
Cross sectional area	**4500/4800 m2**

1.3. Environmental statistics of the Canal:[4]

"Since the very first opening of the Suez Canal at 1869, it has played a big role in maritime transport. During the course of the years, the Suez Canal is always improving its properties to meet the demand of the ships."

For the current status of the ship traffic on the Suez Canal is as follows: [5]

Total number of vessels calling at Suez Canal	**20384 ship**
Net Tonnage	**844.4 million Ton**
Container Vessels	**7718 ship**
Net Tonnage of Container Vessels	**437806 Thousand tons**
Cargo volume from North to South	**286028 Thousand ton**
Cargo volume from South to North	**424047 Thousand ton**
Total cargo volume	**700.027 Thousand Ton**
Containerized cargo from North to South	**141381 Thousand Ton**
Containerized cargo from South to North	**177107 Thousand Ton**
Total of Containerized cargo	**318488 Thousand Ton**

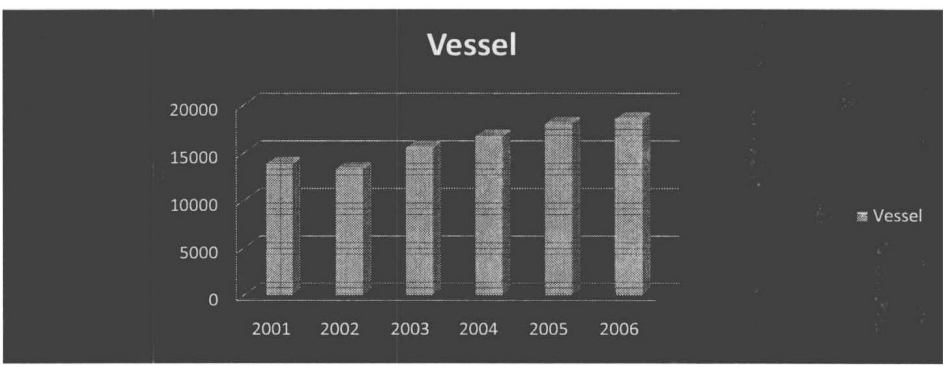
[2] http://www.rafimar.com/homepage/suez_canal.html#transit

[4] For further information about recent Statics please check http://www.suezcanal.gov.eg/TRstat.aspx?reportId=1

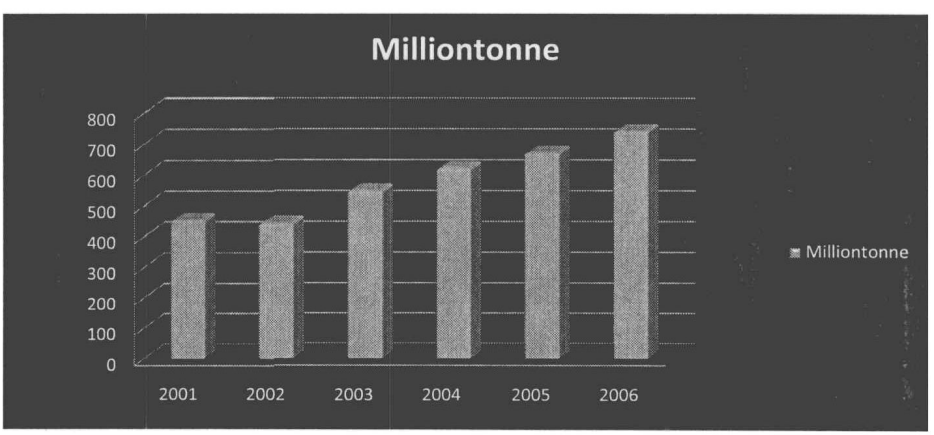
[5] http://www.emdb.gov.eg/english/inside_e.aspx?main=suezcanal&level1=statistics

Over the last 8 years the number of vessels passing the Suez Canal has been increased to more than 5000 Vessels than in the year 2000. This just proves the increasing importance of the Suez Canal throughout the years.
Statistics from the Egyptian Maritime ministry show the increase in the total number of vessels passing the Suez Canal:[6]

1.3.1. Traffic of Vessels Crossing Suez Canal:

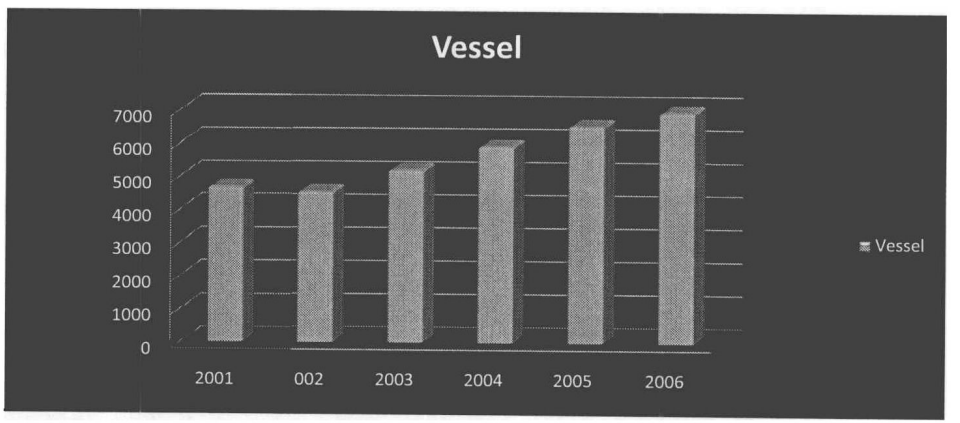


1.3.2. Net Tonnage of Vessels Crossing Suez Canal:

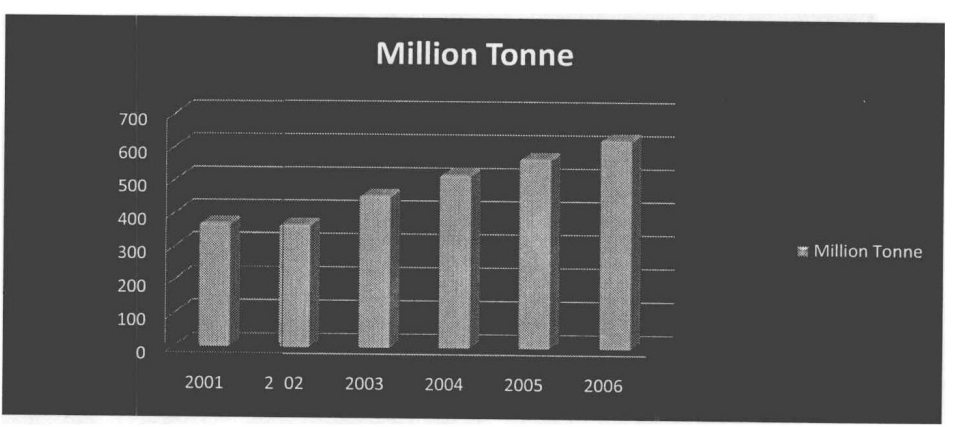


[6] http://www.emdb.gov.eg/english/inside_e.aspx?main=suezcanal&level1=totals

1.3.3. Number of Containers Crossing Suez Canal



1.3.4. Total Cargo Crossing Suez Canal



2. Authorities Structure:

*"**The Suez Canal Authority** (SCA) is a state owned authority, which owns and maintains the Suez Canal. It was set up by Egypt to replace the then privately nationalized company in the 1950s, which resulted in the Suez Crisis. After the UN intervened, Egypt agreed to pay millions of dollars to shareholders of the nationalized Suez Canal Company."*

The Suez Canal is controlled and organized in many small agencies under the Ministerial service for transportation. The tasks of Maritime transport are carried out and organized again under the Department of the Maritime Transport Sector. This sector operates under the instruction and organization of the Minister of Transport.

The structure adopted by the Central Body of Organization and Administration, which is currently being elaborated, includes a number of counseling, assisting and executive activities. The main Authorities that control movements on the Suez Canal are the Port Said Authority and the Red Sea Port Authority.

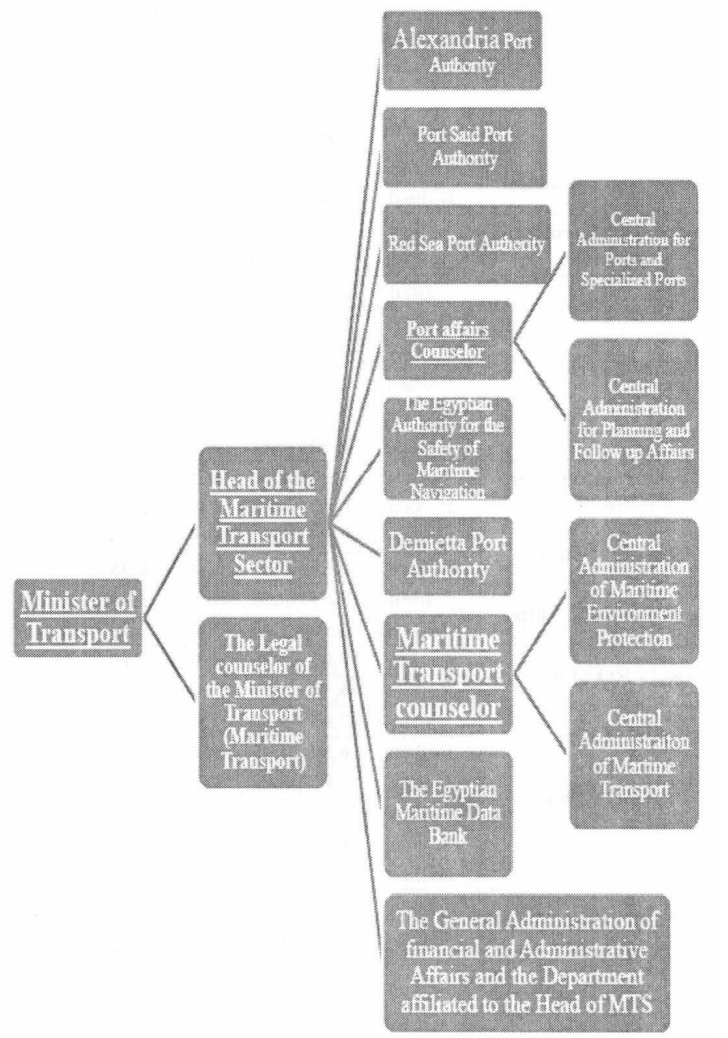
2.1. Goals of the Authorities instruction:

1. Setting goals and policies of bodies, organizations and entities, as well as the Follow-up implementation and coordination between them
2. The development of Egyptian ports to keep pace with progress in the shipping industry and add competitiveness and modernization of infrastructure facilities and the transition from performing the role of the crossing to be a link in a multimodal transport and distribution center.
3. Coordination with everyone to unite and to review and audit decisions, laws and legislation (government bodies - ministries - bodies' ports - Rooms navigation - users of the port).
4. Raise the efficiency of workers in maritime transport in accordance with international standards to improve the efficiency of maritime transport and provide the possibility of export of labor freely.
5. To enter an era of information technology in the maritime transport sector.
6. Achieve safe navigation in the territorial waters in accordance with international standards and the reduction of accidents and pollution confrontation.
7. Encourage private sector participation in all activities of maritime transport vessels and his Aims.
8. Marketing and shipping activities to attract investments in all shipping activities.
9. Follow up the developments of shipping and the predictability to keep pace and increase the volume of transit trade in Egypt.

2.2. Reference of the Ministry of Transport:

- Planning to ensure the upgrading of facilities and the development of maritime transport in line with global developments in the context of the economic and social Development plan of the State.
- Policy-making for the establishment of the Ports and Lighthouses and development to ensure sufficient upgrading to cope with the volume of world trade and coordination between the bodies of ports.
- To provide a means to aid navigation in territorial waters to ensure the safety of navigation.
- Supervision and control over the implementation plans to ensure the safety of maritime transport units and movement of all fixed and mobile installations as well as equipment and machinery that are actively shipped in coordination with the Competent organizations of the State

2.3. Structure of Egyptian Maritime Authorities:[7]



[7] http://www.mts.gov.eg/mtsector/departments/structure.aspx

3. Tariffs for Suez Canal transit:

"The Suez Canal Authority announces that the transit dues for the year 2008/2009 will be as shown in the table below, as per circular no. 1/2007. This circular takes effect as of April 1st 2008". See table of transit charges below.[8]

Tariff	Vessel type	Condition	First 5000	Next 5000	Next 10000	Next 20000	Next 30000	Next 50000	Rest
08-01	Tankers of Crude Oil	Laden	7,65	4,80	3,90	1,70	1,50	1,40	1,30
		Ballast	6,50	4,08	3,32	1,45	1,28	1,19	1,11
08-02	Tankers of Petroleum Products	Laden	7,65	4,80	3,90	2,35	2,30	2,20	2,10
		Ballast	6,50	4,08	3,32	1,45	1,28	1,19	1,11
08-03	Dry Bulk Carriers	Laden	7,65	5,20	4,40	1,40	1,30	1,25	1,20
		Ballast	6,50	4,42	3,74	1,19	1,11	1,06	1,02
08-04	LPG Carriers	Laden	7,65	4,90	3,90	2,80	2,60	2,50	2,50
		Ballast	6,50	4,17	3,32	2,38	2,21	2,13	2,13
08-05	LNG Carriers	Laden	7,65	5,30	4,90	3,40	3,30	3,20	3,10
		Ballast	6,50	4,51	4,17	2,89	2,81	2,72	2,64
08-06	Chemical and Other Liquid Bulk	Laden	8,00	5,50	4,70	3,00	2,90	2,80	2,80
		Ballast	6,80	4,68	4,00	2,55	2,47	2,38	2,38
08-07	Container Ships	Laden	7,65	5,00	4,00	2,80	2,60	2,05	1,95
		Ballast	6,50	4,25	3,40	2,38	2,21	1,74	1,66
08-08	General Cargo Ships	Laden	7,65	5,50	4,00	3,00	2,90	2,85	2,80
		Ballast	6,50	4,68	3,40	2,55	2,47	2,42	2,38
08-09	RO - RO Ships	Laden	7,65	5,30	4,30	3,10	2,90	2,80	2,70
		Ballast	6,50	4,51	3,66	2,64	2,47	2,38	2,30
08-10	Vehicle Carriers	Laden	7,65	5,00	3,85	2,75	2,60	2,05	1,95
		Ballast	6,50	4,25	3,27	2,34	2,21	1,74	1,66
08-11	Passenger Ships	Laden	7,65	5,00	4,30	3,05	3,00	2,90	2,80
		Ballast	6,50	4,25	3,66	2,59	2,55	2,47	2,38
08-12	Special Floating Units	Laden	8,30	5,10	4,80	3,40	3,20	2,90	2,80
		Ballast	0,00	0,00	0,00	0,00	0,00	0,00	0,00
08-13	Other Vessels	Laden	8,00	5,00	4,40	3,20	3,10	2,90	2,80
		Ballast	6,80	4,25	3,74	2,72	2,64	2,47	2,38

[8] http://www.lethsuez.com/tariff_08.aspx

The special drawing right SDR is an international reserve asset created by the International Monetary Fund to supplement existing reserves. It is valued on the basis of a basket of five currencies and can be used in a wide variety of transactions and operations among official holders.

Remarks :

1. If in ballast, Chemical / Oil Tankers are to be charged at the same rate as Oil tankers.

2. Combined Carriers (OBO) when transiting in Ballast, combined Carriers are to be charged at the same rate applied to Ballast Bulk Carriers.

3. Combined Ballast Gas Carriers LNG/LPG Transit Dues for combined Ballast Gas Carriers are to be calculated according to the last shipment transported through the Suez Canal, in case the last cargo was LNG.

4. Container vessels or Lash vessels carrying containers or lashes over the weather deck will be subject to the following surcharges on the Suez Canal Dues:-

2%	For vessels carrying one tier of containers or lashes.
4%	For vessels carrying two tiers of containers or lashes.
6%	For vessels carrying three tiers of containers or lashes.
8%	For vessels carrying four tiers of containers or lashes.
10%	For vessels carrying Five tiers of containers or lashes.
14%	For vessels carrying Six or more of containers tiers.

this, however, shall be increased of the rate of 1% for each extra tier exceeding 6 tiers :

15%	For Vessels carrying seven tiers of containers.
16%	For Vessels carrying eight tiers of containers.

5. Containerships are to be exempted from extra dues on the top tier in the following two cases:
If the top tier contains no more than ten containers (TEU).
If the top tier has a protrusion of not more than 4 feet.

6. Any vessel carrying only containers to be treated as FCC (fully cellular container vessel)

7. The acceptable currencies for payment of transit dues.

- U.S. Dollar	- Sterling pound	- Euro
- Japanese yen	- Canadian dollar	- Swedish kroner
- Danish kroner	- Norwegian kroner	- Swiss franc

8. Transit Dues Rates are determined on the basis of SDR (Special Drawing Rights) SDR unit consists of :

U.S Dollar	45 %
Euro	29 %
Yen	15 %
Pound sterling	11%

4. Representation of differences between Suez Canal passage and travelling around Cape Agulhas.

4.1. Economic Differences:

"The geographical position of the Suez Canal makes it the shortest route between East and West as compared with the Cape of Good Hope. The Canal route achieves a saving in distance between the ports north and south the Canal, which can be translated into other savings in time, fuel consumption and ship operating costs."

In this part, we show an example for the difference between crossing the Suez Canal and taking the route around Africa. This Example is just to show how effective passing through the Suez Canal can be.

First: Ship Detail example:

MV "Y"
LOA= 188.10 m
BOA= 32.00 m
Speed= 20 Kn.
HF consumption per day: 65t/day by 20 Kn.
International Tonnage: GRT= 23652/NRT= 10596
Suez Tonnage: GRT= 24728/NRT=20232[9]

Route A: Transit in Suez Canal
Departure: Hamburg (Germany)
Destination: Singapore (Singapore)
Distance: 8513 NM
Time to proceed: **17 Days /18 Hours** by constant speed of 20 Kn.
HF Consumption: Time of Trip x HF Consumption per day = 17, 75 days x 65 t/day = **1170t**

Route B: Round Cape Agulhas
Departure: Hamburg (Germany)
Destination: Singapore (Singapore)
Distance: 12006 NM
Time to Proceed: **25 days** by constant speed of 20 Kn.
HF Consumption: Time of Trip x HF Consumption per day = 25 days x 65 t/day = **1626t.**

[9] The Suez Canal NRT or/and GRT are calculated by the Dockyard. There is no official formula to calculate this value. It is dependent on the specified volume of each vessel, which would be calculated separately by the shipyard and classification company.