

# PORTS AND WATERWAYS

## CASE STUDY: PORT OF SINGAPORE

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**Abstract.** This work has the intention to report the port of Singapore, one of the most important ports in the world. Through this work we will demonstrate characteristic of the harbor, as illustration, why such importance of this port to the global economy, geography, organized port, the docks, port access, docking cradle, turning basin, retro port, berth, accessibility to other modes, TEU, the main types of cargo, port features, among other features.

**Keywords:** Harbor, economy, Singapore, and characteristics of the port.

## 1. INTRODUCTION

It covers all facilities and terminals that maintain maritime trade flow of Singapore. In terms of tonnage, with about 1.2 billion, and overflow is still the world's largest, and is also responsible for half of the annual supply of crude oil to navigation, or bunker, with about 25 million tons, and 20 % of world container traffic, about 25 million TEUs. Their regular lines connect more than 600 ports in 123 countries.

## 2. DEVELOPMENT AND DISCUSSION

### 2.1 Location.

Located south of the Malaysian peninsula. Limited maritime way north to Malaysia and south to Indonesia

Figure 1 - Geographic location.



Source: Google Maps

## 2.2 Organized port area (polygon)

Organized Port of Singapore consists of two-port operators, one is the Port Authority of Singapore and the other is the port of Jurong.

Figure 2 - The organized port area.



Source: Google Maps, 2018.

## 2.3 Quayside

The Port of Singapore presents the pier with approximately 21,630 meters in length.

Figure 3 - Harbor Wharf.



Source: <https://safety4sea.com>, 2018.

#### 2.4 Access channel

The one port access channel is defined as a stretch of waterway that connects the berths of the port to the open sea and thus enables working or mooring the ship. In the port of Singapore access channel in the Strait of Singapore.

Figure 4 - Access channel.



Source: Google Earth, 2018.

#### 2.5 Cradle docking

The port has organization and planning in distributed 37 berths, with computerized and automated equipment, which provides efficiency and productivity.

Figure 5 - Berth



Source: <https://expresso.sapo.pt> 2011.

## 2.6 Evolution Basin

A turning basin is a place that is installed near the pier with depth and suitable dimensions that enable maneuvering and docking of the vessel.

Figure 6 - Evolution Basin



Source: <http://planetando.blogspot.com> 2012.

The terminal at the Port of Singapore is the busiest in the world and can accommodate all types of vessels, including container ships, bulk carriers, ro-ro ships, cargo ships, coastal vessels, and barges. The patios are used for storage, packaging, and distribution of charges.

Figure 7 - Top terminals and patios



Source: <http://jornalcanal16.com.br/>, 2015.

## 2.8 Retroporto

The retroport is characterized by being an area adjacent to the port terminal and this site plays storage or services that facilitate customs control logistics and the port terminal traffic. And often it is located a bit away from the terminal.



Figure 8 - Retro Port

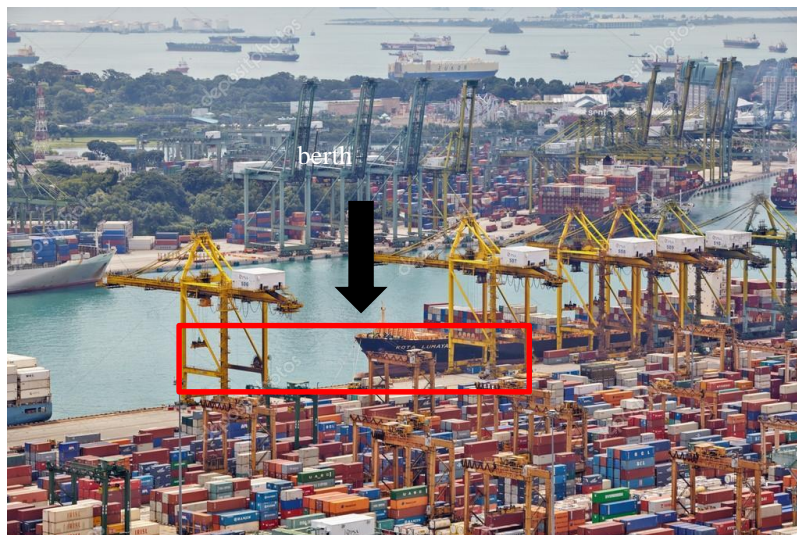


Source: Google Maps, 2018.

## 2.9 Berth

The dock is a structure for anchoring boats which allows the vessel to load or unload cargo.

Figure 9 - Anchorage



Source: <https://pt.dreamstime.com/>, 2013.

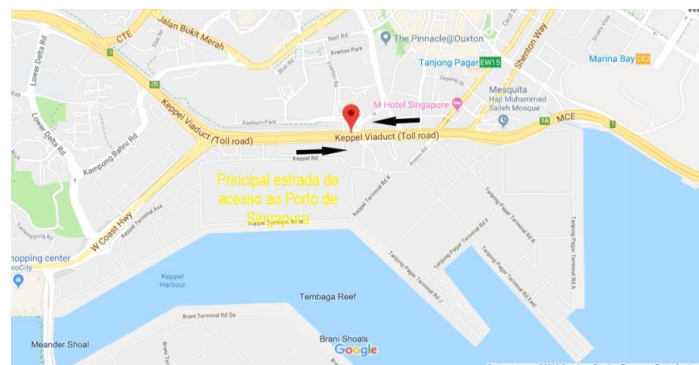
## 2:10 accessibility by other modes

Figure 10 - accessibility by other modes



Source: Google Maps, 2018.

Figure 10 - Stretch of road access



Source: Google Maps, 2018.

## 2:11 annual load port drive-in "TEU"

According to the Maritime and Port Authority of Singapore, the port operated 7.5 million TEUs (unit equivalent to one 20-foot container / 6 meters) in the period from January to March, an annual growth of 6.6%. In March alone, the volume of Singapore

containers reached 2.6 million TEUs, compared to 2.5 million in the same month last year.

### **2:12 Main types of cargo handled at the port**

The main cargoes in the port of Singapore Bulk cargo and specialized, such as:

- a) heavy equipment;
- b) machined loads;
- c) palletized loads (traditional and 16 being bagged);
- d) Cars;

The Port of Singapore is the third port of Southeast Asia that moves more container.

### **2:13 ship with larger you can use the port (type and capacity)**

The Container Port OOCL Hong Kong, is one of the vessels have large and its route the port of Singapore. And has the following characteristics:

- a) Length and Width: 399.87 mx 58.8m;
- b) Type: Container Port;
- c) Flag: Hong Kong [HK];
- d) Capacity: 21,413 TEU;
- e) Year built: 2017;
- f) State: active.

### **2:14 depth of the port channel and maximum draft for ships**

Pasir Panjang terminal in the port of Singapore can reach up to 18 meters deep and the cranes of the pier can reach 24 rows of containers.

The Port of Singapore can meet a maximum draft of 16 meters.

The distance of the foot pilot average of 2 meters.



### 3. REFERENCES

- [1] Galinski, Marcia CÉLIA. Prospects and challenges for the competitiveness of the port of saints. Available at: <<http://www.unaerp.br/documentos/1490-423-1488-1-sm/file>>.
- [2] GROUP PORTAL seaman. Not mol or maersk - OOCL Hong Kong is the largest containero the world. Available at: <<https://www.portalmaritimo.com/2017/05/16/nem-mol-nem-maersk-oocl-hong-kong-eo-maior-conteinerdo-mundo/>>.
- [3] Marine Traffic. OOCL hong kong. Available at: <<https://www.marinetraffic.com/pt/ais/details/ships/477333500>>.
- [4] SINGAPORE MPA. Terminals. Available at: <<https://www.mpa.gov.sg/web/portal/home/port-of-singapore/operations/port-infrastructure/terminals>>.
- [5] PortFolk. Port of Singapore. Available at: <<https://portogente.com.br/portopedia/73179-porto-de-cingapura>>.
- [6] PortFolk. Port and Terminal retroportuário. Available at: <<https://portogente.com.br/portopedia/72905-terminal-portuario-e-retro-portuario>>.
- [7] SINGAPORE PSA. Terminals. Available at: <<https://www.singaporepsa.com/our-business/terminals>>.
- [8] SAFETY4SEA. Port of Singapore to use there to Improve port calls. Available at: <<https://safety4sea.com/port-of-singapore-to-use-ai-to-improve-port-calls/>>.
- [9] SAPARE. Channels of access to ports. Available at: <<http://metodologiacientifica-rosilda.blogspot.com/2009/02/canais-de-acesso-aos-portos.html>>.
- [10] SEA NEWS. Singapore launches an ambitious blueprint to drive Singapore port of the future global maritime hub. Available at: <<http://www.seanews.co.uk/singapore-launches-an-ambitious-blueprint-to-drive-singapore-port-as-the-future-global-maritime-hub/>>.
- [11] SHIP. Port of Singapore. Available at: <<https://www.ship-technology.com/projects/portofsingapore/>>.
- [12] SIDNEY OLIVEIRA JR. Ports:Singapore and shanghai the world's largest container handling. Available at: <<http://www.portalmaritimo.com/2012/05/10/portos-cingapura-e-xangai-os-maiores-do-mundo-em-movimentacao-de-containeres/>>.