

# Study on Docks

V. Srinivasreddy<sup>1</sup>, J. Sree Naga Chaitanya<sup>2</sup>, Dr. K. Chandramouli<sup>3</sup>, M. Chaitanya Nava Kumar<sup>4</sup>

<sup>1</sup>B. Tech student Department of civil Engineering, NRI Institute of Technology, Perecherla, Guntur, AP, India.

<sup>2</sup>Assistant professor of civil Engineering, NRI Institute of Technology, Perecherla, Guntur, AP, India.

<sup>3</sup>Professor and HOD of civil Engineering, NRI Institute of Technology, Perecherla, Guntur, AP, India.

<sup>4</sup>Assistant professor of civil Engineering, NRI Institute of Technology, Perecherla, Guntur, AP, India.

**Abstract:** Dry-docks are exposed to special conditions such as the extreme degree of humidity Marine conditions, special loading phases, and other conditions related to the marine Environment. In this paper, a general guidance and overview for the design and Construction of the docks are presented. Docks subdivide into two types, wet docks, And dry docks, for wet docks, these structures are built for human services, like Trading, ship anchoring, military services, and other services, while dry docks are Designed and constructed for vessels services. Dry-docks have two main types, the Graving dry-docks which have their own considerations and conditions while the other Type is the floating dry-docks, each one will be discussed and illustrated with all terms And requirements with adscription of first appearance and early days concepts.

**KEYWORDS:** Docks, Dry docks, vessel, Graving, Floating, ship lifts, slipway or patent slip



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## INTRODUCTION

Docks are enclosed areas for berthing the ships to keep them afloat at a uniform level to facilitate loading and unloading cargo. A dock is a marine structure for berthing of vessels for loading and unloading cargo and passengers. Docks are necessary for discharging of the cargo as ships require a number of days for discharging cargo, during which period they need a uniform water level. If ship is subjected to a vertical movement by the tides, great inconvenience will be felt in lifting the cargo from the ship and special arrangement will be needed for lifting the cargo.

Water occupies about 70% of our planet and separates old world (Europe, Asia, Africa) from the new one, humans needed to get through the sea in order to communicate and make trades, so ships or sea vessels were invented, these ships got through high seas and oceans, carrying merchandise and men from all around the globe, then we need to ask this question how did they build these vessels in the first place?, well we can see that in early times vessels were somehow small and they could be built onshore then moved to the sea, at those days the maintenance concept was pretty much simple, whenever repairs are needed vessel can be moved to the shore, but by time passing, vessels became bigger, more merchandise needed to be carried, distances became longer and longer, that's why a new era of building and maintenance concept saw the light, because vessels can no longer be held away to the shore for repairing procedure, this era was of what was called dry-docks.

### History of dry docks

The first early modern European and oldest surviving dry dock still in use was commissioned by Henry VII of England at HMNB Portsmouth in 1495. This dry dock currently holds First World War monitor HMS M33. Possibly the earliest description of a floating dock comes from a small Italian book printed in Venice in 1560, called *Descrittione dell'artifitiosa machina*. In the booklet, an unknown author asks for the privilege of using a new method for the salvaging of a grounded ship and then proceeds to describe and illustrate his approach. The included woodcut shows a ship flanked by two large floating trestles, forming a roof above the vessel. The ship is pulled in an upright position by a number of ropes attached to the superstructure.

## 1.2 Classifications of docks

Docks can be classified into following two categories.

1. WET docks.
2. DRY docks

Docks required for berthing of ships or vessels to facilitate the loading and unloading of passengers and cargo are called wet docks. These are also known as harbor docks. Wet docks.

### 1. WET DOCKS

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### 2. DRY DOCKS

A dry dock 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. Dry docks are used for the construction, maintenance, and repair of ships, boats, and other watercraft.

Over the past 36 years Dry docks World-Dubai has become a leading provider of marine and offshore services to the shipping, oil, gas and energy sectors. Conceived as an ambitious project under the guidance of H.H. Sheikh Rashid Bin Saied Al Maktoum the late Ruler of Dubai, the yard is strategically located in a rapidly developing region of the world.

Dry-docks World completes over 300 projects a year on average, with a record of handling 42 refurbishment projects simultaneously. The yard is spread over 200 hectares, 4 dry docks, with the largest dock capable of handling the world's largest ship, and over 3,700m of berth space. Innovative projects have been constructed in Dry docks World, breaking records for some of the largest new build offshore fabrication projects worldwide.

The yard has received numerous awards and accolades including the British Safety Councils prestigious 5 Star rating for the past 14 years and the Sword of Honor on 11 occasions. Dry dock

### Dry Docks in India

India is surrounded by two coastlines the east and the west. That being said, the density of docks on the western coast is a lot more than that at the eastern one. This forces ships to travel all the way to the western coast or to China and other Southeast Asian countries

like Philippines, for repairs and maintenance, thereby skyrocketing the costs.

Shipping is still in a growing phase with the prestigious Sagarmala project leading the country towards development. That being said, India currently houses seven dry docks – Two at Mumbai Port Trust, One at Vishakhapatnam, owned by Hindustan Shipyard, a floating dock at Panaji, Goa, one dry dock at Mormugao, Goa, One at Kolkata and one at Port Pipavav, Gujrat.

## DRY DOCKS PRINCIPLES

Formerly the domain of much larger vessels, recent advancements in affordability, portability, and ease of use has seen dry docking become the go to method for keeping your personal marine craft in ship shape year round.

While many seafarers have already hopped on board the concept of dry-docking for their pleasure-craft, the principles of floating docks are beneficial for any Sea Captain, as they can help save thousands while helping owners avoid the hassles associated with marine upkeep.

For the uninitiated, dry docking is a method by which boats can be raised from the water to perform repairs and preventative maintenance, as well as deep cleaning of the hull.

Traditionally a costly exercise, floating docks of old were often enormous steel structures, whereby ships would float in, then the water would be drained to allow the load to come to rest of a dry platform. Historically, dry docks were mechanically elevated and lowered, and required countless man hours and moving parts to function successfully.

### 2.1 types of dry docks

Different types of dry docks are used for repairing and cleaning a ship. The main ones are:

#### 1. Graving dock

This type of dry dock is normally constructed on land near the coastal waters with a rectangular solid concrete construction with blocks, walls, and gates. The vessel is shifted inside the dry dock and rested on the blocks. After the ship is in the required position, the gate is closed and water is removed. In the earlier days, the graving dry docks were constructed using stones and

timber. Now, steel and concrete structure is used to make the enclosure and a heavy steel gate is used to seal the dock to stop the ingress of water once the ship is standing on the blocks. The gates can be in two parts with each hinged to the sides and hydraulically operated or one solid steel structure supported on roller over the track, which can be retracted inside the dry dock walls when opening the gate.

#### Advantage of graving docks:

1. It can accommodate bigger size vessels when compared to other dry docking systems
2. The supply of spares, machinery, services to graving dock is very much 5.accessible due to its location-based near the land



FIG:GRAVING DOCK

#### 2. Floating dock

Floating docks are specifically used to repair vessels that have met with accidents or broken down in the middle of the sea. A U shaped structure called pontoons is used to salvage ships from mid sea. These U shaped structures are filled with water, which makes the dock go under water helping the ship to sail. Once the ship is secured and brought to the repair area, the water is released, making the dock to rise up and exposing the parts of ship that are otherwise underwater. The floating dry dock is usually built using steel framing which is similar to that of seagoing vessels with ballast tanks provided on sides and bottom to raise and lower the dock. The floating dry docks are commonly operated in sheltered harbours as there is no wave or natural tidal activity present there.



FIG: FLOATING DOCK

### Advantage of floating docks

1. They can be propelled to the location of a salvage vessel near the harbour
2. They are cheaper to maintain as compared to graving docks and can get a higher resale return
3. They can be installed near or away from the shore inside the harbour, making them a portable and space-saving structure without taking space of the shore facility
4. The complete floating dry dock can be aft or forward trim by ballasting the dock, which further assists the ship or the damaged vessel which cannot be given a trim

### 3. Ship lifts

A Syncrolift or a ship lift docking method is incorporated on ships that weigh from 800 to 25000 ton ship-weight. A floating dock makes use of the buoyant force of the pontoon, but in the Syncrolift, the ship is transferred onto a platform placed on the bed of the graving, and both ship and platform are heaved up on the land by winches installed on either side of the platform.



FIG: SHIP LIFTS

### 4. Slipway or patent slip

Slipway, patent slip Specifically meant for smaller boats, in Slipway, the hull is placed on trolleys and pulled ashore on the inclined surface using winches. The Marine railway is another type of Slipway docking technique, where an inclined plane extends from the shore to the water and the boat is hauled onto the cradle. This technique is usually used in case on repairs for larger ships weighing about 3000 ton in ship weight.



FIG: SLIPWAY OR PATENT SLIP

### CONCLUSION

Taking into account the different facilities and equipment that a shipyard can or should have, a reasonable conclusion seems to be that the dry dock is the most fundamental part since it allows carrying out both shipbuilding and repair works on ships.

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