

Name-Sarishma Bhandari

Roll number- 103117086

Assignment 3:Harbour

## NAVIGATION AIDS

### **Overview**

A Navigation Aid also known as 'aid to navigation' is a marker which aids the traveller during nautical (or aviation) navigation. It may be an instrument, device, chart, sign board or a signal installed at specific locations at the water side or in the water or carried on board vessel which assists **marine signalling**.

### **Components**

Based on the range of coverage navigation aids are of two types; **Short Range Navigational Aids (SRNA)** and **Long Range Navigational Aids (LRNA)**

SRNA function within a geographical limit of a port or harbour whereas LRNA are used for assisting vessels sailing far away or which are maybe in the middle of the sea.

### **Brief Explanation**

SRNA include structures which are installed with or mounted with a light or left unlit in case of navigation at night time and day time respectively. During the daytime visual marks such as buoys, day marks, light house, traffic signals etc can be used however navigation at night time is only possible to a certain extent with the help of a radar reflector augmented with radar boarded on the vessel which helps for broadcasting vessel traffic, weather etc that concerns only the harbour limits and approaches or a retroreflection boards mounting towards the destination when search light is used.

LRNA use satellites assisted by GPS which is capable of providing precise and continuous position based on latitude, longitude and altitude in all weather. For improving the accuracy of position fix and integrity of GPS derived results, **Differential GPS (DGPS)** service has been developed. The DGPS reference stations determine range error and generate necessary correction values of GPS satellite in view. Also radar assisted radio frequency signalling system available to a certain extent for long range are used for warning a mariner by means of radio telegraphy and also often by radio-teletype-writer. Some examples of Global GPS that assist maritime navigation are **Indian Regional Navigation Satellite System (IRNSS)**, Russia **Global Navigation Satellite System (GLONASS)** etc.

## Significance and Inference

Like road signals that help a driver to navigate, the navigation aids help the mariner to navigate in the sea. Also the vessels can be notified or can notify the possible dangers occurring in the ocean so that proper alternative can be adopted. Thus it can be inferred that NA doesn't only help in navigating but also it can help mariner to make a safe decision during unpredictable circumstances faced in the sea.

## TRANSIT SHEDS AND WAREHOUSES

### Overview

After the cargo is unloaded from the ship and before it gets loaded in the ship, the cargo has to undergo a screening for custom clearance before continuing its journey. During this time the cargo is kept at a temporary storage facility such as transit sheds and warehouses which has adequate safety protection. Transit sheds are used when cargo has to be stored for a short duration of time whereas warehouses are used if cargo has to be stored for a longer duration of time.

### Component

The design of both the sheds uses the same design principle. As a thumb rule sheds may be built to a capacity of  $(450-500) \text{ m}^3$  for every running floor of the berth or the size of the shed is calculated based on the maximum tonnage a vessel requires. Width of the shed may be taken as 50-70m, length as 50-80m and height as up to 30m. The cargo may be categorically placed/stored based on the destination place, material type and consignment characteristics.

### Brief Explanation

Transit sheds are usually located adjacent to the quay and is constructed to accommodate maximum capacity for storing incoming and outgoing cargo at a time. Furthermore they are located nearer to the inland transport terminal with equipment such as cranes which can be readily available.

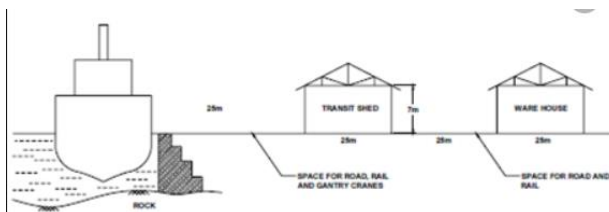


Fig: Transit shed and warehouse



Fig: Stacking of cargo inside sheds

The transit and warehouses are provided with all necessary infrastructures along with 24 hour customs inspection and clearance facilities.

### **Significance and Inference**

The transit sheds and warehouses thus helps for proper managing of cargo. The record of amount of goods exported and imported gives the indirect estimation of economic status of the country.

## **WHARVES AND QUAYS**

### **Overview**

Quays are the stationary platform constructed by concrete, stone or metal. It is aligned along or parallel to the shore which helps vessels to load and unload. The walls which are built to protect the quays and provide stability to them are known as quay walls.

Wharves are similar to quays. They are also a platform built near the shore for vessels to be berthed.

### **Component**

Quay walls are designed in a similar way as retaining walls. The different forces acting on it are water pressure, earth pressure and self-weight of the wall acting vertically through the centre of gravity. Based on their construction there are different types of quay walls.

Wharves are built parallel to shore and on piles whereas quays are also built parallel to shore but on fill. Wharves are similar to quays but it is more of a open or framed structure of posts with bracings.

### **Brief Explanation**

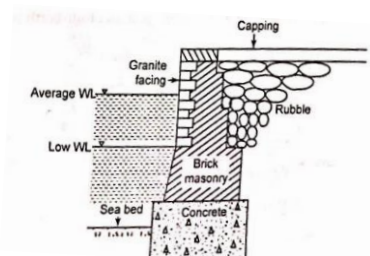


Fig: Solid Quay Wall

One of the types of Quay walls is Solid quay wall. It includes the use of heavy material such as concrete and masonry wall. The heavy weight of the material counteracts the water pressure as well as the earth pressure. It is constructed such that it can take the vessel impact when it is berthing.

Another type is dwarf quay wall which is founded on piles. The other quay walls are similar except the bottom support.

### **Significance and Inference**

Manoeuvring vessels with low water level is hard. Thus construction of wharves and quays help conveniently for loading and unloading of ships.

It can be inferred that wharves and quays are a very important part of harbour/port and therefore should be properly maintained and inspected periodically for analyzing the platform since heavy materials are played upon it along with the impact loading of vessels.