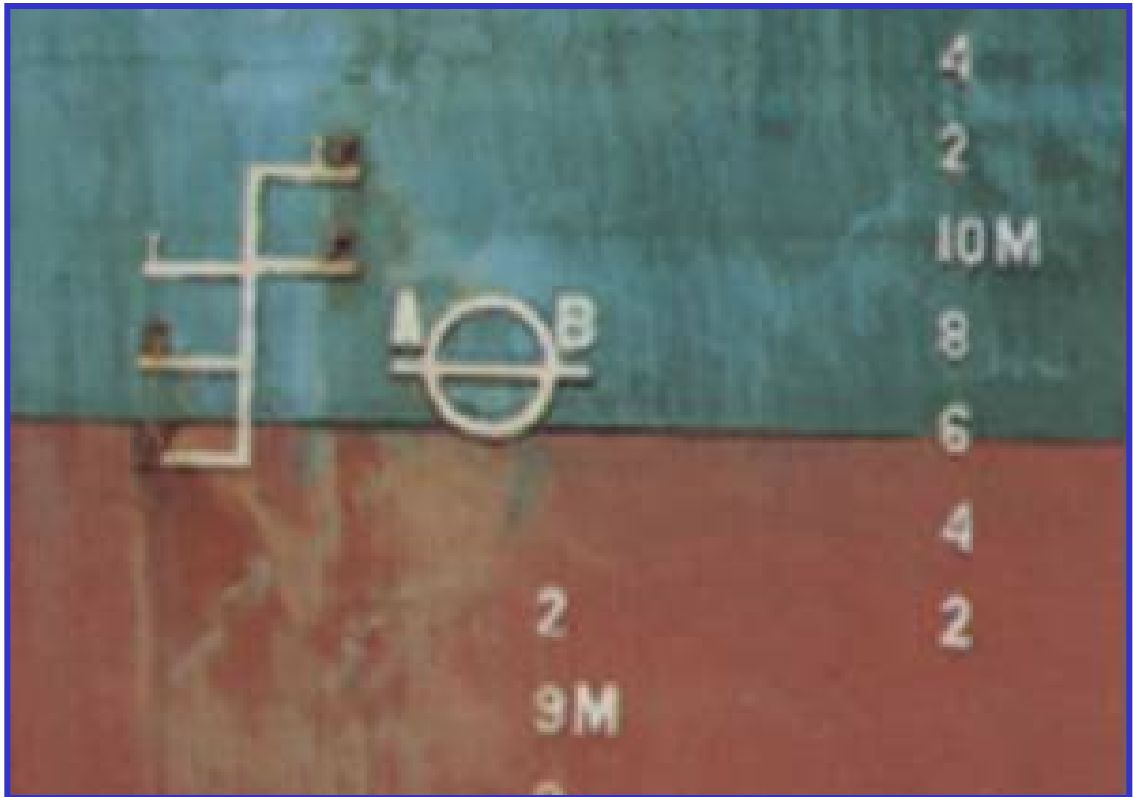


Outcome 1

LESSON 4

Load Lines



Martin Rhodes
Faculty of Maritime Studies
GCNS

LOAD LINES

The M. S. (Load Line) Regulations 1998 (Amended 2000) require that all UK registered ships be assigned a freeboard and a corresponding set of load lines to be marked permanently on the ship's side.

The assigning authority, usually a classification society such as 'Lloyds Register of Shipping' will issue a ***Load Line Certificate***.

Important factors that are taken into account include:

- * Ship stability and reserve buoyancy;
 - * Structural strength;
 - * Hatchways;
 - * Machinery space openings;
 - * All openings in the freeboard deck;
 - * Freeing ports;
 - * Protection of crew;
 - * Ship type (A or B).
- (and many others also.)

Two ship types are considered:

Type A

Is a ship designed to carry only liquid cargoes in bulk (tankers).

Type B

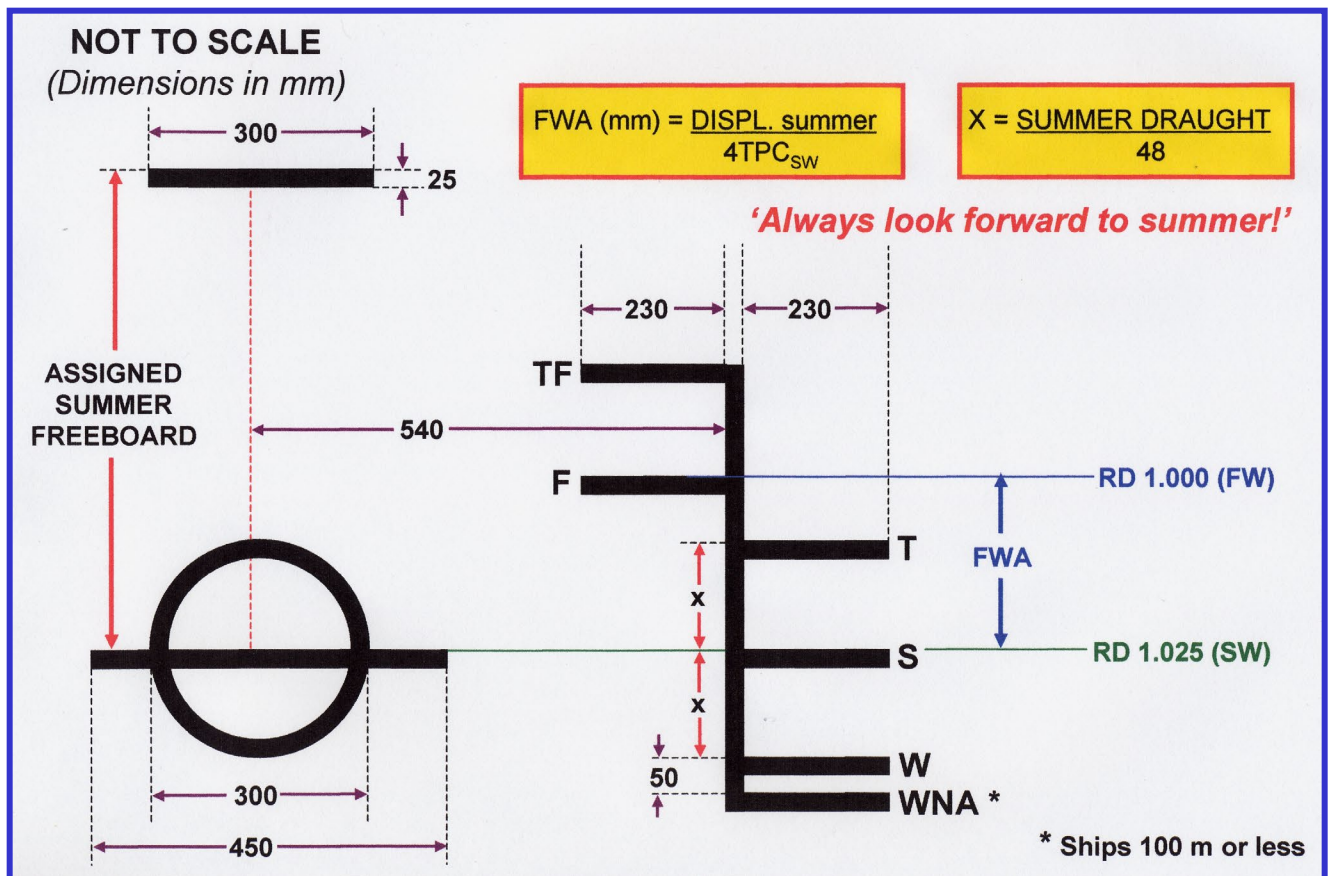
Any other type of ship (bulk carrier, container ship, general cargo etc.)

The load lines for the *starboard side* of a ship are shown.

Note

The spacings between the load lines are measured from the *top edge* of one line to the *top edge* of the other!

The assigned (Summer) freeboard is measured from the *top edge* of the *plimsoll line* (which corresponds to the top edge of the Summer line) to the *top edge* of the *deck line*.



Note

You may be expected to reproduce the above diagram (for the port or starboard side) in the assessment so practice drawing them!

Fresh water allowance (FWA)

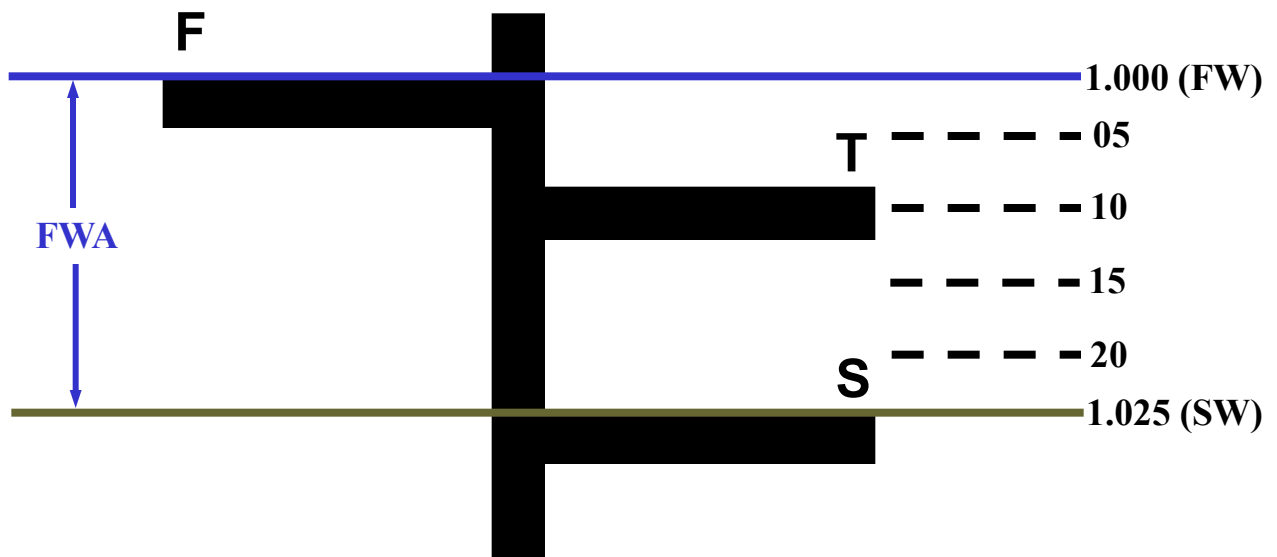
The *Fresh Water Allowance (FWA)* of a ship is the number of millimetres by which the mean draught changes when a ship passes from salt water to fresh water, or vice-versa, when the ship is loaded to the *summer displacement*.

The FWA is found by the formula:

$$\text{FWA (mm)} = \frac{\Delta \text{ Summer}}{4\text{TPC}_{\text{sw}}}$$

If the load line marks are considered, the top of the *Summer* mark and the top of the *Fresh* mark act as the limits of a scale of density that would appear on a hydrometer (an instrument for measuring liquid density).

The ship behaves exactly as a very large hydrometer!



Dock water allowance (DWA)

The *Dock Water Allowance (DWA)* of a ship is the number of millimetres by which the mean draught changes when a ship passes from salt water to dock water, or vice-versa, when the ship is loaded to the *summer displacement*.

The DWA is a fraction of the FWA and is found by the formula:

$$\text{DWA (mm)} = \text{FWA} \times \frac{(1025 - \text{RD dock water})}{25}$$

Note

The densities are multiplied by 1000 to simplify the formula.

The same formula can be easily modified to calculate the change in draught if the ship passes from dock water of one density to dock water of another.

$$\text{DWA (mm)} = \text{FWA} \times \frac{(\text{RD 1} \sim \text{RD 2})}{25}$$