



SHIP MEASUREMENT DEADWEIGHT OR DISPLACEMENT?

Oil Companies International Marine Forum

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1.0 PREAMBLE

It has been convenient for those engaged in the shipping industry and tanker and bulk trades, to use "summer deadweight" as the means of giving a reasonable description of the physical size of a ship as well as being an approximate guide to her cargo carrying capacity.

The introduction of OBO ships, segregated ballast tankers (SBT) and a recent trend towards variable load line positions has resulted in a situation where different types of ships with a wide range of physical sizes may well have the same "summer deadweight". Furthermore, while deadweight remains a good way to broadly describe a ship's carrying capacity, the potential for varying the summer draught mark means that a more exact description is required to ensure that a ship is suitable for a particular port and/or berth. This paper proposes an appropriate way to describe the maximum size of a tanker/bulk carrier which can safely navigate within a port.

The convenience of a single measurement guide like "summer deadweight" is no longer possible, and the bulk trades and shipping industry must prepare for an increased complexity of ship measurement if errors are not to be made or safety impaired.

2.0 RECOMMENDATIONS

It is recommended that port authorities and/or berth operators establish maximum port entry and/or berth approach parameters.

Discussion with terminal representatives within a port is important to ensure that the historical experience with maximum ship size assigned to a particular berth is taken into account when establishing port entry limits. The parameters for port entry and thence berth approach are as follows:

2.1 Port Authorities Requirements

2.1.1 Ship Size Limitations

- (a) Length overall (LOA)
- (b) Beam
- (c) Draught
- (d) Air draught

2.1.2 Other Factors if Appropriate

- (a) Maximum trim

- (b) Minimum draught
- (c) Maximum broadside windage area (end-on windage area if appropriate)
- (d) Arrival displacement

2.2 **Berth Operators' Requirements**

For berth limitations the following ship parameters should be considered by the berth operators:

2.2.1 **Ship Size Limitations**

- (a) Length overall (LOA)
- (b) Beam
- (c) Draught
- (d) Air draught
- (e) Arrival displacement

2.2.2 **Other Factors if Appropriate**

- (a) Maximum/minimum height of manifold or hatch coaming above waterline.
- (b) Maximum trim and minimum draft for berthing and unberthing.
- (c) Maximum longitudinal distance between foremost and aftermost cargo matches (applicable to bulk solid trades).
- (d) Maximum/minimum distance bow/stern to centre of manifold and maximum/minimum distance ship side rail to manifold.
- (e) Special mooring requirements such as size, number and breaking strength of wires/ropes, SPM mooring equipment requirements etc.
- (f) Parallel length of hull.
- (g) Maximum broadside windage area.
- (h) Minimum SWL of crane/derrick for hose connection.

2.3 **Shipowners and Users**

It is appreciated that shipowners and users have a need to describe the bulk carrying capacity of a ship.

However, they are asked to cooperate with the contents of this paper in order that the port authorities and berth operators may safely handle their ships.

3.0 **PHYSICAL DIMENSIONS**

- (a) **LOA:** The length shall be taken as the overall length of the ship.
- (b) **Beam:** The beam shall be taken as the maximum breadth of the ship.

- (c) **Draught:** The draught shall be taken as the maximum or minimum draught permissible as the case may be, which on occasions may require that a forward and aft draught be given. In general a single draught figure will be adequate.
- (d) **Air draught:** The maximum distance from the water level to the highest point of the ship at the prevailing draught.
- (e) **Bow to centre manifold/stern to centre manifold:** The distance from the extreme points of bow or stern to the manifold centre line.
- (f) **Trim:** The trim is the difference between the aft and forward draughts.

4.0 SEGREGATED BALLAST TANKS

A segregated ballast tanker is a tanker which meets the segregated ballast requirements of MARPOL 73/78 and whose ballast water is introduced into tanks, completely separated from the cargo oil and fuel oil systems, which are permanently allocated to the carriage of ballast.

The deadweight of a ship is her carrying capacity at a particular draught expressed in tonnes weight, and summer deadweight is the normal reference when describing the ship's size. However, for SBT tankers the situation is complicated because of the added volume of segregated ballast tanks. Various draft marks may be used:

- (a) **The statutory minimum freeboard draught.**
This is the draught at which the minimum freeboard value is determined by the Loadline Regulations.
- (b) **The scantling draught.**
This is the draught for which the structural strength of the ship has been designed.
- (c) **The designed draught.**
This is the draught on which the fundamental design parameters of the ship are based.
- (d) **The draught selected by the owner.**
This may be any draught less than the statutory minimum freeboard draught.

It should be noted that a loadline mark (and the corresponding loadline certificate) may be at any one or all of the draughts mentioned above.

5.0 SUMMARY

In respect of a port limitation, as distinct from a jetty limitation, there should be no concern about the deadweight or for that matter about the displacement of a ship. The only concern is the physical size of the ship transiting the waters within the harbour limits. Therefore from a port authority's point of view the loa, beam, draught, and air draught should normally be the only criteria for restrictions.

On the other hand the terminal owner/operator is vitally interested in the physical size of the ship and her arrival displacement. Since displacement is the true weight of the ship and her contents, it, coupled with speed of approach, provides the essential data needed for energy absorption limits at the jetty.

The displacement was used in order to establish the strength required for the breasting points. Therefore the terminal owner/operator should be satisfied providing the ship's loa, beam, draught, air draught and displacement are within the design criteria used at the time the jetty was built or rebuilt/modified.

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