

SHIPOWNERS

SECURITY FOR SMALL & SPECIALIST VESSELS

▶ BULLETIN

Loading and discharging procedures for inland barges

The construction and design of a purpose built inland barge, in most cases, differs from that of an ocean-going barge. This is due to inland barges being built to sail in benign or sheltered waters whereas seagoing barges are designed and strengthened to withstand the stresses associated with sea conditions and heavy weather.

Recently the Club has experienced a number of incidents concerning structural failures to inland barges, leading to sinking during loading and discharging procedures. It has been reported that the causes of these incidents can be mainly attributed to a combination of the construction of the barge concerned and the incorrect loading or discharging procedures. This has resulted in an unacceptable level of stress on the barge structure.

When loading high density cargoes in bulk, such as iron ore, it is important that the loading sequence is planned, taking into account the stability criteria of the barge at every stage of loading. Due consideration must be made to ensure the cargo is loaded evenly in small piles in the first round and subsequent passes can be made to increase the cargo quantity of the piles in tandem.

This will ensure that cargo piles are spread out evenly which reduces the stresses on the vessel's structure throughout the loading process. Similar planning is also required in the discharging process to eradicate undue stresses.

When the principle of equal spreading is not followed the vessel can experience either heavy hogging stresses (if the ends are loaded heavier than the midship section) or sagging stresses (if the midship section is loaded more than the ends) in the midship section, mainly concentrated in the areas of the hatch coaming and bottom plating. This will cause deformation of the hatch coaming and, if excessive, can ultimately lead to hull failure and subsequent sinking of the barge.

Deformation of the hatch coaming is one of the tell-tale signs of a barge being subjected to excessive stresses.

Although a barge may be certified to carry high density cargoes, it is important to remember that this carriage is always subject to the barge being operated within the parameters of the barge's stability booklet at all times.

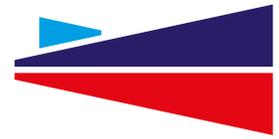
To keep the barge safe a number of barge operators have adopted 'additional strengthening', in consultation with the Classification Society. This includes reinforcements in the areas of the hatch coaming, sheer strake and the longitudinal bulkhead from the tank top. This additional and approved, strengthening may enable flexibility in the loading and discharging stages which may, in turn, aid a fast turnaround.

Similarly, while carrying project cargoes which cannot be spread across the holds, if the load is on the centreline, then the sagging stresses may be compensated by ballasting in the forward and aft parts of the holds. This can also be used with other bulk cargoes, such as sand. In order to avoid excessive transverse stresses when the heavy project cargo is to be loaded on the centreline of the vessel, transverse beams, wooden battens or thick steel plates may be spread across the full breadth of the hold and the cargo may be loaded on to it.

We recommend that Members operating inland barges ensure that cargo operations are planned and carried out in consultation with the barge's stability booklets.

Additionally, the Club has produced a booklet on '[Basic Stability for small vessels](#)' which gives guidance on the fundamentals of stability.k

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Fig. 1&2 Hull failure due to uneven distribution of cargo (sagging).

London

St Clare House
30–33 Minories
London EC3N 1BP

T +44 207 488 0911

F +44 207 480 5806

E info@shipownersclub.com

Singapore

6 Temasek Boulevard
#36–05 Suntec Tower 4
Singapore 038986

T +65 6593 0420

F +65 6593 0449

E info@shipowners.com.sg