



Carefully to Carry

Packaged timber deck cargo – dangerous densities

Sawn Brazilian hardwood

The IMO Code of Safe Practice for Ships Carrying Timber Deck Cargoes stipulates the number and strength of lashings to be applied to timber deck cargoes. The number of lashings is governed by the height of the stow above the weather-deck at the sides. For heights up to 4 metres, lashings are to be pitched 3 metres apart; from 4 metres to 6 metres height, pitched 1.5 metres apart; thereafter pitched 1.5 metres apart (unless required otherwise by the national administration.) All lashings are to have a minimum break load of 133kN (13.6 tonnes).

The Code does not relate the number and strength of lashings to the weight of timber deck cargo to be secured. Possibly when the Code was drawn up, it was assumed that all timber carried in packages would have a density less than 1,000kg/m³. The Committee is concerned that under the current wording of the Code, a packaged timber deck cargo of 2,000 tonnes weight and 4 metres in height may not require a greater number of lashings than a cargo of the same height and volume but weighing only 500 tonnes. In this paper, the Committee considers the implications where the density of the timber may exceed 1,000kg/m³.

Following losses of packaged timber deck cargo from Brazil, investigations revealed that the density of the timber was greater than 1,000kg/m³: in other words the timber as a whole and as loaded dry, was heavier than water. Samples were cut from 14 timbers, each clearly different from the others, but shipped collectively as 'sawn Brazilian hardwood'. Scientific analysis of each sample revealed that 78% of the cargo by weight, had specific gravities (SGs) between 1.0 and 1.4 and that the remaining 22% had an average SG of 0.93. The overall average SG was 1.080 as compared with the SG of oceanic salt water, which is 1.033.

The article on *Timber Deck Cargoes* contains the following statements:

- When timber is correctly stowed on deck as referred to above, the ship may load to the timber load line irrespective of the quantity or type of cargo stowed below decks. The reduction in freeboard enjoyed by a ship which is assigned timber load lines is permitted because of the buoyancy contribution of the timber deck cargo to the ship's stability characteristics.
- When a full timber cargo is carried on deck and the ship is loaded to the timber load line, the statical stability curve may be derived from the cross curves of stability which have been computed taking into account the timber deck cargo. When the timber cargo is not correctly stowed, due to deficient height or other reason, the statical stability curve must be derived from the cross curves computed for the ship without timber deck cargo.



"The carrier shall properly and carefully load, handle, stow, carry, keep, care for and discharge the goods carried."

Hague Rules,
Articles iii, Rule 2

Carefully to Carry Advisory Committee

This report was produced by the Carefully to Carry Committee – the UK P&I Club's advisory committee on cargo matters. The aim of the Carefully to Carry Committee is to reduce claims through contemporaneous advice to the Club's Members through the most efficient means available.

The committee was established in 1961 and has produced many articles on cargoes that cause claims and other cargo related issues such as hold washing, cargo securing, and ventilation.

The quality of advice given has established Carefully to Carry as a key source of guidance for shipowners and ships' officers. In addition, the articles have frequently been the source of expertise in negotiations over the settlement of claims and have also been relied on in court hearings.

In 2002 all articles were revised and published in book form as well as on disk. All articles are also available to Members on the Club website. Visit the Carefully to Carry section in the Loss Prevention area of the Club website www.ukpandi.com for more information, or contact the Loss Prevention Department.

This underlines the technical philosophy of the Code, namely that a timber deck cargo will float and that if it shifts and causes a severe transverse list, it will provide buoyancy to prevent the ship listing further towards capsize. The average SG of a packaged timber cargo is 0.6. The data for the 'timber conditions' in most standard ship stability books indicates an SG of 0.4 where 'condition' volume is set against 'condition' weight. Thus, the lashings approved for such conditions are intended for cargoes of x metres³ and y tonnes. Where Brazilian hardwoods are carried as described above, the same lashings are required to hold x metres³ and 2.7 y tonnes – an increase of 270%, while in addition, the cargo itself can no longer be assumed to provide buoyancy.

The Committee is not aware of any ship having capsized when carrying packaged timber deck cargo but instances are known where ships carrying very dense timber cargoes have suffered massive shifts of cargo, with severe listing followed by the parting of the lashings and cargo being lost overboard. This is then followed by a heavy roll to the opposite side with more lashings parting and more cargo lost. In such instances, the ship usually returns to the upright condition, often structurally damaged, but afloat and capable of navigation. Even if the lashings were not to part, the buoyant nature of the timber would to some degree, mitigate the danger. However, if the deck cargo had an SG of 1.08 and if the lashings were not to part, the ship would list and continue to roll from the listed angle, in circumstances where the presence of the timber would constitute a sinking rather than a buoyant factor. If the timber were then to shift, it is highly likely that a total capsize would result.

Conclusions

- A packaged timber deck cargo with an SG of 0.8 may not be so unusual as to require any special alert, bearing mind that it will still provide a measure of buoyancy.
- A packaged timber deck cargo with an SG in excess of 1.033 (as occurs with Brazilian sawn hardwoods) provides no measure of buoyancy. Such timber may well cause a ship to capsize if the lashings do not part.
- Where packaged timber is loaded and secured by height, as is most frequently the case, then the standard number and strength of lashings when applied to loads of high density timber, may result in no more than 40% of the holding power approved for less dense timber.
- When high density timber is loaded, the ship should not be loaded down to the timber load line.

In order to correctly calculate the ship's static stability, the master requires to know the correct density of the cargo. It is now (since July 1996) a SOLAS requirement that the master be supplied by the shipper with all relevant cargo data, including its density.