

Carefully to Carry

SEPTEMBER 2006

Palletised cargoes

The result of stacking in tiers pallets which are not of adequate construction is likely to be widespread collapse of the stow and damage to the cargo

Wooden pallets are extensively used for the transportation of cargo both in containers and in conventional breakbulk sea-going ships. Palletising of cargo helps to speed up cargo handling operations by consolidating merchandise into units, which can be easily and rapidly handled. Both the efficiency and the reliability of the system depend upon the quality of the construction of the pallet and upon the measures taken to protect the goods and to secure them in place.

When pallets were first introduced into the trade, they were invariably of robust construction. As experience was gained, it was found necessary to secure the goods adequately to the pallet by means of metal strapping bands and to protect them by providing a covering. Nearly all palletised cargoes are received directly from the producers/manufacturers of the goods and it is most desirable that shippers as well as shipowners should appreciate that whilst pallets may appear to be adequate when stacked ashore in a warehouse, they must then be strong enough to be transported to the docks, unloaded, picked up by fork trucks, carried over uneven surfaces and finally loaded onboard ship.

There are formal recommendations which deal with the design, construction and strength of pallets; certain freight conferences specify the standards which they require. The philosophy behind these specifications is that a pallet so constructed will be capable of handling its proper load adequately and it will also be capable of supporting four tiers of similar pallets. It is incorrect to stack in tiers pallets which are not of adequate construction; the result is likely to be widespread collapse of the stow and damage to the cargo.

In the British Standards Institute Publication No. BS2629, Part I 1986, Paragraph C2 of Appendix C states :

"Pallet loading and stacking. Lading patterns should be established for the palletising of each type of merchandise. The pattern should be designed to achieve maximum safety and stability of the goods handled and it should be ensured that it does not entail the safe working load being exceeded



"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.

and the load should, as far as possible, be uniformly distributed on the pallet deck.

Heavier packages should be placed at the bottom of the pallet load where mixed goods are being carried.

The top of the pallet should be levelled off to allow other goods to be safely over-stowed where necessary.

Pallets should not be over-stowed more than four high if they are loaded to their safe working capacity. Where pallets are to be loaded to less than their safe working capacity, the height of stacking should not result in a total stack weight exceeding four times the sum of the weight of one pallet and its safe working load. Further factors to be considered in deciding stacking height are the compressibility of the merchandise or its packing and the stability of the stack and the type of pallet."

The quality and standard of pallets should not be allowed to deteriorate in an effort to reduce costs: if pallets are to be used for sea transport they must be of a consistently high standard. Flimsy pallets constructed from soft wood and designed for storage of lightweight cargo in warehouses, are not uncommonly presented for loading on to ships. Sometimes they are dangerously overloaded and able to withstand neither the rigours of an ocean voyage, nor the stevedoring operations which are entailed. In many cases where the design may be adequate, the materials used and the standards of workmanship are poor.

Experience has revealed that little consideration is given to whether the strength of the pallet matches the weight of the goods it is to carry. Often the dimensions do not match, with the result that bags or cartons project beyond the edges of the platform. Frequently the merchandise is badly stacked or badly secured and is in danger of shifting.

Other inadequacies which have been noted when pallets are presented for sea carriage relate to the methods of securing goods to the pallets. A fairly recent innovation is the shrink plastic cover. This is applied by placing a large piece of plastic over the stack of cartons or bags on the pallet and thereafter applying heat at the folds, in order to shrink the plastic on to the load. Many shippers mistakenly consider that this affords adequate packing and protection. Frequently when a shrink plastic cover has been applied and extended downwards to embrace the pallet, a load of substantial weight may be mistakenly considered to be secured to the pallet. If the load is secured to the pallet by any other means, this is often in the form of weak, flimsy plastic strapping which stretches easily. Subsequently, during the various stages of transportation and as a result of the jolts, jars and tilting which are experienced, pallets quite commonly break or even fall to pieces, loads become lopsided and unstable and sometimes fall off, ending as damaged break bulk cargo.

The method of handling pallets within dock areas may also sometimes leave something to be desired. Where forklift trucks are utilised the forks may be misdirected, so that instead of the forks penetrating beneath the platform of the pallet, they penetrate above it causing damage to the goods. If the cargo is in bags or containers and consists of a liquid or some form of granular material which sifts or runs easily, the entire stability of the load then becomes endangered to such an extent that it may in due course disintegrate. When bagged cargo bulges through the gaps of the planks forming the platform, or where in weak pallets the planks in the platform break, damage can occur when the pallet is picked up. The forks of the lift truck pierce the bulging part of the sack, the contents pour out and the stack or load is rendered unstable.

The photographs below show palletised goods which are typical of those regularly being presented for shipment.

Handling of pallets

The following recommendations have been put forward for the benefit of those handling pallets:

- Where slings are utilised, particularly wire slings, they should be of adequate strength. At the very least, wide nylon belts and spreaders should be utilised.
- Where fork lift trucks are utilised in the handling of pallets, care should be taken to ensure that the forks are not pointing parallel with the base boards of the pallets, otherwise there is a danger of tearing from below.
- Where it is necessary to load pallets in twos, this should if possible be done by utilizing special lifting equipment.
- Where pallets are being handled singly, perhaps because of the low safe working load of the crane, then they should be handled on solid pallets with suitable pallet-lifting gear attached.
- The use of C-hooks, originally developed for the handling of fruit cargoes, is now widespread on palletised goods and has proved very successful.
- Where holds are completely filled with pallets, the incorporation of 'key pallets' in the stowage will assist at the time of discharge. This may be achieved by pre-slinging the pallets with strops or other similar suitable appliances in order to gain access to the remainder of the stow.

Photos 1 and 2: Note the platforms which have to be used in order to load damaged pallets onboard the ship

In Photo 1 it can be seen that the pallet is already breaking up. The stack, even, though cross-tier stowed, consists of polypropylene

woven sacks which slide easily upon each other with the result that the stack becomes unstable and leans over. Each plastic and secured with plastic straps which are not suitable for the purpose intended

Photo 1



Stacking of pallets

When stacking goods on pallets there are a number of steps that can be taken to prevent or reduce some of the more obvious problems.

- The platform of the pallet should be covered with a sheet of cardboard, in order to prevent bulging bags or damage by contact with the sharp edges of the timber platform.
- Where polypropylene bags or paper bags are stowed on pallets, they tend to slide readily because of their smooth surface. In such cases, a square of strong kraft paper can be inserted between each horizontal tier in order to bind the layers of bags together.
- Where multiple paper bags are concerned, the bags can be attached to each other by a patch of glue on the centre surface of each bag.
- In order to prevent the secure strapping from damaging the bags when tightened, a thin square

Photos 3 & 4: The view of the goods in stow, if closely examined, shows many defects such as leaning stacks and pallets which are broken, bending or bulging

Photo 4 shows a method of slinging which causes extensive damage to such pallets

Photo 3



Photo 4



plywood sheet or a sheet of strong cardboard should be placed on the outer perimeter edge of the pallet platform and inserted between the securing bands and the bags. This will also provide protection against the fork ends of the lifting trucks.

In summary, the pallet should be strong enough to support its load and able to withstand handling by stevedores at the several stages of transport. The stacks of the load should be properly built up with interlocking tiers to bind the goods together on the pallets, taking precautions against toppling and instability. The load should fit the pallet and not project over the sides. Preferably it should be firmly secured to the pallet with flat metal bands, or nylon straps, or nylon nets and may incorporate vertical fibre-board/plastic corner angles.