



# Carefully to Carry

## Securing shipments of steel by flexible metal bands

The securing of steel coils since the late 1970s has been carried out most successfully using flexible flat metal banding secured by clips. Securing clips around the bands and tensioning the bands is being undertaken using pneumatically operated tools. This is not to say that the older traditional system of using steel wire has been totally eclipsed. Both systems should, when properly effected, be just as satisfactory and excellent cargo outturns should result.

Initially, some experienced surveyors familiar with the traditional methods expressed doubts about the effectiveness and strength of securing bands. However, since 1979 the majority of shipments of steel coils have been successfully carried using this system and cargo outturns have been just as satisfactory as when wire lashings were used.

It should be emphasised that when utilising strapping bands, it is essential that the correct procedures are closely followed at the time of loading and that the manufacturer's instructions are strictly observed. Correct stowage and lashing is vital when loading shipments of steel, the primary aim being to avoid any risk of cargo shifting during the voyage. The following points should be carefully borne in mind when the use of bands is contemplated:

- The strapping band system is cheaper than the wire cable system because fewer personnel are required to secure the cargo. Straps are easier to thread through the coils and rigging/ bottle screws and bulldog clips are not required.
- The straps can be rendered bar tight at the outset of the voyage whereas wires may still not have reached the full limit of their elasticity and may subsequently slacken off during the voyage.
- When strapping bands are used, it is necessary to utilise an air compressor. The pneumatic tools need constant servicing and require trained operators.
- Normal lashing wire of 16mm diameter loses 30% of its strength in the area of the bulldog clips. The actual breaking strain may therefore be considered as 5.6 tonnes. Metal strapping bands have, in general, a breaking strain of 4 tonnes.
- When a 'key coil' is secured with 16mm wire lashings through the core and with additional cross lashings over the top, a breaking strain of 44.8 tonnes can be achieved (8 lashings x 5.6 tonnes = 44.8 tonnes). This compares with a breaking strain of 32 tonnes when single strapping bands are used. Such a lashing system would be considered adequate for coils weighing up to 15 tonnes. Where very heavy coils are carried, double strapping bands should be applied.

When properly utilised, the strapping band securing system meets all the necessary requirements, i.e. it is of adequate strength and is acceptable for securing average steel cargoes onboard ocean-going vessels. It is again stressed that owners would be well advised always to appoint a surveyor on their behalf in the load-port in order to ensure that the securing system has been properly applied and that the manufacturer's instructions are carefully followed.



"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](http://www.ukpandi.com) for more information, or contact the Loss Prevention Department.

- A certificate should be provided stating the TML for the cargo. It is stipulated by the IMO that the testing necessary for the provision of such certificates should be carried out at least once every six months (see the IMO BC Code section 4.4.1. p.15). The Committee advises masters to ensure that this certificate is dated within six months of loading and that it is issued by a laboratory on which reliance can be placed. The test procedure for determining the TML requires specialised equipment and experienced technicians to conduct the test. It is reasonable to assume that certificates issued by major shippers of mineral ore concentrates as listed in the IMO BC Code are reliable. However, the Committee recommends that where there are shipments of less common materials or where shipments are from newly developed sources, the certificates should be issued by a laboratory known to have the necessary equipment and expertise reliably to conduct the test. If there is any doubt about this matter the Committee recommends that the master should notify his owners. They should then contact the Association in order to obtain expert advice on how to check that the laboratory has the necessary equipment and expertise.

- The master should also receive before loading commences, a letter from the shippers indicating that he will be supplied with certificates stating the average moisture content of the cargo loaded into each separate hold. It will be appreciated that sampling before shipment except in climates where there is no rainfall is not satisfactory. Many of the larger shippers use an automatic sampling procedure during loading in order to obtain satisfactory

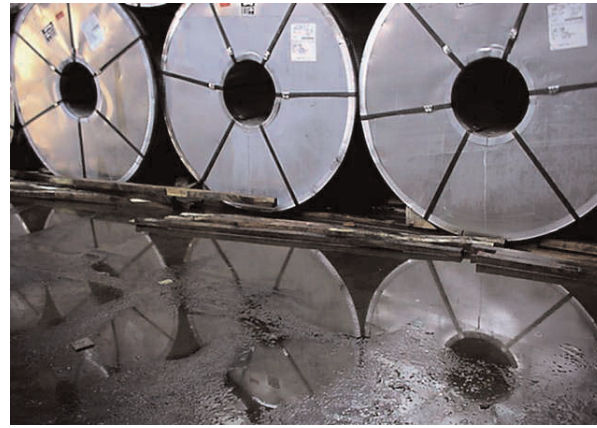


*Photo 1. Coils of hot rolled steel  
These coils are usually between 1.20 and 4.50 metres in diameter and weigh between 5 and 15 tonnes each*

samples for moisture content measurement. Under these circumstances, actual figures for the average moisture content of cargo loaded into each hold can only be given at the end of the loading period.

### Careful examination

Notwithstanding any evidence provided by the various certificates discussed above, masters are strongly advised to examine stockpiles of cargoes before loading. Water draining from such stockpiles must be considered to indicate the probability that a part of the material in the stockpile has a moisture content above the TML. A watch should be kept on the condition of the cargo being loaded. Any obviously wet material should be rejected as such



*Photo 2. Coils of cold rolled steel  
The higher quality surface finish of cold rolled steel makes it much more susceptible to rust damage. It is for this reason that cold rolled steel is usually packed in bituminous paper and kept away from moisture*

cargo might form a shear plane on which a basically sound cargo loaded subsequently, might slide.

If masters are doubtful about the condition of a cargo, they can conduct a 'can test' described in the IMO BC Code, Section 8.3 at Page 24. It must be stressed however, that although an adverse result from this test indicates that the material tested is probably unsatisfactory for ocean carriage, the test cannot be used to confirm that the material tested is safe for carriage. The Committee wishes to warn masters specifically about the risk of loading cargo at sub-zero temperatures when cargo may contain ice crystals but not appear to be damp. It is recommended that when cargo is loaded under such conditions, samples are drawn from various levels including the bottoms of piles and that these are warmed and then tested by the can test.

The Committee also advises that under no circumstances should masters agree to the erection of shifting boards or other temporary arrangements in order to carry cargoes loaded at moisture contents above the TML. The Committee has heard of an incident where longitudinal shifting boards of six inches thickness secured to nine inch square posts were smashed by a shifting concentrates cargo. If bulk-heads are to be erected to facilitate the carriage of this type of cargo, they must be constructed strictly as required in Section 7.2.2 at Page 22 of the Code.

It cannot be too strongly stressed that when carrying cargoes of this nature, failure to ensure that they are accompanied by the correct reliable documentation and to ensure that they are in generally uniform condition at the time of loading can, and has on a number of occasions, resulted in the loss of both a ship and its crew.

### Dangerous reactions

There are two other dangers associated with concentrate cargoes. The first is that some concentrates may heat. Shippers should always be asked specifically about this possibility. Stows of such concentrates should be trimmed roughly flat using a tracked bulldozer or similar machine which also compacts the cargo. It is sometimes helpful to sheet such materials with heavy gauge polythene film which further restricts the rate of air penetration into the cargo.

The second danger arises from the fact that even if concentrate cargoes do not heat, they absorb oxygen such

that the atmosphere above the cargo in a hold which is inadequately or not at all ventilated may become deficient in oxygen and enriched with nitrogen. Air contains roughly 79% nitrogen and 20.8% oxygen and as the oxygen is absorbed by the cargo, so the oxygen content may fall to as low as 4%. The minimum concentration of oxygen required in the atmosphere in order to support life for only a few minutes is 10%. There have been fatal accidents where persons have entered fully closed holds loaded with concentrates where the oxygen content was too low.