

# **Stowage and securing on seagoing vessels**

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# 1. General information

## 1.1 Introduction

Tata Steel Stevedoring uses two methods for loading and securing of steel products:

1. Stowage in vessels with hopper-type holds: pyramidal stowage;
2. Stowage in box-type ship's holds: stowage from side to side.

In either case the securing will be realised by using steel bands which has proven to be a safe and efficient way of lashing.

The loading of the ship will normally be performed with quay cranes. It may be necessary to place fork lift trucks in the hold of the vessel. This depends on the type of material to be loaded, the width of the ship and the exact shape of the hold. In general the tiers in the hold will be built up as shown in the next figure.

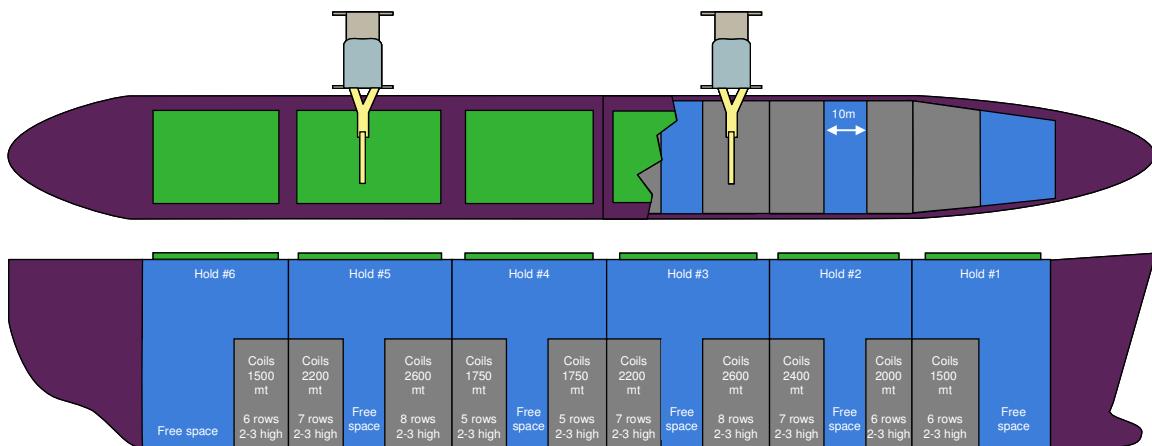


Figure 1 General build of steel products in the hold

The number of coils, tiers and the height of the tiers differ per shipment and ship. The tank-top load is taken into account when calculating the best setup. Free space between the blocks of tiers in a hold is necessary to allow manoeuvring space for the forklift truck.

## 1.2 Agreement on stowage plan and loading sequence

Tata Steel IJmuiden is a production company with limited storage capacity at the ports. Not all the material for ship is physically present at the quay. A large part of the material will be delivered by railroad to the harbour *Just in Time* (JIT). The planning for the JIT delivery is achieved through a very critical network planning. This network plan is constructed following the *first in, first out* principle; material which is loaded first into the ship will be loaded first on wagons. Therefore an agreement on a "loading sequence" is essential. Last minute changes are very disruptive and will often cause delay.

The exact load data will become available only a short time before loading. This gives Tata Steel the opportunity to meet as much as possible the final customer's wishes. On average the cargo is programmed for shipping two days before, but even when loading has started cargo can be added. Thus the making of a packing list can usually only be done just before or even during loading.

A stowage plan is prepared when the cargo to be shipped is known. The decisive factor is the capacity of the ship; width / length of the holds, capacity of the tanktop, and available space in  $m^2$ . In addition, the cargo, material type, dimensions and weight are taken into

account. At first the information is not yet at a single coil detail. The available information consist of average dimensions and weights, including the maximum coil weight.

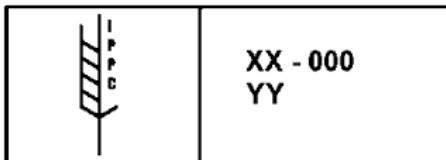
Initially we always contact the ship's officers (or a representative of the charter), to whom the available charge information is provided. This information includes metric tons by destination and type of material. At that time the information is still preliminary, as changes can be made at the last moment (see above).

The ship's officers (or a representative of the charter) will then be asked to create a (pre) stowage plan, and loading sequence based on the cargo break down. This is then returned to the Tata Steel front office which will assess whether it is an acceptable plan for Tata Steel. If adjustments are required this will be communicated with the parties involved. On acceptance there must be an agreement for the stowage plan and the specified loading sequence.

After acceptance the stowage plan will be further processed into various warehouses, ports and cluster plans.

### 1.3 Wood

The dunnage and wedges used are made of new Douglas - lariks - inland pine. For destinations that require so heat treated wood conforming to ISPM 15 will be used, recognisable by the logo in figure 3. Certificate of treatment will be provided after loading.



**Figure 2 ISPM 15 HT example marking**

The size of the dunnage used is 2000 x 150 x 30mm with a tolerance of 2mm. Bark- and dustfree. The size of the wedges are 280x150x150mm where 150mm is the height.

### 1.4 Lashing and securing equipment

Securing will always be realised by using steel bands, which has proven to be a safe and efficient way of lashing. The securing is done using certified steel bands. The tail ends of the steel bands are pneumatically sealed by compressive metal joints. The steel-strip lashing system causes each row of material to be a more massive structure (see *tier set up* for more information).

#### 1.4.1 High tension lashing steel strip



**Supplier:** Theis

**Type:** Elite – High-Tension – Steel strip / HL

**Breaking strength:** 38.2KN / 3820Kg (minimal)

**Elongation:** ca. 12%

**Dimension Steel strip:** 31.70 x 1.12 mm

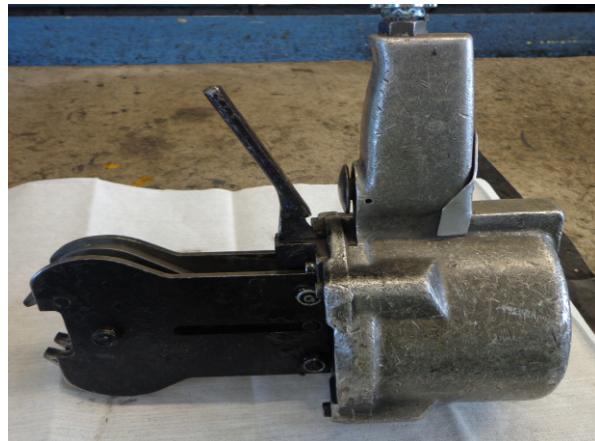
#### 1.4.2 Tensioners



**Pressure setting:** 4.7bar

**Traction power:** 11KN (minimal) - 18KN (maximal)

#### 1.4.3 Sealers



**Pressure setting:** 7.2bar

**Total power of sealing system (strapping):** 36.3KN (minimal)

## 1.5 Harbour specifications

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### Outer harbour quay nr. 1

Quay length	414m
Quay height	4.20m above mean sea level
Air draft top hatch coaming	27.5m above mean sea level
Max. allow. draught: East quay (50-315m)	8.50m (28ft) with a guarantee of always afloat to L.L.W.S.
Max. allow. draught: West quay (315-450m)	9.80m (32ft) with a guarantee of always afloat to L.L.W.S.
Nr. of cranes	1
Lifting capacity	18-35t

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### Outer harbour quay nr. 3

Quay length	250m
Quay height	8.00m above mean sea level
Air draft top hatch coaming	18.6m above mean sea level
Max. allow. draught: Quay (90-250m)	11m (36ft) with a guarantee of always afloat to L.L.W.S.
Nr. of cranes	2
Lifting capacity	58t
Outreach from quay edge	20.5m

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### Inner harbour nr. 3 / All Weather Terminal

Total quay length	212m
All Weather Terminal quay length	120m (covered)
Quay height	4.00m above N.A.P.
Max. allow. draught	6.5m (21'33")
Door Height All Weather Terminal	11.30m above N.A.P.
Nr. of cranes	1
Lifting capacity	40t
lifting height	8m from quay deck
On-shore Power Supply	400 V – 32 A – 3ph

## 2 Stowage

### 2.1 Introduction in stowage

Tata Steel Stevedoring uses two methods for loading and securing of steel coils:

1. Stowage in vessels with hopper-type holds: pyramidal stowage;
2. Stowage in box-type ship's holds: stowage from side to side.

### 2.2 Pyramidal stowage (hopper-type hold)

The stowage of steel coils will be achieved in a special way of stowage, the so-called "pyramidal stowing". Stowing the coils this way avoids difficult loading and discharging procedures and the use of extra equipment, (forklifts, mobile hoisting cranes etc.) Also this kind of stowage has proven to be successful in reducing the amount of damages during the discharging of the coils.

This special way of stowage means that the steel coils are not to be loaded from side to side in the different holds. This pyramidal stowing is also possible due the modern, high quality lashing equipment.

The next figures show some possible configurations of stowage and securing.

#### 2.2.1 Dunnage

Dunnage will be used between the coils and the tank top (c.q. hopper tank). Between the outside coils and the dunnage on the hopper tank, wedges have to be used which have to be placed securely.

Two lines of dunnage on the tank top and in the side, wedging of coils with a minimum of two wedges.

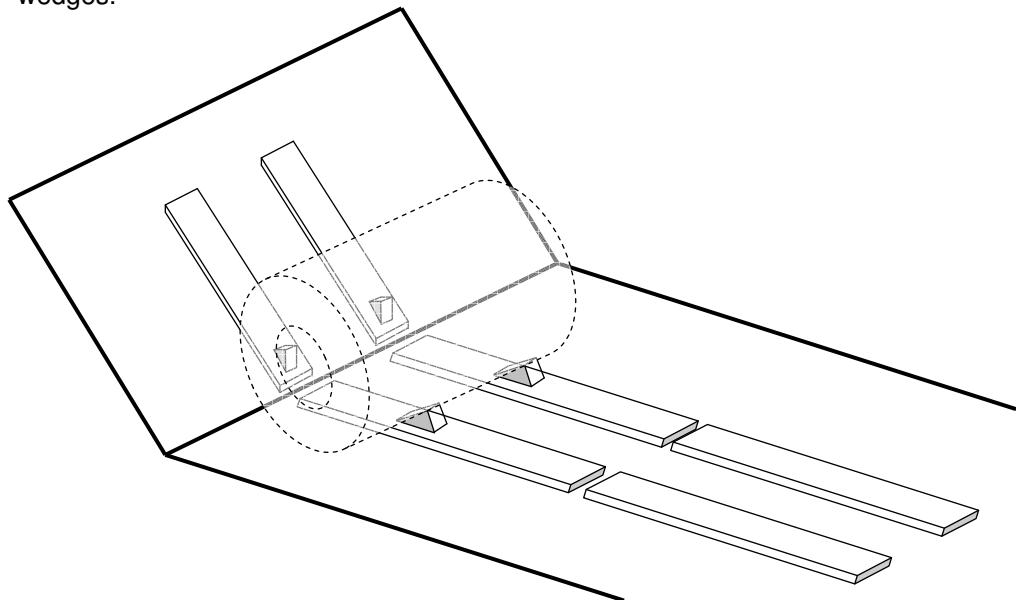


Figure 3 Position of wood on tank top and wing tanks

## 2.2.2 Tier set up

Coils are placed against each other from the sides of the hold. The final coil in the bottom-row is a locking coil.

It is general use to keep a distance between rows of about 10 -15 cm in order to keep space to attach the lashings, for using braided wire-slings and to avoid damage when lifting or using forklifts.

In the final row more vertical lashings will be used to "lock up" the other coils/rows.

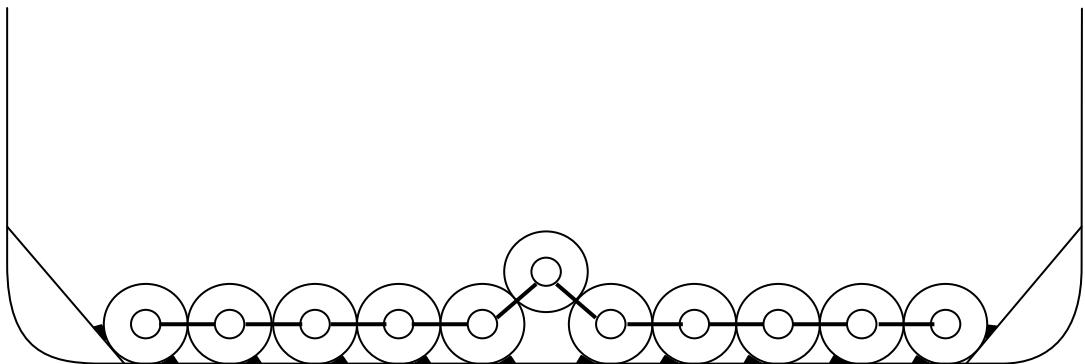


Figure 4 Stowage 1-high begin- and end row

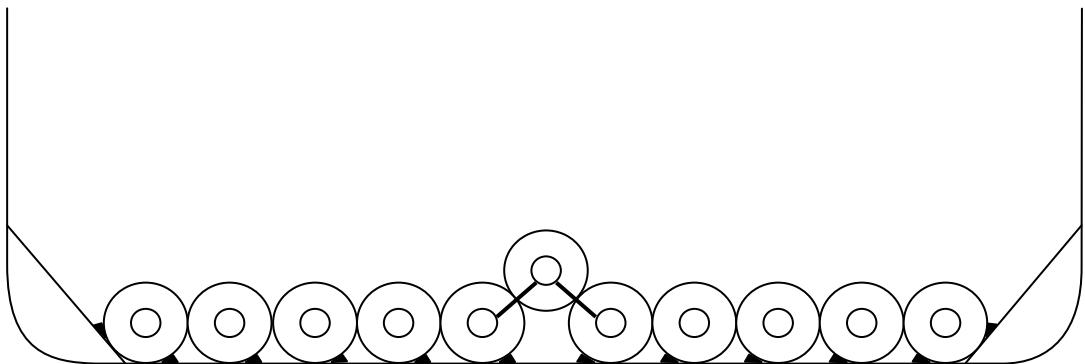


Figure 5 Stowage 1-high between begin- and end row

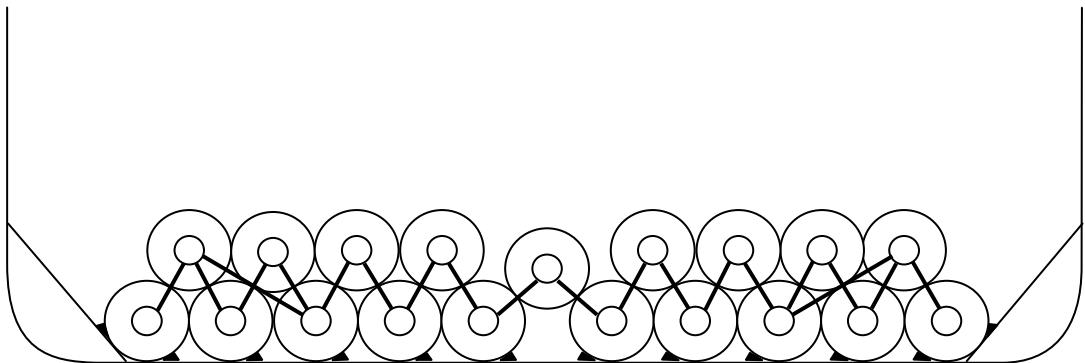


Figure 6 Stowage 2-high

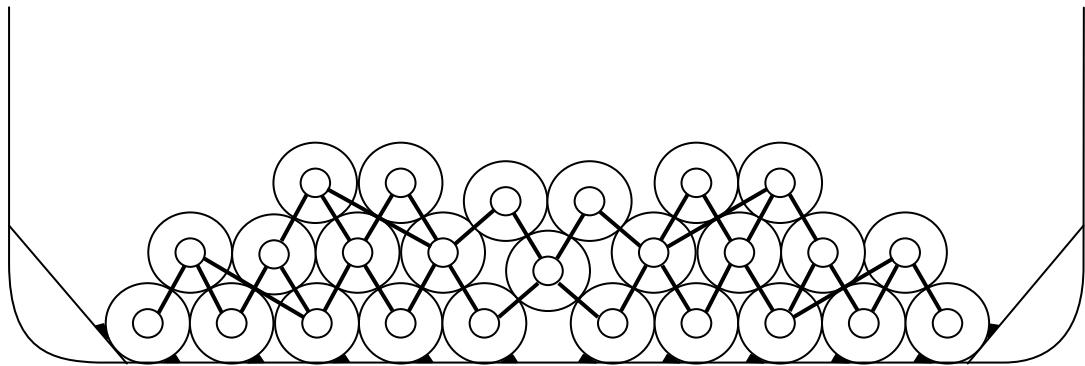


Figure 7 Stowage 3-high

### 2.2.3 Block stowage

For deepsea vessels the first or last tiers of every block near empty space in the first hold receive additional lashing. These two tiers are chocked and lashed in block stowage.

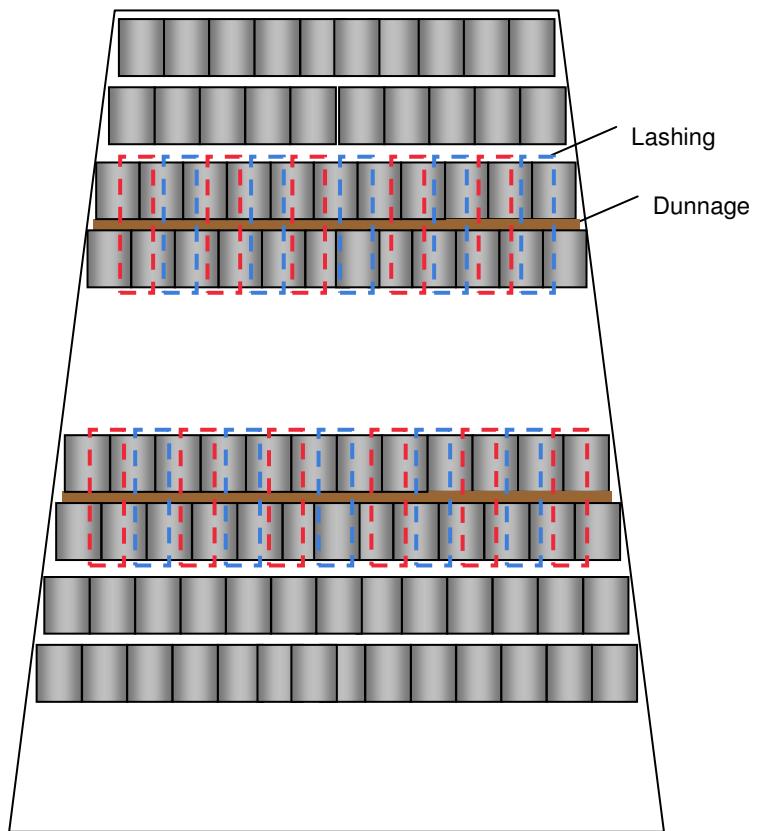


Figure 8 Block stowage in hold #1

## 2.3 Side to side stowage (box-type hold)

In ships with box-type holds, the coils will be loaded from side to side. The next figures show some possible configurations of stowage and securing.

### 2.3.1 Dunnage

Two lines of dunnage are used on the tank top, wedging of coils with minimum of two wedges.

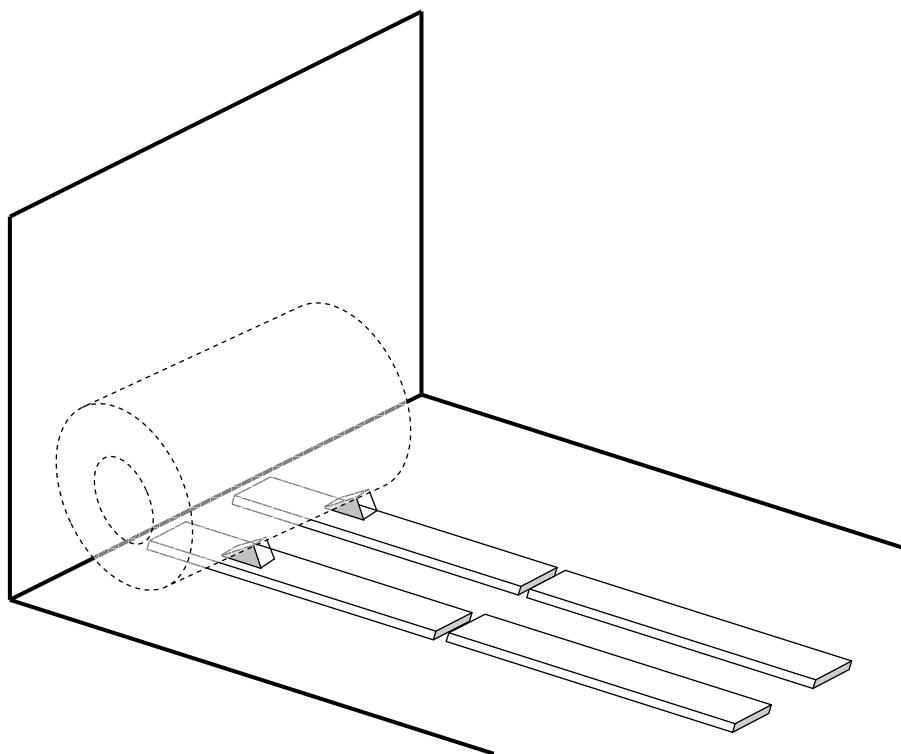


Figure 9 Position of wood on tank top

### 2.3.2 Tier set up

The two top-layers will be secured together; this means that in the top-layer the coils are lashed to the coils in the layer below. When the coils have to be placed 3-high the bottom-layer will not be lashed to the next layer on top of it.

The heaviest coils will be stowed in the lower layer of the rows.

It is general use to keep a distance between rows of about 10 -15 cm in order to keep space to attach the lashings, for using braided wire-slings and to avoid damage when lifting or using forklifts.

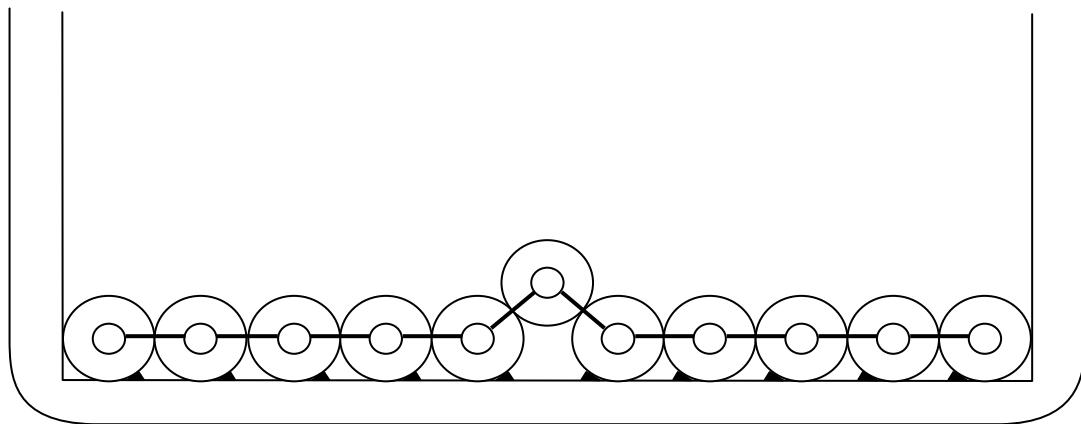


Figure 10 Stowage 1-high begin- and end row

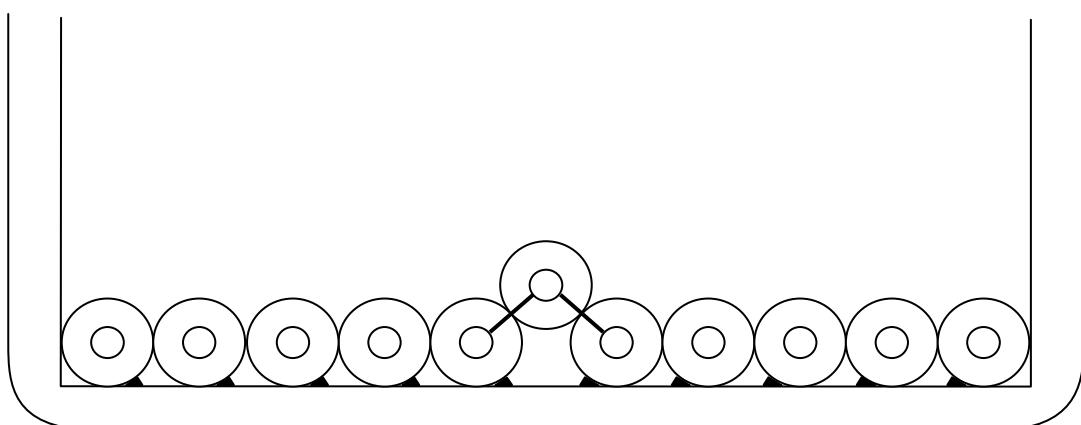


Figure 11 Stowage 1-high between begin- and end row

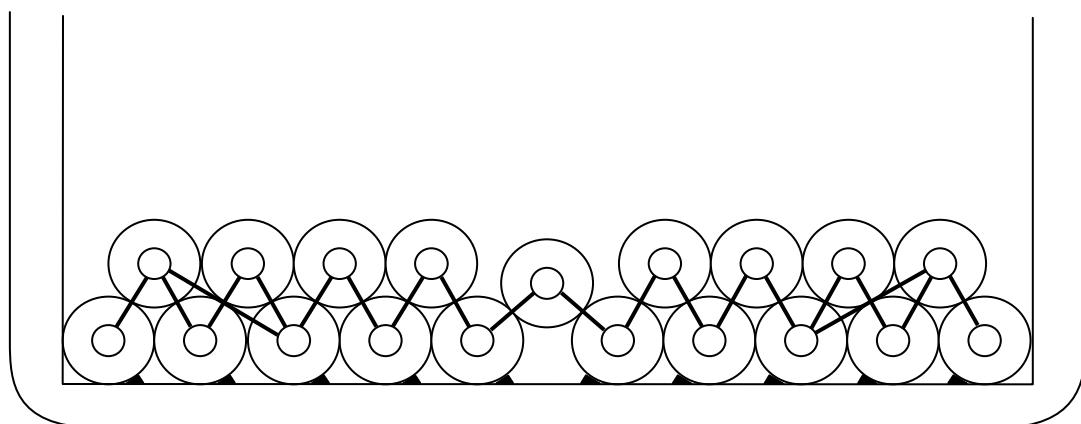


Figure 12 Stowage 2-high

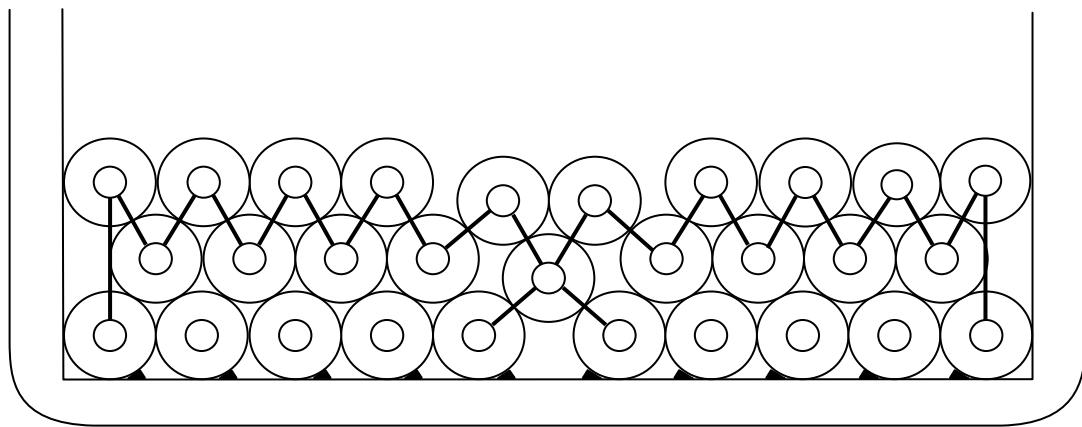


Figure 13 Stowage 3-high

## 2.4 Locking coils

Locking coils secure the tier by pressing the other coils of the tier to the side. The depth of the locking coil is important to keep the tier together. With two locking coils in one tier the depth should be as equal as possible.

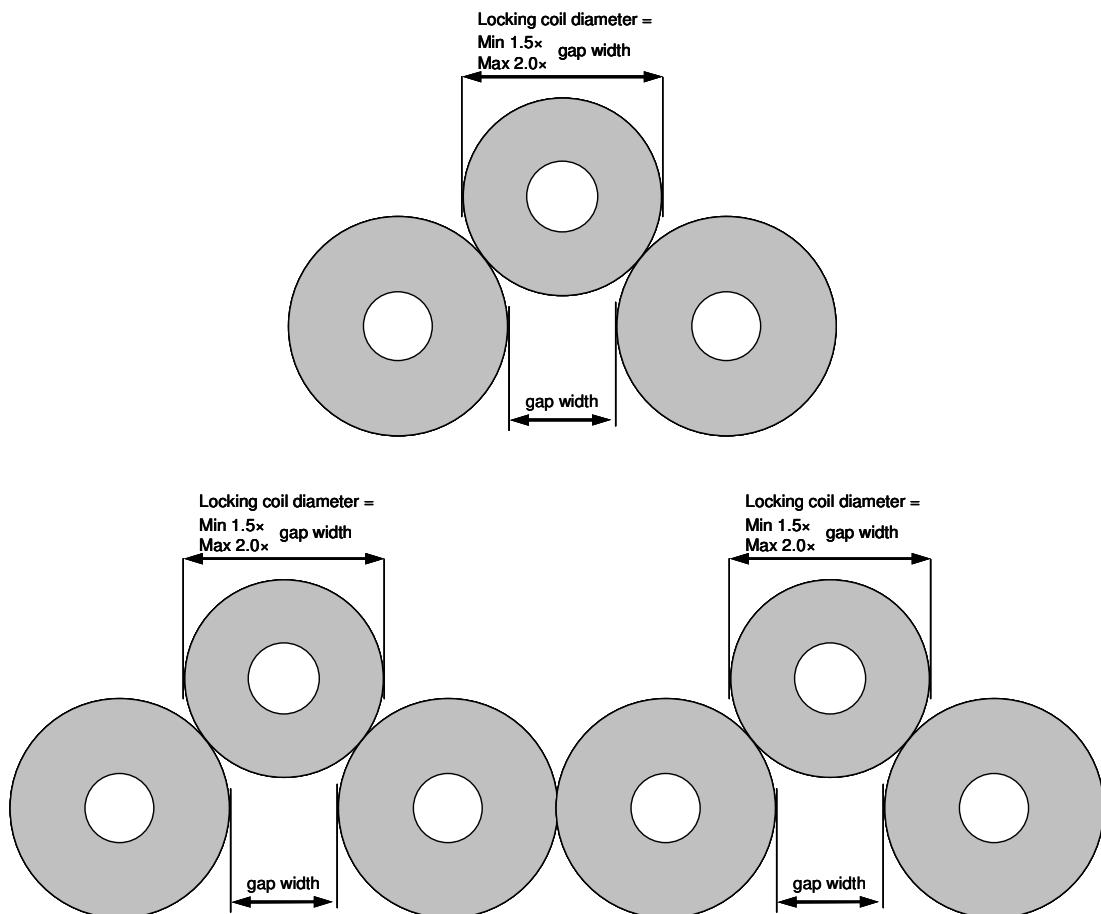


Figure 14 Locking coil examples

### 3. Coils eye to the sky

#### 3.1 Introduction

ETTS stands for "Eye To The Sky". These tinplate coils are so that the coil bore is vertical and placed on skids. Tata Steel Stevedoring uses two methods for loading and securing of ETTS coils:

1. Stowage in vessels with hopper-type holds: pyramidal stowage;
2. Stowage in box-type ship's holds: stowage from side to side.

In either case the securing will be realised by using steel bands, which has proven to be a safe and efficient way of lashing. Securing the coils is carried out with certified steel bands. The tail ends of the steel bands are pneumatically sealed by compressive metal joints. The steel-strip lashing system causes each row of coils to be a more massive structure.

Dunnage should be placed under each top layer of coils to achieve stability. The coils are choked and stowed with dunnage between each of the coils. A top coil should not exceed an overhang in free space of 10 centimetres otherwise there should be an overlay to the next bottom coil with a minimum of 10 centimetres.

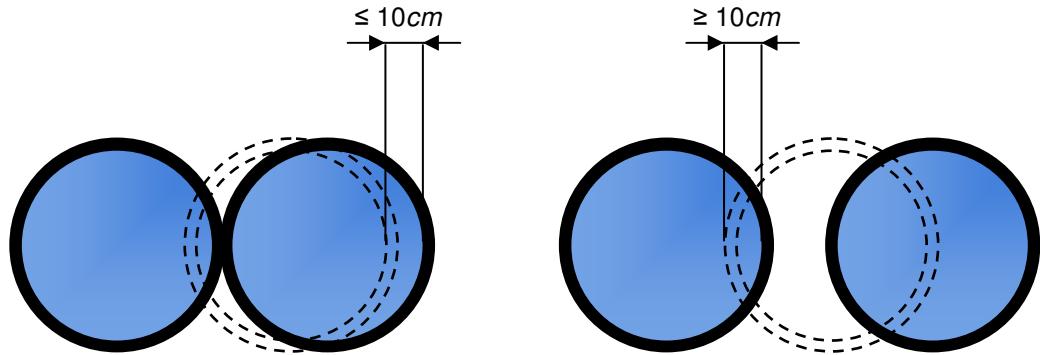


Figure 15 Overhang and overlay with ETTS stowage

### 3.2 Pyramidal stowage (hopper-type hold)

Underneath the top layer dunnage will be placed abeam to increase stability of the rows. Wooden chocks will be applied between the coils to create a solid block stowage.

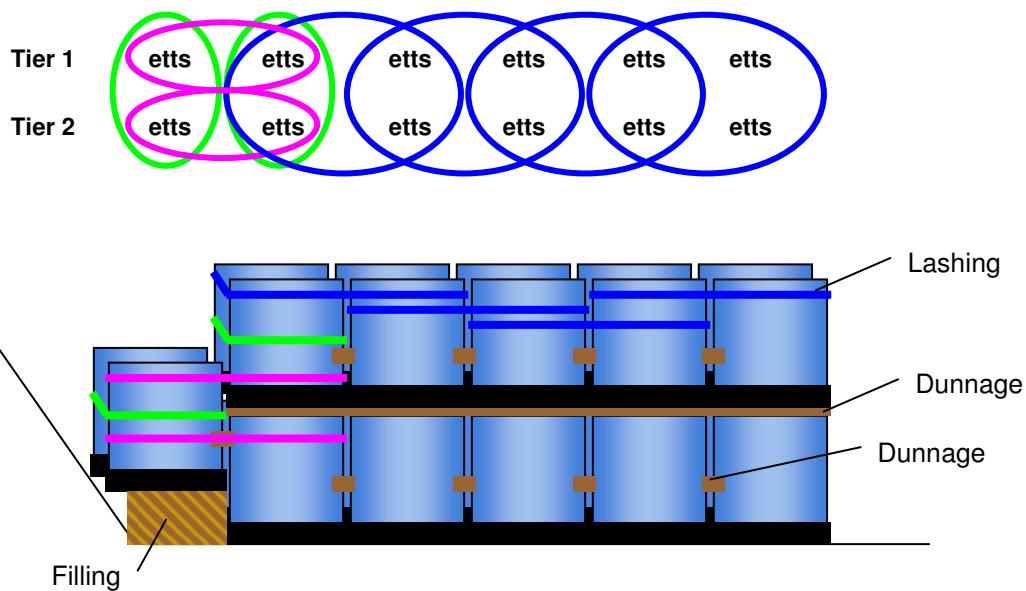


Figure 16 Lashing of ETTS coils 2-high

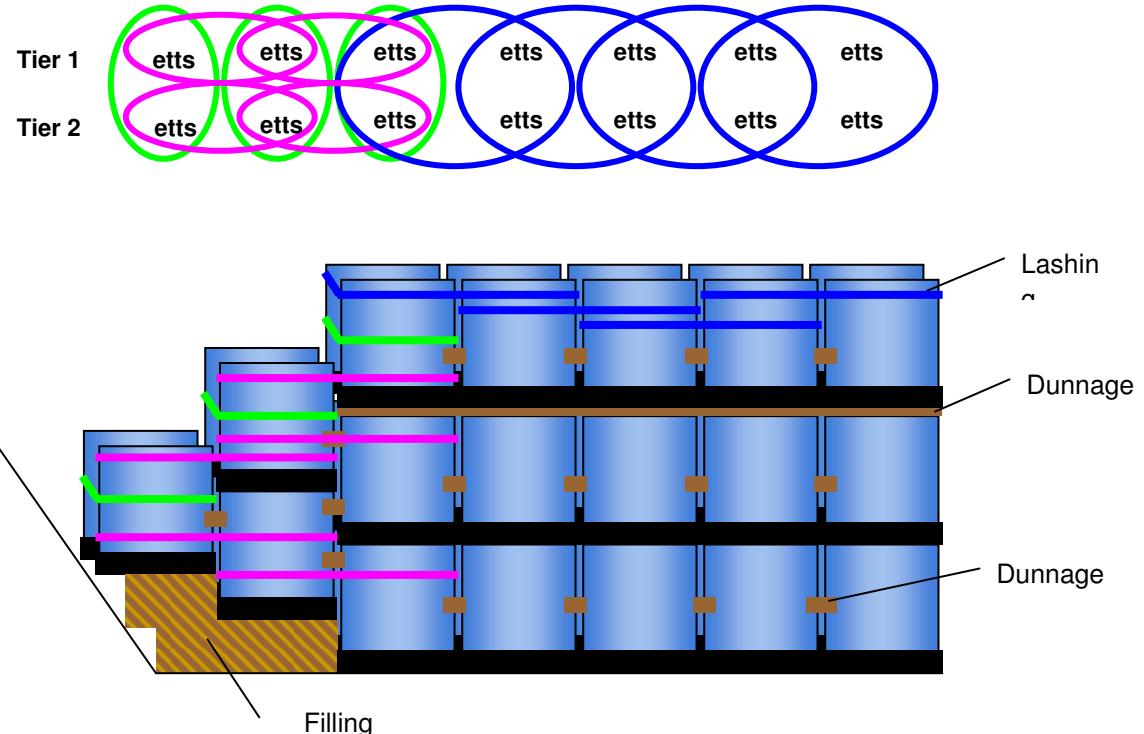


Figure 17 Lashing of ETTS coils 3-high

### 3.3 Side to side stowage (box-type hold)

Two ways of side to side stowage of ETTS coils exist.

#### 3.3.1 Line stowage

Loading and lashing of ETTS coils in box-type ship's holds, line stowage.

First and last row to be lashed completely, the rows in between will not be lashed.

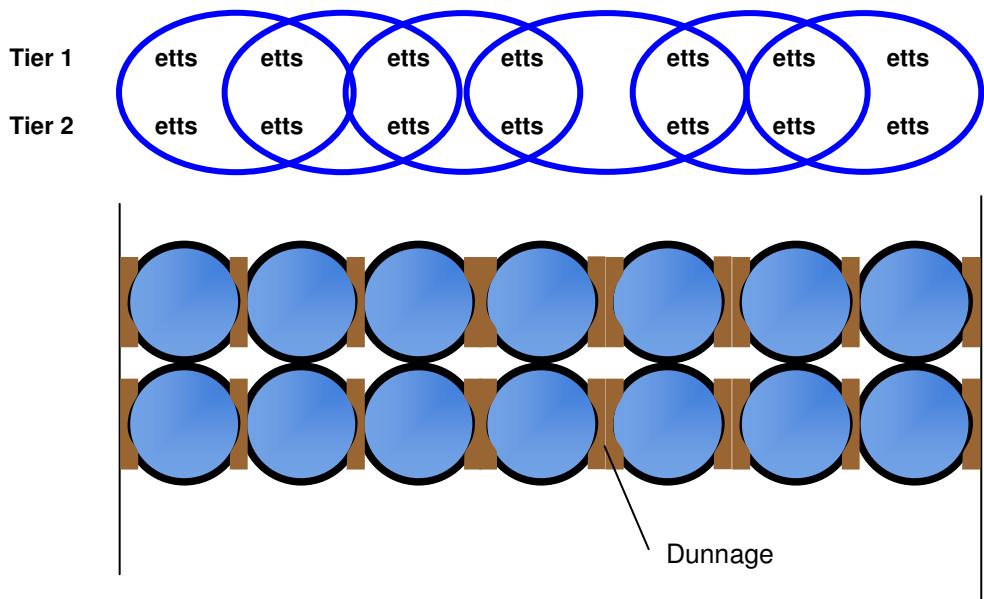


Figure 18 Lashing and securing in lines

#### 3.3.2 Honeycomb stowage

First and last row to be lashed completely, the rows in between will not be lashed.

Every last and every 10th will be placed on anti slip mats and lashed together to the adjacent tier.

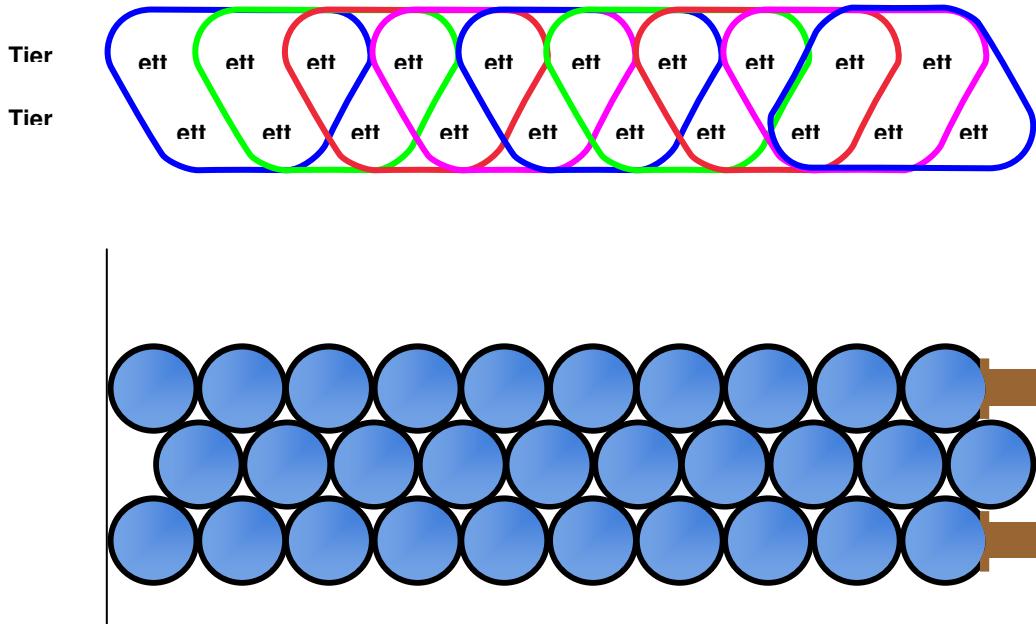


Figure 19 Lasing and securing honeycomb configuration

## 4. Tinplate

Tinplate material consist of tinplate sheets bundled together on a wooden pallet. Stowage and securing is as customary done as follows:

- In rows against port side and starboard side with skids athwart ship
- Middle skidded bundles with skids in longitudinal direction
- Gaps to be filled up with dunnage

## 5. Slabs

Stowage and securing of slabs is as customary done as follows:

- Slabs to be stowed in such a way that every slab is surrounded by dunnage of minimal  $10 \times 10 \times 10\text{cm}$  to enable trouble-free discharging activities.
- Hardwood dunnage is used on the tank top and between the slabs.
- Softwood should be used as vertical spacing wood.
- Slabs should never touch the any part of the ships hold.
- The weight of the slabs should be evenly spread out over the tank top space.
- Small deviations on this standard can be made due to customer demands.

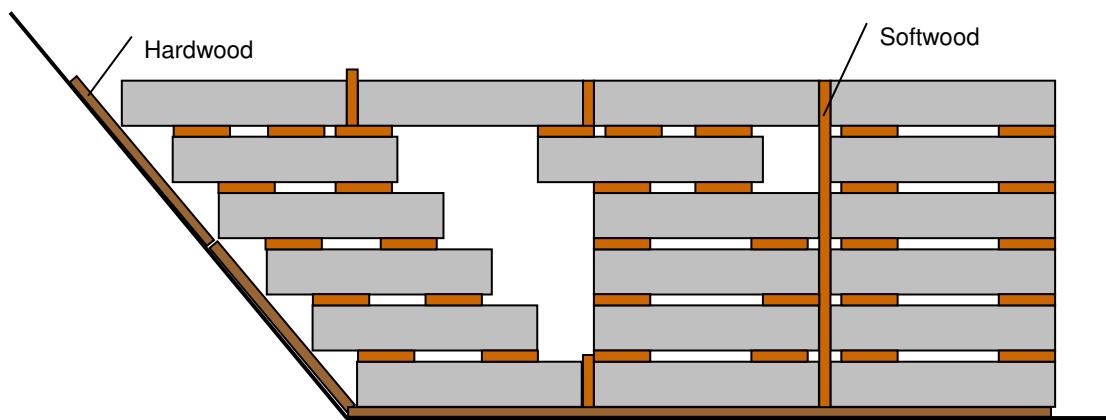


Figure 20 Slab stowage example