

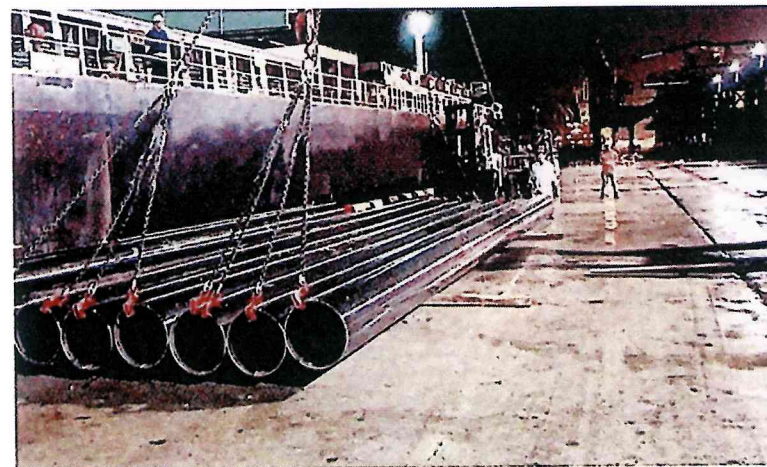
Pipes



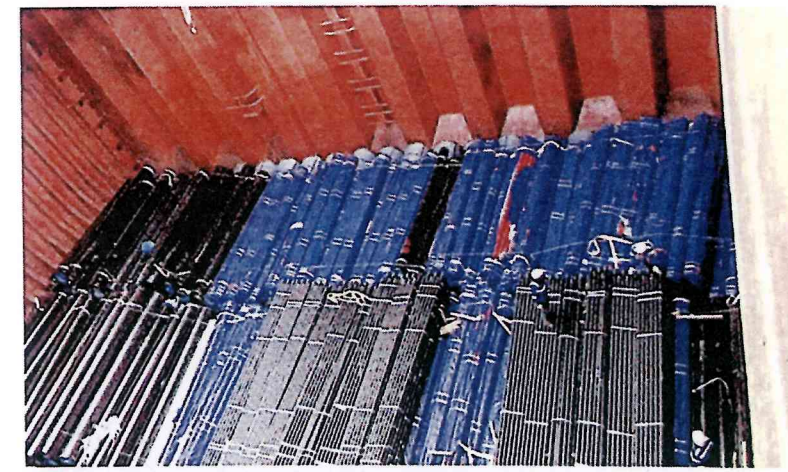
✓ Pipe bundles being tipped by sorting hooks at Jurong Port, while the nylon lifting slings are positioned underneath. The pipes are pre-slung for tipping



✗ A loose stow of mixed size and bundled pipes, making discharge difficult, dangerous and slow. For mixed size pipes, pre-slinging is required



✓ Pipes being discharged by pipe hook



✗ A loose stow of mixed size and bundled pipes

Pipes



✓ Pre-slung pipes. The stevedores use tipping hooks to prepare the single basket lift for discharging



✓ Swaged pipes loaded in an athwartships and longitudinal stow. Note that rope grommets are used at both ends to protect the swage. No dunnage was used



✗ Stow of various bundled and single pipes. The stow is not level. No dunnage is used. Pre-slinging with nylon web slings is required for such a stow



✓ Lashed stow of various diameter pipes. Wires used for lashing. Note the dunnage between the tiers

difficult,
ed

Pipes



Discharging pipes with a single basket sling and placing the pipes on the quay



The pipes are handled with a forklift truck



The pipes discharged with hooks to barges. The pipes should be pre-slung



The pipes discharged with hooks to barges. The pipes should be pre-slung

Pipes

Notes

- Where possible, the pipes for loading should be of the same size and length in a stow.
- Tank-top load limits are not to be exceeded. Consideration is to be given to the hopper areas, where the load limits may be smaller. Maximum tier heights are dependent upon the type/size of pipes. If in doubt, seek clarification from the shipper.
- The tank-top is to be prepared with appropriate hardwood dunnage to prevent steel-to-steel contact and to increase friction. Lashings are to be positioned athwartships and ready on the tank-top.
- The maximum distance between layers of timber dunnage on the tank-top typically should not exceed 3 metres. The first and last rows of dunnage should be approximately 1 metre from the end of the pipes.
- Dunnage is to be hardwood boards with typical cross-section of 75 mm x 75 mm (to enable lashing wires to pass through easily).
- Dunnage is to be used in way of bulkheads and other structures. For large diameter pipes, wedges are to be nailed to the underlying dunnage boards on the tank-top and fitted to both sides of each pipe to prevent them rolling.
- When loading small diameter pipes in bundles, dunnage should be used between the cargo tiers. Alternatively, the bundles should be pre-slung.
- When loading large diameter pipes, dunnage between tiers may not be necessary. Vertical dunnage between the last layer of pipes should be considered. A dunnage stool may be required to be built between the stow and the side bulkheads of the hold.
- For a stow of mixed diameter pipes, pre-slinging of the pipes is required. Dunnage between tiers should also be considered.
- All tiers are to be stowed predominantly in the fore-and-aft direction and level.
- In the cargo compartments, where possible, safe passage should be provided directly from the Australian ladders to the top of the cargo stow. Safe access should also be provided from the tank-top to the top of the cargo stow.
- DO NOT mix the lashing arrangement; choose one and stick with it.



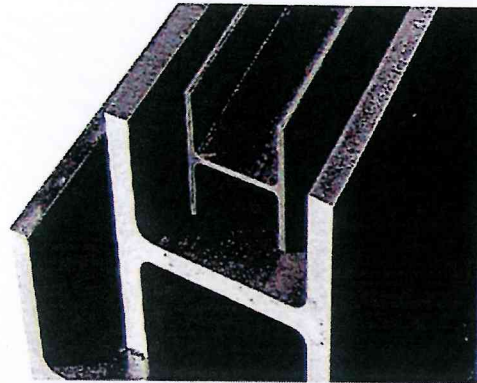
pre-slung

Structural Steel

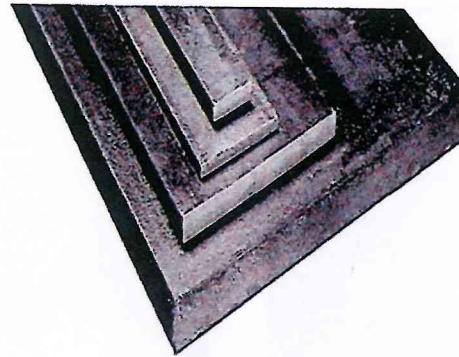
General

Structural steel is a generic term for manufactured, shaped steel and includes beams, flats, rails, channels, angles, rounds, half rounds, squares, profiles and others used in the construction and other industries. The cargo is generally shipped in unprotected bundles secured by lengths of steel band or thin wire rods wrapped around the bundles at intervals. These bands or wire rods hold

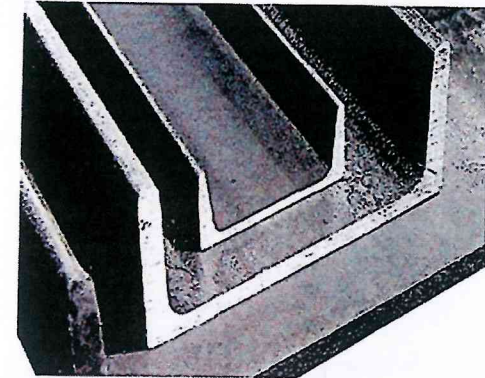
no strength and must not be used for lifting. The number of units per bundle will vary with their size and shape within the bundle. Bundles are typically 6 or 12 metres in length, although longer units of 18 metres may also be transported. The weight of a bundle will vary.



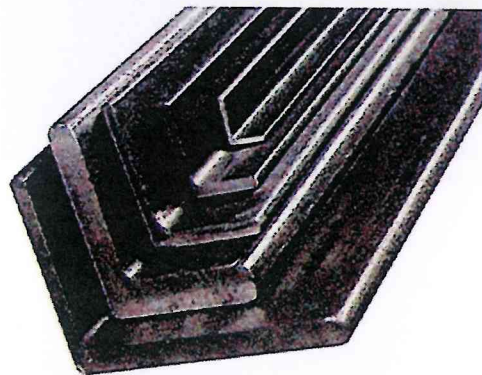
Beams



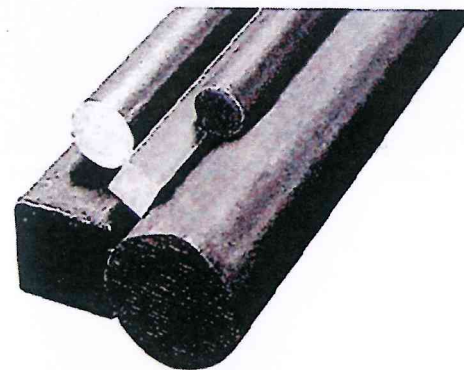
Flats



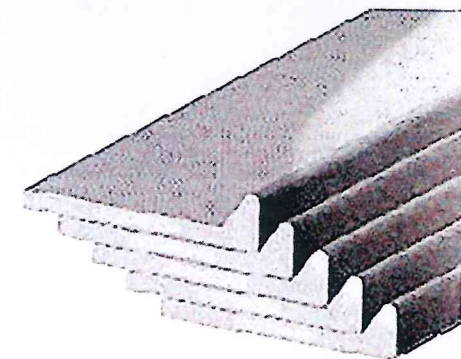
Channels



Angles



Rounds and squares



Bulbs


Structural Steel

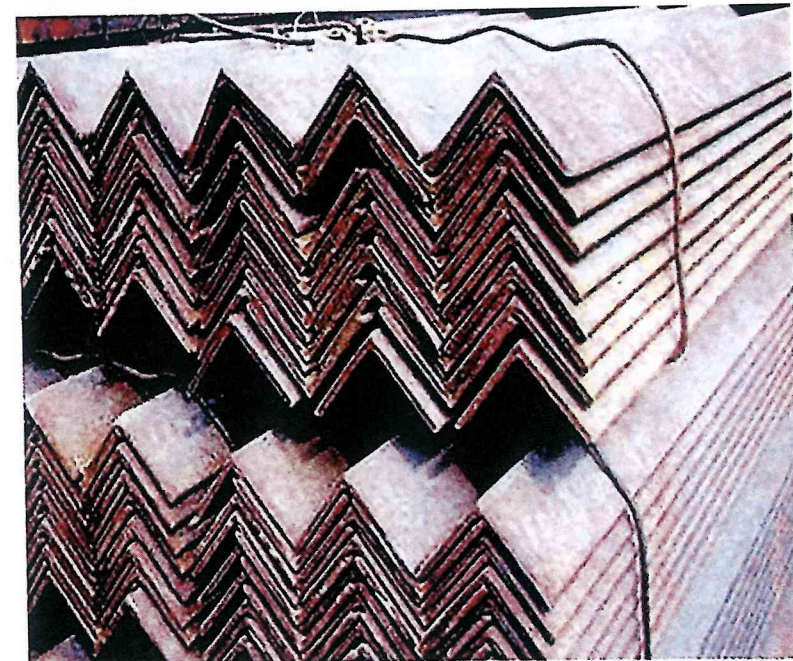
Bundling


Some units are bundled but others are not. Usually, wire rod is used for bundling purposes. The wire rod should be of 6 mm size and should be double and spaced, depending on the length of the structural steel, at intervals of approximately 2 to 3 metres and at 0.5 metres from the ends. The two ends

of the wire bands should be securely twisted at least three times to provide strength for tipping of the bundles. Proper and effective bundling helps with tip-lifting and maintains tight bundles of rebar when handled with slings and forklift trucks.



 Units in open storage prior to shipment, showing signs of corrosion



 Wire strapping along the length of the bundles is not designed for lifting

Structural Steel

Dunnage

Steel cargoes tend to shift if not correctly dunnaged as there is very little friction between steel products laid directly on top of each other.

In accordance with industry best practice, robust, good, dry, bark-free, hardwood dunnage should be used throughout as soft wood dunnage is too easily crushed or damaged.

Timber dunnage should be laid athwartships on the tank-top prior to loading, spaced at intervals of not more than 3 metres. Dunnage should also be placed on hoppers and against bulkheads, as well as between this cargo and any adjacent cargo to assist with slinging during discharging. The first and last dunnage rows should be placed approximately 1 metre from the end of the units to allow for slings to be passed underneath.

Tank-top dunnage should be at least 75 mm x 75 mm of hardwood. Structural steel should be stowed in level tiers, with dunnage between each tier. Robust hardwood dunnage of size 60 mm x 60 mm should be used between the first six tiers. For the subsequent tiers, soft wood dunnage of the same size may be considered instead. The dunnage between tiers should be aligned vertically.

Any nylon belts used for pre-slinging should be clearly and permanently labelled with the SWL of the sling.



Good example of a reasonable stow, with dunnage provided on every tier

provide
slings with
slings and



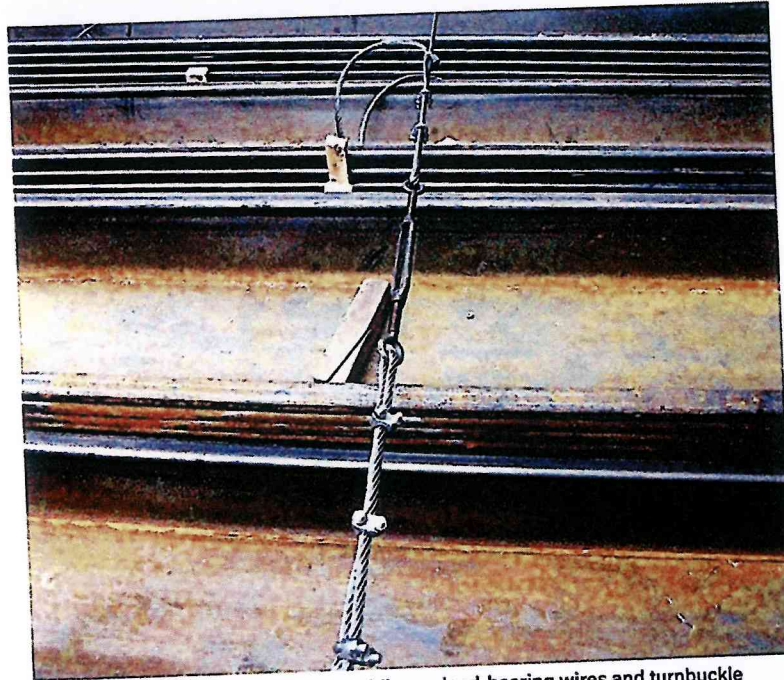
lifting

Steel Cargoes

Structural Steel

Lashings

When the cargo is stowed in the fore-and-aft direction across the full width of the cargo hold, the stow is prevented from shifting by the friction resistance of the timber dunnage and the confines of the cargo space. Wire lashings are used to secure the stow in a single block and prevent the initial movement of the bundles, particularly if the stow is not across the full width of the hold. All lashings should be tight and well made. The Master should be supplied with certificates for all of the lashing equipment used.



✓ Good example of grips with saddles on load-bearing wires and turnbuckle correctly positioned

An appropriate number of lashing wires should be laid in an athwartships direction on the tank-top in preparation for being passed back over the stow to secure the cargo in one block. There are no specific requirements for the minimum number of wires or chains to be used, although a minimum of 2 per 6 metre length or 3 per 12 metre length of bundle would be considered reasonable. The upper tier or tiers should be properly secured by the use of dunnage and wedges prior to lashing.



✓ Structural steel reasonably lashed across the cargo hold width

Structural Steel

Stowage

The cargo units are normally handled with the use of chains or wire slings.

Steel is a heavy cargo and the cargo hold tank-top loading limits must be considered when loading. The maximum height of the stow will depend on the allowable load limit determined by the shipyard and confirmed by the Classification Society when the ship was built and it should be remembered that this limit was calculated when it was new. For older ships, with normal wear and tear on the tank-top plating and associated under-deck stiffening, it is prudent to allow a safety margin.

It is normal practice to stow bundles of structural steel aligned in a fore-and-aft direction, across the full width of the cargo hold, although it may occasionally be partially stowed in the hatch square where different cargo has been loaded under the coamings. The stow should form a solid block within the cargo space.

It is not uncommon for alternate layers of structural steel to be stowed athwartships, but care should be taken to ensure that the cross layer is of identical size and type and that there is no steel-to-steel contact with the ship's structures. The ends of athwartship units should not be in direct contact with the ship's shell plating or bulkheads.

It is important to stow the ends of the bundles in a neat line as overhanging bundles can cause difficulties when discharging adjacent cargoes stowed in the same hold.

For two horizontally separated stows, the clearance between the stows, where possible, should not be less than 1 metre.



✓ A good, even stow of structural steel bundles with dunnage between the tiers to assist the discharge operation

Structural Steel

Ports typically use 2 chain mesh slings, each of 10 tonne SWL with a 'choke hitch'. In this manner, they can handle 6 or 7 bundles per lift, of a maximum cumulative weight of approximately 14 tonnes.

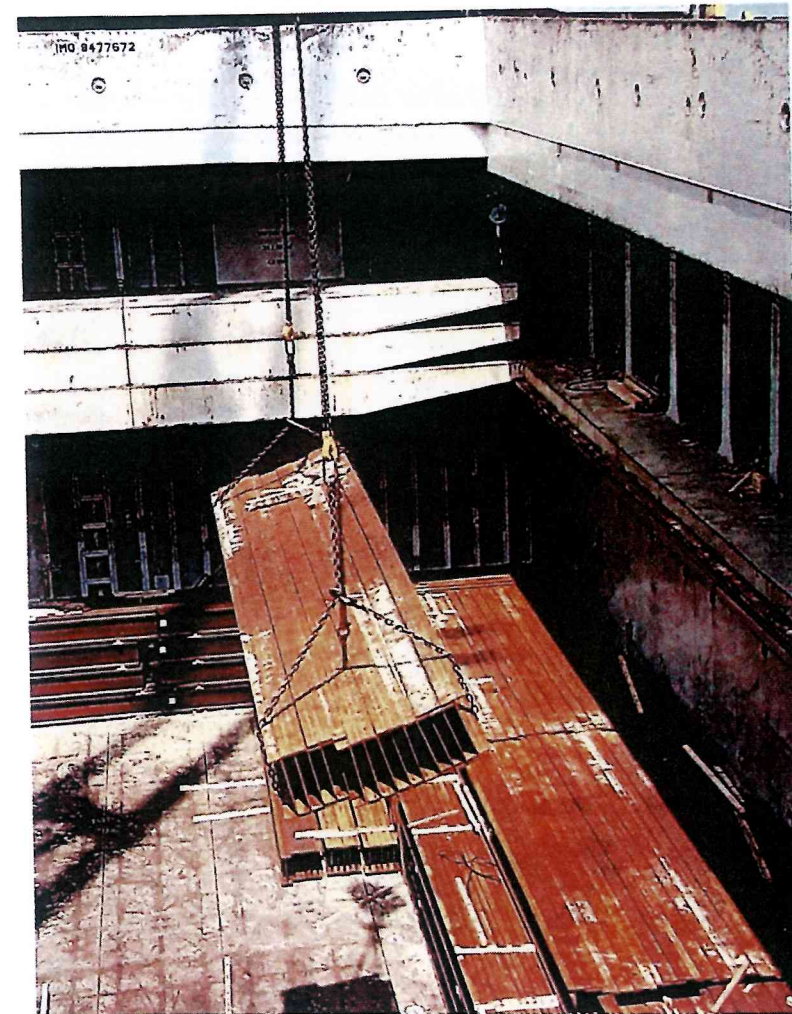
If the bundles are tightly packed, there are no slings pre-fitted and there is no timber dunnage separating the tiers. Smaller chains are used to tip lift the bundles sufficient to rig the lifting chains. This takes time and ultimately delays the discharge operation.

Braided slings are used for handling sheet piling as the edges are susceptible to damage.

Beam clamps and 'C' hooks are also used for discharging of single units of structural steel.



An application of the two-leg chain choke hitch around I-beams



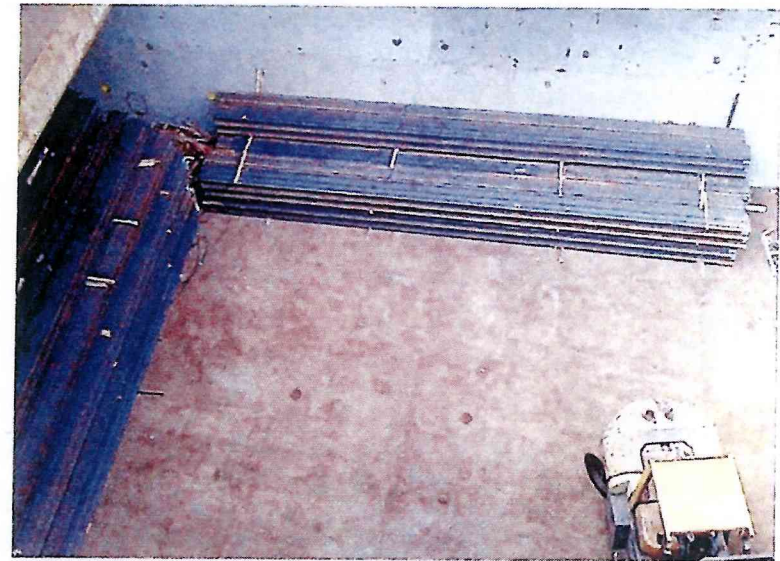
Choke hitch

Structural Steel

Under-Coaming Stowage

All cargoes are discharging by vertical lift only. To avoid personal injury and to minimise cargo damage, ports do not normally use the lifting gear to drag cargo from the under-coamings to the open hatch square. Forklift trucks are utilised to facilitate the discharging of such cargo.

This requires that the bundles stowed under the wings of a hopper-type cargo hold, or under the coamings of a box-type cargo hold, are stable and well dunnaged between each tier. If an athwartships stow is considered, the length of the units should be identical to the width of the cargo hold.



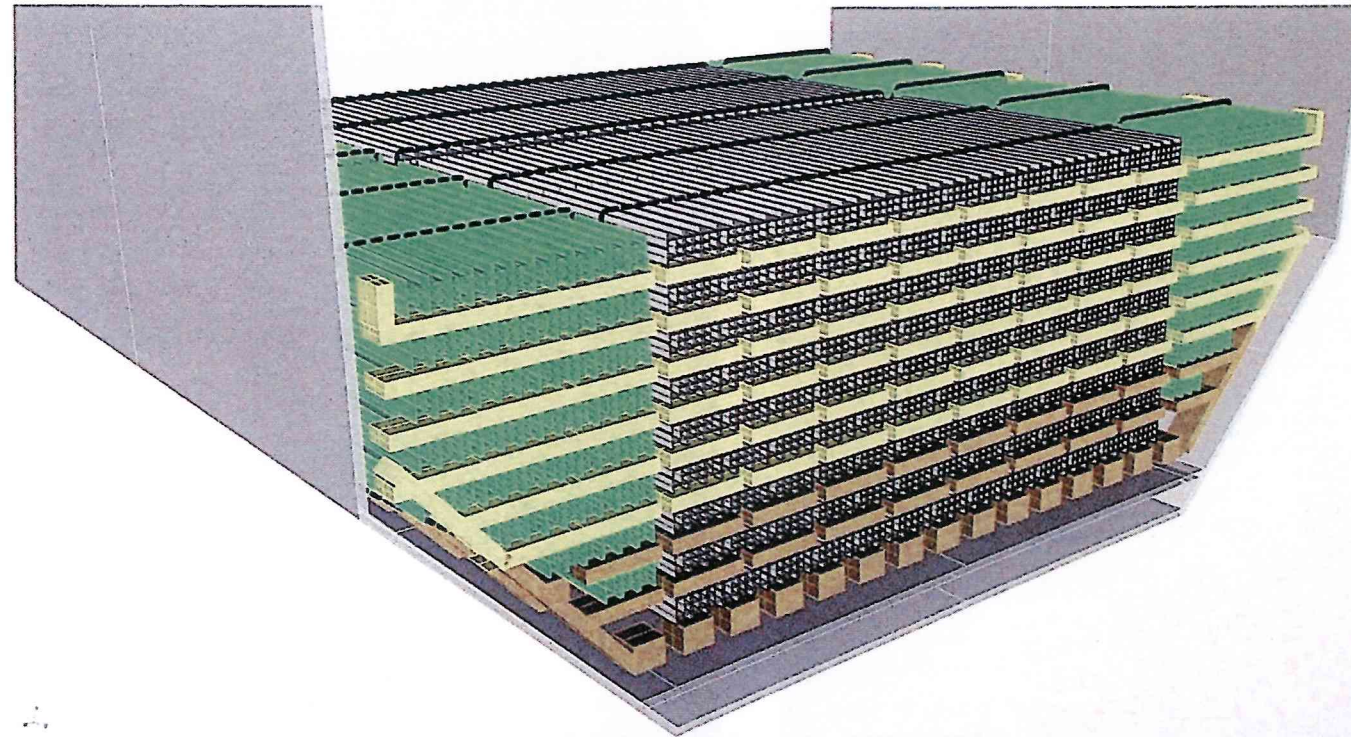
X Units stowed under the wings by a forklift truck, prior to loading in the hatch square. Dunnage and lashing wires should have been pre-laid on the tank-top, with additional dunnage between the subsequent tiers



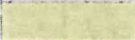

Structural Steel

Schematics for Correct Stowage, Lashing and Dunnaging

All schematics are indicative.

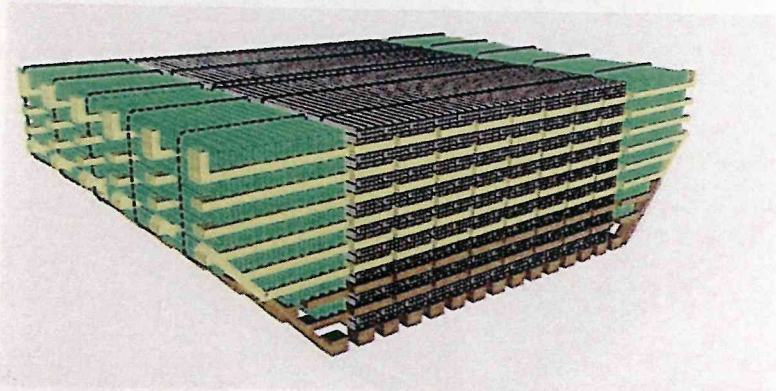
For structural steel units, the under-coaming cargo is lashed separately.



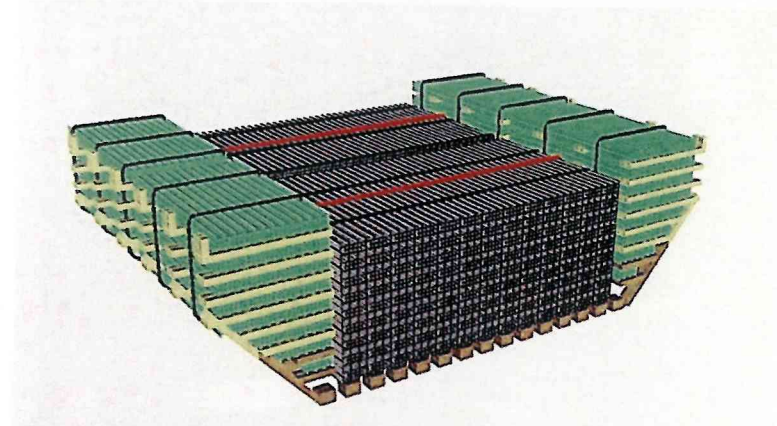
	Under-coaming stow
	Open hatch stow
	Soft wood dunnage
	Hardwood dunnage

Structural Steel

Schematics of the dunnage and lashing to be used for a stow of structural steel.

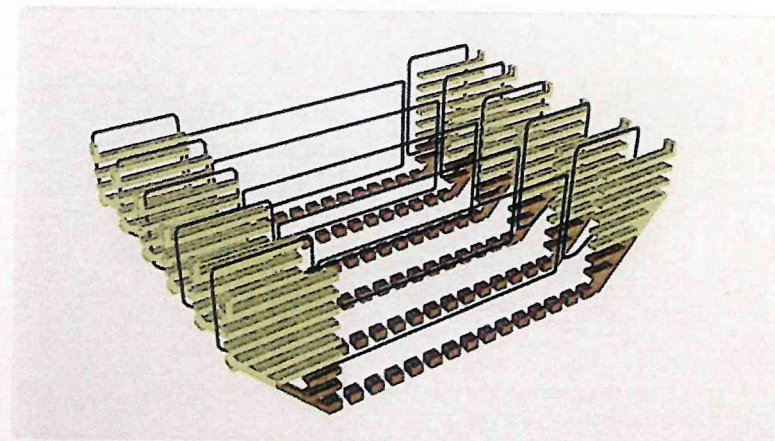


The under-coaming stow is lashed separately to prevent collapse of the stow during discharging



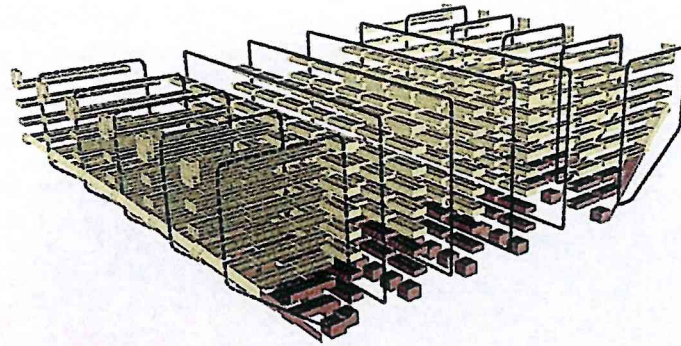
The pre-slung stow (shown in red) under the open hatch is lashed separately. It does not require dunnage except for the first tier to avoid contact with the tank-top

	Under-coaming stow
	Open hatch stow
	Soft wood dunnage
	Hardwood dunnage

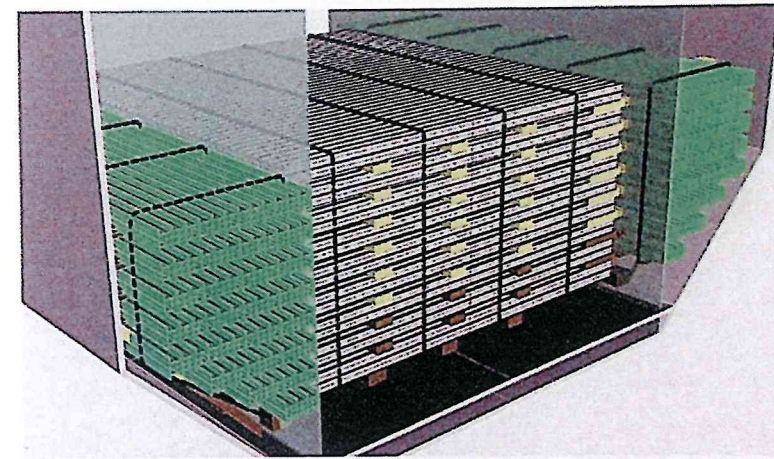


Dunnage and lashing schematic for a longitudinal stow of structural steel. If the stow under the open hatch is pre-slung, dunnage need not be used for this part of the stow

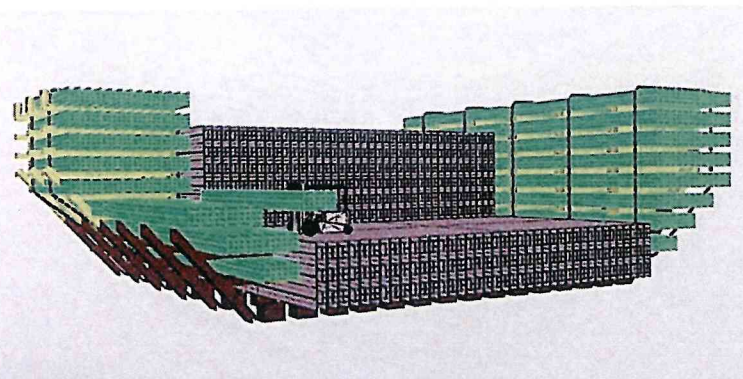
Structural Steel



Dunnage and lashing schematic for an athwartships stow of structural steel under the open hatch area



The stow under the open hatch may need to be loaded/discharged together with the under-coaming stows. Steel plates should be used for the forklift truck for manoeuvring. The under-coaming stow lashing is independent to prevent collapse of the stow




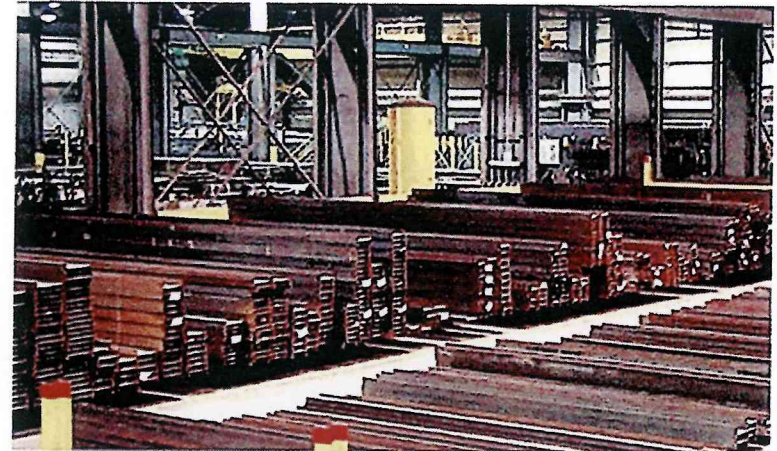
The stow under the open hatch area is stowed in an athwartships direction. Dunnage and lashing are used for all stows


	Under-coaming stow
	Open hatch stow
	Soft wood dunnage
	Hardwood dunnage

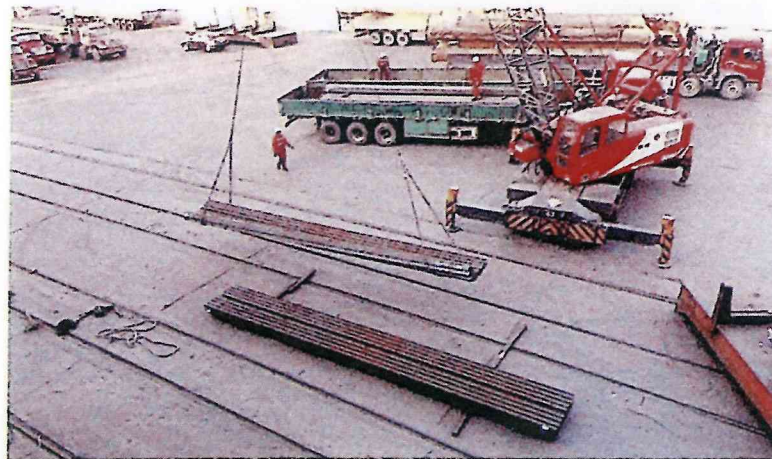
Structural Steel




 Units are often left in open yard storage where they may become wetted, with subsequent corrosion. Many receivers will not accept extensively corroded units




 Units stored inside a warehouse, protected from the elements. The stow is raised above any possible standing water



 Bundled units about to be loaded

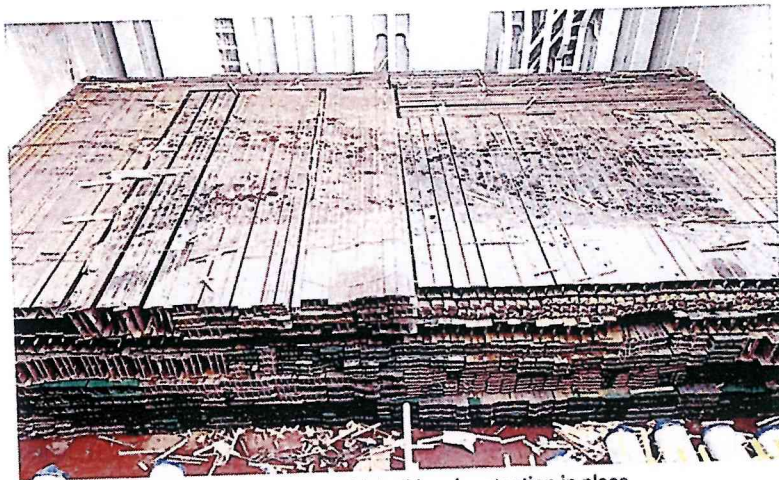


 The tank-top is prepared prior to loading, having been cleared of debris. Dunnage and lashing wires have been pre-laid

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of Steel Cargoes

Structural Steel



✓ Compact stow, well levelled with bulkhead protection in place



✓ Well dunnaged and levelled stow with appropriate lashings in place



✗ Reasonably levelled stow, but insufficient steel plates in place, which may result in cargo damage



✗ 60 mm x 60 mm plywood dunnage being laid between layers of structural steel. The dunnage should be of hardwood for the first six tiers

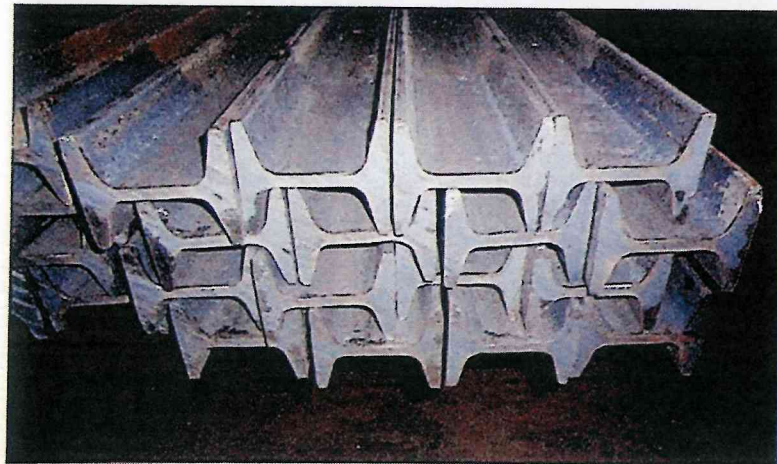
Structural Steel



X The dunnage on the bulkheads should be placed prior to positioning of the structural steel to prevent damage to the coating and the bulkhead



X Missing dunnage on the side bulkhead of the stow



X The longer structural steel units should be stowed under the shorter units



✓ Lashings being tensioned on the completed stow



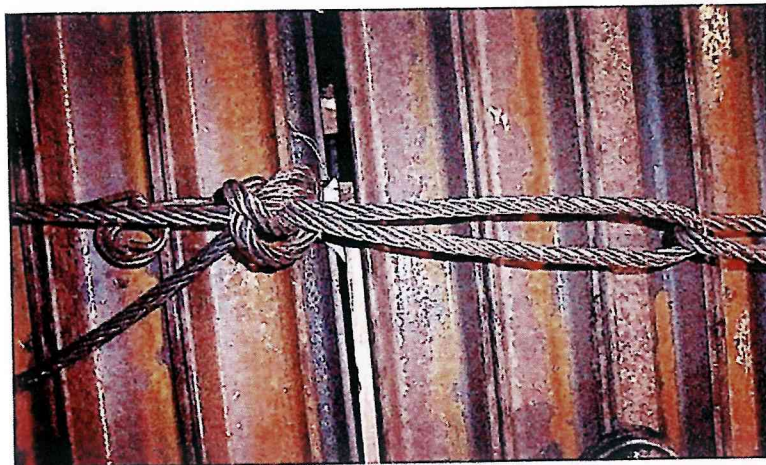
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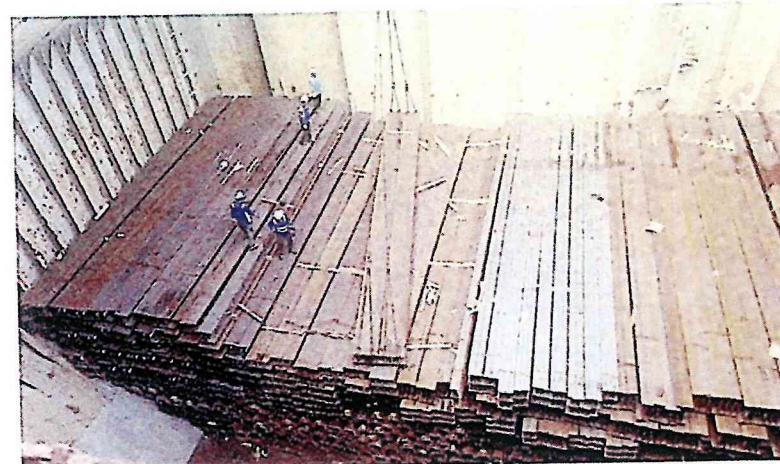
Structural steel.

Steel Cargoes

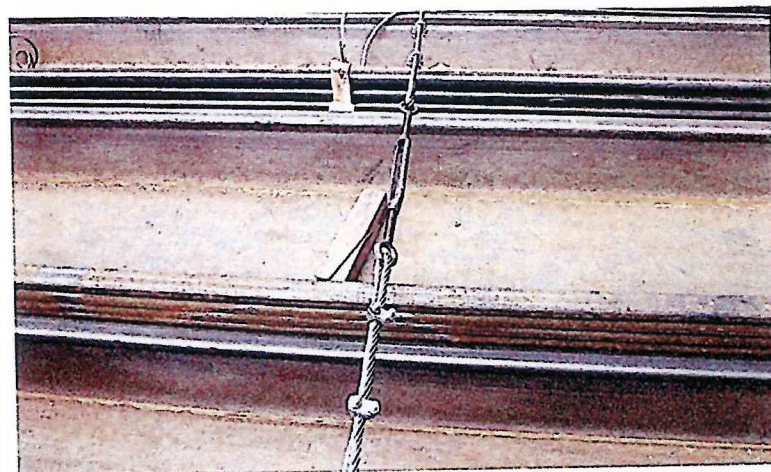
Structural Steel



✘ Incorrect method of lashing without usage of grips



✔ Tiers of various structural steel evenly layered and correctly stowed to form a block stow in a hopper-type cargo hold. Dunnage well placed between tiers

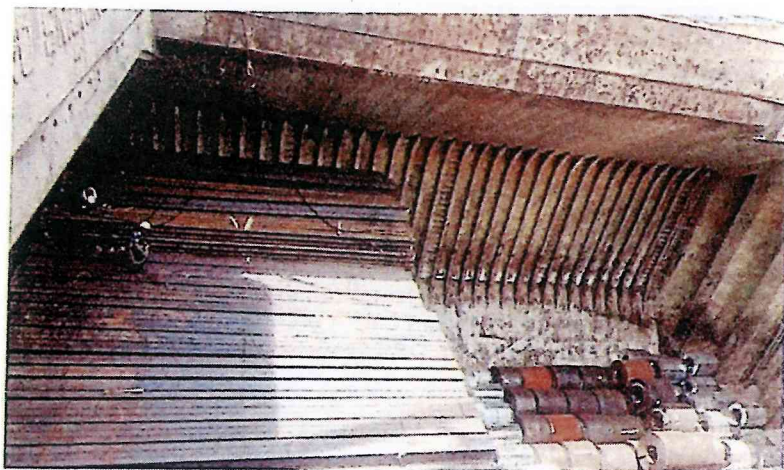


✘ As a minimum, three wire clips should always be used at each wire end



✔ Units with well-positioned dunnage ease the discharge operation and allow for easy slinging and handling of the bundles

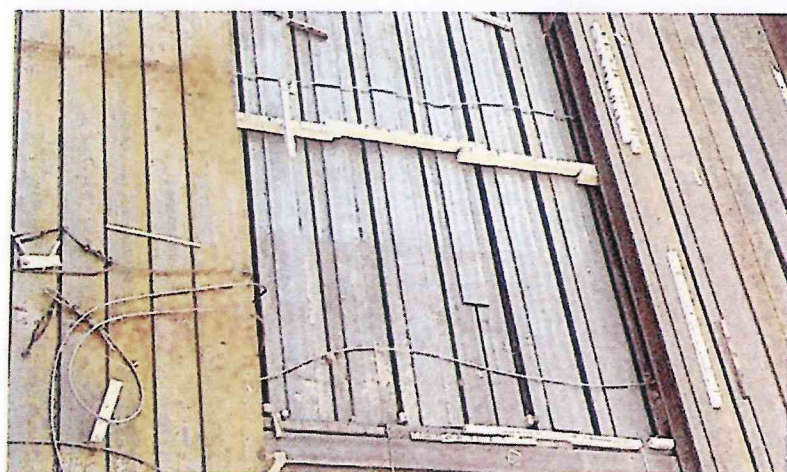
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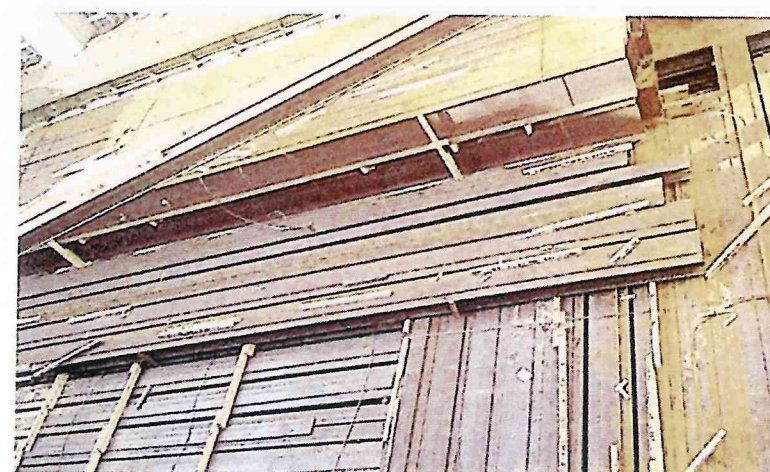
✓ Good stow with appropriate dunnaging in place



✓ Good level stows with vertical dunnage wedges




✓ Good use of dunnage. Stows in longitudinal and athwartships directions. However, the lower stow is covered with longitudinally-oriented beams




✓ Good stows in longitudinal and athwartships directions. The lower stow is covered with longer longitudinally-oriented beams

Structural Steel




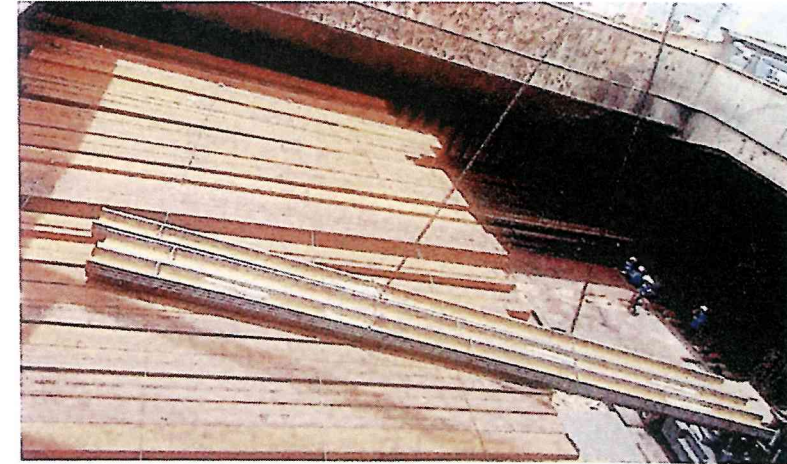
 An athwartships stow of beams. The length is identical to the width of the hold. No dunnage is used for the bulkheads. This may cause damage to ship and cargo




 Under-coaming stow in an athwartships direction



 Well-secured and dunnaged upper tier of structural steel products

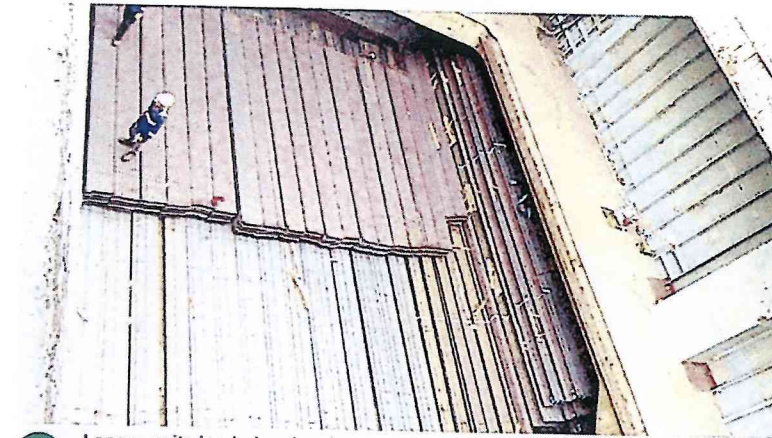


 Use of choke hitch method for discharging

Structural Steel



✘ If insufficient space is left between adjacent cargoes, discharge becomes very slow and damage to both cargoes is likely, particularly if the wire rod in coils under the coaming must be discharged first



✔ Longer units loaded under shorter units

Tip-lifting causes excessive operational delay.



✔ Tight block stow requires the first lift to be assisted by tip-lifting to pass the chain sling. It is recommended that the first bundle is pre-slung



✔ Where the bundles are strong and tight, the discharging can be carried out by the use of beam clamps placed at both ends of the units

Structural Steel

Using a forklift truck to position the bundles under the hook.



✓ Forklift trucks are used to assist with the wing access and slinging of the bundles



✓ The bundles are then manoeuvred into position for the stevedores to attach the slings



✓ Once discharged, the structural steel units can be handled by side-loading forklift truck. Such side-loading forklifts are used at Jurong Port



✓ Once discharged, the structural steel units can be handled by conventional forklift truck

Structural Steel

Notes

- Tank-top load limits are not to be exceeded. Consideration is to be given to the hopper areas, where the load limits may be smaller.
- The loading of structural steel is normally in the fore-and-aft direction. Sheet piling and some units allow for loading in an athwartships direction.
- The cargo units should not be in direct contact with the ship's shell plating, bulkheads or tank-top.
- The tank-top is to be prepared with appropriate dunnage to prevent steel-to-steel contact. Lashing wires are to be pre-positioned on the tank-top. Dunnage on the tank-top is to be robust hardwood with a minimum cross-section of 75 mm x 75 mm.
- The maximum distance between rows of timber dunnage is not to exceed 3 metres. The first and last rows of dunnage should be positioned approximately 1 metre from the ends of the cargo units.
- Dunnage between tiers is to be laid to assist with slinging. 60 mm x 60 mm dunnage may be used between the layers, with robust hardwood dunnage between the first six tiers and soft wood dunnage for the subsequent tiers.
- All tiers are to be stowed level. The face of the stow is to be as straight as possible, with sufficient clearance from the adjacent stow to prevent virtual over stows. Longer units are to be stowed under shorter units.
- When the stow is complete, a sufficient number of wire lashings are to be used for the securing of the whole block of cargo units.
- Where possible in the cargo compartments, safe access should be provided directly from the ladders to the top of the cargo stow. In bulk carriers, this access should be provided directly from the Australian ladders. Safe access should also be provided from the tank-top to the top of the cargo stow.

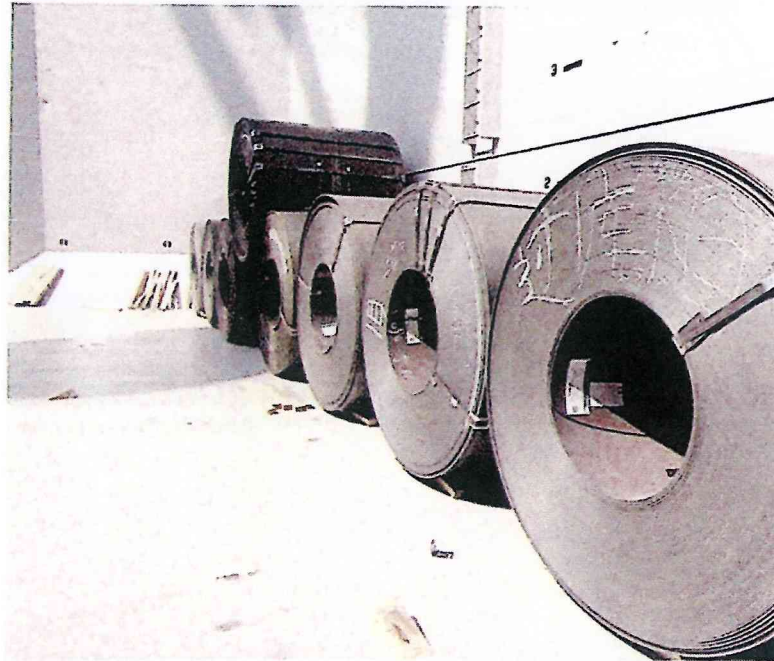
Hot and Cold Rolled Steel Coils

General

Coils are generally of two types - hot rolled coils (HRC) and cold rolled coils (CRC). HRC are unfinished products without packing, which will be further processed. CRC are finished products ready for direct use when uncoiled. CRC are shipped fully wrapped, packed and protected to avoid damage by handling and moisture ingress. Both types of coils are normally secured by metal strapping bands. The coils are secured by several straps (usually four for HRC and five or six for CRC), which are transversely passed through the core. In addition to the transverse straps, coils are also secured by not less than three

circumferential straps for both types of coils. These strapping bands are not designed for lifting and must not be used for this purpose. Coils presented for loading with broken, loose or missing metal straps should not be accepted.

Coils come in various sizes and grades. The weight varies but, generally, coils are more than 7 tonnes and may be up to 30 tonnes per unit. Coil sizes vary from between 1.5 metres and 2 metres in length with a maximum outside diameter of approximately 1.5 metres.



HRC with insufficient metal straps should not be accepted for loading



Packaged CRC discharged with braided sling

Hot and Cold Rolled Steel Coils

Dunnage

The lower tier of coils on the tank-top or 'tween deck should be stowed on bark-free dunnage (boards/timber planks). Similarly, timber dunnage should be used on hoppers, in way of side frames or vertical bulkheads. It must be remembered that the dunnage used for the loading of coils cannot distribute the load of a coil over the tank-top, although it may assist to some extent. To distribute the load over the tank-top, timber wooden beams must be used. The selection of such beams and their size should be in accordance with the cargo hold structural parameters of the individual ship and the beam location in the cargo hold. The typical size of timber beams for load distribution is between 100 mm x 100 mm up to 200 mm x 250 mm.

When using timber planks, and regardless of the number of tiers, a minimum of two lines per row of coils should be laid on the tank-top for coils of 7 to 15 tonnes in weight and a length of 1.5 metres. For single-tier coils of between 15 to 22 tonnes in weight and a length of 1.5 to 2 metres, three lines should be used. Where two tiers of coils are stowed, four wooden planks should be used. For heavier coils of up to 30 tonnes loaded in a single tier, four planks are to be used.

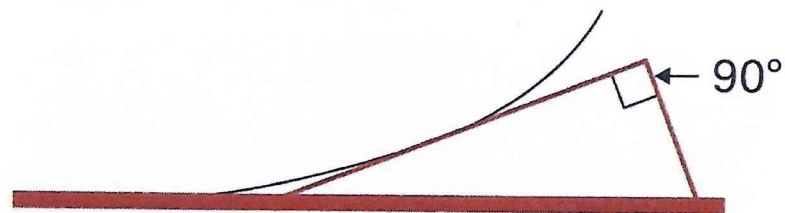
The cross-section of the planks should be 150 mm x 25 mm (6" x 1"). The length may vary, but it is usual for the wood to be approximately 1 to 1.5 metres in length. In any event, the length must cover the footprint of a coil on the tank-top and spread over at least two frames/longitudinals.



Dunnage boards and wood wedges prepared for the loading of steel coils

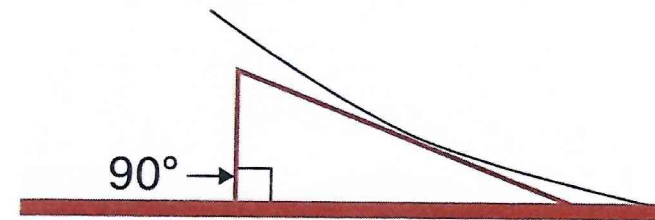
Hot and Cold Rolled Steel Coils

Each coil should be resting against an outboard adjacent coil. Dunnage wedges should be placed and nailed on the timber planks pointing to the ship's side to lock in the coils. The right angle of the wedge should be on the top, as indicated



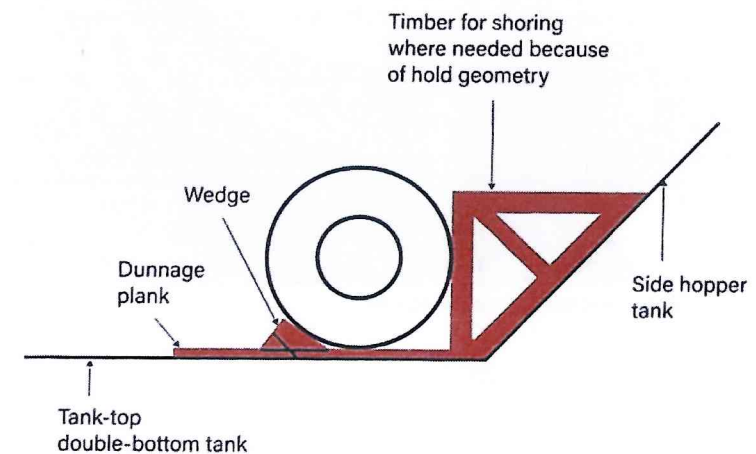
Correct use of the wedge with the right angle on top

in the schematics below. Where one coil from the first tier is locked with two second-tier coils on both sides, there should be wedges on both sides of the first-tier coil.



Incorrect use of the wedge with the right angle on the plank

If the coils rest against side frames, proper dunnage should be used, and care should be taken to ensure that the load on the coils is evenly spread along the length to avoid the coil deforming around the frames. This is particularly relevant on the lower tiers, where the weight from the upper tiers pushes the first-tier coils sideways. Timber shoring should be considered for cargo holds with different geometry.

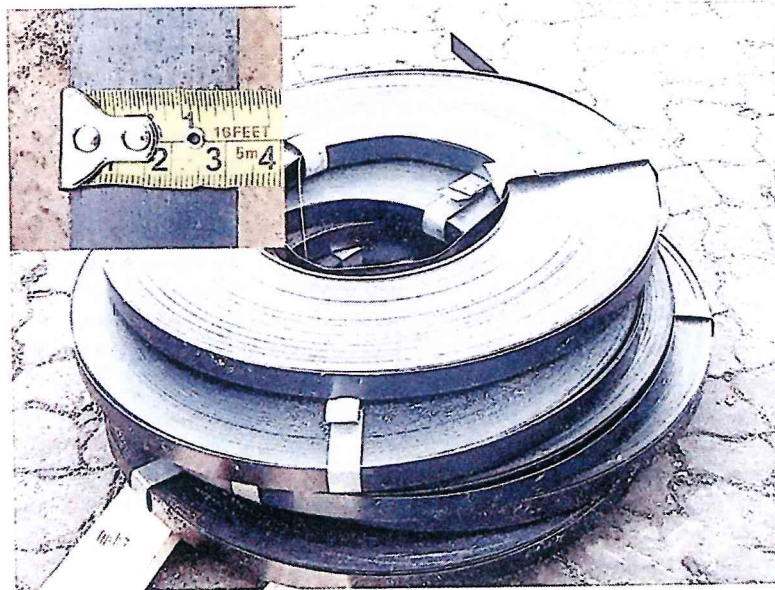


As a result of the geometry of the cargo compartments, dunnage for shoring should be used at the ship's hopper side

Hot and Cold Rolled Steel Coils

Lashings

The objective of lashing is to form one large immovable block of coils and this is usually carried out through the use of steel strapping bands of between 25 mm and 40 mm. The SWL of these strappings is usually approximately 4 tonnes.



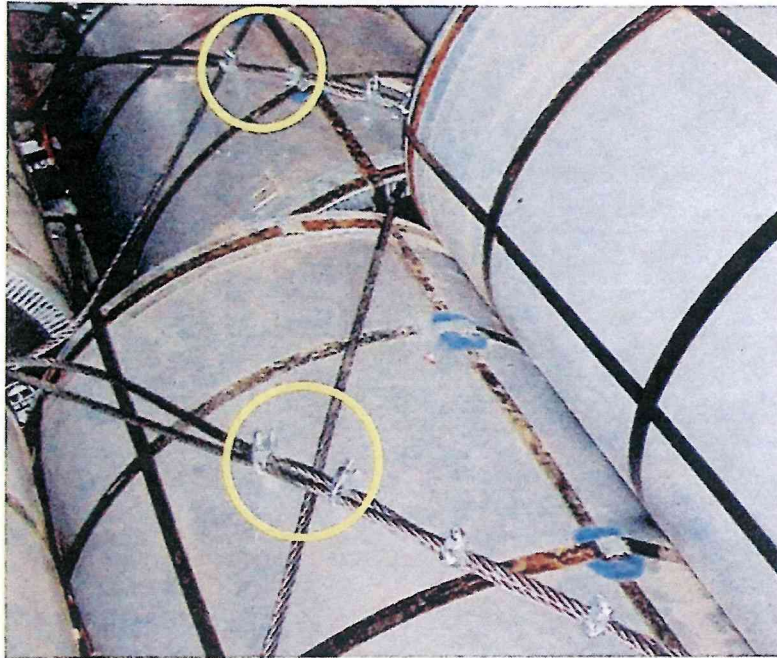
25 mm steel strapping bands for securing coils

Steel strapping bands should always be tightened with pneumatic tools by trained people and never by hand. Consideration should be given to doubling the strapping of coils that weigh above 15 tonnes.

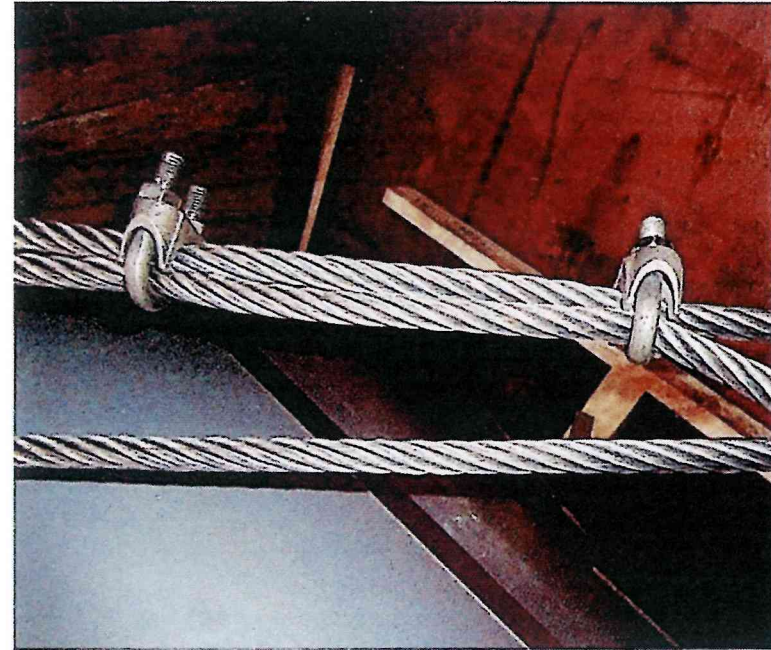


Tightening of steel strapping bands with a pneumatic tool. For coils of the size in the photograph, double metal straps should be used for lashing

Hot and Cold Rolled Steel Coils



✘ Incorrect use of bulldog grips. Saddle not positioned over load-bearing wire



✘ Incorrect way of connecting two wires and using bulldog grips. Insufficient number of grips used

Hot and Cold Rolled Steel Coils

Stowage

The ship's cargo securing manual (CSM) will generally provide sufficient details for loading, stowage, securing and dunnaging of steel sheeting in coils. Where this is not the case, instructions should be sought from the Classification Society to avoid structural failures and overloading of the cargo compartments' tank-tops.

Steel coils are generally heavy units and, unlike the other types of steel cargoes, produce concentrated point loading on the tank-top rather than a homogeneous load. The maximum allowable tank-top loading may easily be exceeded, resulting in structural damage. Steel coils are usually stowed with their axis in a fore-and-aft direction. An althwartships stow is not recommended. According to '*Thomas' Stowage*', coils should be stowed across the full width of the cargo hold and arranged so that they are tightly and compactly stowed. Coils may also be stowed with their axis in a vertical direction.

Compact, rigid blocks are vital to effect a good stow. With their low stowage factor, coils cannot be stowed on the 'tween deck but only on the tank-top in the cargo holds. The stowage should be uniform and compactly arranged to avoid breakdown of the stow and subsequent crushing and/or disintegration of coils.

Single-tier coils without a locking coil should be avoided if possible. It is recommended that, where the tank-top strength is not exceeded, a locking coil is always placed.



Compact stow of CRC in a hopper-type cargo hold

Hot and Cold Rolled Steel Coils

Coils should be handled with care to prevent scoring, scratching, localised sharp bends and/or damage to the packing of the CRC. Braided wire slings, nylon slings, clamps, tongs, 'C' hooks and magnets are normally used for this purpose. The handling of CRC with braided wire slings requires the use of spreaders. Nylon web slings may be used without spreaders.

When forklift trucks are used to handle the coils, these are normally equipped with flat blades, poles, clamps, tongs or 'C' hooks.

If the coils are of different sizes, the largest and heavier coils should be stowed in the first tier. Coils with failed or insufficient straps should not be loaded without this problem being rectified. Each first-tier coil should rest against either another coil or the adjacent bulkhead.

The maximum number of coil tiers depends on the weight of the coils. For coils with a weight of 15 tonnes and above, the maximum number of tiers is usually two. Where the coils are lighter, the stow can have more tiers, although the maximum is three. For coils of more than 25 tonnes, one-tier stowage only should be considered. In any event, the maximum uniform loading of the tank-top should never be exceeded.

Coils may not be stowed on top of other steel cargoes (plates, pipes, sections, H-beams, etc.). However, it is not usual to store other steel cargoes on top of coils, except for wire rod in coils (WRIC).

When the stow is not spread across the whole tank-top area but is loaded together with other cargoes, a stow of coils may be loaded in any part of the hold. When more than one tier of coils is to be loaded in the foremost holds of a bulk carrier, and where the cargo is not a full stow throughout the tank-top, the coils are to be stowed in the aft part of the hold to prevent collapse due to the ship's movement in adverse weather.



Nylon web sling

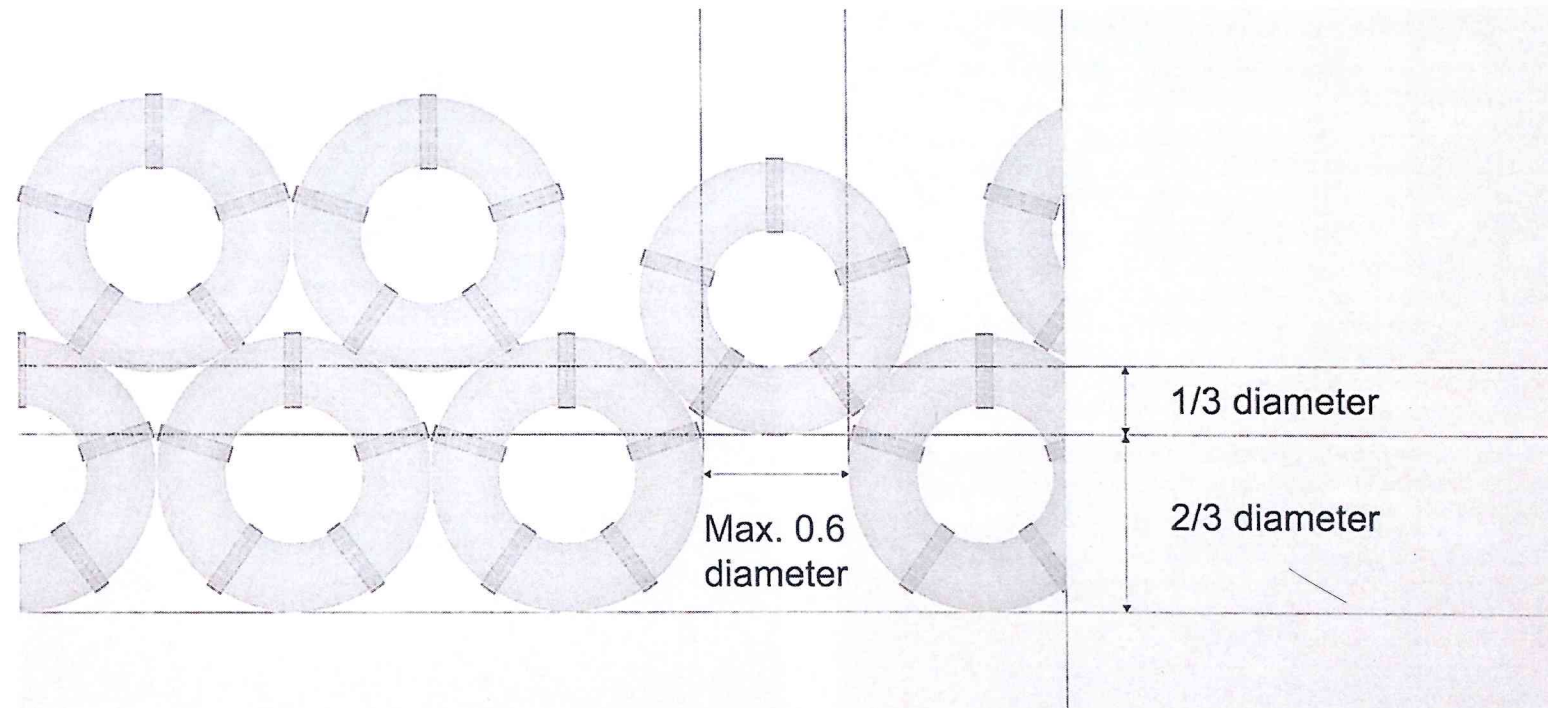


Braided wire slings

Hot and Cold Rolled Steel Coils

Where there is no space for use of a locking coil, chocking hardwood timber should be used or shoring between the two adjacent coils in the middle of the row. As a rule, the use of a locking coil should be considered when the space

between two adjacent first-tier coils is between 30% and 60% of the locking coil width. Another rule is the lower inner edge of the locking coil is to be within the outer and inner edges of the first-tier coils.



Hot and Cold Rolled Steel Coils

There should always be spacing of between 150 mm and 250 mm between two adjacent rows.



Under-Coaming Stowage

For homogeneous cargo loaded throughout the cargo hold in bulk carriers, coils stowed under the coamings cannot be directly lifted by using the vertical plumb of the crane's wire. These coils need to be pulled into the hatch square using

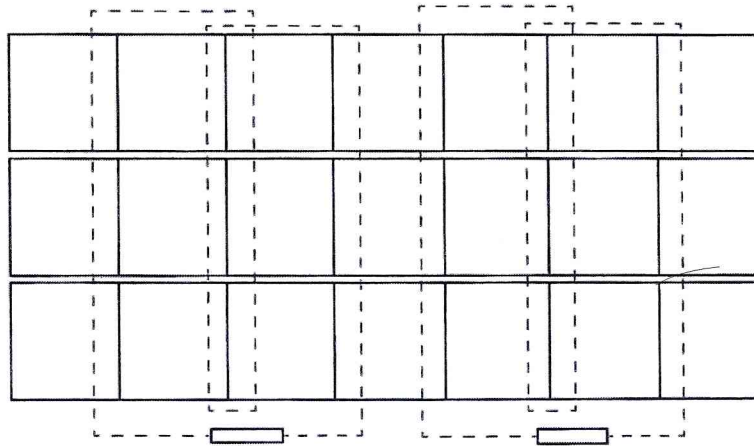
forklift trucks and manoeuvred onto the tank-top within the hatch square layer by layer. For coils stowed with the axis in a fore-and-aft direction in the hopper areas, there is no direct lift for the forklift trucks and the possibility of damaging the cargo is increased. In this situation, the forklift truck should use nylon web or braided wire slings to handle and reposition the coils.

Hot and Cold Rolled Steel Coils

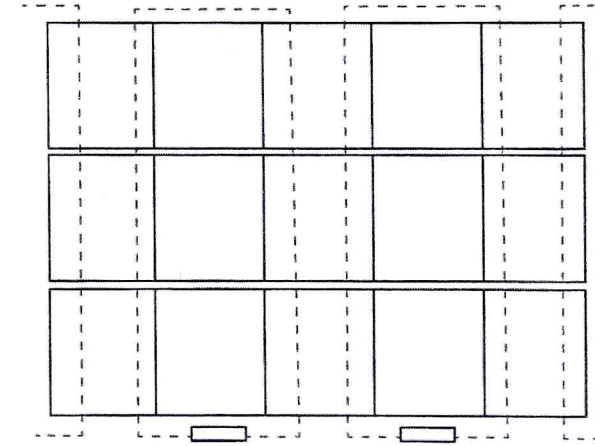
Suggested Stowage and Lashing of Coils

When the cargo does not form a full load in one hold, to prevent fore-and-aft shifting of the coils, the upper tier of coils should be lashed using one of the arrangements below.

Two and three coils from the second or third tiers in adjacent rows should also be lashed together to prevent the coils from shifting longitudinally.



Olympic method of lashing with wires or metal strap bands



Group method of lashing with wires or metal strap banding

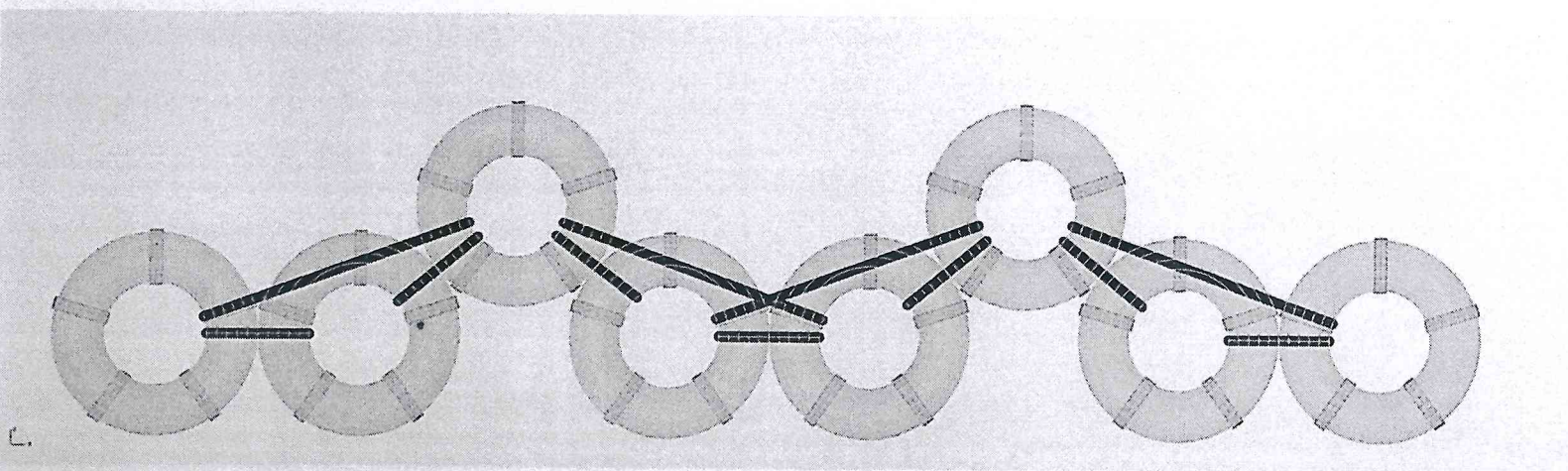
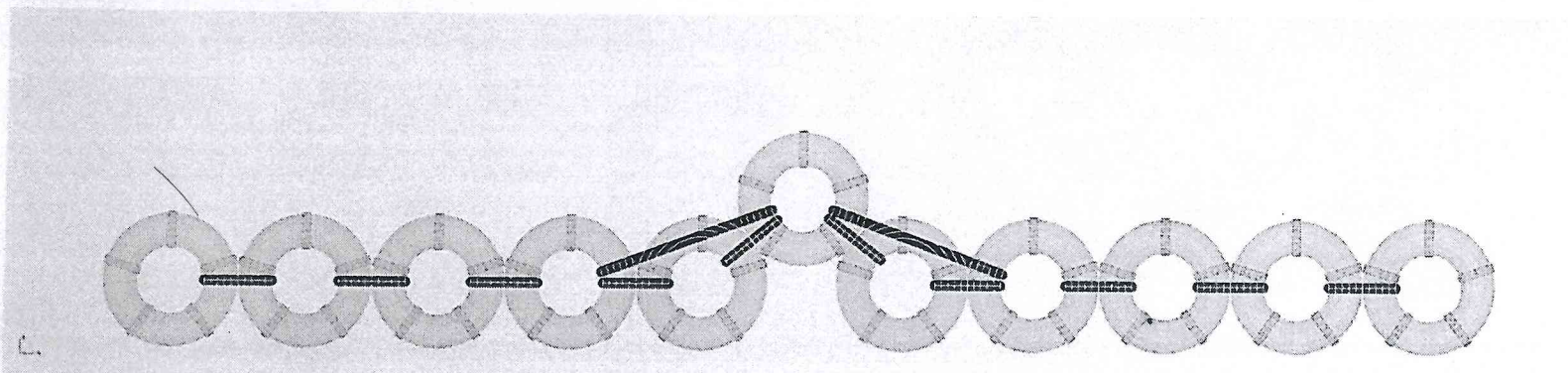
Wires with turnbuckles or rigging screws are used. Alternatively, metal strap banding with pneumatically tightened clamps are quite commonly used.

Hot and Cold Rolled Steel Coils

Stowage and Lashing of a Single Tier of Heavy Coils with One and Two Locking Coils

Medium heavy and heavy coils of 15 to 25 tonnes can be loaded in one or two tiers. Coils of more than 25 tonnes should be loaded in one tier only, with one or two locking coils or dunnage structure. Where the ship's cargo securing manual

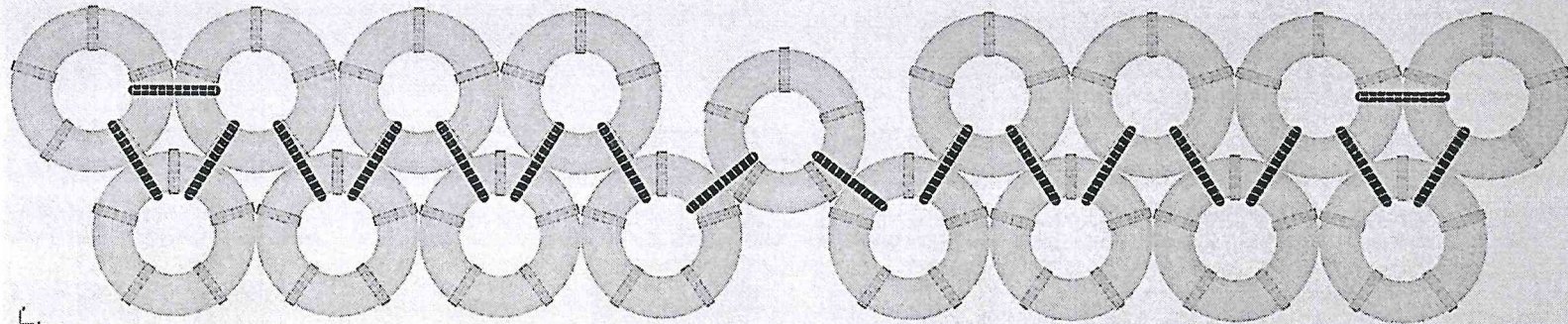
does not allow for a locking coil to be used, proper dunnage structures must be built.



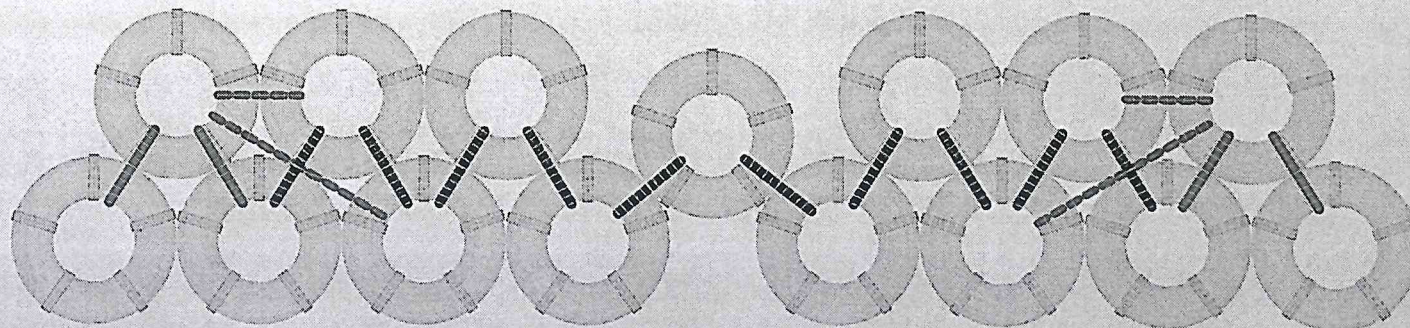
il strap
ed.

Hot and Cold Rolled Steel Coils

Stowage and lashing of two tiers of coils. Inverted pyramid stow in hopper-type cargo holds.

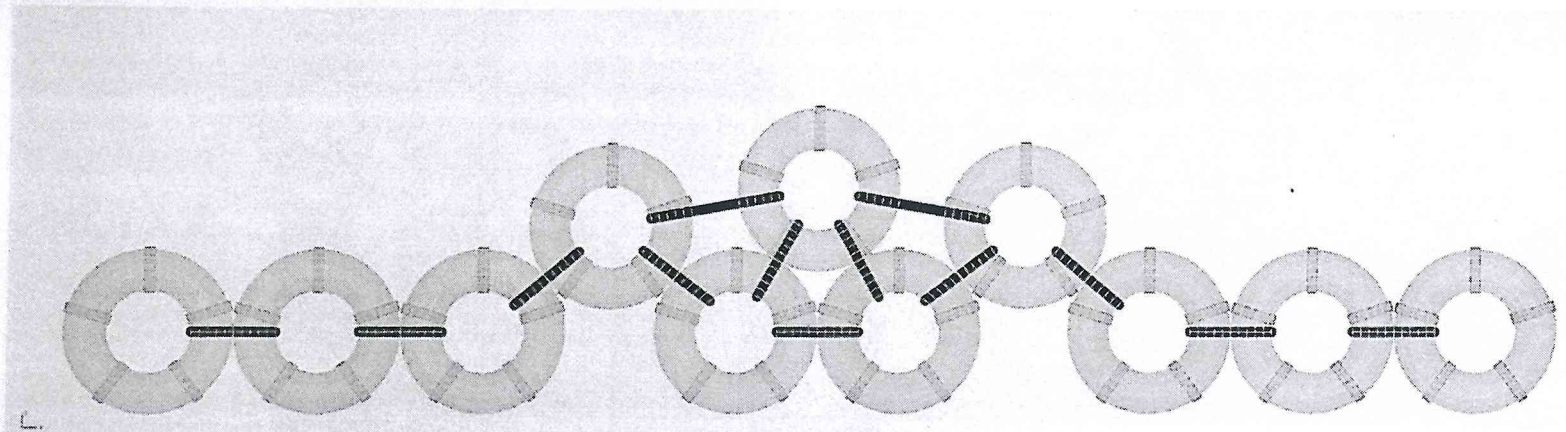


Pyramid stow in hopper-type cargo holds. The two end coils from the second tier should be secured to three adjacent coils from the first and second tier, or three coils from the first tier only. The red dotted line indicates that only one lashing is required and not both.

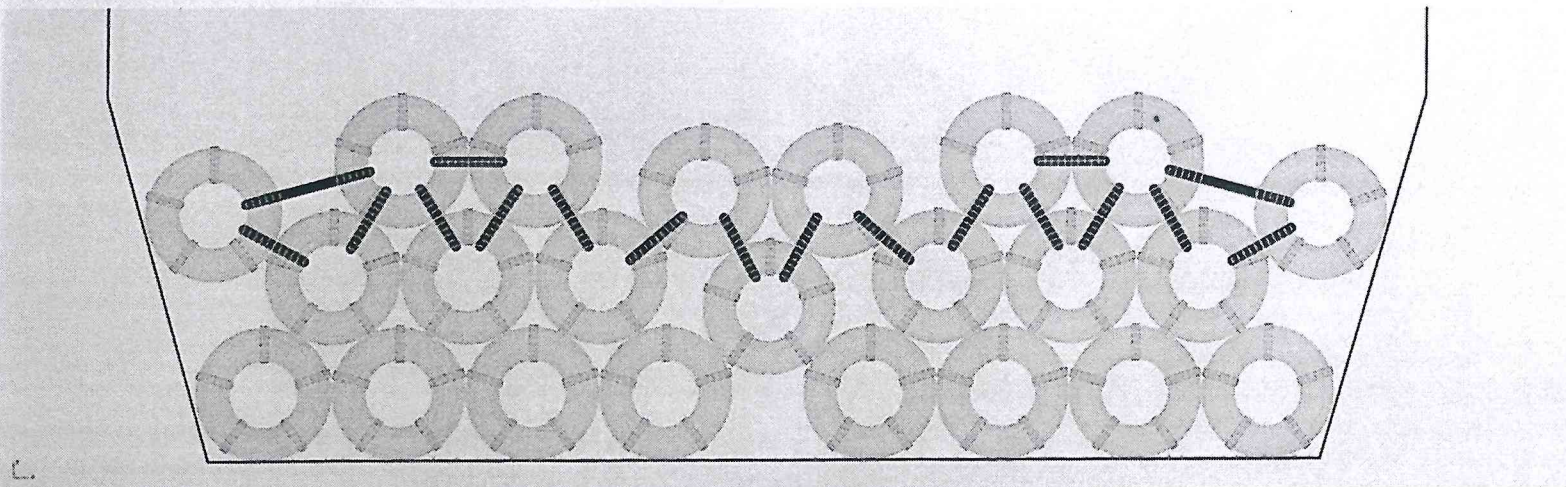


Hot and Cold Rolled Steel Coils

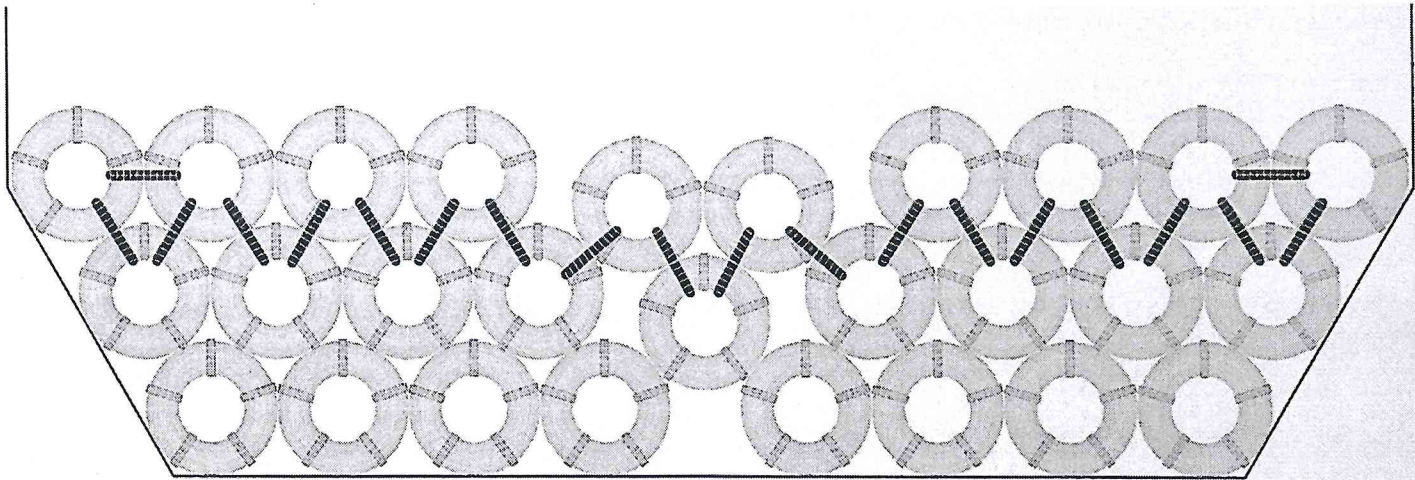
Stowage and lashing of an incomplete second tier of coils with two locking coils.



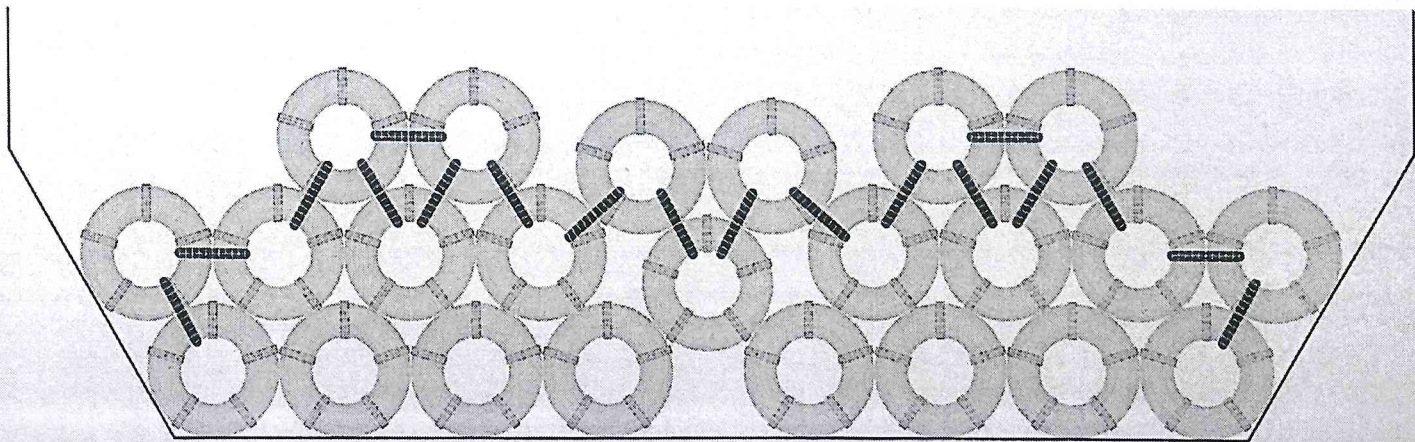
Stowage and lashing of three-tier coils. This loading pattern is to be applied for light and medium light coils of up to 15 tonnes of unit weight.



Hot and Cold Rolled Steel Coils



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Hot and Cold Rolled Steel Coils



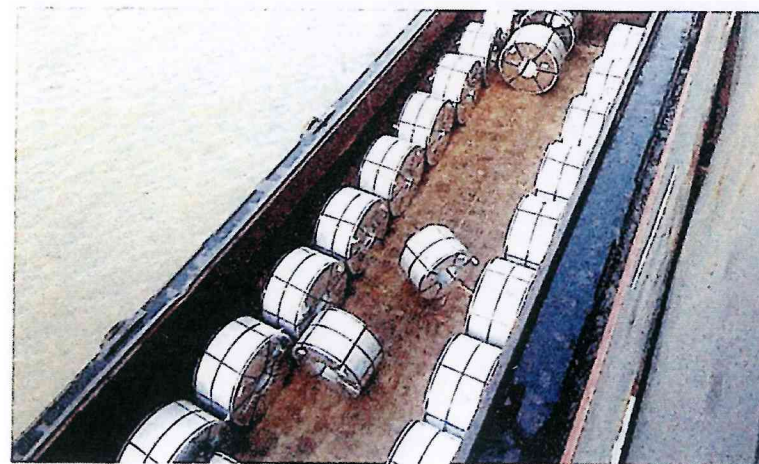
✓ CRC stored in a warehouse prior to loading



✓ HRC stored in a warehouse prior to loading

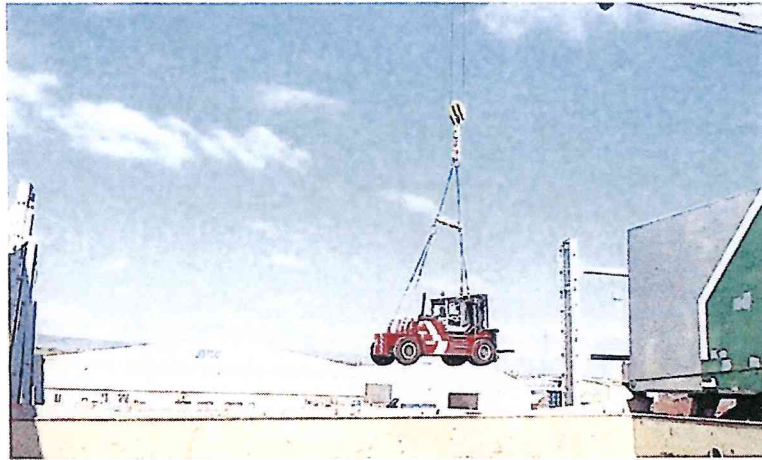


✓ CRC alongside ship prior to shipment



✗ CRC delivered by a barge - coils not chocked and lashed

Hot and Cold Rolled Steel Coils



✓ Lowering of a forklift truck into the cargo hold for stowing coils



✓ Use of a forklift truck equipped with a pole to handle coils under the coaming area



✓ Proper dunnage prepared for the loading of coils



✗ Incomplete dunnage laid for the loading of coils

Hot and Cold Rolled Steel Coils



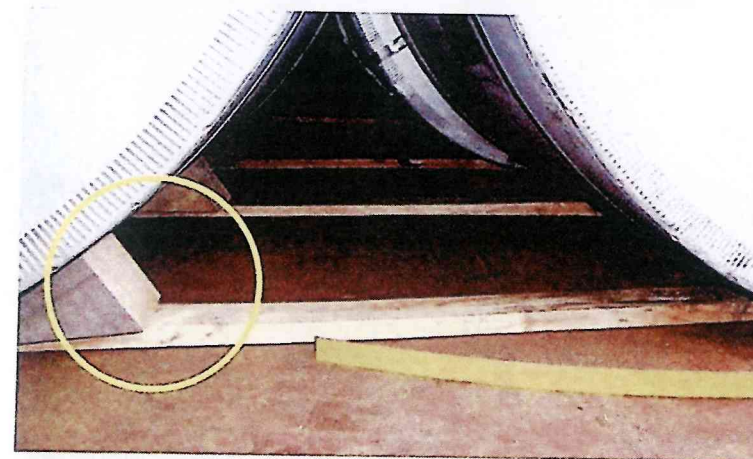
✘ First tier of coils. Correct place for the wooden wedge on the dunnage plank, but incorrect positioning with the right angle down. Dunnage too thin



✘ First tier of coils. Correct place for the wooden wedge on the dunnage plank, but incorrect positioning with the right angle down. Dunnage too thin

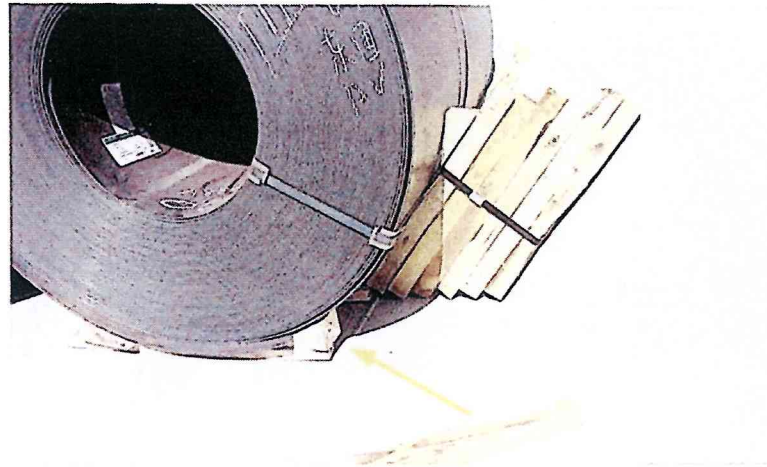


✘ First tier of coils. Incorrect place for the wooden wedge on the tank-top, but correct positioning with the right angle up

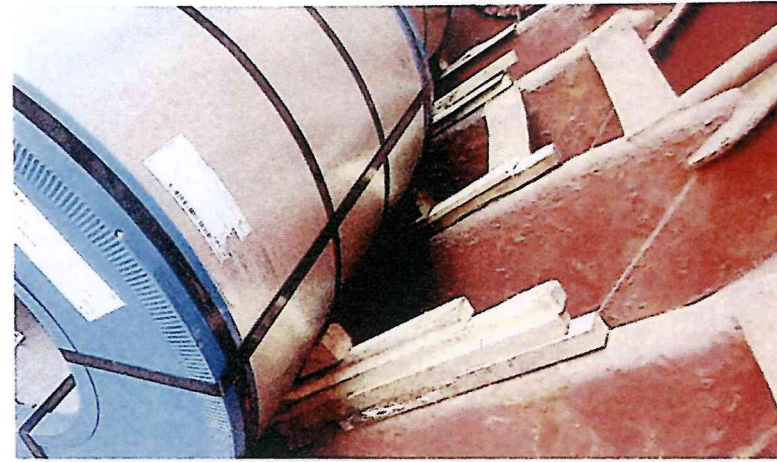


✔ First tier of coils. Correct place for the wooden wedge on the tank-top and correct positioning with the right angle up

Hot and Cold Rolled Steel Coils



❌ Dunnage used for shoring of HRC. The shoring structure should be as one block with the front and aft parts. Incorrect use of the bottom wedge



❌ Dunnage used for shoring of CRC. The shoring structure should be as one block with the front and aft parts. Incorrect use of the wooden wedges



❌ Insufficient securing of the dunnage for shoring in one block. Shifted dunnage during the passage

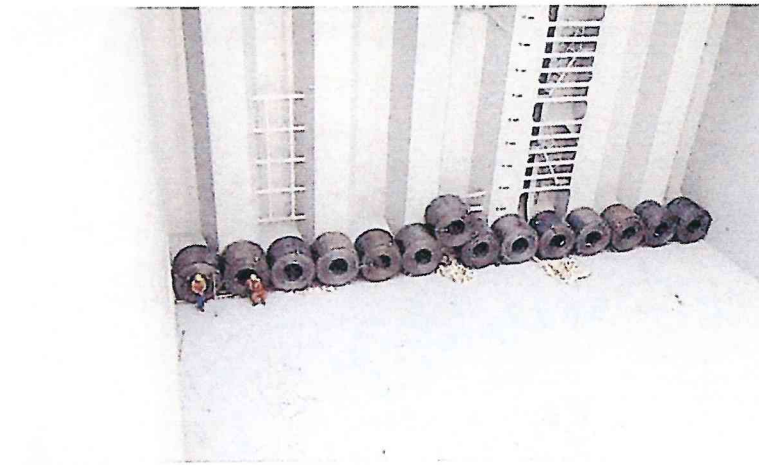


✅ Correct loading and pyramid stowage of CRC in fore-and-aft direction in hopper-type cargo hold with flaring of the coils

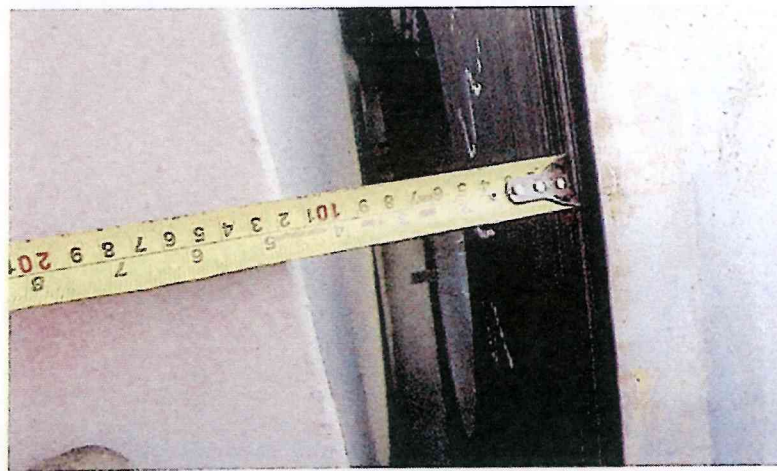
Hot and Cold Rolled Steel Coils



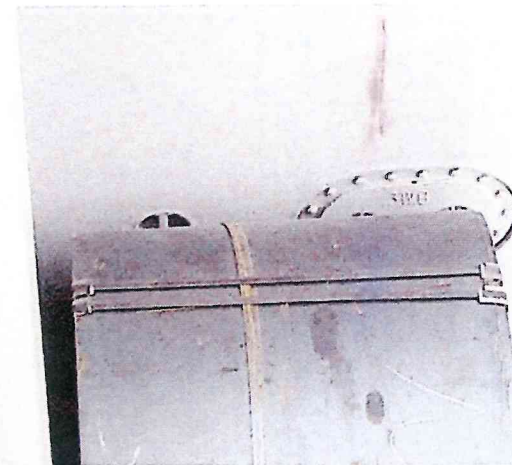
✓ First row of HRC loaded with a locking coil. The locking coil is not positioned in the middle of the row because of the access ladder



✓ One tier of HRC with a locking coil in the middle of the row

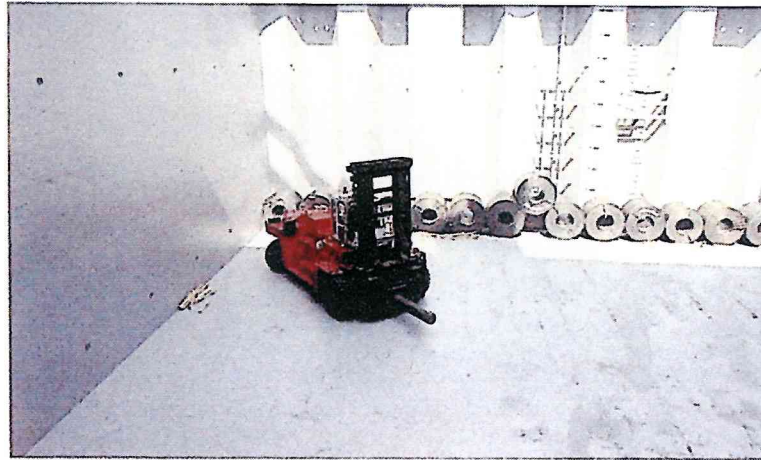


✗ The first tier of coils is loaded too close to the forward bulkhead without dunnage. It is good practice to use dunnage between the coils and fore-and-aft bulkheads



✗ Missing dunnage between the coil and the bulkhead

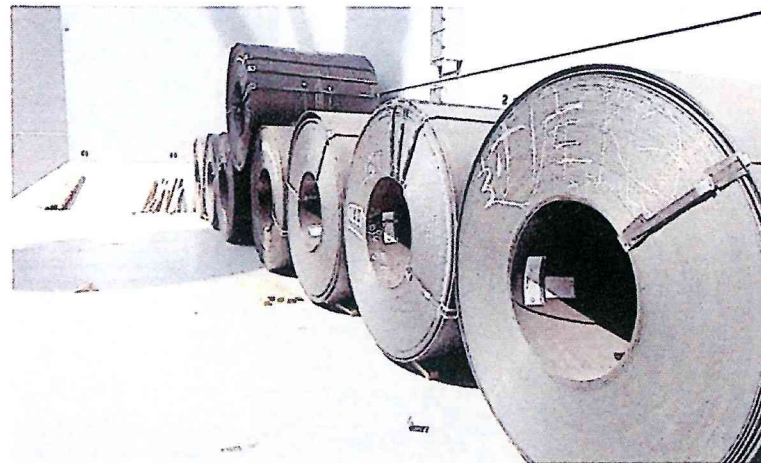
Hot and Cold Rolled Steel Coils



✓ Use of a forklift truck with a pole to stow the coils



✓ Homogeneous stow of HRC prior to lashing. Sufficient space between the rows allowing for the slings to be passed through the coils



✗ The HRC have irregular and insufficient transverse metal straps. Such coils should not be accepted for loading

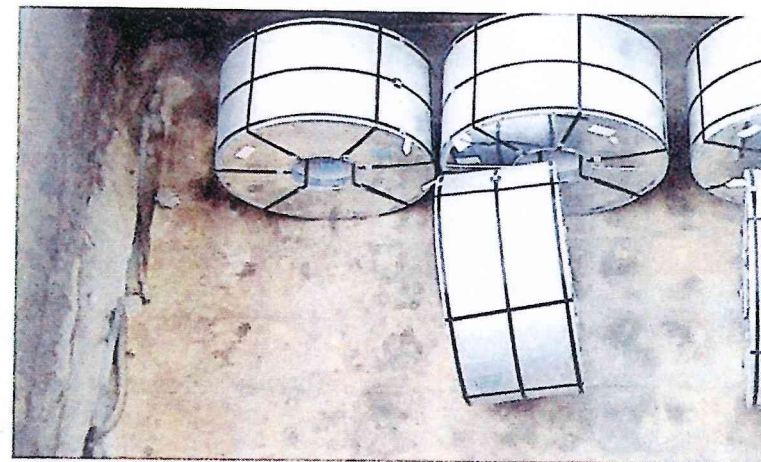


✓ Box-type cargo compartment. A single-tier stow of HRC without locking coils. The second tier is not complete

Hot and Cold Rolled Steel Coils



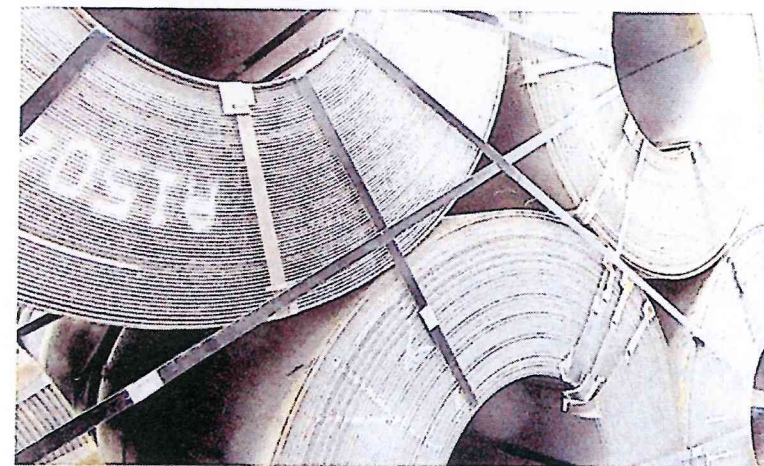
✘ Loading of HRC in a hopper-type cargo hold. HRC are generally heavy and three rows of dunnage are not sufficient



✘ Loading and stowing of CRC without the use of dunnage

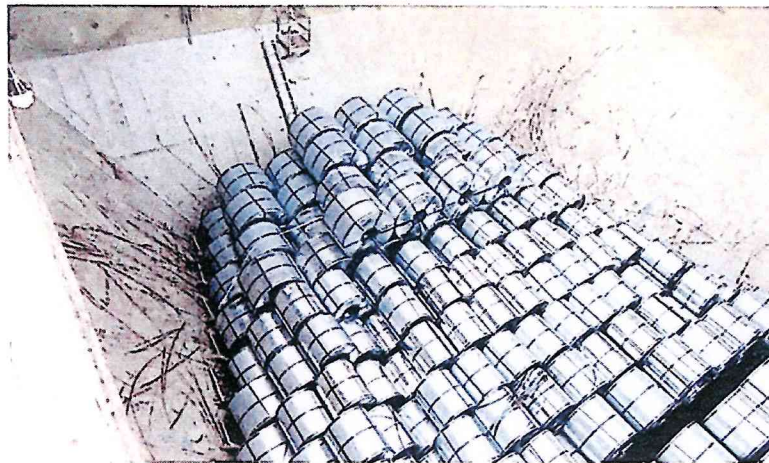


✘ Insufficient space for a locking coil. No chocking dunnage is used to prevent the coils from shifting



✔ Correct lashing of the second tier of heavy coils. The lashing straps are doubled by way of securing two second-tier adjacent coils. No chocking dunnage is used

Hot and Cold Rolled Steel Coils



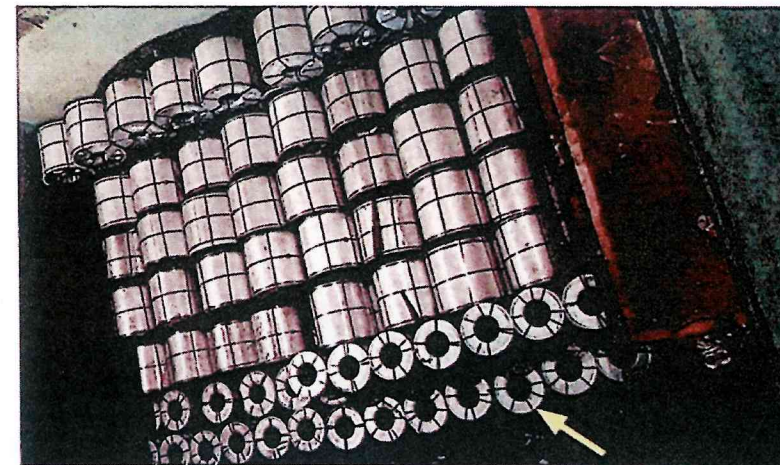
A good pyramid stow of CRC in the aftmost part of a hopper-type cargo hold



Pyramid stow of CRC with a third tier of coils with good lashing. The heavy coils are not on top of the lighter ones



Locking coils or chocking dunnage should be placed on the first-tier coils in the centre

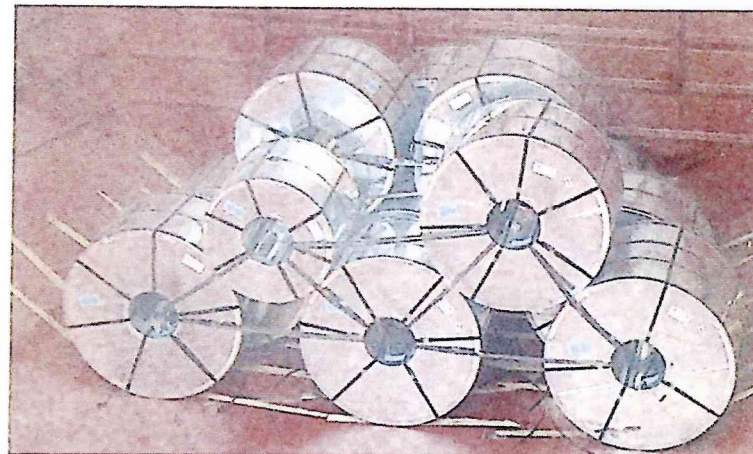


Eye to the sky stowage of coils has been discontinued as it requires extensive securing and dunnaging. However, such part-stowage can still be observed

Hot and Cold Rolled Steel Coils



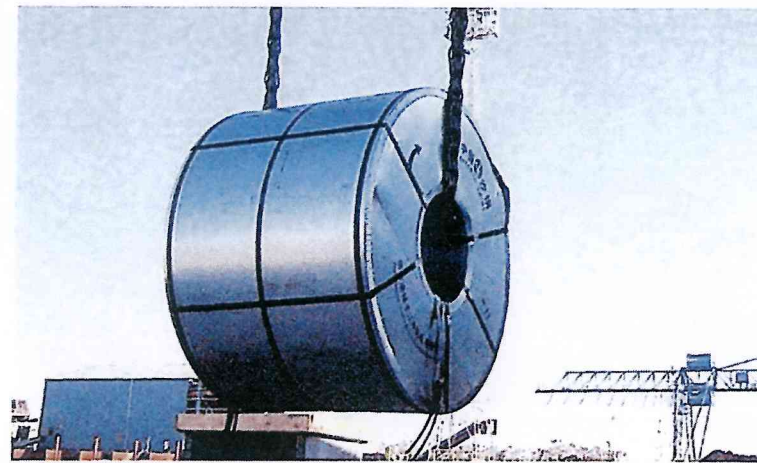
✓ Correct securing of the locking coils for homogeneous cargo stow in one hold



✗ Properly stowed coils with the lighter coils on top of the heavier coils. No use of wooden wedges and shoring dunnage on the hopper tanks

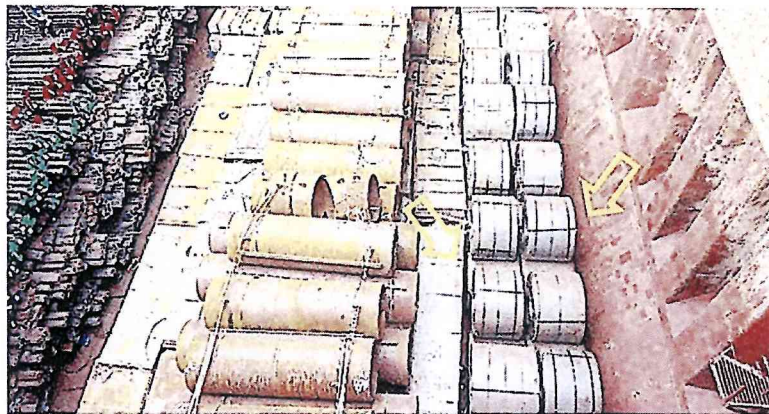


✓ Handling of HRC with long braided wire slings without a spreader, which is acceptable. This is not acceptable for CRC

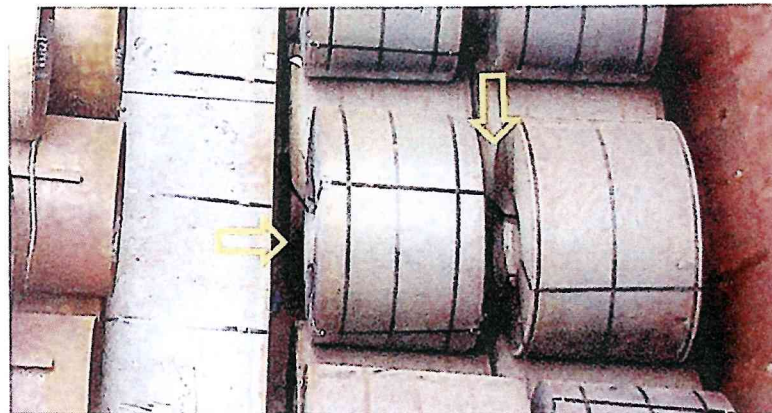


✓ Handling of CRC with braided wire slings and a spreader

Hot and Cold Rolled Steel Coils



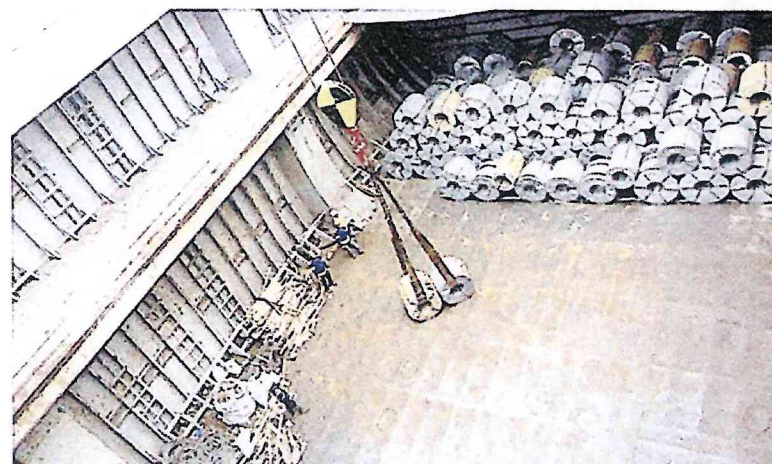
✘ Mixed loading of HRC with steel plates. No dunnage is used for separation of the two parcels. No dunnage is used between the HRC and the hold's stool/bulkhead



✘ The upper-tier coils of the two adjacent rows are not lashed together. Lashing was only used between the tiers in one row



✔ Use of nylon web slings for handling HRC

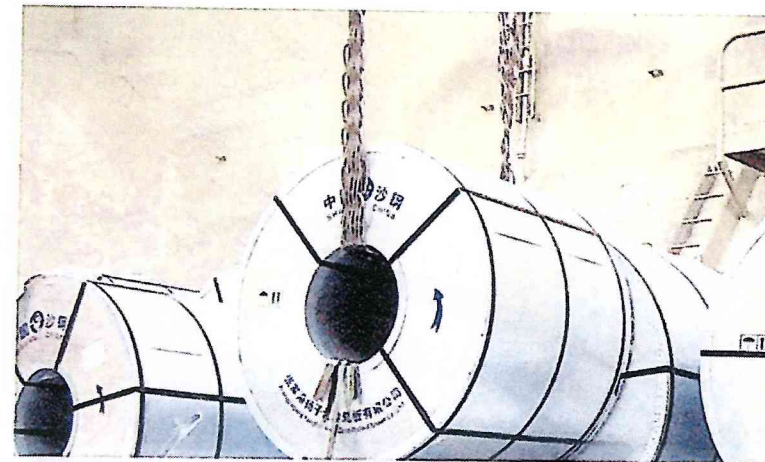


✔ Use of nylon web slings for handling CRC. This type of sling is unlikely to damage the coils, even when used without a spreader

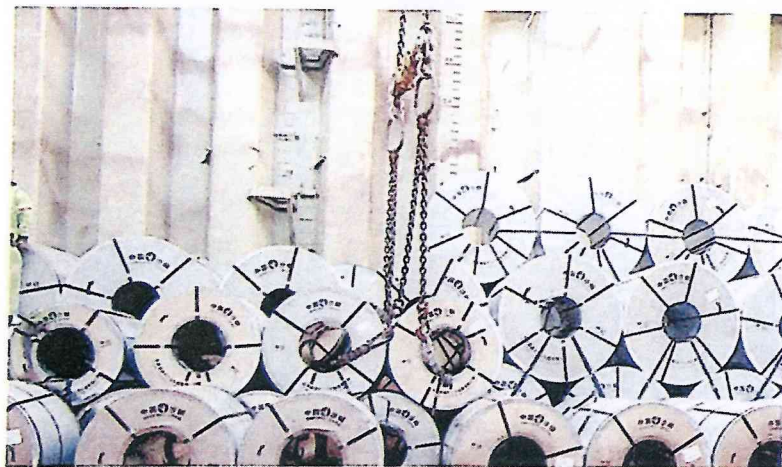
Hot and Cold Rolled Steel Coils



✓ Braided wire sling is passed through the coil in preparation for discharging



✓ Discharging of CRC with braided wire sling and a spreader

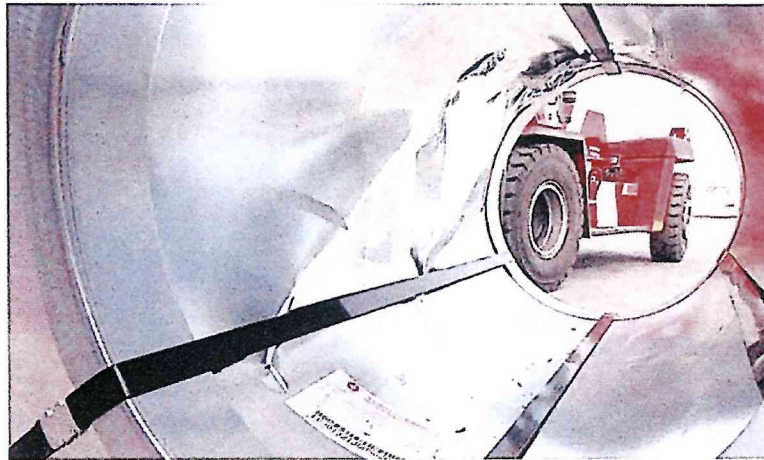


✓ Discharging of two CRC with braided wire slings and a spreader

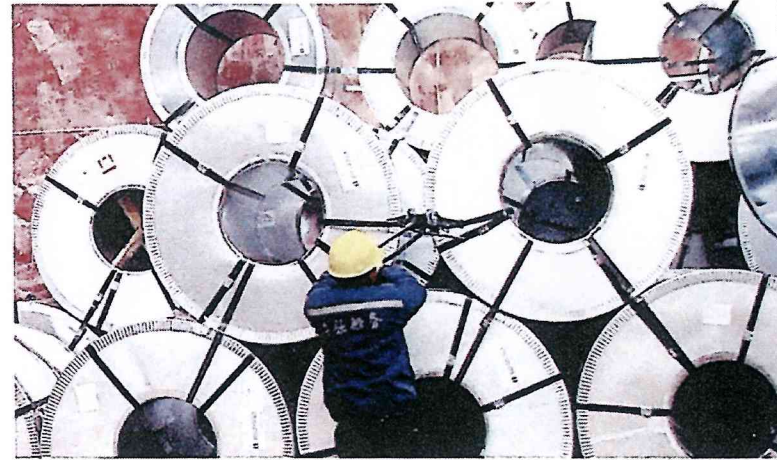


✓ Using a forklift truck with a pole for shifting coils under the coaming areas

Hot and Cold Rolled Steel Coils



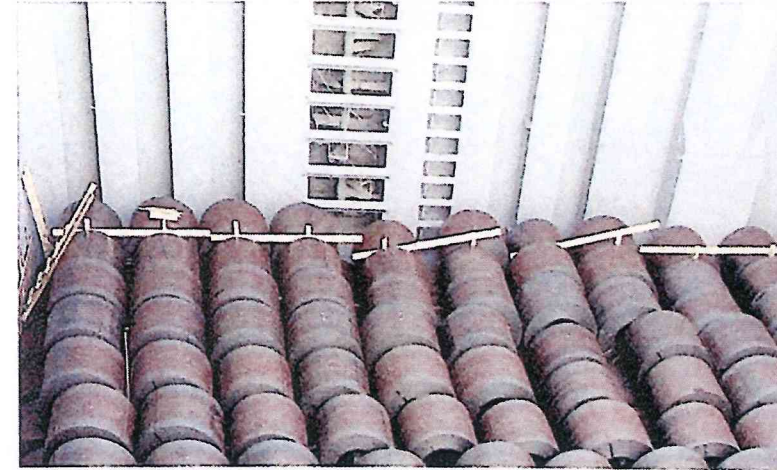
✘ Coil damaged by a forklift truck when handled from the under-coaming area. The end coil on each side of the first tier risks damage



✔ Good storage of coils on dunnage and being secured with strapping bands



✔ Good storage of coils with shoring dunnage at the bulkhead and safety access to the top tiers of coils



✔ Stow of two tiers of coils with a safety access to the top tier. Dunnage between the rows



bands



space between

Notes

- The loading of coils should be in accordance with the ship's cargo securing manual and the CSS Code.
- Coils should be stowed with their axes in the fore-and-aft direction. The stowing of coils should start from the side of the hold going inward.
- The maximum number of coil tiers will be determined by the ship's cargo securing manual and Class. Great care must be taken to ensure the maximum uniform loading of the tank-top is not exceeded.
- For part-loaded holds, coils should be loaded against the aft bulkhead if possible.
- Ideally, coils should not be overloaded with other cargoes. Coils must not be loaded on top of other cargoes.
- Two adjacent coil tiers should have space to allow for passing the slings through the coils.
- Depending on the width of the coils, two, three or four wooden planks should be laid on the tank-top. The size of the planks should be 150 mm x 25 mm (6" x 1"). The length of the planks should allow for locking wooden wedges to be placed under the coils.
- Wooden wedges should be used to lock the coils from the inboard side of the coils. These should be correctly placed on the wooden planks and nailed, if possible.
- Each end coil on the first tier should rest on dunnage placed on the side bulkhead and the adjacent coil. The other coils should rest on two adjacent coils.
- Dunnage between tiers is not required.
- The first tier of coils should be locked with one or two locking coils, depending on the space. Where a locking coil cannot be used, proper hardwood dunnage between two adjacent coils should be used.
- For second-tier coils, each end coil should be lashed to three adjacent coils, one from the second tier and the two lower-tier coils. Alternatively, the coil should be lashed to the three lower-tier coils.
- In the cargo compartments, where possible, safe passage should be provided directly from the ladders to the top of the cargo stow. In bulk carriers, this access should be provided directly from the Australian ladders. Safe access should also be provided from the tank-top to the top of the cargo stow.