Subject :
Timber deck cargo in the context of damage stability requirements
Interpretation on Paragraph 1 of Regulation 25-8, Chapter II-1, SOLAS

# NKTECHNICAL INFORMATION

No. : 367

Date : 30 June 2000

To: Shipowners and Shipbuilders concerned

In case where the damage stability calculation for ships carrying timber deck cargoes is made in accordance with Chapter II-1 of SOLAS, the buoyancy of the timber deck cargoes could not be taken into account in that calculation up to now. But, IACS decided that the buoyancy of timber deck cargoes shall be taken into account in the damage stability calculations and adopted the unified interpretation, UI SC 161, concerning to this issue on 25 April 2000 at IACS Council. This UI SC 161 will enter into force from 1 January 2001.
However, the extent of buoyancy of timber deck cargoes that may be taken into account in the damage stability calculations shall be followed as stated below for the longitudinal and transverse direction. (Please refer to the "Figure 1".)

1. Longitudinal direction
   The buoyancy of only one standard superstructure height of timber deck cargoes may be considered in spite of the buoyancy of the height of timber deck cargoes actually stowed on board the ship. But, the buoyancy of timber deck cargo within the longitudinal extent of damage is to be ignored in the damage stability calculation.
2. Transverse direction
   The buoyancy of timber deck cargo within the longitudinal extent of damage is to be ignored from side to side in the damage stability calculation at any of transverse damage extent.



Therefore, in case where the timber cargoes are loaded on upper deck, allowable loading capacity of timber cargoes will be increased as compared with the present loading capacity, as a curve of limiting $G_0M$ for timber load line can be created separately.

In detail, please refer to the attached UI SC 161.

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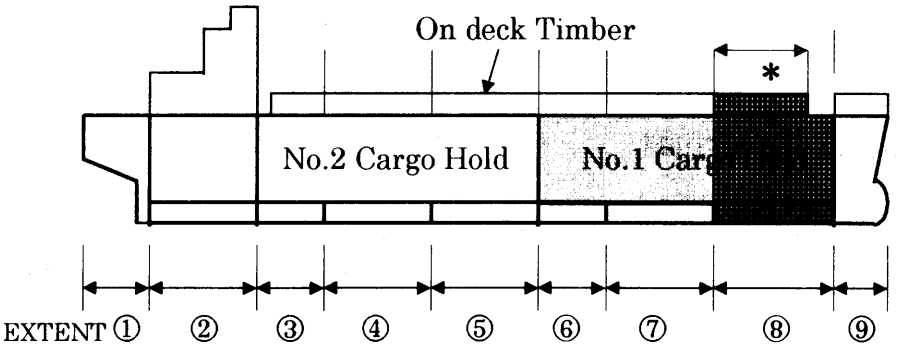
Attachment : 1. IACS UI SC 161
2. Extract of IMO Resolution A.715(17), Chapter 3

ClassNK NIPPON KAIJI KYOKAI
4-7, KIOI-CHO, CHIYODA-KU,
TOKYO 102-8567, JAPAN.

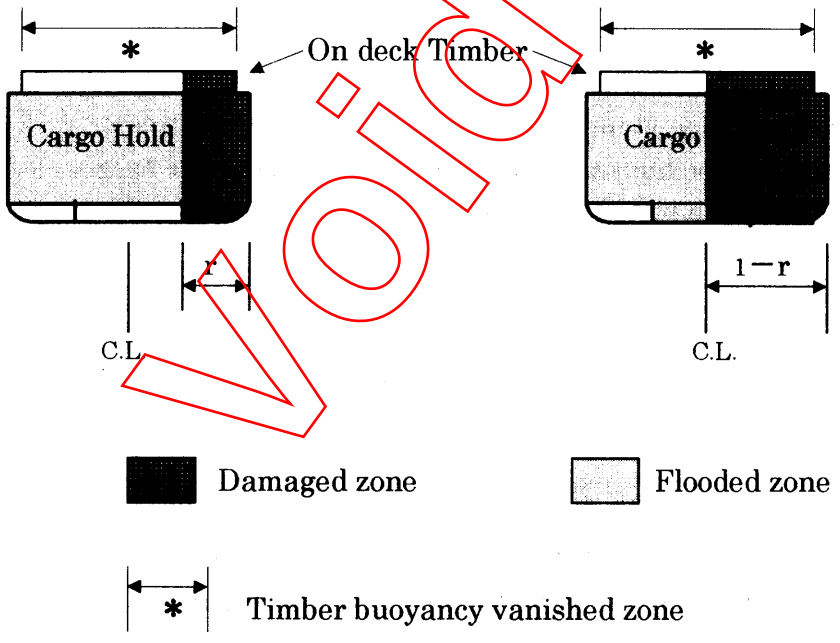
**Figure 1**

[ Damage Case of Extent ⑧ ]




[Case 1] Only outer side part is damaged

[Case 2] Half breadth part is fully damaged



# IACS UI SC 161 (adopted on 25 April 2000 at Council)

# Timber deck cargo in the context of damage stability requirements

**(Chapter II-1, Regulation 25-8.1)**

**SOLAS Regulation II-1/ 25-8.1 reads:**

**Stability information**

1 The master of the ship shall be supplied with such reliable information as is necessary to enable him by rapid and simple means to obtain accurate guidance as to the stability of the ship under varying conditions of service. The information shall include:

.1) a curve of minimum operational metacentric height (GM)versus draught which assures compliance with the relevant intact stability requirements and the requirements of regulations 25-1 to 25-6,alternatively a corresponding curve of the maximum allowable vertical centre of gravity (KG)versus draught, or with the equivalents of either of these curves;

.2) instructions concerning the operation of cross-flooding arrangements; and .3 all other data and aids which might be necessary to maintain stability after damage.

3) all other data and aids which might be necessary to maintain stability after damage.



**Scope**

The provisions given hereunder apply to ships that are subject to SOLAS, Chapter II-1, Part B-1 subdivision and damage stability calculations and engaged in carrying timber deck cargoes. The buoyancy of the timber deck cargo can optionally be taken into account in the damage stability calculations, subject to the provisions that have been set forth in this document.

They shall comply with the requirements of the "CODE OF SAFE PRACTICE FOR SHIPS CARRYING TIMBER DECK CARGOES,1991", and Ships that are provided with and make use of their timber load line shall also comply with the requirements of regulations 41 to 45 of the "LOAD LINE CONVENTION,1966".

**Definitions**

The following definitions apply for the purposes of this interpretation:

timber means sawn wood or lumber, cants, logs, poles, pulpwood and all other types of timber in loose or packaged forms. The term does not include wood pulp or similar cargo;

timber deck cargo means a cargo of timber carried on an uncovered part of a freeboard or superstructure deck. The term does not include wood pulp or similar cargo;

timber load line means a special load line assigned to ships complying with certain conditions related to their construction set out in the "LOAD LINE CONVENTION 1966" and used when the cargo complies with the stowage and securing conditions of the "CODE OF SAFE PRACTICE FOR SHIPS CARRYING TIMBER DECK CARGOES, 1991 (Resolution A.715(17))";

deepest timber subdivision load line is the subdivision load line which corresponds to the timber summer draught to be assigned to the ship;

respective partial load line is the light ship draught plus 60% of the difference between the light ship draught and the deepest timber subdivision load line



**Interpretation**

1. The stowage of timber deck cargoes shall comply with the provisions of Chapter 3 of the "CODE OF SAFE PRACTICE FOR SHIPS CARRYING TIMBER DECK CARGOES, 1991 (resolution A.715 (17))".
2. The ship shall be supplied with comprehensive stability information which takes into account timber deck cargo. Such information shall enable the master, rapidly and simply, to obtain accurate guidance as to the stability of the ship under varying conditions of service, and as required in SOLAS Regulation II-1, 25-8 it shall include, among other damage stability related issues, a curve of minimum operating metacentric height (GM) versus draught which covers the requirements of SOLAS Regulation II-1/25-8.1.1.
3. The height and extent of the timber deck cargo shall be in accordance with Chapter 3.2 of the "CODE OF SAFE PRACTICE FOR SHIPS CARRYING TIMBER DECK CARGOES,1991", and shall be at least stowed to the standard height of one superstructure, if considered buoyant in the context of the subdivision and damage stability calculations.
4. Account may be taken of the buoyancy of the timber deck cargo, assuming that such cargo has a permeability of 25% of the volume occupied by the cargo, however, the buoyancy of only one standard superstructure height of timber deck cargo may be considered.
5. Unless instructed otherwise by the Administration, the stability information for ships with timber deck cargoes may be supplemented by a second curve of limiting GM (or KG) covering the then permissible draught range as specified below. Thus when accepting two stability limiting curves one curve shall be applicable when carrying timber deck cargo and a second

curve for any other loading condition.

6. The above described provision of two curves are to be developed as described in SOLAS Regulation II-1/25-8.3, if they have been determined from considerations related to the subdivision index, based on the following:

6.1. for any loading condition other than timber deck cargo, the limiting GM with the draughts as described in SOLAS Regulation II-1/25-8.3, and

6.2. for timber deck cargo, the limiting GM shall be varied linearly between that the deepest timber subdivision load line and the respective timber partial load line. Where timber freeboards are not assigned the deepest and partial draughts shall relate to the summer load line.

7. For the purpose of the subdivision and damage stability calculations, the permeabilities of each space or part of space shall be as described in SOLAS Regulation II-1/25-7, however supplemented by the following for the undamaged timber deck cargo:

| **Spaces** | **Permeability** |
|---|---|
| Timber cargo on deck for both draught | 0.25 |

8. When considering the vertical extent of damage, the upper deck may be regarded as a horizontal subdivision (in accordance with SOLAS Regulation II-1/25-6.3). Thus, when calculating damage cases limited vertically to the upper deck with the corresponding v-factor, the timber deck cargo may be considered to remain buoyant with an assumed permeability of 0.25. For damage extending above the upper deck the timber deck cargo buoyancy in way of the damage zone is to be ignored.

Footnote: Implementation date 1 January 2001

IMO Resolution A.715 (17)
"Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 1991"

## Chapter 3 – Stowage

### 3.1 General

3.1.1 Before timber deck cargo is loaded on any area of the weather deck:

.1 hatch covers and other openings to spaces below that area should be securely closed and battened down;

.2 air pipes and ventilators should be efficiently protected and check-valves or similar devices should be examined to ascertain their effectiveness against the entry of water;

.3 accumulations of ice and snow on such area should be removed; and

.4 it is normally preferable to have all deck lashing, uprights, etc., in position before loading on that specific area. This will be necessary should a preloading examination of securing equipment be required in the loading port.

3.1.2 The timber deck cargo should be so stowed

.1 safe and satisfactory access to the crew's quarters, pilot boarding access, machinery spaces and all other areas regularly used in the necessary working of the ship is provided at all times;

.2 where relevant, openings that give access to the areas described in 3.1.1.1 can be properly closed and secured against the entry of water;

.3 safety equipment, devices for remote operation of valves and sounding pipes are left accessible; and

.4 it is compact and will not interfere in any way with the navigation and necessary working of the ship.

3.1.3 During loading, the timber deck cargo should be kept free of any accumulations of ice and snow.

3.1.3 Upon completion of loading, and before sailing, a thorough inspection of the of the ship should be carried out. Soundings should also be taken to verify that no structural damage has occurred causing an ingress of water.

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* Reference is made to the Recommendation on intact stability for passenger and cargo ships under 100 meters in length (resolution A.167(ES.IV)), as amended by resolution A.206(VII) with respect to ships carrying timber deck cargoes.

3.2 Height and extent of timber deck cargo

3.2.1 Subject to 3.2.2, the height of the timber deck cargo above the weather deck on a ship within a seasonal winter zone in winter should not exceed one third of the extreme breadth of the ship.

3.2.2 The height of the timber deck cargo should be restricted so that:

.1 adequate visibility is assured;

.2 a safe margin of stability is maintained at all stages of the voyage;

.3 any forward-facing profile does not present overhanging shoulders to a head sea; and

.4 the weight of the timber deck cargo does not exceed the designed maximum permissible load on the weather deck and hatches.

3.2.3 On ships provided with, and making use of, their timber load line, the timber deck cargo should be stowed so as to extend:

.1 over the entire available length of the well or wells between superstructures and as close as practicable to end bulkheads;

.2 at least to the after end of the aftermost hatchway in the case where there is no limiting superstructure at the after end;

.3 athwartships as close as possible to the ship's sides, after making due allowance for obstructions such as guardrails, bulwark stays, uprights, pilot boarding access, etc., provided any area of broken stowage thus created at the side of the ship does not exceed a mean of 4% of the breadth; and

.4 to at least the standard height of a superstructure other than a raised quarterdeck.

3.2.4 The basic principle for the safe carriage of any timber deck cargo is a solid stowage during all stages of the deck loading. This can only be achieved by constant supervision by shipboard personnel during the loading process.

3.2.5 Appendix A provides general advise on stowage practices which have proved to be effective for various types of timber deck cargoes.

APPENDIX A

ADVICE ON STOWAGE PRACTICES

## 1 General

1.1 The stowage practices described in this appendix have been found to achieve satisfactory results, provided that account is taken of the recommendations of chapters 1 to 6. Although specific conditions may dictate a departure from these guidelines, the basic principle as detailed in 1.2 should nevertheless be adhered to.

1.2 The basic principle for the safe carriage of timber deck cargo is, as indicated earlier, to make the stow as solid and compact as practicable. The purpose of this is to:

.1 prevent slack in the stow which could cause the lashings to slacken;

.2 produce a binding effect within the stow; and

.3 reduce to a minimum the permeability of the stow.

1.3 Lashings prevent deck cargo from shifting by increasing the friction due to pre-stress forces and counteracting forces on the stow in the direction of possible shifting. The lashings should meet the following criteria:

.1 the strength of all lashing elements should be at least equal to that recommended in the Code; and

.2 the necessary tension should be maintained during the whole voyage.

1.4 The shifting of timber deck cargo is due mainly to the following causes which may occur singly or together:

.1 lashings becoming slack due to compaction of the cargo during the voyage, unsuitable devices for tightening the lashing systems and/or inadequate strength of the lashings;

.2 movement of the cargo across the hatch covers due to insufficient friction, particularly in ice and snow;

.3 inadequate strength of the uprights due to poor material properties and/or excessive forces;

.4 heavy rolling or pitching of the ship;

.5 impact from heavy seas.

1.5 Great care should be taken to keep the ship in an upright condition during loading as even a slight list will impose a considerable load on the retaining uprights. The necessity for prudent ship handling during the voyage cannot be overstressed; imprudent ship handling can nullify even the best of stowages.

1.6 The lashings should be in accordance with chapter 4 of the Code and may comprise the following types:

.1 Hog lashings are normally used over the second and third tiers and may be set "hand tight" between stanchions. The weight of the upper tiers when loaded on top of these wires will further tighten them (see figure 1).

.2 Wire rope lashings which are used in addition to chain lashings. Each of these may pass over the stow from side to side and loop completely around the uppermost tier. Turnbuckles are fitted in each lashing to provide means for tightening the lashing at sea (see figure 2).

.3 Wiggle wires which are fitted in a manner of a shoelace to tighten the stow. These wires are passed over the stow and continuously through a series of snatch blocks, held in place by foot wires. Turnbuckles are fitted from the top of the footwire into the wiggle wire in order to keep the lashings tight at sea (see figures 3 and 4).

.4 Chain lashings which are passed over the top of the stow and secured to substantial padeyes or other securing points at the outboard extremities of the cargo. Turnbuckles are fitted in each lashing to provide means for tightening the lashing at sea (see figure 5).

1.7 Systems for securing timber deck cargoes are shown in figures 3, 4, 5, 6 and 7.

2 Packaged timber and cants

2.1 Timber packages are usually bundled by bandings fastened mechanically (hard bundled) or by hand (soft bundled). The packages may not have standard dimensions and they are not always flush at both ends. The stowage problem is compounded by differences in the lengths of packaged timber when the packages are stowed on board the ship. Moreover, the master of the ship often has no influence on the order in which the packages are delivered.

2.2 Packages which contain random lengths likely to disrupt the compaction of the stow should not be loaded on deck. Other packages of random lengths capable of compact stowage may be loaded on deck in a fore and aft direction but not on exposed surfaces or in the stowage outboard of the hatch coamings (see figures 8 and 9).

2.3 Packages for deck stowage should be solidly made up. They should have bands adequate to prevent slackening or disintegration of the package during the voyage, which could cause a loosening of the stow as a whole. Slack bands on the top surface of the deck cargo are dangerous foot traps.

2.4 Cants are usually bundled by banding, but the irregularities caused by varying thicknesses and curved sides make compact bundling very difficult to achieve. Because of these factors, considerable broken stowage is encountered as well. The tendency is for the packages to assume a rounded cross section within the bands due to the curved sides of the individual pieces (see figure 10).

2.5 A solid stow of packaged timber is not always possible as the packages of timber have different measurements, may be partially soft bundles, and gaps may exist between the packages. It is essential, however, that the upper tier and outboard packages be stowed as compactly as possible and the upper tiers chocked as necessary.

2.6 The methods used to stow cargoes of loose timber for transport cannot always be applied to the transport of packaged timber as:

.1 packaged timber cannot be stowed to give a compactness as tight as that achieved with loose timber, and lashings may therefore be less effective;

.2 packaged timber cannot be stowed between the uprights as densely and with so few gaps as loose timber. The uprights may consequently have to sustain greater loads when packaged timber is being carried and may absorb the forces generated by the cargo when it is moving.

2.7 Before commencing to load on the deck or hatches a firm and level stowage surface should be prepared. Dunnage, where used, should be of rough lumber and should be placed in the direction which will spread the load across the ship's underdeck structure and assist in draining.

2.8 Due to the system of athwartship lashing, the stowage of packages should generally be in the fore and aft direction; the wings of the upper two tiers should always be in the fore and aft direction. It is advisable to have one or more non-adjacent tiers stowed athwartships when above the level of the hatches in order to produce a binding effect within the cargo. Also, athwartship packages should be carried above the hatches to interlock the load. If packages with great differences in length are to be loaded, the longest packages should be stowed fore and aft outboard. Short packages should be confined to the inner portions of the stowage. Only packages flush at both ends can be stowed athwartships (see figures 11, 12 and 13).

2.9 The timber should be loaded to produce a compact stow with a surface as level as practicable. Throughout the loading, a level and firm stowage surface should be prepared on each working tier. Rough dunnage, if used, should be spread over at least three adjacent packages to produce a binding effect within the stow, particularly in the wings.

2.10 Any gaps occurring around packages in which the cargo may work at sea, such as in the vicinity of hatch coamings and deck obstructions, should be filled with loose timber, efficiently chocked off or effectively bridged over. For this purpose a supply of timber chocking material should be made available to the ship.

2.11 Packages at the outboard edges of the stow should be positioned so that they do not extend over the padeyes and obstruct the vertical load of the athwartship lashings. The end of each deck stow should be flush in order to minimize overhangs to resist the influence of green seas and to avoid the ingress of water.

2.12 Large heavy boards and squares of timber, when loaded on deck in combination with packages, should preferably be stowed separately. When placed in upper tiers, heavy pieces of timber tend to work loose at sea and cause some breaking of packages. In the event that boards and squares are stowed on top of packages they should be efficiently restrained from movement.

2.13 When the final tier is loaded on a large number of tiers, it may be stepped in from the outer edge of the stow about 0.5-0.8 m (a half package).

## 3 Logs

3.1 If logs are loaded on deck together with packaged timber, the two types of timber should not be intermixed.

3.2 Logs should generally be stowed in a fore and aft direction to give a slightly crowned top surface such that each log is adequately restrained from movement when the system of securing is in place and set up taut.

3.3 In order to achieve a compact stow, the butt of each log or sling of logs should not be in the same athwartship plane as those adjacent to it.

3.4 In order to achieve a more secure stowage of logs when stowed on deck, a continuous wire (hog wire) should be utilized at each hatch meeting the specifications of chapter 4 of this Code. Such hog wire should be installed in the following manner:

.1 at approximately three quarters of the height of the uprights, the hog wire should be rove through a padeye attached to the uprights at this level so as to run transversely, connecting the respective port and starboard uprights. The hog lashing wire should not be too tight when laid so that it becomes taut when overstowed with other logs;

.2 a second hog wire may be applied in a similar manner if the height of the hatch cover is less than 2 m high. Such second hog wire should be installed at approximately 1 m above the hatch covers;

.3 the aim of having the hog wires applied in this manner is to assist in obtaining as even a tension as possible throughout, thus producing an inboard pull on the respective uprights.

## 4 Pulp wood and pit-props

4.1 When these items are stowed in the manner described below good compaction of the deck cargo can be obtained.

.1 In the deck area clear of the line of hatches, the cargo should be stowed in the athwartship direction, canted inboard by some cargo laid fore and aft in the scuppers.

.2 At the centre of the stow, along the line of hatches, the cargo should be laid in the fore and aft direction when the wing cargo has reached hatch height.

.3 At the completion of loading, the cargo should have a level surface with a slight crown towards the centre.

4.2 To prevent the cargo from being washed out from below its lashings, it is recommended that nets or tarpaulins be used as follows:

.1 the ends of each continuous section of deck cargo, if not stowed flush with the superstructure bulkhead, may be fitted with a net or tarpaulin stretched and secured over the athwartship vertical surface;

.2 over the forward end of each continuous section of deck cargo and in the waist of the ship the top surface may be fitted with a net or tarpaulin stretched and secured across the breadth of the cargo and brought down the outboard vertical sides to securing points at deck level.

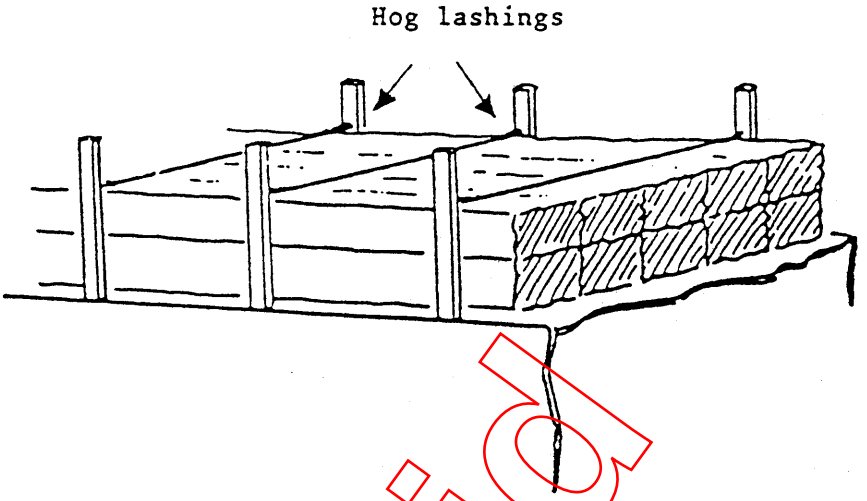



Figure 1



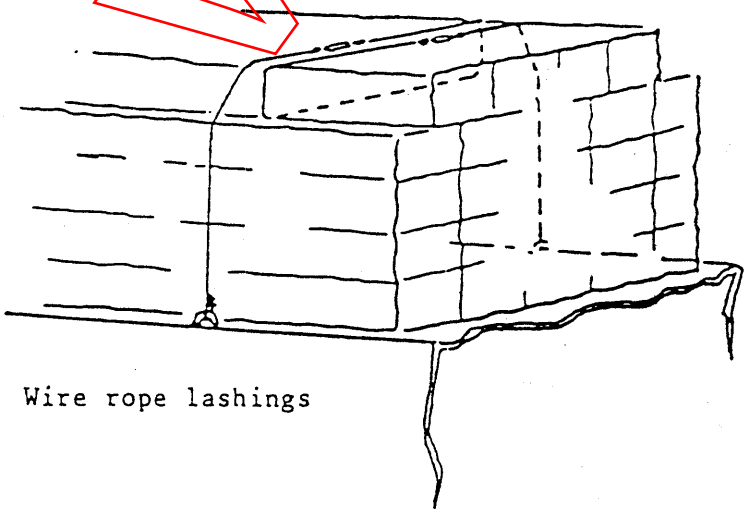



Figure 2

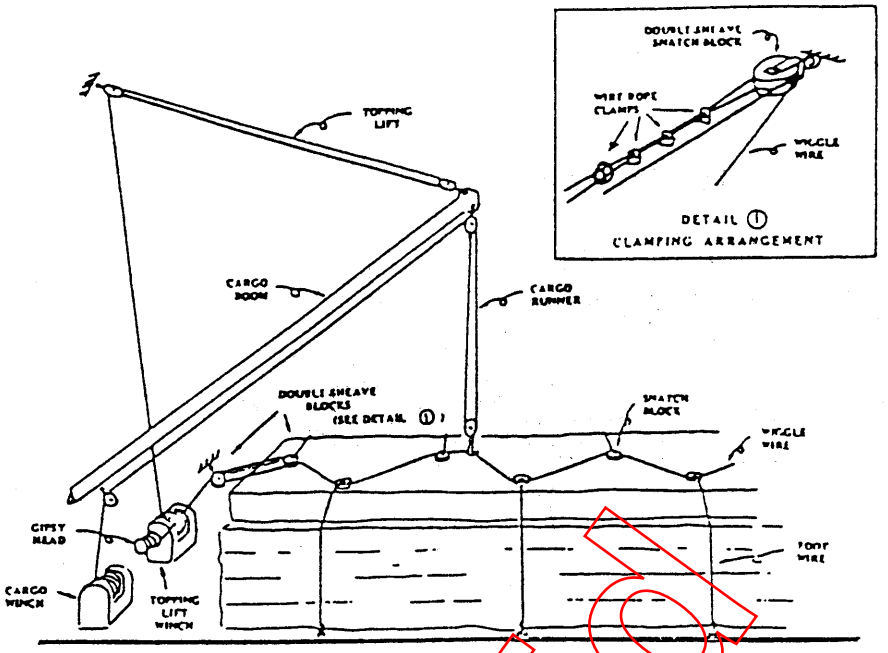



Figure 3



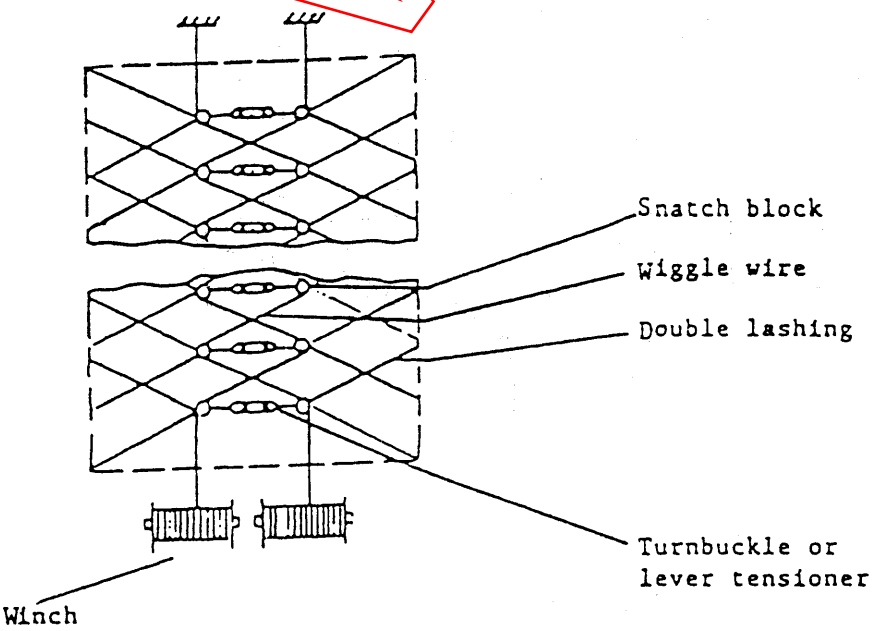



Figure 4

Chain lashings

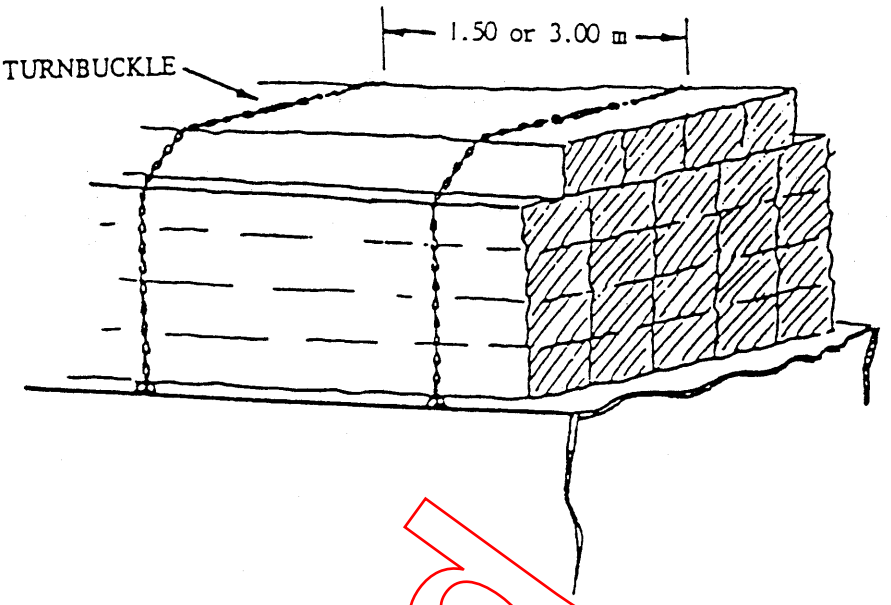



Figure 5



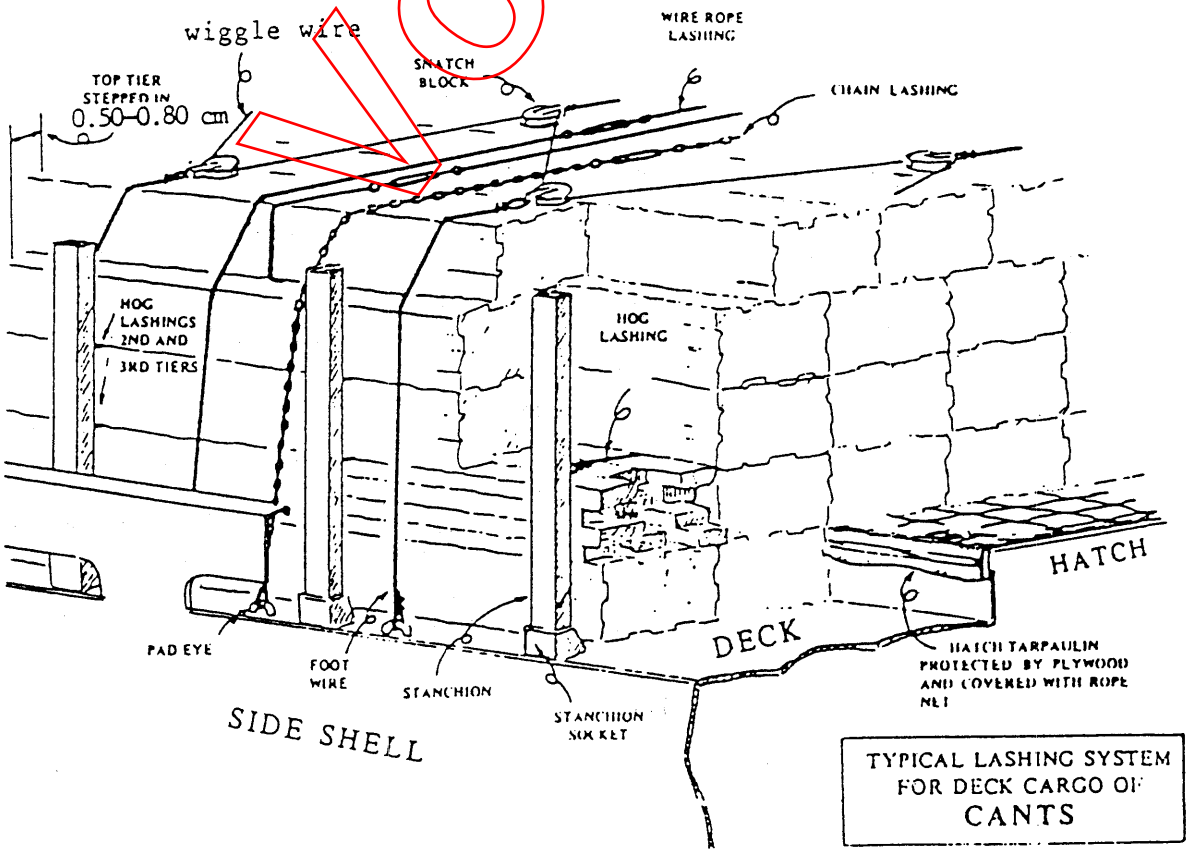
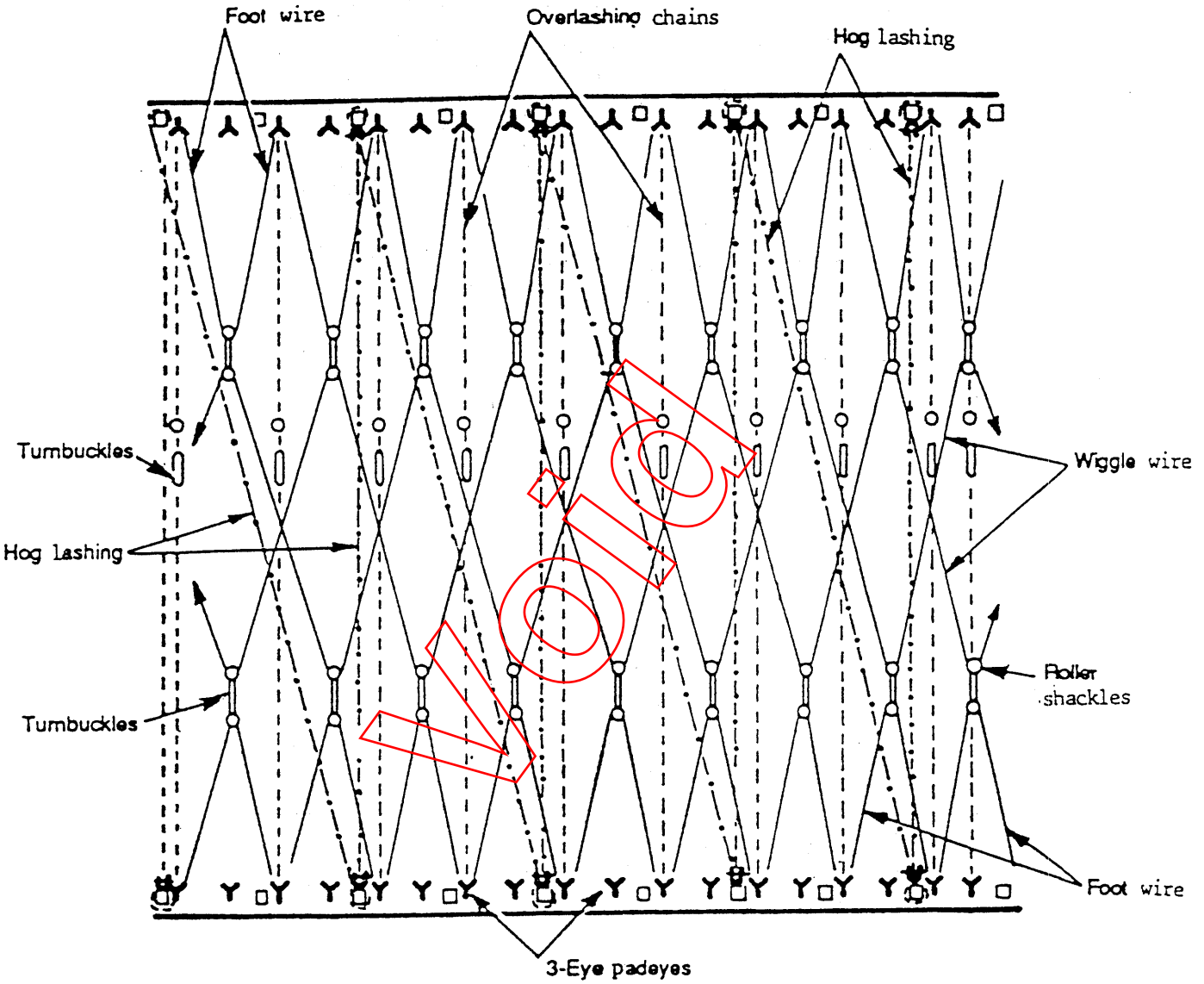



Figure 6




NOTE: Roller shackles to be affixed between all foot wires and wiggle wires and at least two turnbuckles to be inserted between the wiggle wire and the foot wire on each side (port and starboard).

Figure 7

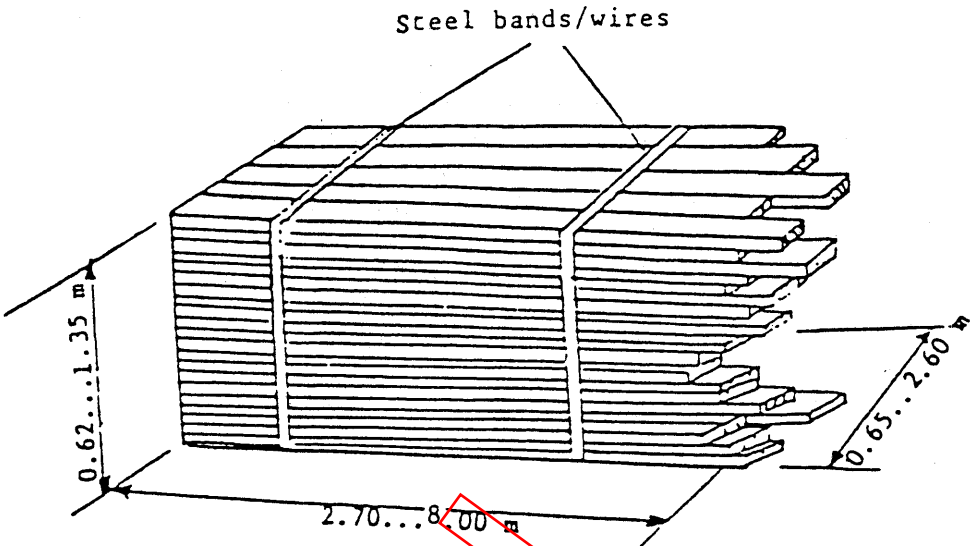



Figure 8



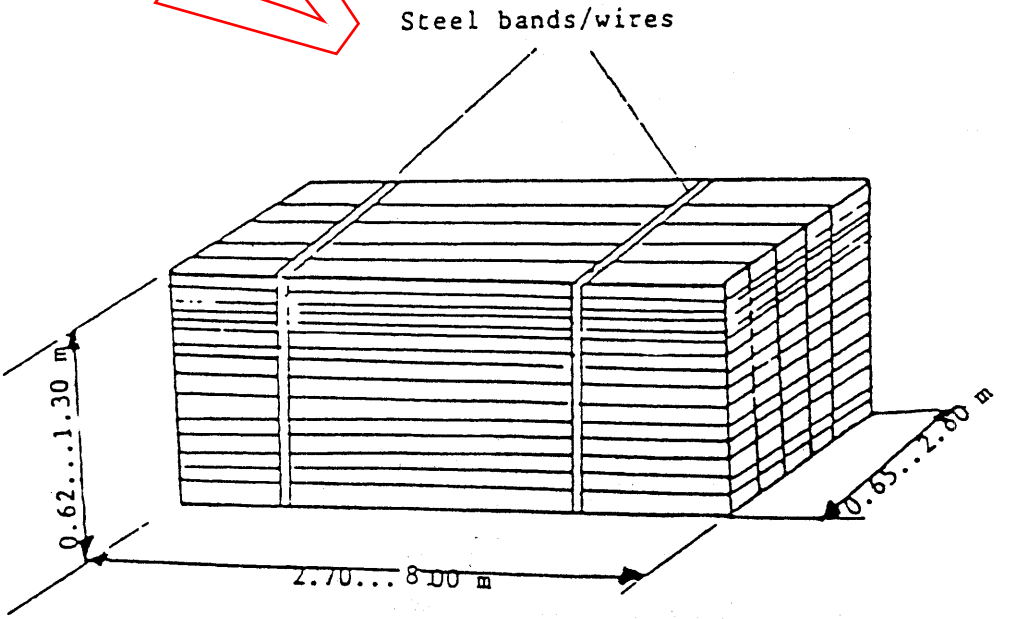



Figure 9

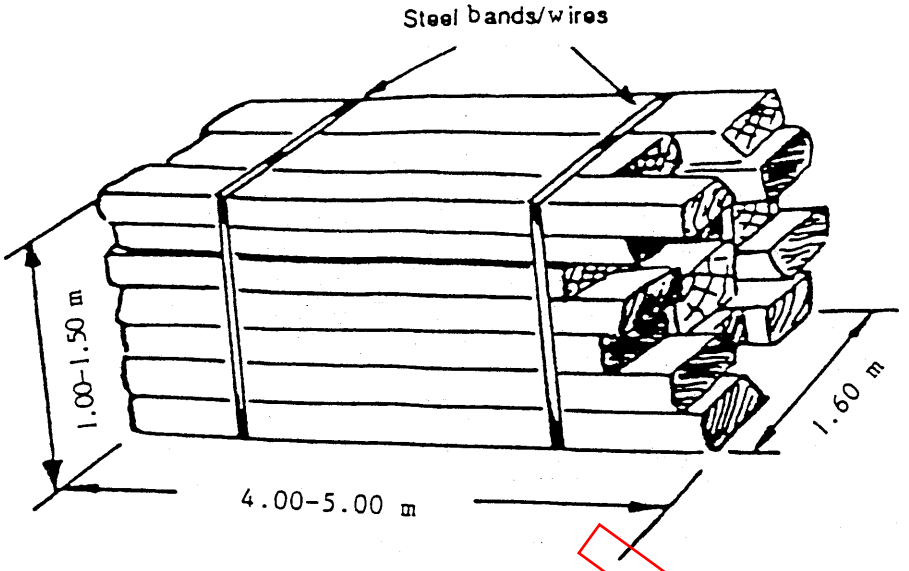



Figure 10



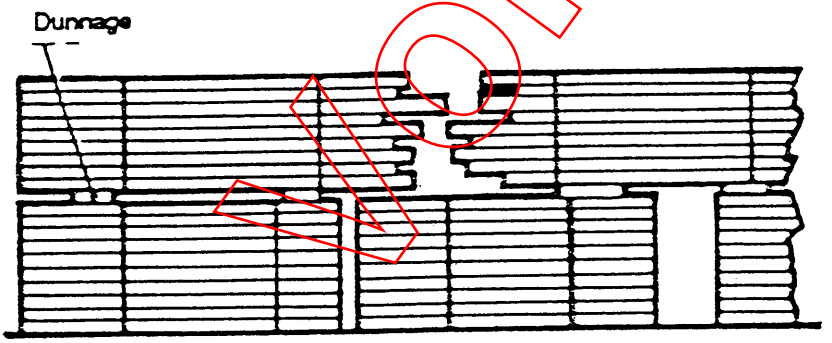



Figure 11

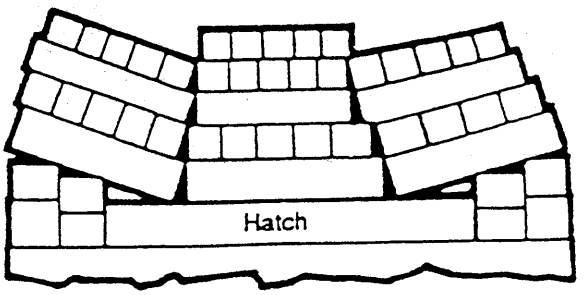



Figure 12

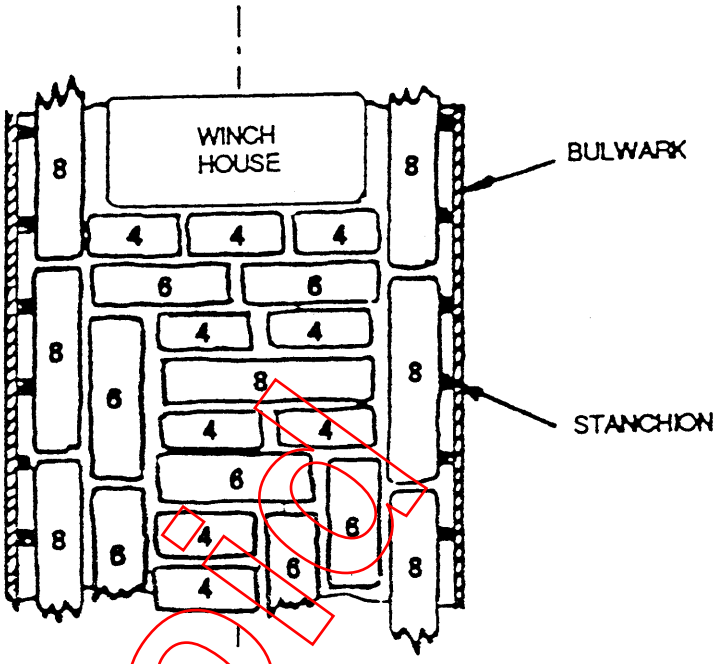



Figure 13