

Guideline for Steel product shipment

Version 1

2009. 7. 22

Corporate Liner Operation Team



Contents

1. Introduction
 - 1.1 Purpose and Range
 - 1.2 Responsibility of cargo securing
 - 1.3 Specification of HMM Containers

2. Cause of damage during underway
 - 2.1 Vessel movement at Sea
 - 2.1.1 Linear motion
 - 2.1.2 Rotational motion
 - 2.2 Cargo damage on the Sea

3. Application and Acceptance
 - 3.1 Application Procedure
 - 3.2 Title of Application
 - 3.3 Format of Application
 - 3.4 Loading Pattern
 - 3.5 Cargo Securing Survey
 - 3.6 Identification
 - 3.7 Rejection
 - 3.8 Application procedure as per vessel operator (in-Gauge)
 - 3.9 Application procedure as per vessel operator (Out of Gauge)

4. Loading and Securing of Steel product
 - 4.1 Loadable capacity
 - 4.1.1 Allowable concentrated load of 20'DC
 - 4.1.2 Maximum payload of FR cntr
 - 4.2 Securing arrangement of steel coil
 - 4.2.1 General method of securing
 - 4.3 Example of securing
 - 4.3.1 Arrangement "Eye-To-The-Sky" pattern and stowage example
 - 4.3.2 Arrangement "Eye-To-The-Wall" pattern and stowage example
 - 4.3.3 Arrangement "Eye-To-The-Door" pattern and stowage example
 - 4.4 Securing arrangement for steel pipes and steel Bar
 - 4.4.1 General method of securing
 - 4.4.2 Steel Pipe & Bar shipment of multi stacking

Guideline for Steel product shipment

1. Introduction

1.1 Purpose and range

The purpose of this guideline is to ensure the safety transportation of special goods such as coil, pipe, steel bar, angle cargoes into HMM containers and protect the possible damage.

But, This guideline only covers on board ocean-going vessels during sea passage, does not treat of the road, rail, inland waterway transportation

1.2 Responsibility of cargo securing

This guideline is made for provide the basic information for safety lashing method and accomplish the burst-up the special cargoes loading on HMM containers.

It is not covered the final own shippers responsibility with safe stuffing and lashing for prevent the cargo damages during transportation.

1.3 Specification of HMM containers

(Unit : mm / Kgs)

Type	Weight		External Dimensions			Internal Dimensions			Lashing Ring		Lashing Rod	
	Tare	Payload	L	W	H	L	W	H	EA	B.L	EA	B.L
20' DC	2,185	28,295	6,058	2,438	2,591	5,898	2,352	2,393	5 x 4	1,500	4 x 4	1,000
40' DC	3,890	28,610	12,192	2,438	2,591	12,032	2,352	2,393	10 x 4	1,500	4 x 4	1,000
40' HC	3,890	28,610	12,192	2,438	2,896	12,032	2,352	2,698	10 x 4	1,500	4 x 4	1,000
20' FR	2,890	31,110	6,058	2,438	2,591	5,638	2,194	2,231	5 x 2	5,000	4 x 2	5,000
40' FR	5,000	40,000	12,202	2,438	2,591	11,652	2,374	1,959	7 x 2	5,000	6x2, 8	5,000

* Table on the dimension and weight are basically provided as per New built equipment at 2007 years. All of the dimensions and weight are slightly different as per built year and construction makers. Therefore, if you need more detailed information for the each type of container, please refer to the "Global board" or contact "Corporate Equipment Management Team" & "Corporate Liner Operation Team".

2. Cause of damage during underway

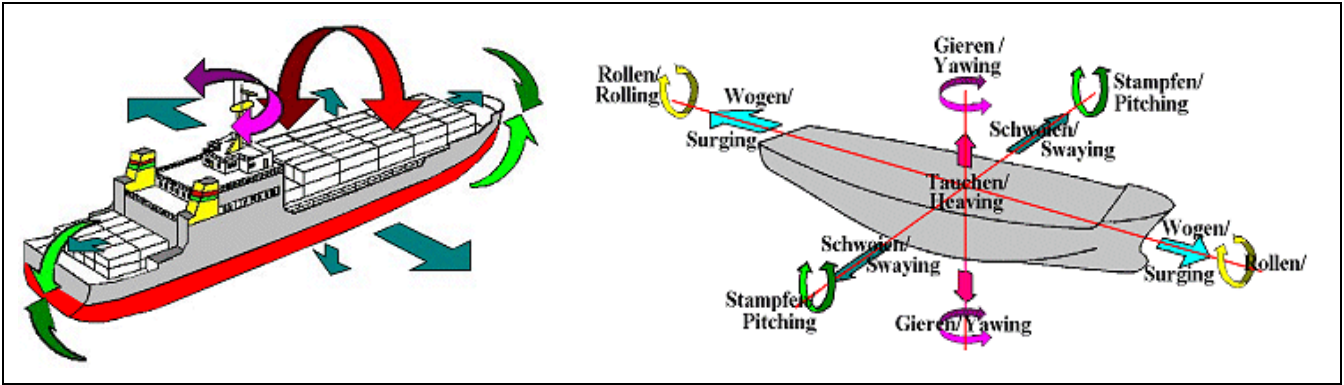
2.1 Vessel movement at sea

Voyages are made in a variety of weather conditions which are likely to exert a combination of forces upon the ship and its cargo over a prolonged period. Such forces may arise from pitching, rolling, heaving, surging, yawing or swaying or a combination of any two or more.

These kinds of force will be incurred the slight or heavy damaged into hull and cargoes. Especially, Special shipment such as coil, pipe, steel bar are have a heavy risk of damage if it's not sufficient lashing.

Guideline for Steel product shipment

Below figures simply drawing the vessel's movement

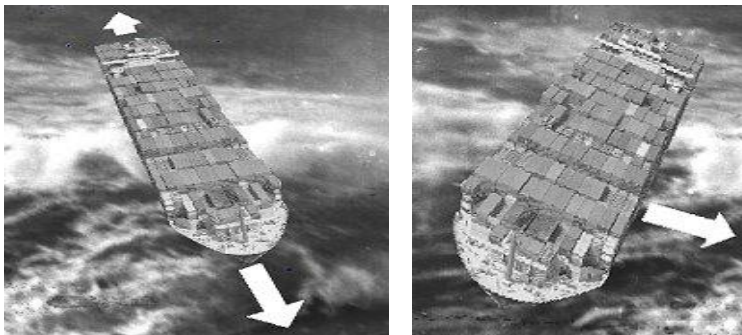


All kinds of ship movement may be divided into three types of linear motion and three types of rotational motion

Linear motion	Rotational motion
Surging is motion along the longitudinal axis.	Rolling is motion around the longitudinal axis.
Swaying is motion along the transverse axis.	Pitching is motion around the transverse axis.
Heaving is motion along the vertical axis.	Yawing is motion around the vertical axis.

2.1.1 Linear motion

In **surging** and **swaying**, the sea's motion accelerates and decelerates the ship forward and backward and side to side. Depending upon the lie of the vessel, these movements may occur in all possible axes, not merely, for example, horizontally. If a vessel's forebody is on one side of a wave crest and the afterbody on the other side, the hull may be subjected to considerable torsion forces



Heaving involves upward and downward acceleration of ships along their vertical axis. Only in an absolute calm are upward and downward motion at equilibrium and the ship floats at rest. Buoyancy varies as a ship travels through wave crests and troughs. If the wave troughs predominate, buoyancy falls and the ship "sinks" (top picture), while if the wave crests predominate, the ship "rises" (bottom picture). Such constant oscillation has a marked effect on the containers and their contents.

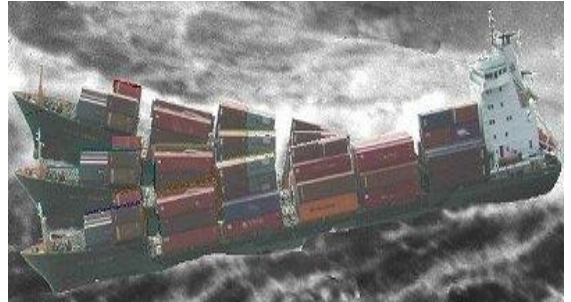


Guideline for Steel product shipment

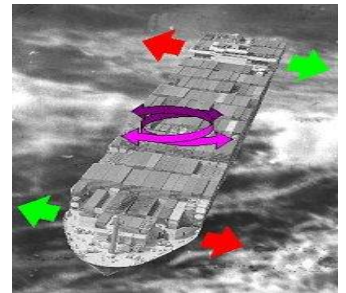
2.1.2 Rotational motion

Rolling involves side-to-side movement of the vessel. The rolling period is defined as the time taken for a full rolling oscillation from the horizontal to the left, back to horizontal then to the right and then back to horizontal. In vessels with a high righting capacity, i.e. stiff ships, rolling periods of ten seconds and below are entirely usual. Rolling angle is measured relative to the horizontal. Just in moderate seas, even very large vessels roll to an angle of 10° .

In **pitching** a ship is lifted at the bow and lowered at the stern and vice versa. Pitching angles vary with the length of vessel. In relatively short vessels they are $5^\circ - 8^\circ$ and sometimes more, while in very long vessels they are usually less than 5° . In a container ship 300 m in length with a pitching angle of 3° , a container stowed in the bay closest to the bow or stern at a distance of approx. 140 m from the pitching axis will cover a distance of 29 m within a pitching cycle, being raised 7.33 m upwards from the horizontal before descending 14.66 m downwards and finally being raised 7.33 m again and then restarting the process. During upward motion, stack pressures rise, while they fall during downward motion.



Yawing involves rotation of the ship around its vertical axis. This occurs due to the impossibility of steering a ship on an absolutely straight course. Depending upon sea conditions and rudder deflection, the ship will swing around its projected course. Yawing is not a cause of shipping damage.



2.2 Cargo damage on the Sea



Guideline for Steel product shipment

2.2 Cargo damage on the Sea



Coil damage



Coil damage

Guideline for Steel product shipment



Steel Bar damage



Steel pipe damage

3. Application and Acceptance

This application and acceptance are mainly described based on “In-Gauge” Steel Product(*).

(*) Steel Product : Steel Coil, Pipes, Bars, Roll, Steel Plate, Cable Drum and a movable goods

Are applicable.

3.1 Application Procedure

A booking office shall make an application for Steel product and send it to ROC, but no later than three (3) working days before the vessel arrival. ROC shall confirm acceptance or rejection to the booking office within one (1) working day of receiving the application.

3.2 Title of application

3.2.1 Initial application

[Steel Product application for Route / Vessel full name / Voyage No. \(REF NO.\)](#)

ex) Steel Product application for AEX/Hyundai Shanghai 005W (REF NO. AEX-20081020-1)

3.2.2 Revised application

[\(1st revised\) or \(2nd revised\) on the title](#)

ex) (1st revised) Steel Product application for AEX/Hyundai Shanghai 005W

(REF NO.AEX-200810020-1)

(2nd revised) Steel Product application for AEX/Hyundai Shanghai 005W

(REF NO.AEX-200810020-1)

3.2.3 Cancellation

[\(Cancellation\) on the title](#)

ex) (Cancellation) Steel Product application for AEX/Hyundai Shanghai 005W

(REF NO.AEX-200810020-1)

3.2.4 Others

3.2.4.1 Not allowed to include unnecessary information such as booking no, PVY, Cut off, internal messages etc.

3.3 Format of Application

The booking office is responsible to provide the following information to each ROC/Planner.

[Subject : \(As per the 3.2 Title of application\)](#)

[1\) Vessel and Voyage](#)

[2\) Port of Loading and Discharging](#)

[3\) Description of cargo\(Commodity & Dimension\)](#)

[4\) Type & Size of container to be used](#)

[5\) Total Weight of cargo\(per container\)](#)

[6\) The number of Steel Product\(per container\)](#)

[7\) Weight per Steel Product](#)

[8\) Method/materials of stuffing/securing \(in detail as per 3.4 Loading pattern\)](#)

3.4 Loading pattern

Diagrams/Pictures/Photos/Sketch of the loading pattern shall be sent to ROC together with the application, and the stuffing of Steel Product into container must be performed in accordance with the loading pattern approved by ROC.

3.5 Cargo Securing Survey

Cargo Securing Survey has to be carried out by an authorized surveyor after stuffing of Steel Product into (on) a container unless ROC allows remission of the survey in writing. The regular shipments can be exempted from survey subject to judgment and the prior consent of ROC.

The survey report has to fully demonstrate the status of loading, blocking and bracing of Steel Product and be sent to ROC prior to loading the container onto the target vessel.

3.6 Identification

Steel Product must be identified on shipping document and instruction as "Steel (Metal) Products" and properly informed to the concerned parties in order to arrange the proper stowage and operation during transportation.

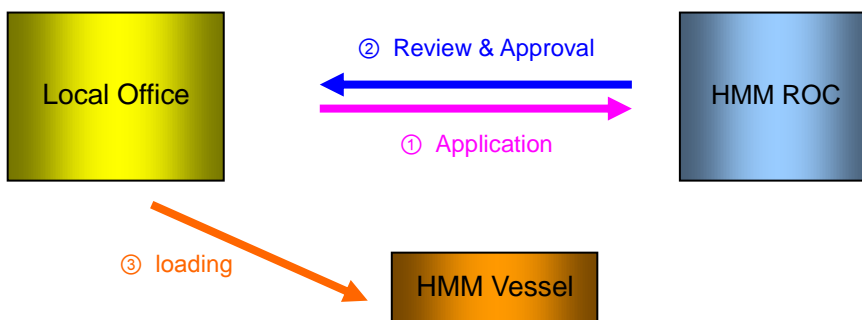
3.7 Rejection

Acceptance of Steel Product is always considered that the loading/blocking/bracing of Steel Product will be done according to the approved loading pattern and the requirements in this procedure. Improper application will be rejected at any time by ROC and cargo supervisor/Master of the vessel have right to reject any shipment did not stow safely and if there is a discrepancy between the application and actual stuffing in a container, even if it was already accepted.

3.8 Application procedure as per Vessel Operator (In-Gauge)

3.8.1 Booking for HMM operating Vessel

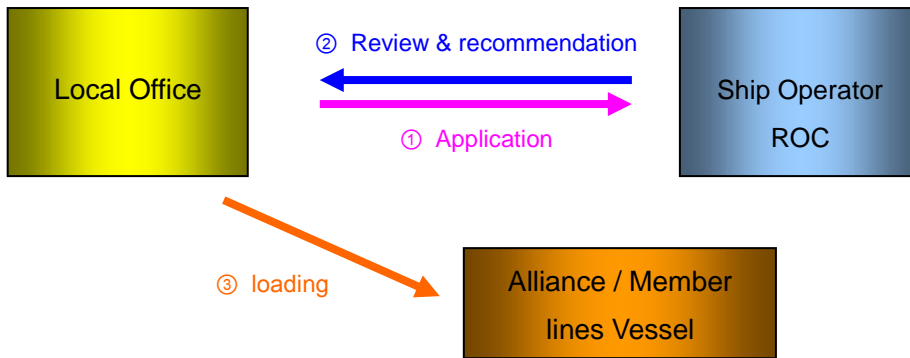
- ① Local office send a Steel Product application to HMM ROC
- ② HMM ROC review and approve.
- ③ Local Offices book the shipment on HMM Vessel.



Guideline for Steel product shipment

3.8.2 Booking for Alliance / Member lines Vessel

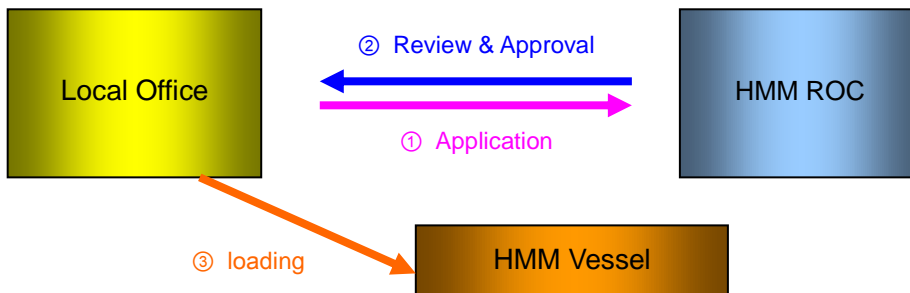
- ① Local office send a Steel Product application to ship operator's ROC and Copy to HMM HQ Alliance & Joint Operation Part / ROC
- ② Ship operator's ROC review and recommend.
- ③ Local Offices book the shipment on Alliance / Member's vessel.



3.9 Application procedure as per Vessel Operator (Out of Gauge)

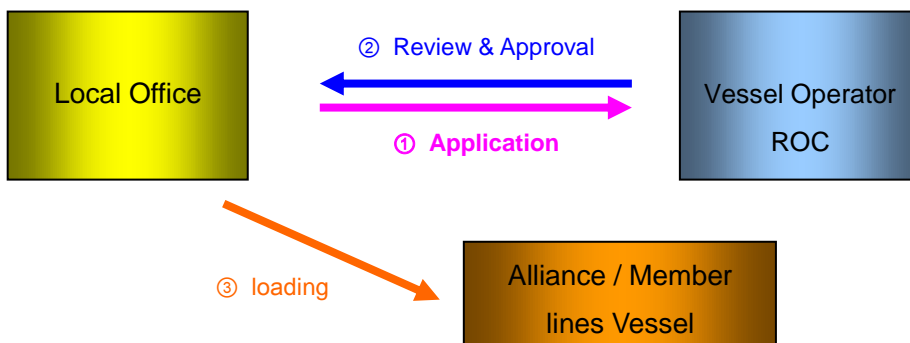
3.9.1 Booking for HMM operating Vessel

- ① Local office send a Steel Product application to HMM ROC
- ② HMM ROC review and approve.
- ③ Local Offices book the shipment on HMM Vessel.



3.9.2 Booking for Alliance / Member lines Vessel

- ① Local office send a Steel Product application to Vessel Operator's ROC and Copy to HMM HQ Alliance & Joint Operation Part / ROC
- ② Vessel Operator review and approve.
- ③ Local Offices book the shipment on Alliance / Member's Vessel.



Guideline for Steel product shipment

■ Summary for Application procedure

Size of Commodity	Booking to	Application to	
		Steel Product (Coil/Pipe/Bar etc)	Non-Steel Product
In Gauge	HMM vessel	ROC1	ROC1
	Alliance vessel	Vessel Operator / ROC2	N/A
Out of Gauge	HMM vessel	ROC1	ROC1
	Alliance vessel	Vessel Operator / ROC2	Vessel Operator / ROC2

* ROC1 (for HMM vessel)

Asia ROC1 : HQ Corporate Liner Operation Team / EA-EU-TP Operation Part(Seoul)

Europe ROC1 : HMM Rotterdam ROC

Trans-Pacific ROC1 : AHQ HASA ROC (Dallas)

* ROC1 (for Non-HMM vessel)

Asia ROC1 : HQ Corporate Liner Operation Team / Alliance & Joint Operation Part(Seoul)

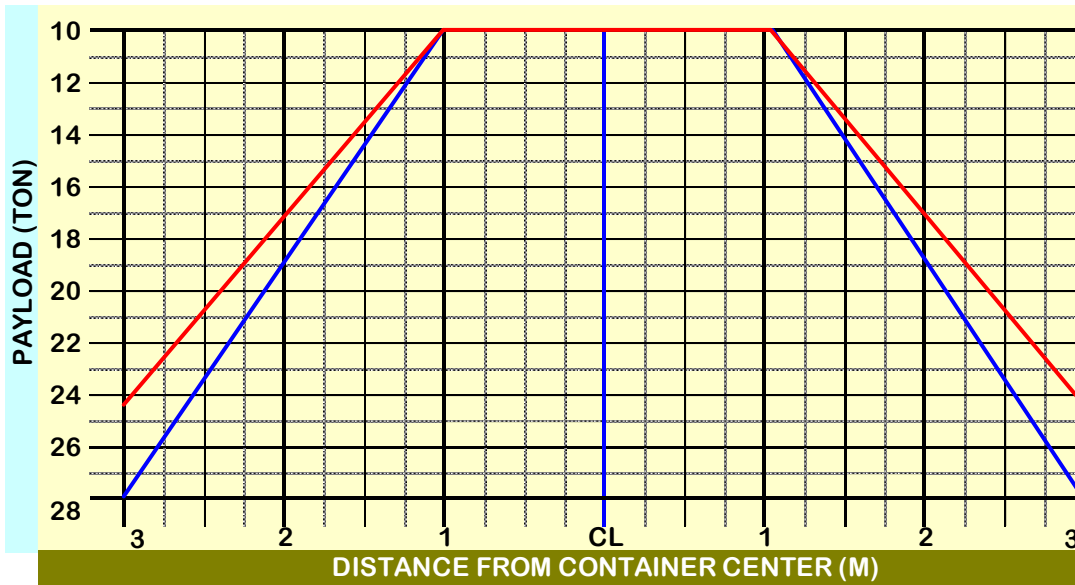
Europe ROC1 : HMM Rotterdam ROC , EHQ Operation(for TAS)

Trans-Pacific ROC1 : AHQ HASA ROC (Dallas)

4. Loading and Securing of Steel product

4.1 Loadable Capacity

4.1.1 Allowable concentrated Load of 20'DC

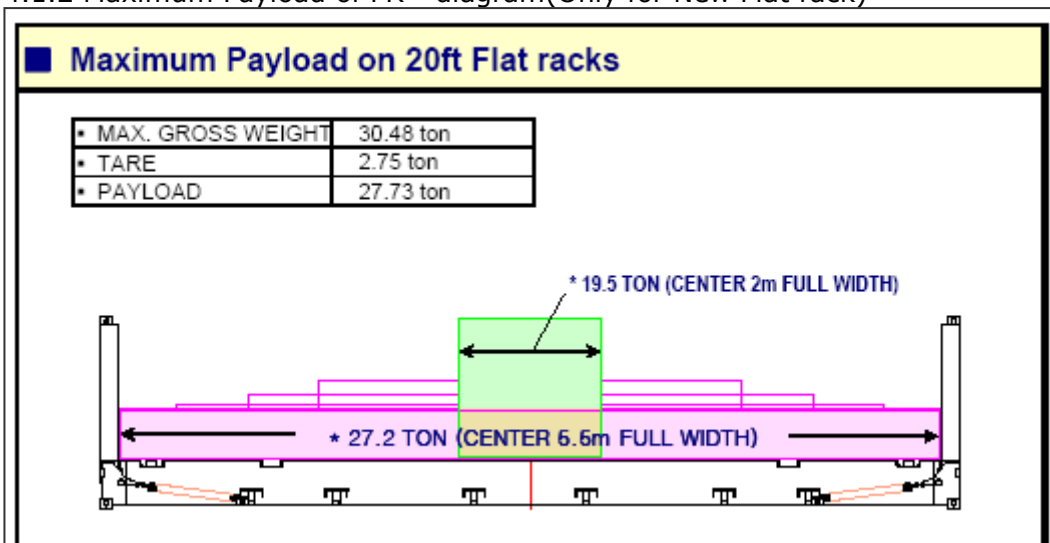


[Figure 4.1.1 Allowable concentrated table of 20'DC]

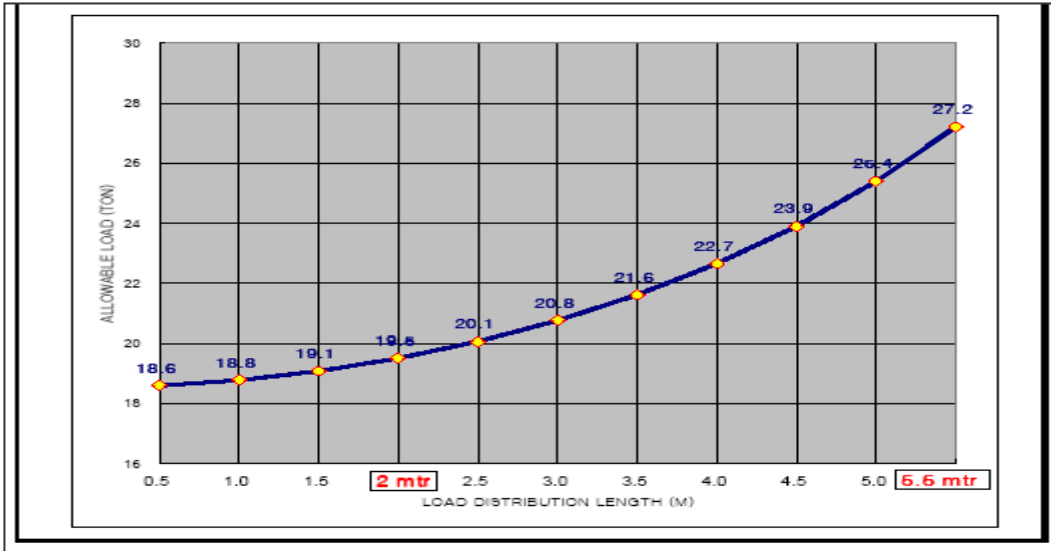
■ CONCENTRATED LOAD:

Cargo Weight		Length of Cargo/Dunnage
24m/t Payload	28,2 m/t Payload	
10,000 kg	10,000 kg	- Load on center 2.2m with Full width
13,100 kg	14,030 kg	- Load on center 3.0m with Full width
17,000 kg	19,075 kg	- Load on center 4.0m with Full width
20,900 kg	24,110 kg	- Load on center 5.0m with Full width
24,000 kg	28,150 kg	- Load on center 5.3m with Full width

4.1.2 Maximum Payload of FR - diagram(Only for New Flat rack)

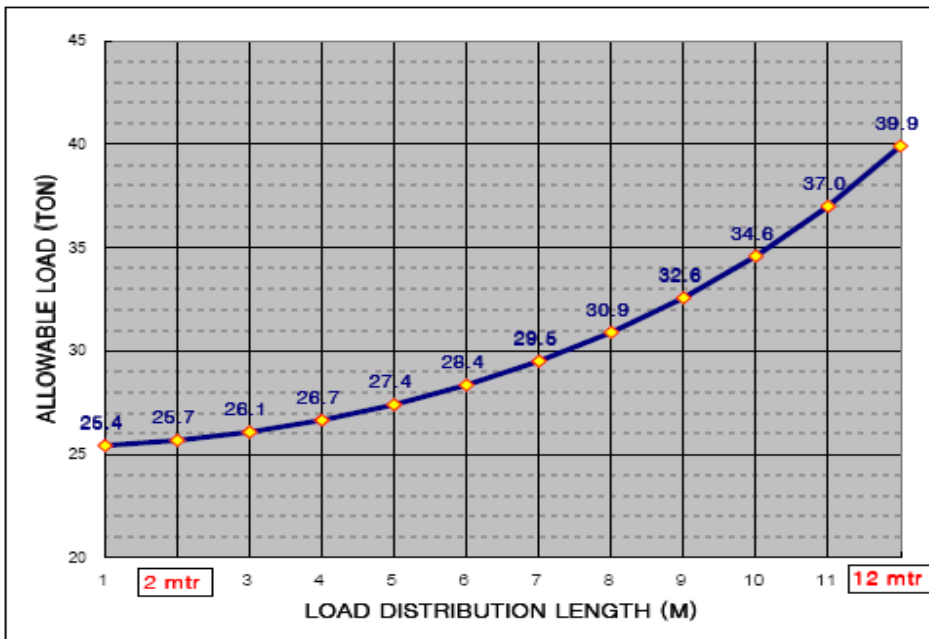
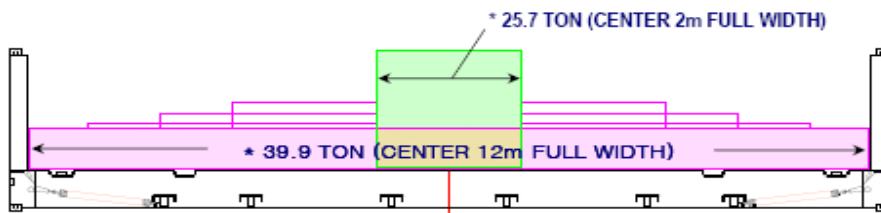


Guideline for Steel product shipment



Maximum Payload on 40ft Flat racks

• MAX. GROSS WEIGHT	45 ton
• TARE	5 ton
• PAYLOAD	40 ton basis

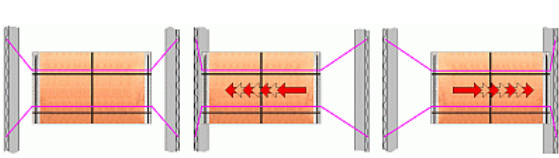
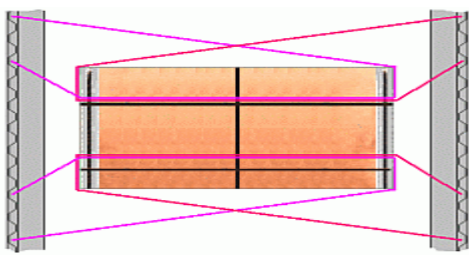
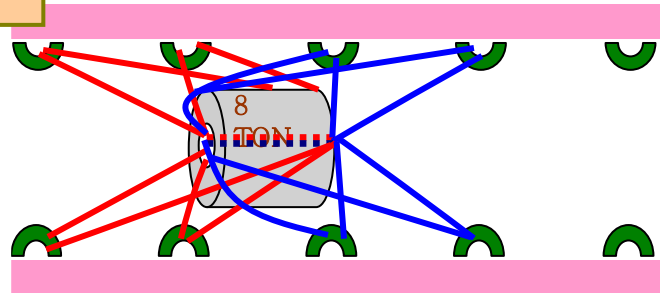


4.2 Securing Arrangement of steel coil

- aa) To insure a safe sea transportation, all the procedures in this document have to be implemented.
- bb) It is recommended that Steel coil have to be secured to the pallet which must be nailed firmly to the container floor to prevent coils from shifting during sea transportation.
- cc) Shipper is fully responsible for using equipment unsuitable condition.
- dd) Weight of coils must be distributed evenly to the container floor to avoid "nose & tail heavy".

4.2.1 General method of securing

aa) Lashing

	<p>In case of improper Lashing : Coils able to move freely in their lashings</p>
	<p>Recommended : Coil fixed with loop lashings. : Loop lashing can prevent the coils from moving sideways. : Depending upon the angle, loop lashing can generate horizontal securing forces in the crosswise and lengthwise directions as well as in the vertical direction.</p>
	<p>The number of lashing q'ty should be enough to hold 70% of cargo weight.</p> <p>Ex) Cargo weight : 8m/t SWL of lashing eye in the cntr : 1.5m/t TTL number of lashing q'ty : 4 => $8 \text{ ton} * 0.7 = 5.6$ ⇒ $5.6 / 1.5 = 3.7$</p> <p>* The broking load of lashing eyes in DC is 1.5 m/t.</p>

Guideline for Steel product shipment

bb) Wedges

x

Incorrectly cut wedges

: The wedges have been cut so that the nails will have to be driven into the end grain. This will result in the wedges splitting, at the latest when exposed to impact in transit . The wedges rely solely on the nail shear forces. High maximum securing loads cannot be expected

Recommended

The steel sheet rolls rest on the wedge beams in such a way that they are not in contact with the floor of the DC container in the middle. The Wedge width should be same with steel roll's length in order not to move it.

The height of wedge is depend on the radius of coil. The details are refer to the below table.

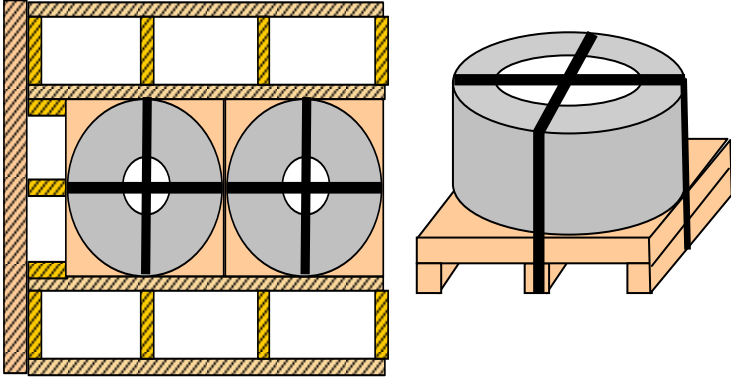
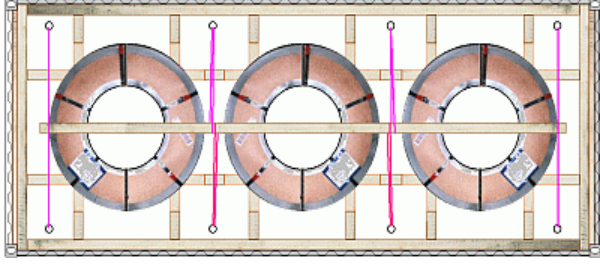




Radius (m)	A (L of Nail)	X H of Wedge)
0.4	0.09	0.07
0.6	0.13	0.11
0.8	0.18	0.14
1.0	0.22	0.18
1.2	0.26	0.22
1.4	0.31	0.25
1.6	0.35	0.29
1.8	0.40	0.32
2.0	0.44	0.36

Blocking rolling cargo by Wedge

4.3 Example of securing

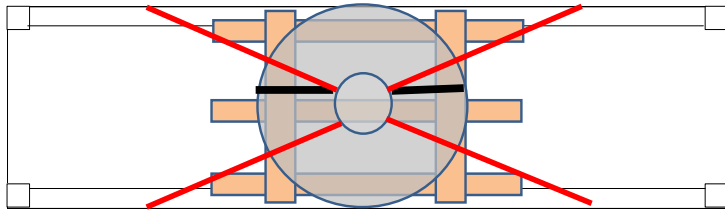
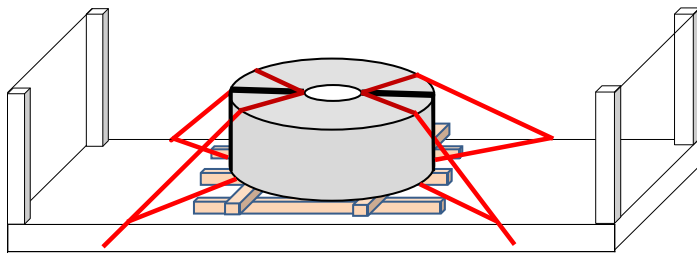
4.3.1 Arrangement "Eye-To-The-Sky" pattern and stowage example

[For loading in Dry cntr]

	<p>Lashing : fastened onto wooden pallet with steel strapping</p> <p>Dunnage : Must load on pallet</p> <p>Wedge : Unnecessary</p> <p>Bracing & Blocking : Need the sound transfer of pressure to the cntr walls</p>
	<p>Securing with squared lumber and hold-down members</p>
<p style="text-align: center;">Improper</p>	<p style="text-align: center;">Recommended</p>
	
	

Guideline for Steel product shipment

[For loading in FR cntr]



Lashing

: The number of lashing q'ty should be enough to hold 70% of cargo weight

Dunnage

: should keep shape of "#" on FR cntr in order to distribute the weight properly and be decided q'ty & size of dunnage considering weight distribution on FR cntr.

Wedge

: Unnecessary subject to hold cargo with steel band with dunnage

Bracing & Blocking

: Unnecessary subject to above Condition

Guideline for Steel product shipment

4.3.2 Arrangement "Eye-To-The-Wall" pattern and stowage example

[For loading in Dry cntr & FR cntr]

	<p>Lashing : The number of lashing q'ty should be enough to hold 70% of cargo weight</p>
	<p>Dunnage : Q'ty of size of dunnage should be decided considering weight distribution on Equipment</p>
	<p>Wedge : See 4.2.1 General method of securing</p>
	<p>Bracing & Blocking : depend on cargo weight & size should be arranged</p>

Improper

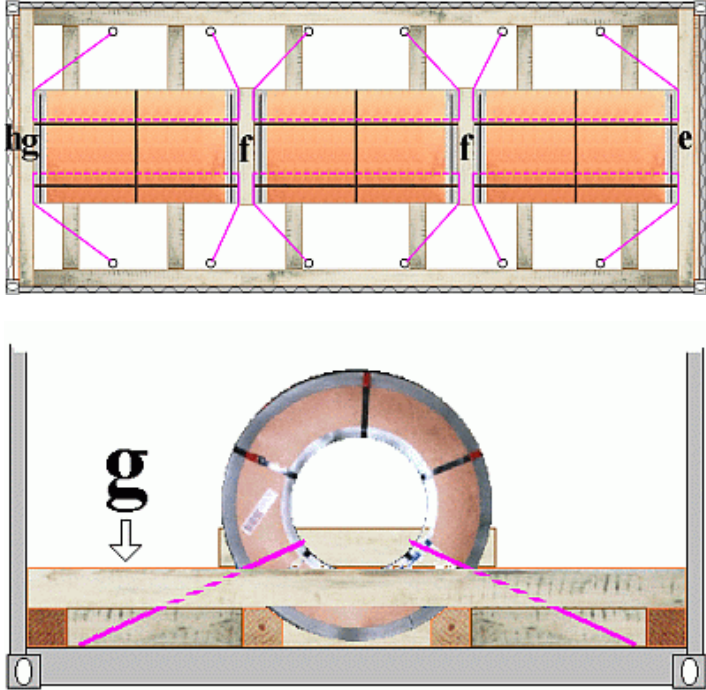
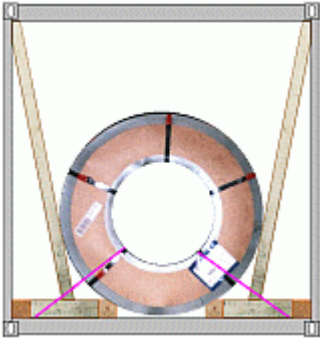


Recommended



Guideline for Steel product shipment

4.3.3 Arrangement "Eye-To-The-Door" pattern and stowage example

[For loading in Dry cntr]

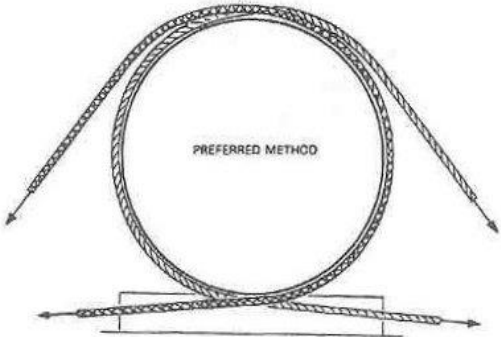
	<p>Lashing : See 4.2.1 General method of securing</p> <p>Dunnage : Q'ty of size of dunnage should be decided considering weight distribution on Equipment</p> <p>Wedge : See 4.2.1 General method of securing</p> <p>Bracing & Blocking : Need the sound transfer of pressure to the cntr walls</p>
	<p>Securing with squared lumber and lashing band</p>
<p>Improper</p>	<p>Recommended</p>
	

4.4 Securing arrangement for steel pipe

4.4.1 General method of securing

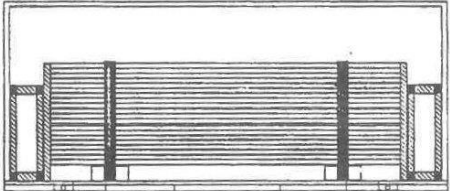
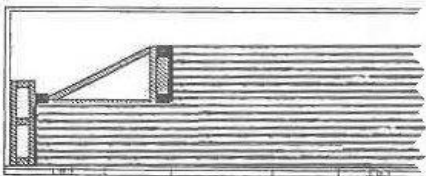
aa) Weight Distribution : The weight should be evenly distributed over the entire floor surface of a container.

bb) Lashing

	<ol style="list-style-type: none">1) Should be adequately secured/braced by wires, chains, steel bands or equivalent means having sufficient strength so as to withstand the rigors of the voyage.2) Loop lashing required around the cargo.3) Lashings should be protected with the proper pad (rubber sheet, etc) so as to avoid any reduction of the strength through fatigue, deterioration, etc.4) Lashings should be independent of each other.5) Securing devices should be assembled so that each component is of equal strength.
---	---

cc) Wedging : Pipes should be blocked with wedges to prevent the rolling.

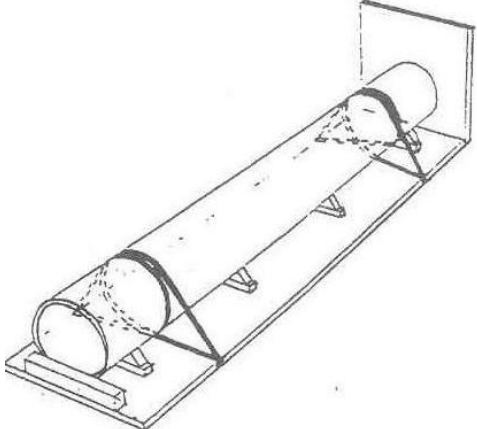
dd) Blocking

	<ol style="list-style-type: none">1) Spaces between cargoes and equipment walls (front, rear and 2 sides) should be filled with dunnages, blocks stanchions or other suitable means.2) The upper layer should be blocked adequately
	

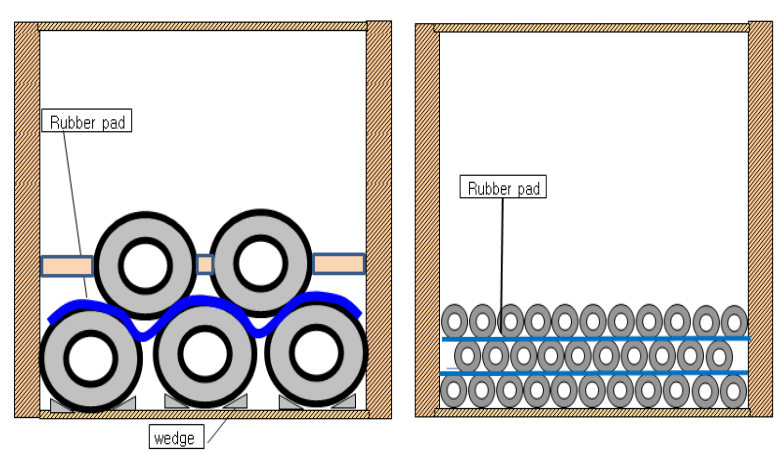
Guideline for Steel product shipment



4.4.2 Steel Pipes & Bar shipment of multi stacking.

[Single stacking in the Dry cntr/Fra-rack cntr]

	<p>Lashing : all round lashing is necessary on fore & aft Of cargo</p>
	<p>Dunnage : Necessary for weight distribution & protecting lashing wire</p>
	<p>Wedge : Necessary for prevention of movement of cargo</p>
	<p>Bracing & Blocking : According to some space between cntr constructure and cargo, Blocking is necessary</p>

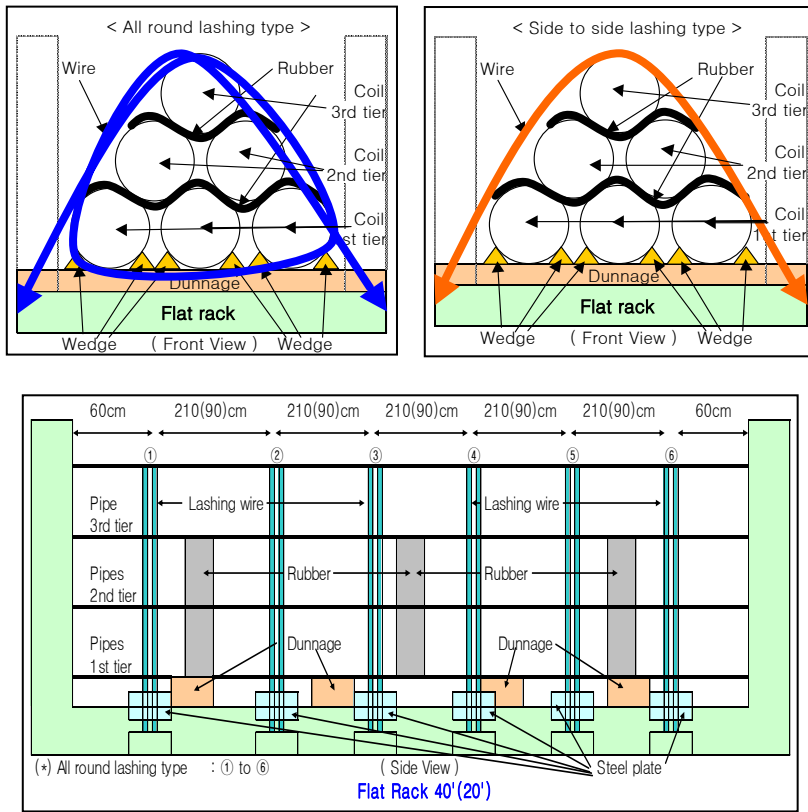
[Multi stacking in the Dry cntr]

	<p>Lashing : Unnecessary subject to Stuffing Status (No space between cargo)</p>
	<p>Dunnage : Unnecessary subject to containerr Capacity</p>
	<p>Wedge : necessary to prevent cargo movement</p>
	<p>Bracing & Blocking : between cntr and cargo, Blocking is necessary and rubber pad should be arranged between cargos</p>

Improper	Recommended
	
<p>Due to No blocking in blank space is too side of Stacked cargo, it is easy to be collapsed during navigation under heavy weather condition</p>	<p>Blocking & Rubber Pad was arranged to prevent movement of cargo in container</p>

Guideline for Steel product shipment

[Multi stacking on the flat-lack cntr]



Lashing

: should be enough to hold 70% of cargo weight

Dunnage

: Necessary for weight distribution & protecting lashing wire

Wedge

: Necessary for prevention of movement of cargo

Bracing & Blocking

: Unnecessary
If length of cargo is shorter than inner size of cntr, should be arranged accordingly considering some space between cargo & structure of cntr

Improper



Due to side to side lashing & no rubber ped, it is easy to move fore & aft direction
Lashing wire which is touched with cntr is not protected by steel plate

Recommended



This lashing way is round lashing and there are rubber peds between pipe and pipe to prevent movement of fore & afr direction

CONFIDENTIAL

Guidelines on Securing of Cable Drum

Version 1-1
(2010.10.21)

Corporate Liner Operation Team



1. General

- 1) 이 Guideline은 컨테이너선에 선적되는 Cable Drum의 안전한 해상운송을 위한 현대상선의 Stuffing 및 Lashing 방법에 대한 권고이며, 이 Guideline에 따라 적합하게 FR cntr에 고박되었다 하더라도 Lashing/Securing의 모든 책임은 화주에게 있음
- 2) 이 Guideline은 컨테이너선에 주로 선적되는 Cable drum 중 그 크기와 중량이 현대상선 FR cntr의 Max payload 및 허용 강도를 넘지 않는 범위 내의 최대값을 가지는 Cable drum에 대한 예시이므로 중량 및 크기가 예시된 Cable 보다 작은 화물은 해당 권고에 따라 선적 가능함

2. Size별/선적 형태별 Cable drum의 종류

Nos	Kind	Stuffing	Remark
1)	width 2.35m, 19.0 ton	1 pc on 1 x 20'FR,	종방향(Alongship) 선적 => OH
2)	width 3.00m, 27.0 tons	1 pc on 1 x 20'FR,	횡방향(Athwart ship) 선적 => OWH
3)	width 2.35m, 19.5 ton	2 pcs on 1 x 40'FR,	종방향(Alongship) 선적 => OH
4)	width 2.80m, 27.5ton	1 pcs on 1 x 40'FR,	횡방향(Athwartship) 선적 => OWH
5)	width 2.80m, 19.5ton	2 pc on 1 x 40'FR,	횡방향(Athwartship) 선적 => OWH

(OH : Over-Height only, OWH : Over-Width+Over-Height cargoes)

3. Lashing Materials 사용 권고사항

Materials	Size
Wooden wedge	90mm(H) x 120mm(W) x 330mm(L) x ten (10) ea per drum
Wooden dunnages	95mm(H) x 95mm(W) x 2400mm(L) x two (2) ea per drum 15mm(H) x 120mm(W) x 2400mm(L) x two (2) ea per drum
Steel wire ropes	16 mm dia. x twelve (12) points per drum
Turnbuckle & Shackles	Turnbuckle : 18 mm dia., Shackles : 20 mm Dia.
Clip-ends & Chain	Clip-ends : 18 mm dia., Chain : 12 mm dia.

4. Stuffing 권고사항

- 1) Cable drum의 무게 중심이 FR cntr의 Center에 위치 하며, 앞뒤좌우의 Balance가 맞도록 작업
- 2) Cable Skid(steel cradle)와 Flat rack의 Side rail이 사이에 Rubber Pad 설치 필수(마찰력 보강)
- 3) Cable Drum의 Skid가 좁아 Flat rack의 Side Rail에 닿지 않는다면 Dunnage를 이용하여 화물이 Side Rail에 놓여 지도록 유도한다.
- 4) Flat rack의 Camber 처짐을 최소화 하기 위하여 화물 선적 전 처짐방지용 받침대를 대고 작업

5. Lashing 권고사항

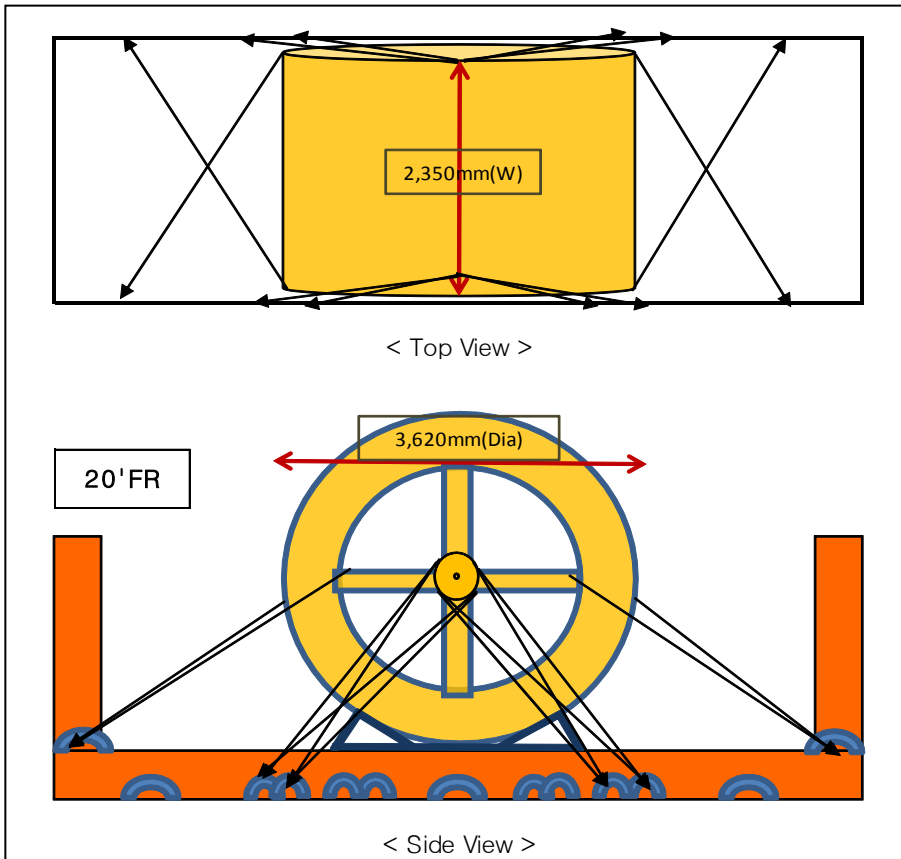
- 1) Lashing Hoop 1개에 같은 방향의 Lashing은 1개만 허용
- 2) Wire Lashing의 경우 3개 이상의 Wire Clip을 사용 및 최소 한쪽면에 6개 Wire Lashing 고박
- 3) Sliding Force를 줄이기 위하여 Fore&Aft 방향에 각 4 pcs의 Wooden Wedge 설치

6. Stowage 권고사항

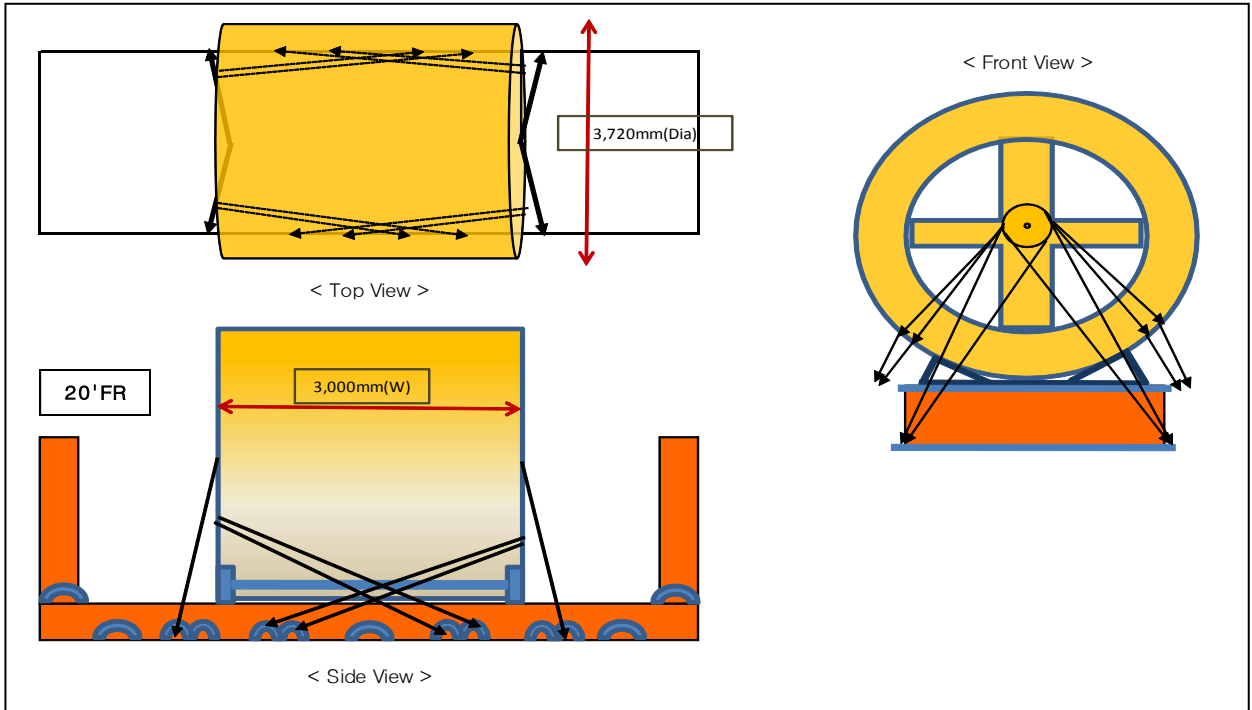
: 화물은 가급적 선박의 Midship, Hold Top에 선적하며, 선수부에는 선적을 지양한다.

7. Cable Drum 종류별 Stuffing/Lashing 권고사항

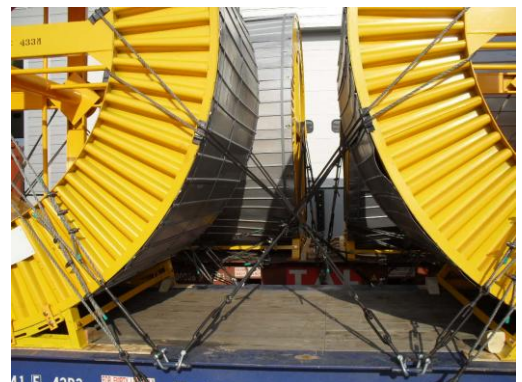
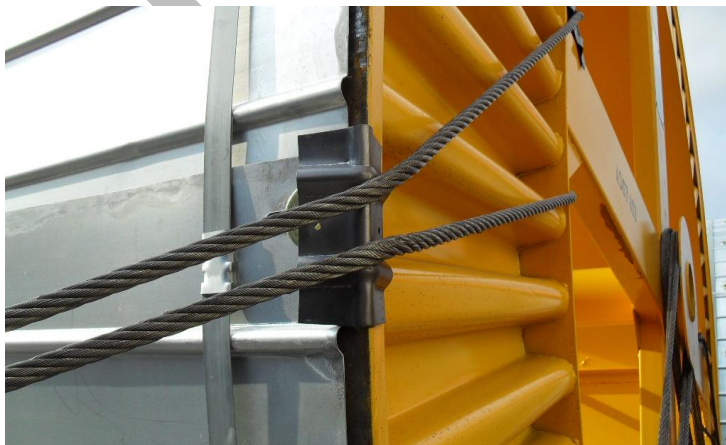
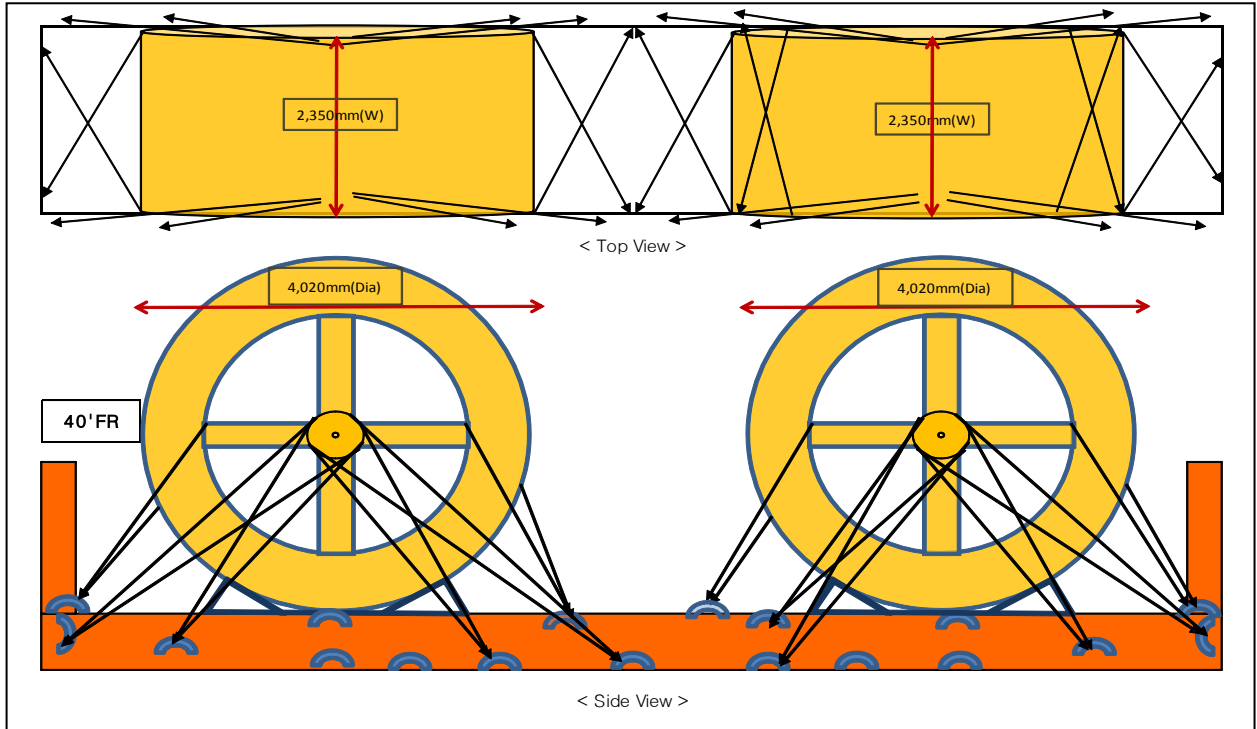
1) Cable 3620mm dia. x 2350mm(W), 19.0 tons 화물 고박 권고 : 20'FR (중방향 선적)



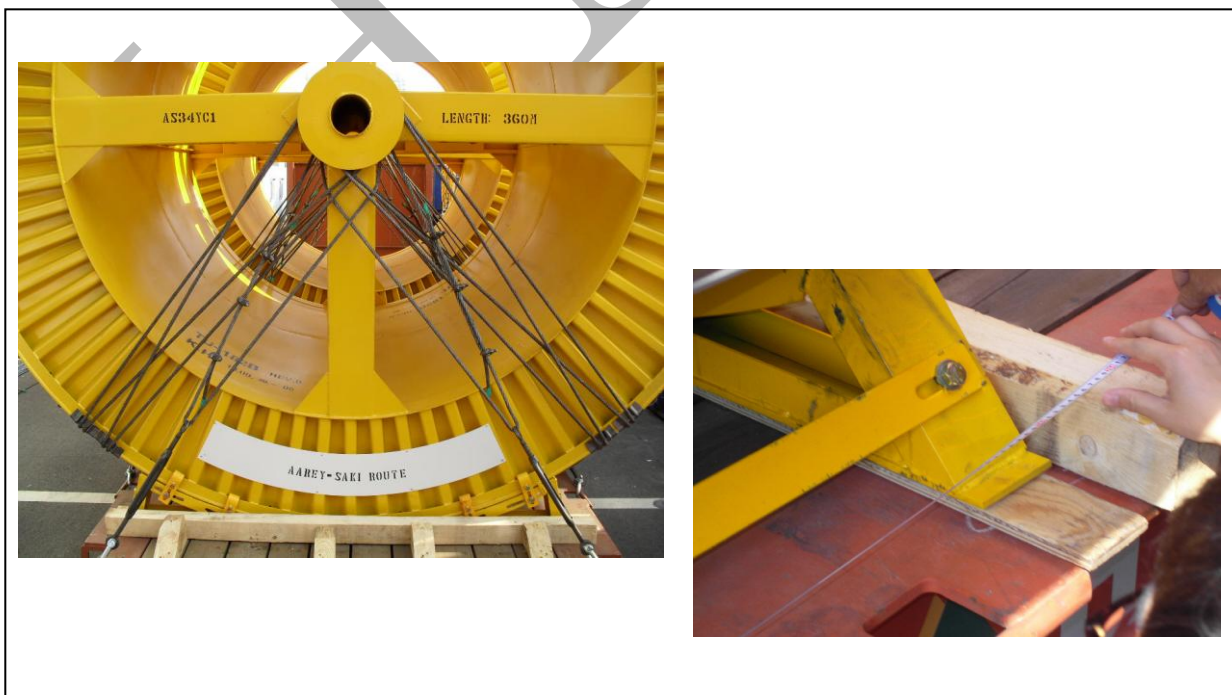
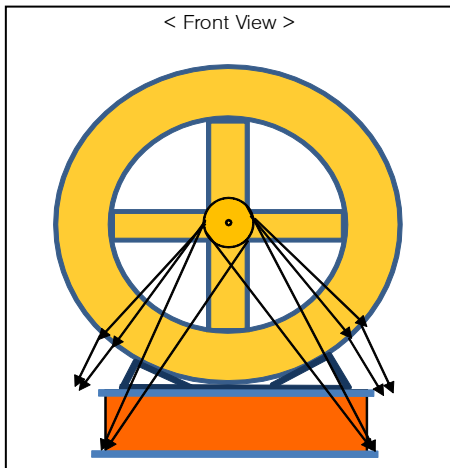
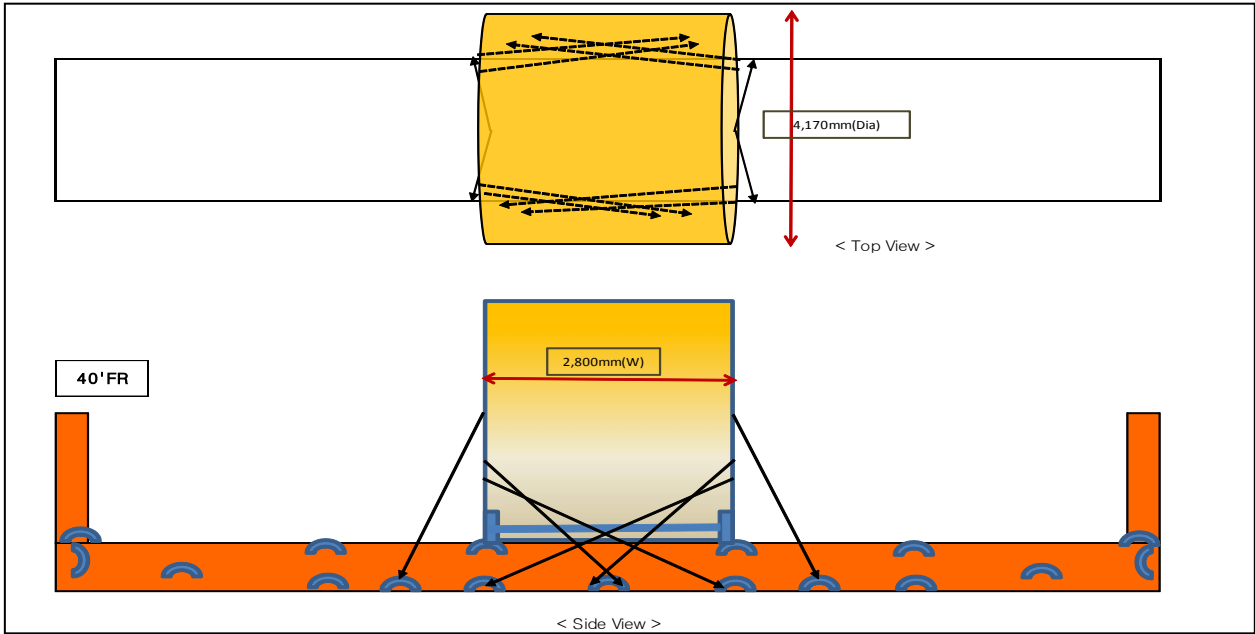
2) Cable 3720mm dia. x 3000mm(W), 27.0 tons 화물 고박 권고 : 20'FR (횡방향 선적)



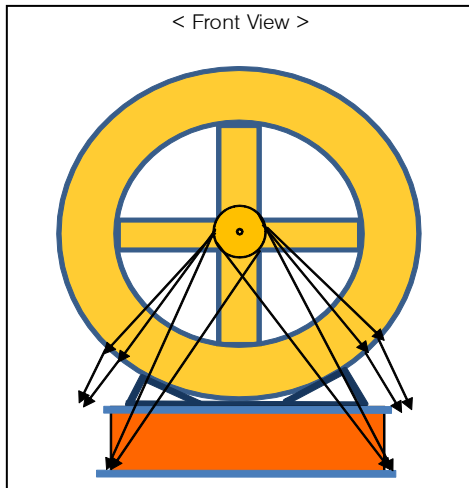
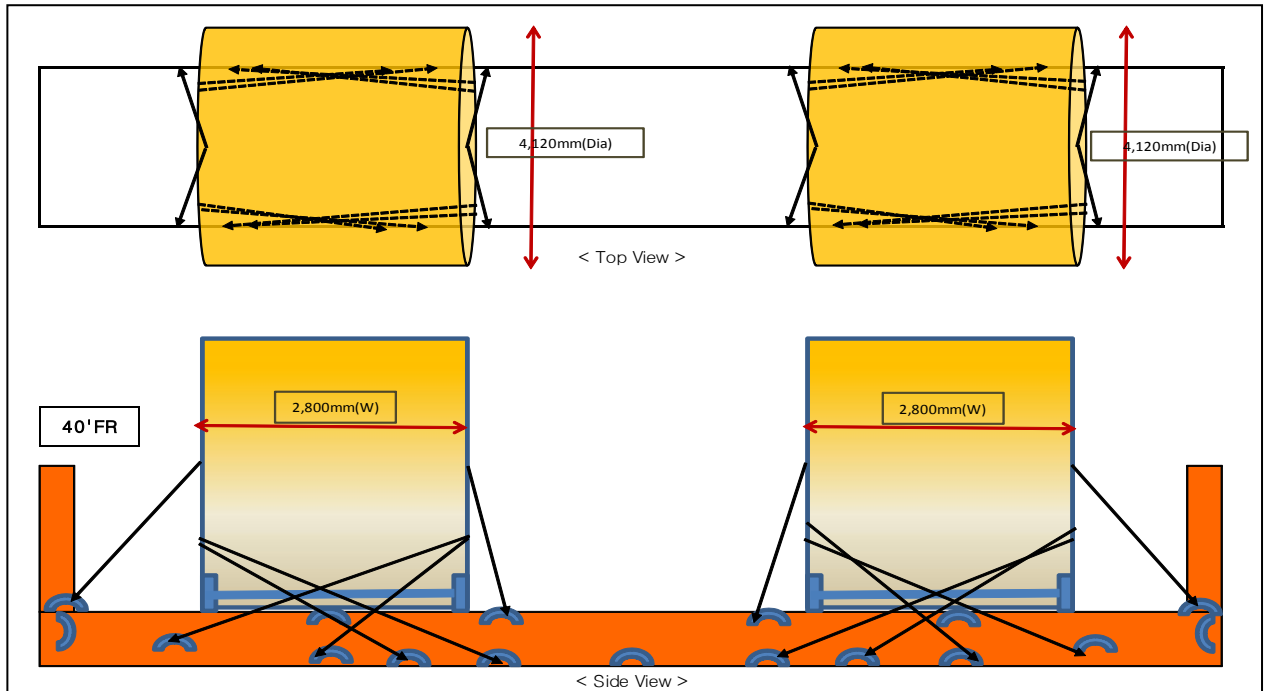
3) Cable 4020mm dia. x 2350mm(W), 19.5 tons, 2 pcs 화물 고박 권고 : 40'FR (2 pcs 종방향 선적)



4) Cable 4170mm dia. x 2800mm(W), 27.5 tons 화물 권고 : 40'FR (1 pc 횡방향 선적)



5) Cable 4120mm dia. x 2800mm(W), 19.5 tons : 40'FR (2 pcs 횡방향 선적)



6) Stuffing Procedure



DD) Lashing & Blocking



7) 별첨 : Cable Drum 선적 및 고박에 대한 추가 사진 첨부

= 끝 =

HMM

Guideline for special cargo securing

4.2 Securing Arrangement of steel coil

- aa) To insure a safe sea transportation, all the procedures in this document have to be implemented.
- bb) It is recommended that Steel coil have to be secured to the pallet which must be nailed firmly to the container floor to prevent coils from shifting during sea transportation.
- cc) Shipper is fully responsible for using equipment unsuitable condition.
- dd) Weight of coils must be distributed evenly to the container floor to avoid "nose & tail heavy".

4.2.1 General method of securing in Dry container

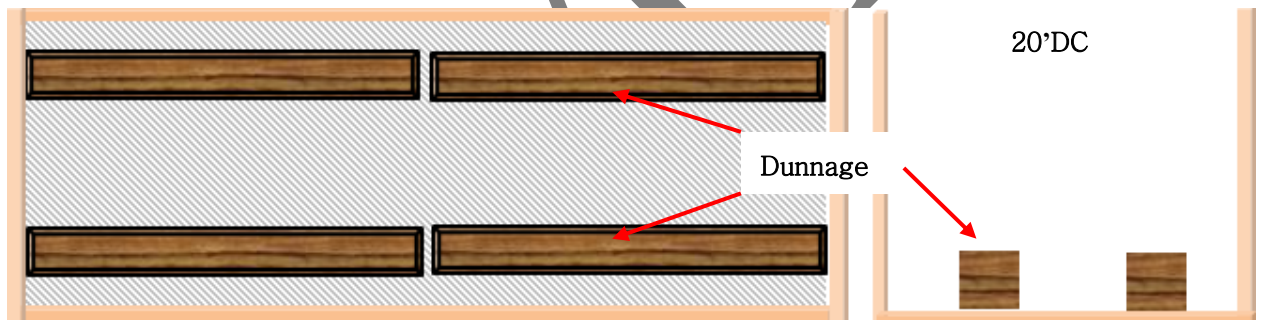
- aa) Dunnage & Weight distribution.

< Use 20' Dry Container >

- Coils up to 9,000Kg – 24 tons rated containers can be used.
Maximum capacity of the container must not be exceeded.
- Coils up to 13,000Kg – 30 tons rated containers must be used.
Maximum coil weight : 13,000kg
Maximum capacity of the container must not be exceeded.

(*) Coils above 13,000Kg – Flat Rack containers must be used.

< Dunnage >



- Coils up to 9,000Kg – 2,500 x 200 x 200 mm (L x W x H)
- Coils up to 13,000Kg – 2,950 x 200 x 200 mm (L x W x H)
- Wooden material : Coniferous trees

Guideline for special cargo securing

bb) Wedge & Blocking

X

Incorrectly cut wedges

: The wedges have been cut so that the nails will have to be driven into the end grain. This will result in the wedges splitting, at the latest when exposed to impact in transit . The wedges rely solely on the nail shear forces. High maximum securing loads cannot be expected

Recommended

The steel sheet rolls rest on the wedge beams in such a way that they are not in contact with the floor of the DC cntr in the middle.

(*) **Wedge length : over coil length**
 (*) **Blocking : put on the dunnage with nailing**

The height of wedge is depend on the radius of coil. The details are refer to the below table.

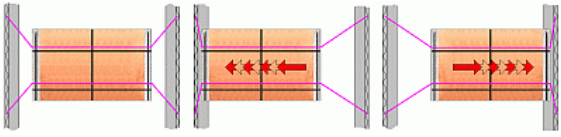
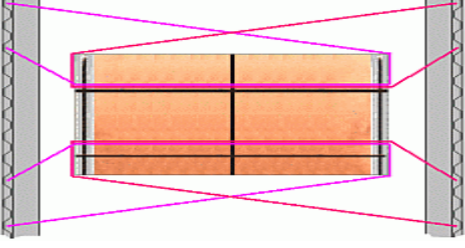
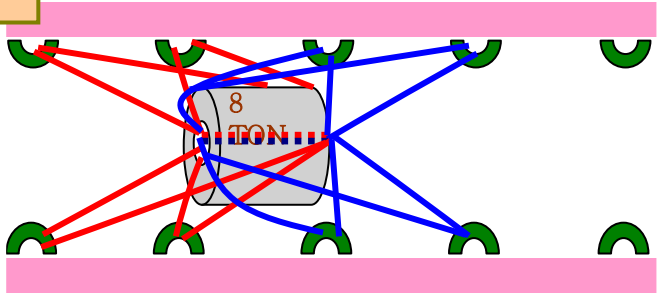
Radius (m)	A (L of Nail)	X (H of Wedge)
0.4	0.17	0.14
0.6	0.25	0.20
0.8	0.33	0.27
1.0	0.41	0.34
1.2	0.50	0.41
1.4	0.58	0.48

L : Length
H : Height

Blocking rolling cargo by Wedge

Guideline for special cargo securing

cc) Lashing

<p>X</p> 	<p>In case of improper Lashing : Coils able to move freely in their lashings</p>
<p>O</p> 	<p>Recommended : Coil fixed with loop lashings. : Loop lashing can prevent the coils from moving sideways. : Depending upon the angle, loop lashing can generate horizontal securing forces in the crosswise and lengthwise directions as well as in the vertical direction.</p>
<p>O</p> 	<p>The number of lashing q'ty should be enough to hold 70% of cargo weight.</p> <p>Ex) Cgo weight : 8m/t SWL of lashing eye in the cntr : 1.5m/t TTL number of lashing q'ty : 4 => $8 \text{ ton} * 0.7 = 5.6$ ⇒ $5.6 / 1.5 = 3.7$</p> <p>* The breaking load of lashing eyes in Dry Container is 1.5 m/t.</p>

(*) Lashing Wire(Band) specification : over SWL 5 tons

Guideline for special cargo securing

4.2.2 Example of securing

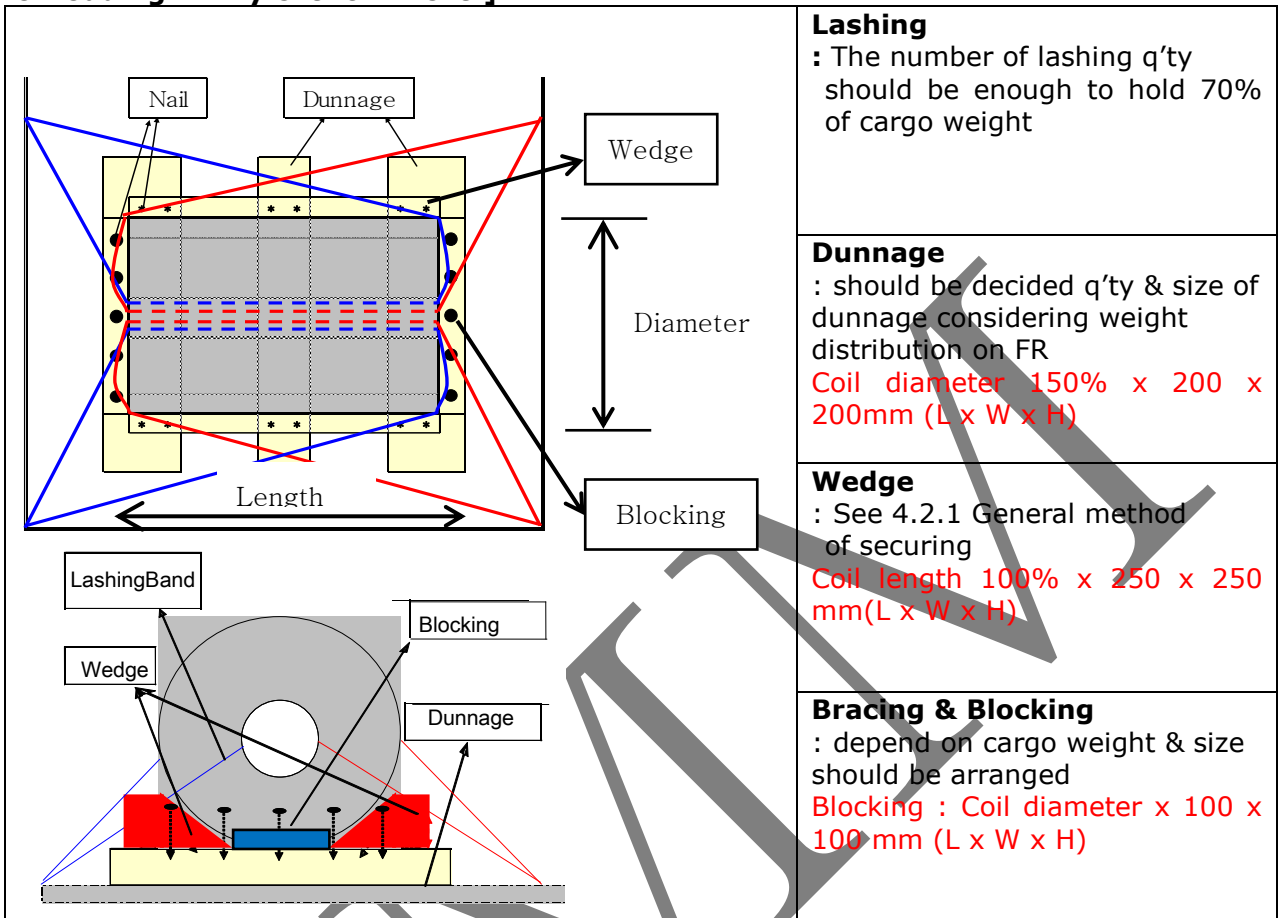
4.2.2.1 Arrangement "Eye to sky" and stowage example

[For loading in Dry cntr]

		<p>Lashing : fastened onto wooden pallet with steel strapping</p>
		<p>Dunnage : Must load on pallet</p>
		<p>Wedge : Unnecessary</p>
		<p>Bracing & Blocking : Need the sound transfer of pressure to the cntr walls</p>
		<p>Securing with squared lumber and hold-down members (*The securing is changeable depending on coil's weight & dimension.</p>
<p>Improper</p>		<p>Recommended</p>

4.2.2.2 Arrangement "Eye to Side Wall" and stowage example

[For loading in Dry cntr & FR cntr]



Lashing
: The number of lashing q'ty should be enough to hold 70% of cargo weight

Dunnage
: should be decided q'ty & size of dunnage considering weight distribution on FR
Coil diameter 150% x 200 x 200mm (L x W x H)

Wedge
: See 4.2.1 General method of securing
Coil length 100% x 250 x 250 mm(L x W x H)

Bracing & Blocking
: depend on cargo weight & size should be arranged
Blocking : Coil diameter x 100 x 100 mm (L x W x H)

Improper

Recommended



Added bracing & blocking as red color

(*)The securing is changeable depending on coil's weight & dimension
(*)Weight per a coil should not exceed 13.0 tons.

4.2.2.3 Arrangement "Eye to Door" and stowage example

[For loading in Dry cntr & FR]

	<p>Lashing : Unnecessary subject to load on pallet</p>
	<p>Dunnage : Must load on pallet ① 3000 x 200 x 200 mm (L x W x H) ② 2400 x 200 x 200 mm (L x W x H)</p>
	<p>Wedge : See 4.2.2 General method of securing ③ Coil length x 250 x 250 mm (L x W x H)</p>
	<p>Bracing & Blocking : Need the sound transfer of pressure to the cntr walls ④ Blocking on the dunnage : Length between 2 wedge x 100 mm x 100 mm (L x W x H)</p>
<p>Securing with squared lumber and hold-down members Lashing Band(wire) with over SWL 5 tons</p>	
<p>Improper</p>	<p>Recommended</p>

(*)The securing is changeable depending on coil's weight & dimension

(*) Weight per a coil should not exceed 13 tons.

4.2.2 General method of securing in Flat rack.

→ Coils weight above 13.0 tons, Flat Rack containers must be used.

4.2.2.1 Arrangement "Eye to sky" and stowage example

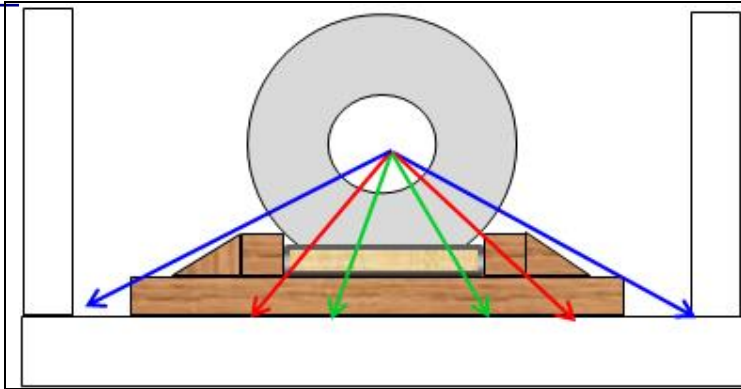
[For loading in FR cntr]

	<p>① Lashing : The number of lashing q'ty should be enough to hold 70% of cargo weight</p>
	<p>② Dunnage : should keep shape of "#" on FR cntr in order to distribute the weight properly and be decided q'ty & size of dunnage considering weight distribution on FR cntr.</p>
	<p>Wedge : Unnecessary subject to hold cargo with steel band with dunnage</p>
	<p>Bracing & Blocking : Unnecessary subject to above Condition</p>

4.2.2.2 Arrangement "Eye to side" and stowage example

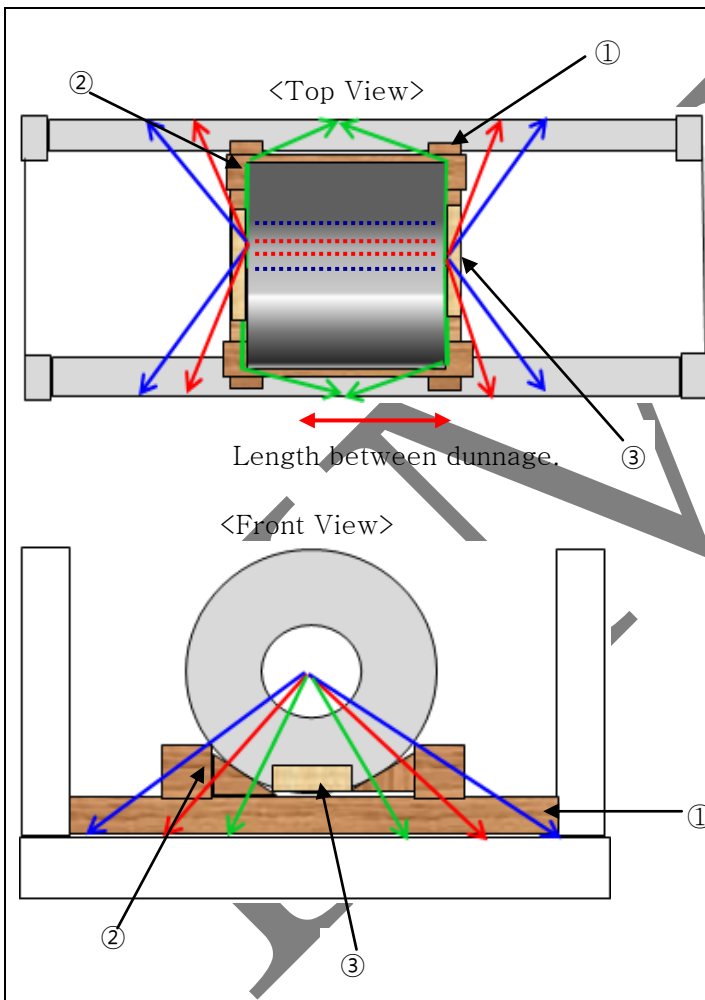
<p><SIDE VIEW></p>	<p>Lashing : Turn buckle : 20mm in dia x each wire rope Shackle : 20mm in dia x each turn buckle.</p>
	<p>① Dunnage : Length on Load Distribution table x200 x 200 mm (L x W x H) <ul style="list-style-type: none"> ➢ Below 20ton : 2.0 Meter ➢ Below 22ton : 3.0 Meter ➢ Below 24ton : 4.0 Meter ➢ Below 26ton : 5.0 Meter ➢ Above 26ton : 6.0 Meter </p>
	<p>② Wedge : 2400 x 200 x 200 mm(L x W x H)</p>

Guideline for special cargo securing



③ Bracing & Blocking
 : Length between wedge x 100 x 100 mm (L x W xH)

4.2.2.3 Arrangement "Eye to end" and stowage example



Lashing
 : The number of lashing q'ty should be enough to hold 70% of cargo weight

① Dunnage
 : 2400 x 250 x 250 mm(L x W x H)

② Wedge
 : Length between dunnage x 250 x 250 mm (L x W xH)

Bracing & Blocking
 : Length between 2 wedge x 100 mm x 100 mm(L x W x H)

(*) Point Loading
 → Length between dunnage.

Upto 20 ton : 1.0 Meter
 Upto 23 ton : 1.5 Meter
 Upto 26 ton : 2.0 Meter
 Upto 30 ton : 2.5 Meter