MSC GUIDELINE
FOR SHIPPING STEEL COILS

1. Introduction

1.1. Shipping condensed mass cargos in GP containers holds a potential risk for containers, vessels and crew. The sheer weight of the cargo can lead to a collapse of the floor when it is not spread properly along the container's floor. Additionally, shifting of the cargo inside the container caused by improper lashing might tear the side panels and drop outside the container.

1.2. Steel coils are considered as the condensed mass cargos. They are treated distinctly since they have special characteristics, mainly special and constant design and concentrated great pressure on relatively small area.

1.3. This guideline for shipping steel coils is designated for cargo care and to protect MSC equipment and the crew handling it.

2. Objective

2.1. Defining mandatory technical requirements for shipping steel coils.

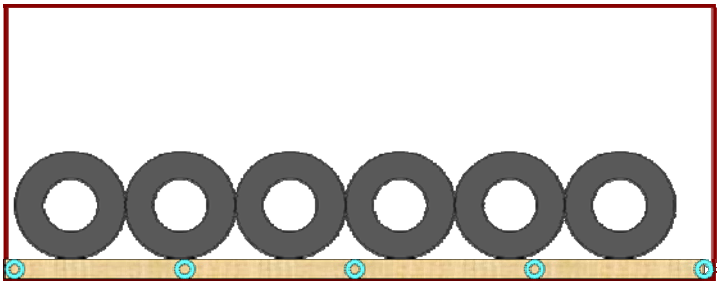
2.2. Establishing a procedure which will allow MSC key account customers to use the company's equipment safely and efficiently when shipping steel coils.

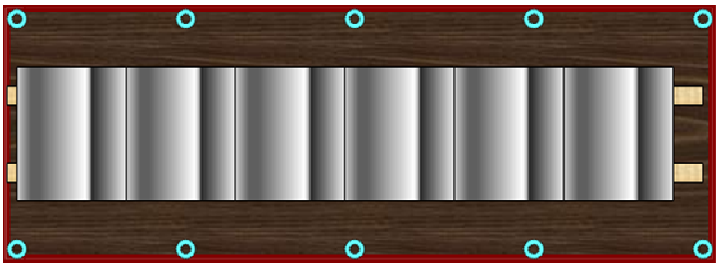
3. Mandatory Technical Requirements

3.1. Stowage

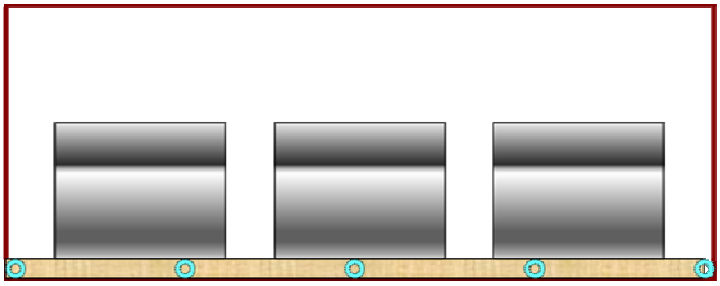
Steel coils should be properly stowed in the containers with eye to wall, eye fore & aft and eye to sky.

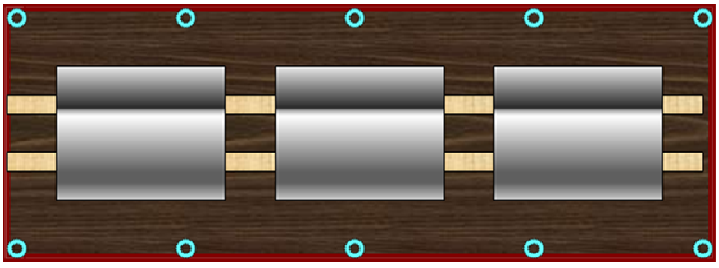
3.1.1. Eye to Wall



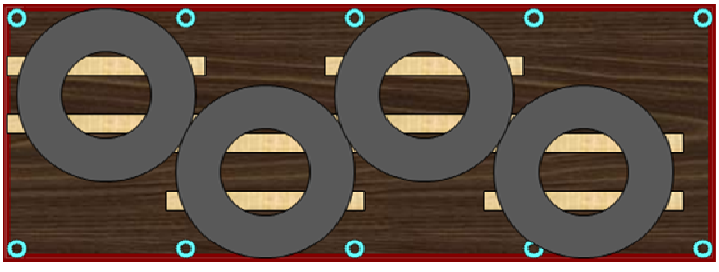


3.1.2. Eye Fore & Aft





3.1.3. Eye to Sky



3.2. Bedding

Steel coils cannot contact with the container's floor. Each coil should be bedded with two longitudinal rails made of Hard-Wood

3.2.1. Calculation of the Length of Wooden Longitudinal Rails

The length of the Wooden Longitudinal Rails is determined by the weight of the cargo. As a Rule-of-Thumb, the length of each Rail ($\mathbf{L_r}$) should be calculated according to the following formula:

$$L_r = M_c \times L_c \div P_c$$

Or roughly

$$L_r = M_c \times 0.22$$

Where:

L_r = ***Length of each rail*** *(in meters)*

M_c = ***Coil Weight*** *(in tons)*

L_c = ***Container Internal Length*** *(in meters)*

P_c = ***Container Payload*** *(in tons)*

3.2.2. Calculation of the Distance between of Wooden Longitudinal Rails

For a coil stowed in the container with eye fore & aft, the Transverse Distance between Longitudinal Rails ($\mathbf{R_d}$) should be set so that the bottom of the Coil will not touch the container's floor. Optimal distance between the bottom of the Coil and the floor is **5** cm. The Minimum distance between the Longitudinal Rails ($\mathbf{R_d}$) should be $\mathbf{D_c / 2}$ (half of Coil's Diameter).

$$R_d = D_c \div 2$$

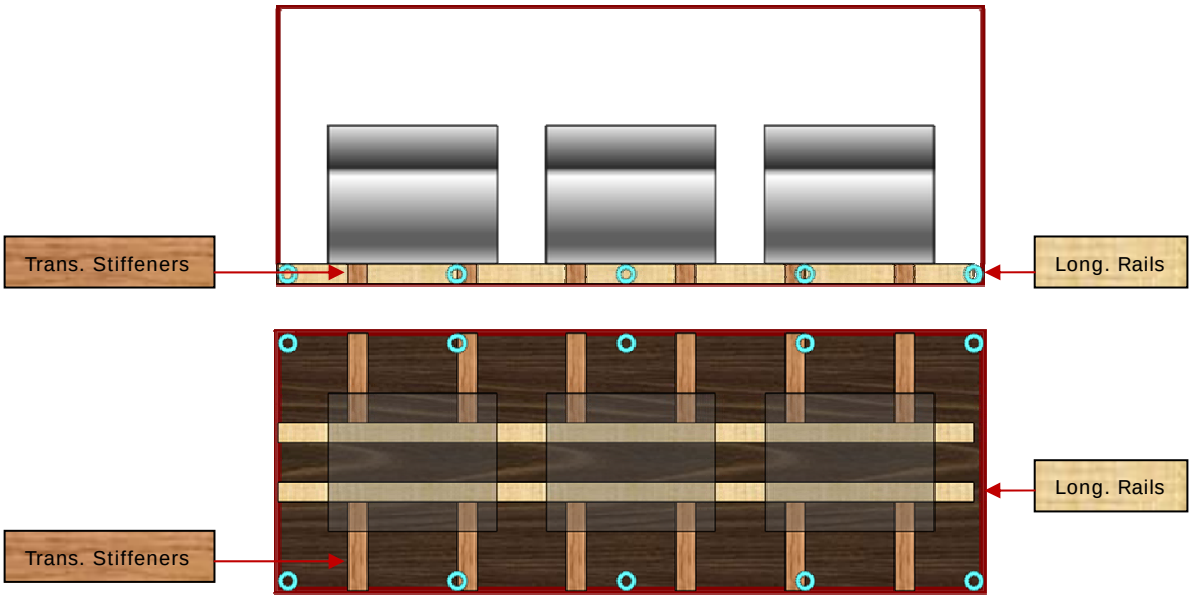
Where:

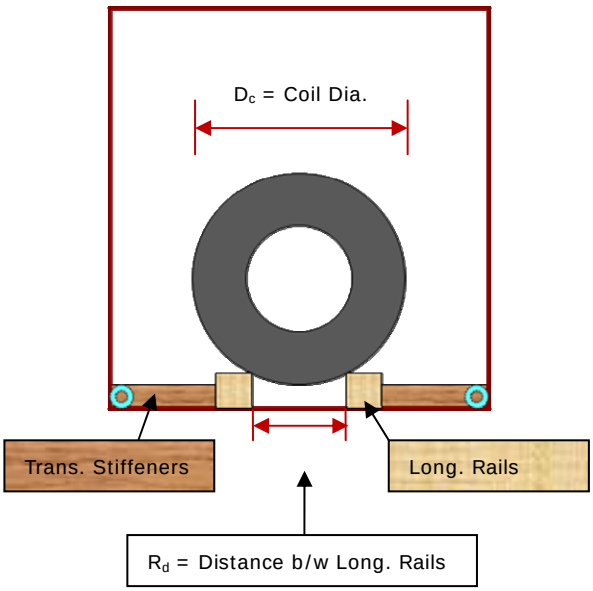
R_d = ***Trans. Distance b/w Long. Rails*** *(in meters)*

D_c = ***Coil Diameter*** *(in meters)*

The Longitudinal Rails should be properly reinforced to the container's floor by nailing.

The Wooden Longitudinal Rails should be reinforced to the container's Side-panel by using Transverse Stiffeners (web shaped) made of Hard-Wood. The stiffeners should be nailed to the container's floor.





3.2.3. Calculation of the Longitudinal Rail's Cross Section

The cross-section of the rails should be set according to the following rules:

COIL WEIGHT (tons)	**CROSS SECTION** (cm)	**STOWAGE**	**QTY** (pcs)	**REMARKS**
Less than 5	10 x 10	Eye to wall / Eye fore & aft / Eye to sky	2	Hard wood
5 - 7 (incl. 5)	10 x 10	Eye to wall / Eye fore & aft / Eye to sky	2	Hard wood
7 - 9 (incl. 7)	10 x 10	Eye fore & aft	2	Hard wood
	15 x 15	Eye to wall	2	Hard wood
	10 x 10		**3**	Hard wood
9 - 12 (incl. 9)	15 x 15	Eye fore & aft	2	Hard wood
More than 12	20 x 20	Eye fore & aft	2	Hard wood

3.2.4. Example

A coil weights 7 tons and should be carried on 2 Wooden Longitudinal Rails with a cross section of 10 x 10 cm in length calculated as below:

$$L_r = M_c \times L_c \div P_c = 7 \times 5.902 \div 28 = 1.47 \text{ Meters}$$

3.2.5. Easy Reference

When the bedding materials are prepared for supporting of coils in the container, the below table can be as an easy reference:

COIL WEIGHT (tons)	**TIMBER SIZE** (cm)	**STOWAGE**	**QTY** (pcs)	**REMARKS**
Less than 5	110 x 10 x 10	Eye to wall / Eye fore & aft / Eye to sky	2	Hard wood
5 - 7 (incl. 5)	150 x 10 x 10	Eye to wall / Eye fore & aft / Eye to sky	2	Hard wood
7 - 9 (incl. 7)	190 x 10 x 10	Eye fore & aft	2	Hard wood
	190 x 15 x 15	Eye to wall	2	Hard wood
	190 x 10 x 10		**3**	Hard wood
9 - 12 (incl. 9)	250 x 15 x 15	Eye fore & aft	2	Hard wood
More than 12	20 x 20	Eye fore & aft	2	Hard wood or Steel beams. The length should be calculated based on the above-mentioned formula

3.3. Wedging/Blocking/Chocking Arrangement

The coils in container should be wedged, blocked and chocked where necessary and applicable.

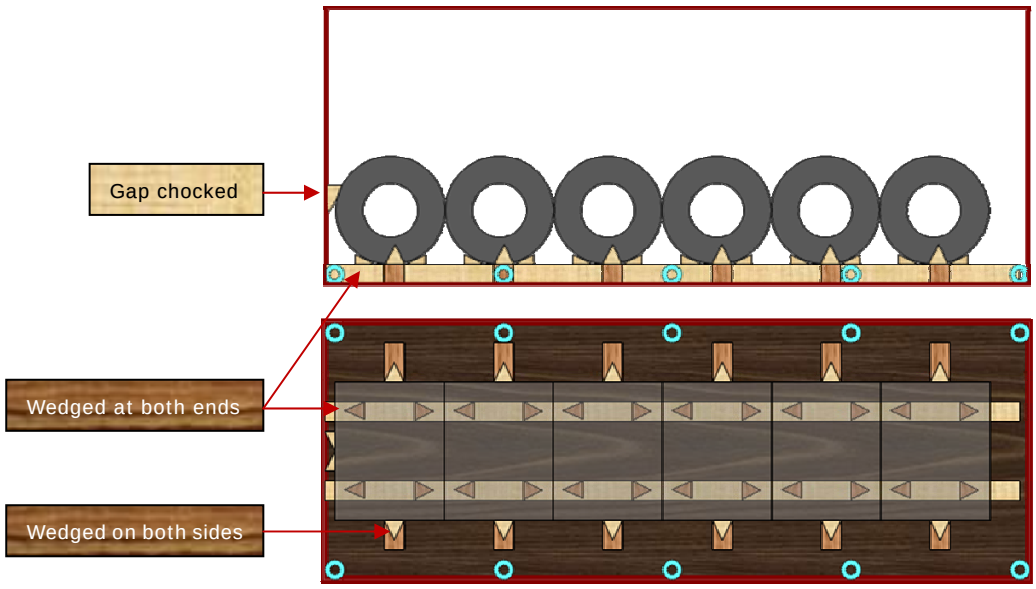
COIL WEIGHT (tons)	STOWAGE	WEDGING/BLOCKING/ CHOCKING
Less than 5	Eye to wall / Eye fore & aft / Eye to sky	Wedged and/or blocked
5 - 7 (incl. 5)	Eye to wall / Eye fore & aft	Chocked, wedged and/or blocked
7 - 9 (incl. 7)	Eye fore & aft	Chocked, wedged and/or blocked
	Eye to wall	Chocked, wedged and/or blocked
9 - 12 (incl. 9)	Eye fore & aft	Chocked, wedged and/or blocked
More than 12	Eye fore & aft	Chocked, wedged and/or blocked

3.3.1. For Coil Weights 5 Tons or Less

a) Eye to Wall

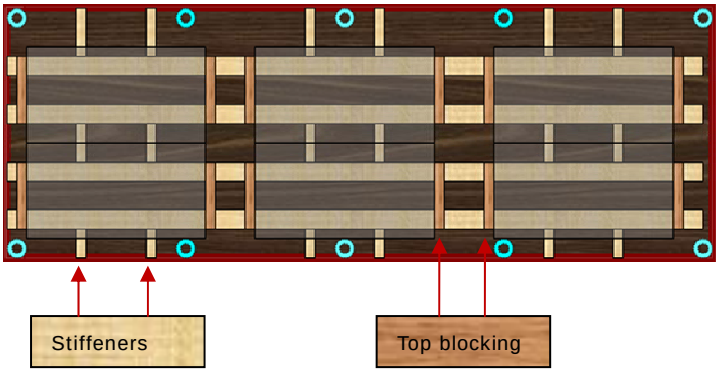
Wedging should be applied to coil on both sides and at both ends

Gap between coil and front end wall should be chocked.



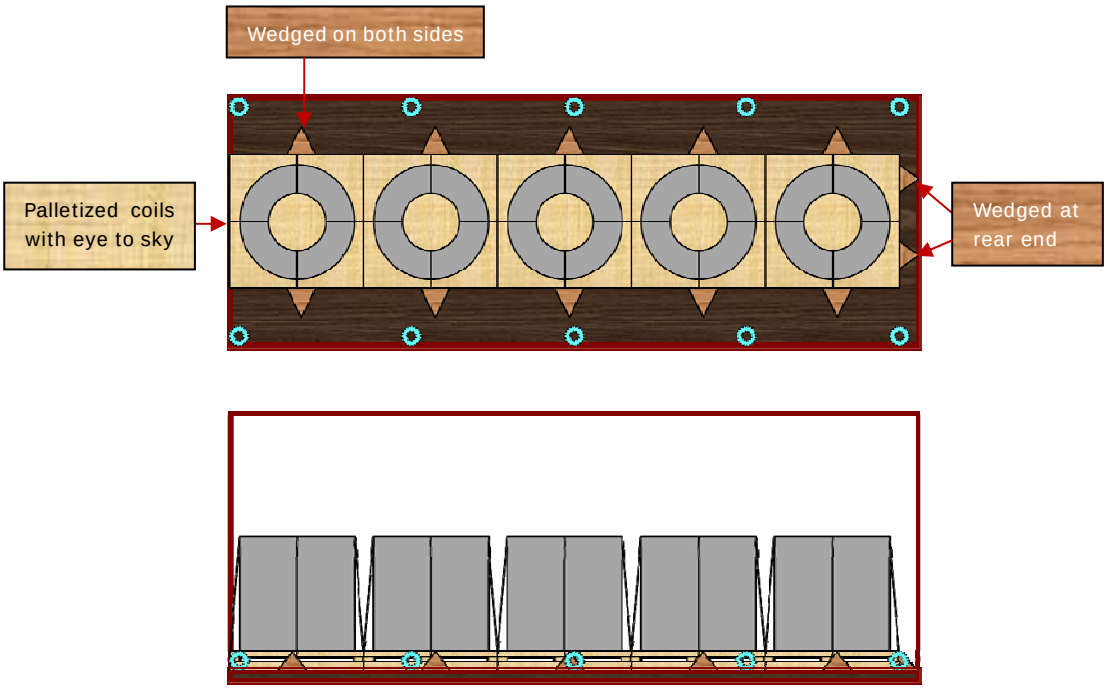
b) Eye Fore & Aft

Coils should be blocked at both ends.



c) Eye to Sky

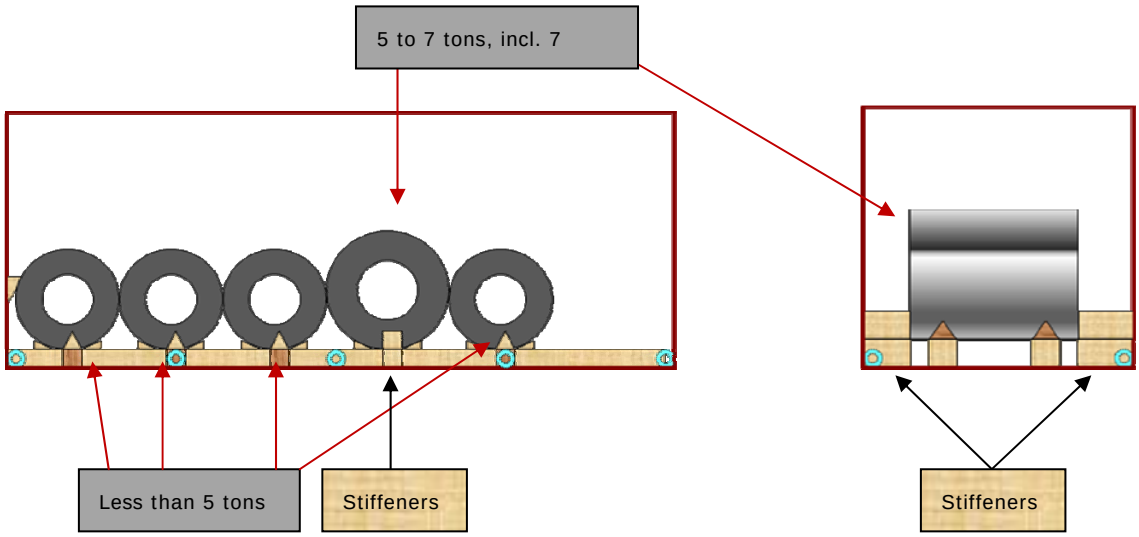
Wedging should be applied to coil pallet on both sides and at rear end



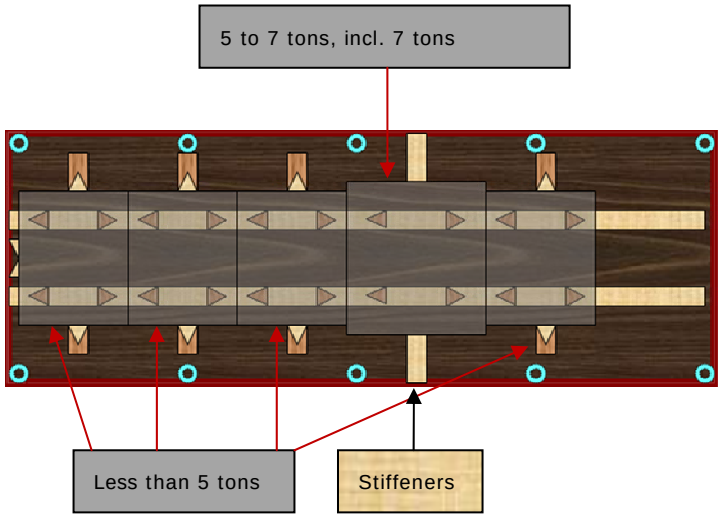
3.3.2. For Coil Weights 5 Tons and up to 7 Tons

Wedging or blocking should be applied.

Void space between coils and side walls should be chocked with stiffeners.



(Side view) (Front view)

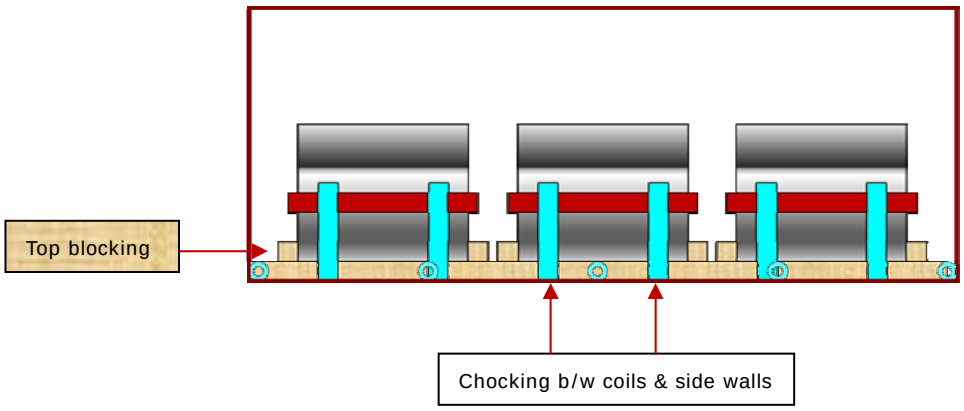


(Top view)

3.3.3. For Coil Weights 7 Tons or More

Wedging or blocking should be applied.

Void space between coils and side walls should be chocked with wooden structures.



3.4. Lashing Arrangement

3.4.1. General

All coils must be lashed. No loose coils are allowed in the container.

Lashing/securing should be carried out in accordance with “IMO MSC/CIRC 745 GUIDLINES FOR CARGO SECURING MANUAL AND GOOD SEAMANSHIP PRACTICE”.

Lashing materials must be approved. Taking into consideration the weight of the coil to be secured, as a general rule of thumb, the combined breaking strength of the lashings to be used must be at least **1.8** times the coil weight.

Suitable “chafing gear” and/or “softeners” should be fitted on the lashings in any areas where the lashings make contact with the coil and other lashings, in order for cargo care and to prevent excessive wear and subsequent failure of the lashings.

Lashings should be secured to the fixed lashing rings in the container. Lashings are not to be secured to any other points other than those designated for this purpose.

3.4.2. Calculation of Lashing Force

If a coil weights 19 tons, combined BS (Breaking Strength) to be applied should be calculated as below:

L_f = M_c x 1.8 = 19 x 1.8 = 34.2 Tons = 336 kN

Where:

L_f = Lashing Force *(in tons / kN) or* ***Combined BS*** *(in tons / kN)*

M_c = Cargo Weight *(in tons) or* ***Mass Force*** *(in kN)*

Example:

If the coil weights 19 tons and the Breaking Strength (BS) of wire rope is **6,000** tons or **58** kN, then **6** lashings (336/58 kN) in total should be used to secured it.

3.4.3. Demonstration of Lashing/Securing Mode