



THE GUIDELINE FOR

# CONTAINERS LOADING ON BULK CARRIERS

This document is prepared to give a brief guideline for carrying containers on bulk carriers which do not have container transport facilities for the convenience of ship owners as well as ship management companies.

OCTOBER, 2021







# CONTENTS

<b>1. INTRODUCTION</b>	<b>3</b>
<b>2. REQUIREMENTS FOR CARGO HOLD LOADING</b>	<b>4</b>
2.1 Individual Stowage of Each Container	4
2.2 Stack Loading of Containers	6
<b>3. REQUIREMENTS FOR ON-DECK LOADING</b>	<b>8</b>
3.1 Individual Stowage of Each Container	8
3.2 Stack Loading of Containers on Deck	10

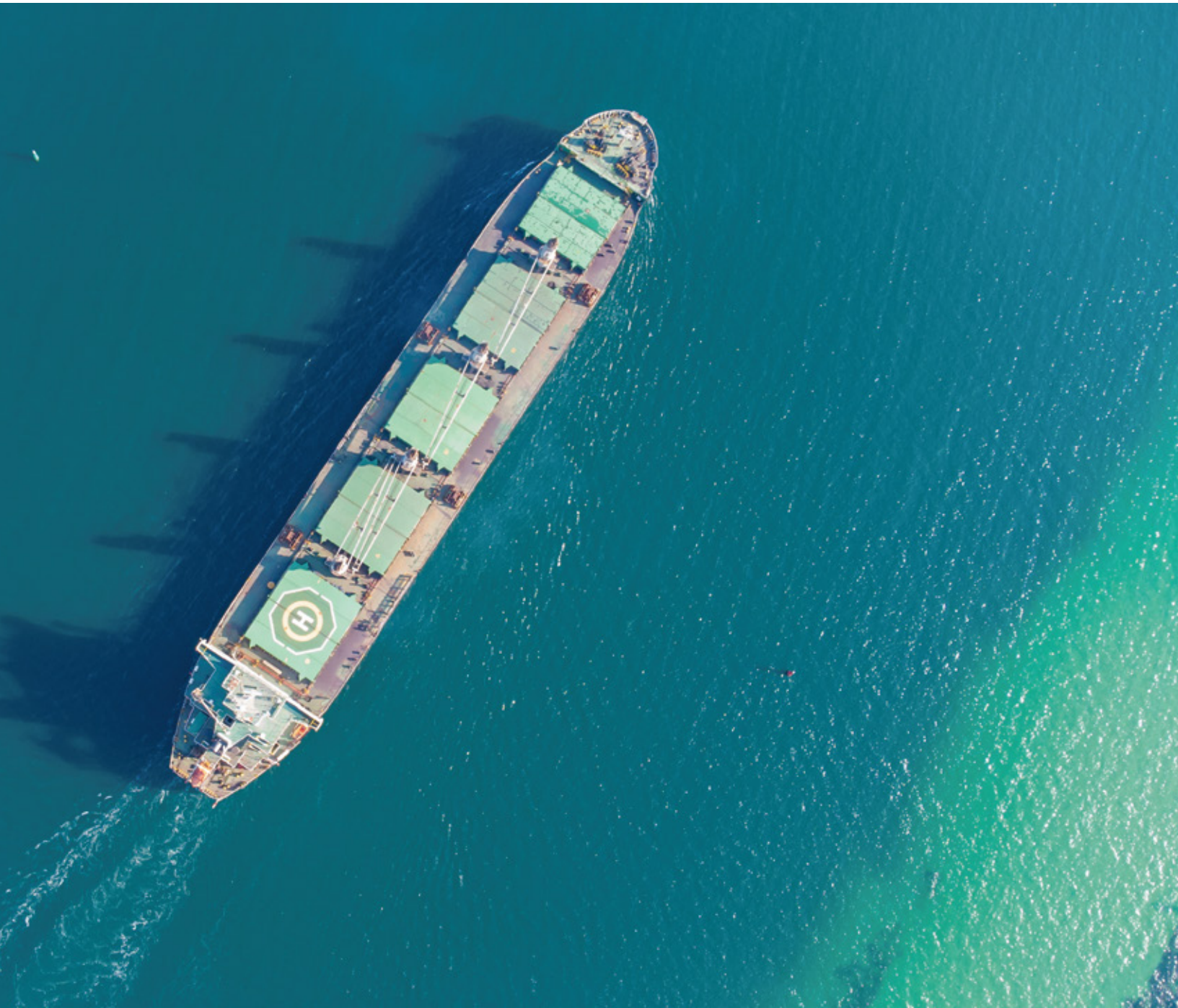


# 1. INTRODUCTION

This guideline is prepared to provide guidelines for carrying containers on bulk carriers which do not have container transport facilities. Even though bulk carriers are not specially designed to transport containers, containers can be transported on bulk carriers if the requirements of paragraphs 2 and 3 of this guideline are satisfied.

In order to facilitate identification of the technical requirements for loading containers on bulk carriers, we divided the items to be considered into two conditions, "Cargo hold loading" and "On-deck loading", taking into account the actual container loading patterns.

For your information, except for the technical issues, other requirements such as ship's insurance, survey, ISM audit, crew education etc. need to be consulted with the relevant agencies in advance.





## 2. REQUIREMENTS FOR CARGO HOLD LOADING

There are two ways to load containers in cargo holds. The first way(Para.2.1) is to load and secure containers individually like general cargoes, and the second one(Para.2.2) is to stack containers in layers.

### 2.1. Individual Stowage of Each Container like General Cargoes in Cargo Hold

#### 2.1.1. Container Stowage and Securing Arrangements

When loading each container individually like a general cargo, containers can be stowed and secured in accordance with Annex 1 of CSS Code.

#### 2.1.2. Hull Structure Strength

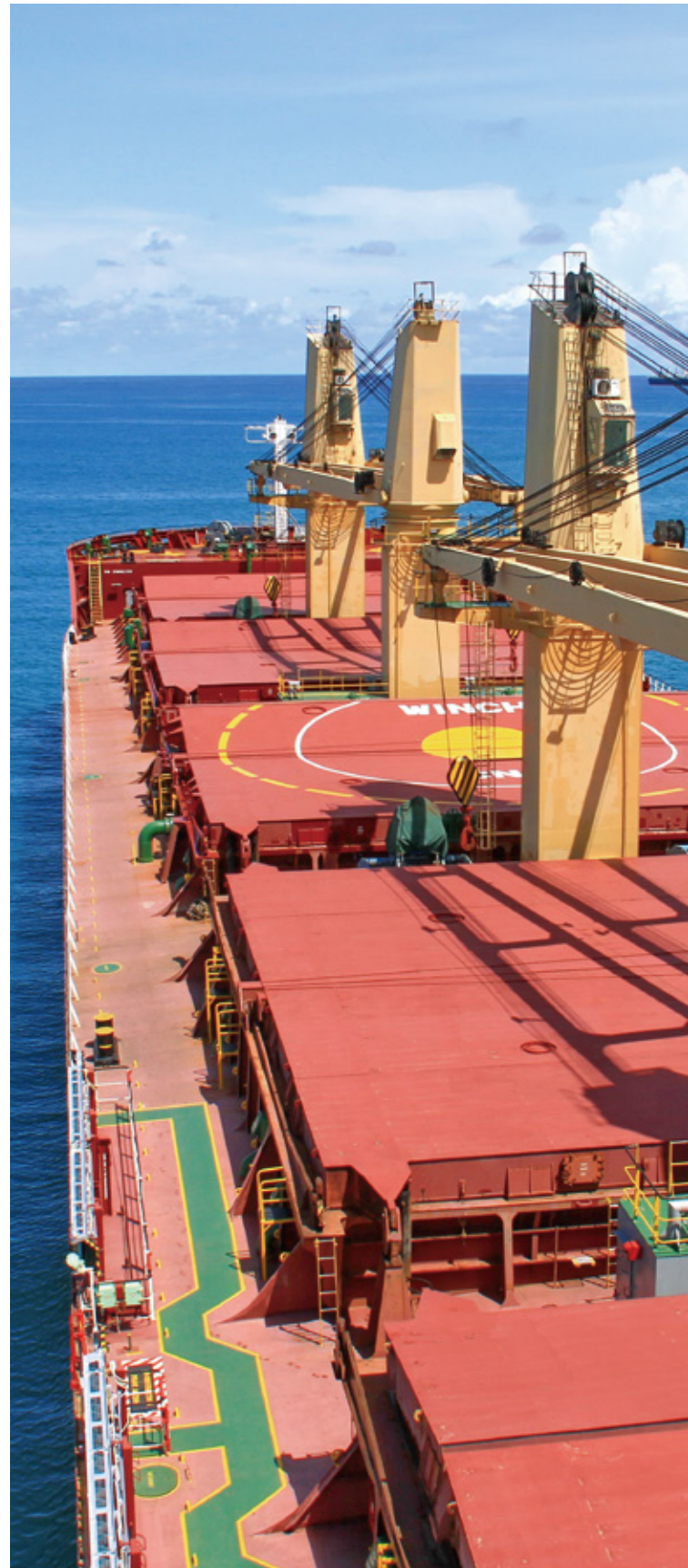
Containers, when not resting on stacking devices, should be stowed on timber of sufficient thickness (i.e. dunnages), arranged in such a way as to transfer the container load evenly on to the hull structure of the stowage area in order to avoid unexpected damages from the point loads of the container.

#### 2.1.3. Cargo Securing Manual (CSM)

In general, the cargo securing manual(CSM) is to be approved and on board for vessels intended to carry cargoes which are need to be secured in accordance with SOLAS VI/5. The CSM is to be prepared in accordance with the Guidelines for the Preparation of the Cargo Securing Manual (MSC.1/Circ.1353)

In case of carrying each container individually like general cargoes, at least the following items shall be included in CSM in addition to a typical CSM.

- CSS Code Annex 1 (Safe stowage and securing of containers on deck of ships which are not specially designed and fitted for the purpose of carrying containers)
- List, arrangement, certificate, etc. of fixed securing devices (fixed securing devices are to be of KR approved ones)





#### 2.1.4. Stability Information Booklet (Loading manual)

A supplement to the Stability information booklet should be submitted for approval. In the supplement, typical container loading conditions (Departure and Arrival), relevant information for the container loading, and longitudinal strength calculations for cargo hold flooding are to be included.

If the containers are loaded together with bulk cargoes (in other cargo holds), the typical loading & unloading sequence also should be included in the above supplement.

#### 2.1.5. Loading Instrument

Loading instrument should be updated in order to calculate the loading conditions as indicated above 2.1.4. The test report for the loading instrument should be submitted for approval.

Although the VGM of container in accordance with SOLAS VI/Reg.2.5 is not subject to Classification Approval, loading instrument should also be updated.

#### 2.1.6. Calculation of Lightship Properties

If there are alterations that affect the ship's lightweight and center of gravity, detailed weights and center (LCG and VCG) calculation to adjust the lightship properties should be carried out and submitted to the Surveyor.

Where the deviation of lightweight exceeds 2% of the originally approved lightweight, or the deviation of lightship's longitudinal center of gravity exceeds 1% of the LBP, an inclining test should be carried out and the Stability information booklet (including Loading manual, Grain loading manual (if applicable), Test report of loading instrument, and in some cases, Damage stability calculation in accordance reg.27 of ICLL) should be submitted for approval.<sup>1)</sup>

Where a ship applies to the Ship's Safety Act of the Korean Government, and the deviation exceeds the following limits, the drawings mentioned in 1) shall be submitted for approval.

- Where the calculated vertical center of gravity (VCG) is increased and the deviation of lightweight is not less than 0.5% of the approved value.
- Where the calculated vertical center of gravity (VCG) is decreased and the deviation of lightweight is not less than 1.5% of the approved value.



### 2.1.7. Fixed Fire Extinguishing System for Cargo Spaces

The cargo spaces on cargo ships of 2,000 gross tonnage and upwards shall be protected by a fixed carbon dioxide fire extinguishing system complying with the provisions of the Fire Safety Systems Code.

### 2.1.8. Carriage of Dangerous Goods (CDG)

If dangerous goods are shipped inside the container in cargo holds, the cargo spaces shall be protected by a fixed carbon dioxide fire extinguishing system complying with the provisions of the Fire Safety Systems Code. In addition, the requirements of SOLAS II-2 /Reg.19 shall be met.

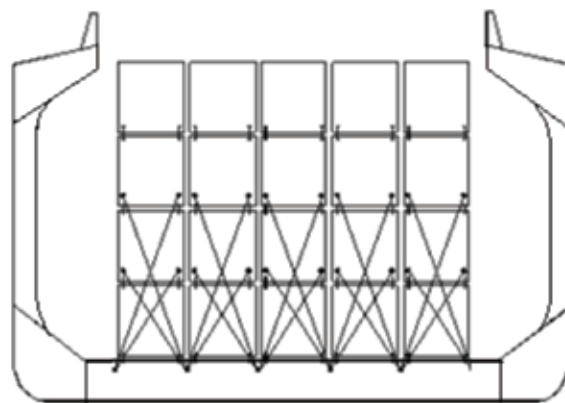
Also, to confirm this, a cargo list that is shipped inside the container shall be submitted to this society

## 2.2. Stack Loading of Containers in Cargo Hold

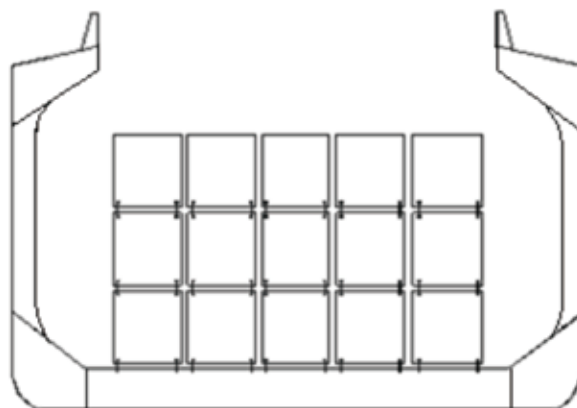
### 2.2.1. Container Stowage and Securing Arrangements

When loading containers by stacking up, containers can be stowed and secured in the hold without the cell guides in accordance with the requirements of KR Guidance Part 7 Annex 7-2 paragraph 5 "Container securing arrangements for underdeck stowage without cell guides".

The stowage and securing methods in cargo hold are similar to ones of the on-deck loading of container ships, but other special securing devices and arrangements may be required depending on their lashing patterns. The pictures below show some examples of typical lashing methods in cargo holds.



HIGH TIERS



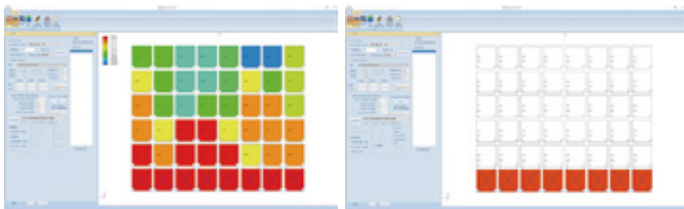
LOW TIERS



### 2.2.2. Allowable Container Weight and Stack Height

Allowable container weight distribution and stack height will be determined by the lashing calculations and the strength assessment of hull structures in accordance with KR Guidance Part. 7 Ships of Special Service Annex 7-2 Guidance for the Container Securing Arrangements.

Lashing calculations for determining the allowable container weight distribution, stack height, etc. can be easily and quickly carried out by using the KR SeaTrust-LS program provided by KR. The pictures below show some examples of lashing calculations using the program. The KR SeaTrust-LS program can be provided free of charge if requested by the customer.



The example of lashing calculation  
KR SeaTrust-LS

### 2.2.3. Hull Structure Strength

The double bottom structures of bulk carriers are normally designed, in general, to carry high density cargos. Therefore double bottom grillage strength might be enough to carry containers in cargo hold. However, strength check can be required to verify their strength.

In addition, local reinforcements such as cone brackets under container sockets are to be provided to withstand point loads from the container corner casting considering staking load.

In this case, structural reinforcement drawings(including strength assessment report) are to be submitted for approval.

### 2.2.4. Cargo Securing Manual

In case of carrying containers by stacking up in cargo hold, at least the following items shall be included in CSM in addition to a typical CSM.

- The contents related to the standardized cargo loading
- Container Stowage Arrangement (CSA)
- List, arrangement, certificate, etc. of fixed and portable securing devices (container securing devices are to be of KR type approved ones)

### 2.2.5. Stability and Longitudinal Strength (LOADING MANUAL)

See to 2.1.4

### 2.2.6. Loading Instrument

See to 2.1.5

### 2.2.7. Calculation of Lightship Properties

See to 2.1.6

### 2.2.8. Fixed Fire Extinguishing System for Cargo Spaces

See to 2.1.7

### 2.2.9. Carriage of Dangerous Goods (CDG)

See to 2.1.8



## 3. Requirements for On-deck Loading

Like loading containers in cargo hold, there are two ways to load containers on deck/hatch covers. The first way is to load and secure containers individually like general cargoes, and the second one is to stack containers in layers and both cases are covered by this Guidelines.

### 3.1. Individual Stowage of Each Container like a General Cargo on Deck

#### 3.1.1. Container Stowage and Securing Arrangements

When loading each container individually like general cargoes, containers can be stowed and secured in accordance with Annex 1 of CSS Code.

#### 3.1.2. Hull Structure(i.e. deck) Strength

Containers, when not resting on stacking devices, should be stowed on timber of sufficient thickness(i.e. dunnages), arranged in such a way as to transfer the container load evenly on to the hull structure of the stowage area.

#### 3.1.3. Hatch Cover Strength

Hatch covers of bulk carriers are normally designed to withstand only the small uniform design loads induced by green sea but not point loads from the containers.

Therefore, the strength assessment for the hatch covers is to be carried out and structural reinforcements(ex: increase of scantlings, adding buckling stiffeners, supporting structures under container sockets, etc.) may be required depending on the results of the strength assessment. Please refer to IACS UR S21A for the strength assessment of hatch covers.

If necessary, the reinforcement of hatch coaming may be required depending on the results of the strength assessment.

In this case, the reinforcement drawing including the strength assessment report are to be submitted for approval.

#### 3.1.4. Cargo Securing Manual(CSM)

In case of carrying each container individually like general cargoes on upper deck, at least the following items shall be included in CSM in addition to a typical CSM.

- CSS Code Annex 1 (Safe stowage and securing of containers on deck of ships which are not specially designed and fitted for the purpose of carrying containers)
- List, arrangement, certificate, etc. of fixed securing devices (fixed securing devices are to be of KR approved ones)

When carrying each container individually like general cargoes on upper deck, CSS Code Annex 14 need not be considered.

#### 3.1.5. Towing & Mooring Fitting Strength

In general, in the case of bulk carriers constructed on or after 1 January 2007, shipboard fittings and their hull supporting structures for mooring and towing are designed in accordance with SOLAS II-1/3-8, MSC.1/-Circ.1175 and IACS UR A2 without considering deck cargoes.

Therefore, the increased side projected area of deck cargo is to be taken into account to the equipment number for the selection of mooring and towing fittings and their hull supporting structures. The revised Equipment Number Calculation is to be submitted for approval to confirm whether the shipboard fittings need to be changed or not.

If the equipment letter for mooring and towing fittings is changed due to the increase of the revised equipment number, the strength assessment is to be re-carried out and relevant drawings(ex: Equipment Number, Mooring Arrangement and their hull supporting structure drawings including strength assessment report) are to be submitted for approval.



### 3.1.6. Visibility Plan

When the containers are loaded on deck/hatch, the visibility plan should be submitted for approval. And this information should be included in the supplement to LOADING MANUAL, and the loading instrument should be updated for the calculation of visibility.

### 3.1.7. Stability and Longitudinal Strength (LOADING MANUAL)

A supplement to the Stability information booklet should be submitted for approval. In the supplement, typical container loading conditions (Departure and Arrival), relevant information for the container loading, and longitudinal strength calculations for cargo hold flooding are to be included.

In the above loading conditions, the projected lateral area of the containers on deck/hatch cover is to be considered in the stability calculation and relevant data are to be included in the supplement.

If the containers are loaded together with bulk cargoes, the typical loading & unloading sequence also should be included in the above supplement.

For the ships with assigned reduced freeboard(can be confirmed in international Load Lines Certificate), damage Stability of SOLAS Chapter II-1 in accordance with IACS UI LL65.

### 3.1.8. Loading instrument

Loading instrument should be updated in order to calculate the loading conditions as indicated above 3.1.7. The test report for loading instrument should be submitted for approval. (if applicable, the function of check the loading condition with the required GM and allowable trim range in accordance with SOLAS II-1)

Although the VGM of container in accordance with SOLAS VI/Reg.2.5 is not subject to Classification Approval, loading instrument should also be updated.

### 3.1.9. Calculation of lightship properties

If there are alterations that affect the ship's lightweight and center of gravity, detailed weights and center (LCG and VCG) calculation to adjust the lightship properties should be carried out and submitted to the Surveyor.

Where the deviation of lightweight exceeds 2% of the originally approved lightweight or the deviation of lightship's longitudinal center of gravity exceeds 1% of LBP, an inclining test should be carried out and the Stability information booklet (including Loading manual, Grain loading manual (if applicable), Test report, and in some cases, Damage stability calculation in accordance reg.27 of ICLL) should be submitted for approval.<sup>1)</sup>

Where a ship applies to the Ship's Safety Act of the Korean Government, and the deviation exceeds the following limits, the drawings mentioned in 1) shall be submitted for approval.

- Where the calculated vertical center of gravity (VCG) is increased and the deviation of lightweight is not less than 0.5% of the approved value.
- Where the calculated vertical center of gravity (VCG) is decreased and the deviation of lightweight is not less than 1.5% of the approved value.

### 3.1.10. Cargo Dangerous Goods (CDG)

If dangerous goods are transported in the container on deck, the requirements of SOLAS II-2 /Reg.19 shall be met. Also, to confirm the safe carriage of them, the information of dangerous cargoes in the container shall be submitted to this society.

### 3.1.11. Panama Canal

It is necessary to confirm with the Panama Canal Authority in advance whether it is possible to pass through the Panama Canal. Fittings and facilities required by the Panama Canal should be installed.

If the container is loaded on deck/hatch cover, the volume of the container should be considered in the calculation of PC/UMS Documentation of Total Volume. The documentation should be issued by KR or the Canal Authority.

## 3.2. Stack Loading of Containers on Deck

### 3.2.1. Container Stowage and Securing Arrangements

Containers, in general, can be loaded on deck and hatch covers of bulk carriers similar to a conventional container ship.

Please refer to KR Guidance Part 7 Annex 7-2 paragraph 4 "Arrangements for stowage on exposed decks without cell guides" for more detailed instructions.

### 3.2.2. Allowable Container Weight and Stack Height

Allowable container weight distribution and stack height will be determined by the lashing calculations and the strength assessment of hull structures in accordance with KR Guidance Annex 7-2 as well as stability calculations.

In terms of lashing calculations please refer to last paragraph of section 2.2.2.

### 3.2.3. Hull Structure(i.e. deck) Strength

In order to load containers by stacking up on the upper deck, the strength assessment for the deck structures is to be carried out to withstand the point loads from the container corner casings and structural reinforcements may be required depending on the results of the strength assessment.

In general, local reinforcements under container sockets are to be provided to withstand point loads from the container corner castings considering staking load.

In this case, structural reinforcement drawings including strength assessment report are to be submitted for approval.

### 3.2.4. Hatch Cover Strength

See 3.1.3

### 3.2.5. Cargo Securing Manual

In case of carrying containers by stacking up on deck, at least the following items shall be included in CSM in addition to a typical CSM.

- The contents related to the standardized cargo loading
- Container Stowage Arrangement (CSA)
- List, arrangement, certificate, etc. of fixed and portable securing devices (container securing devices are to be of KR approved ones)

### 3.2.6. CSS Code Annex 14 (CSAP)

For ships constructed on or after 1 January 2015 which are specially designed and fitted for the purpose of carrying containers on deck like a typical container ship, additional safety measures for safe lashing working conditions are to be provided in accordance with CSS Code Annex 14(MSC.1/Circ.1352).

In this case, Cargo Safe Access Plan(CSAP) is to be submitted for approval.

For ships constructed before 1 January 2015, it is necessary to consult with the Flag Administration whether this regulation applies or not.

### 3.2.7. Towing & Mooring Fitting Strength

See 3.1.5

### 3.2.8. Visibility Plan

See 3.1.6

### 3.2.9. Stability and Longitudinal Strength (LOADING MANUAL)

See 3.1.7

### 3.2.10. Loading Instrument

See 3.1.8

### 3.2.11. Calculation of Lightship Properties

See 3.1.9

### 3.2.12. Carriage of Dangerous Goods (CDG)

See 3.1.10

### 3.2.13. Panama Canal

See 3.1.11



For more information, contact Korean Register

**Drawing Approval**

**Head Office Technical Division**  
**Dry Cargo Ship Team**

Tel : +82 70-8799-8404

E-mail : hull1@krs.co.kr

**Survey Application**

**Head Office Survey Division**  
**Survey Team**

Tel : +82 70-8799-8200

E-mail : survey@krs.co.kr

**Stability Calculation**

**Head Office Technical Division**  
**Stability & Tonnage Team**

Tel : +82 70-8799-8480

E-mail : stability@krs.co.kr

**Business Promotion**

**Head Office Business Division**  
**Overseas Business Development Team**

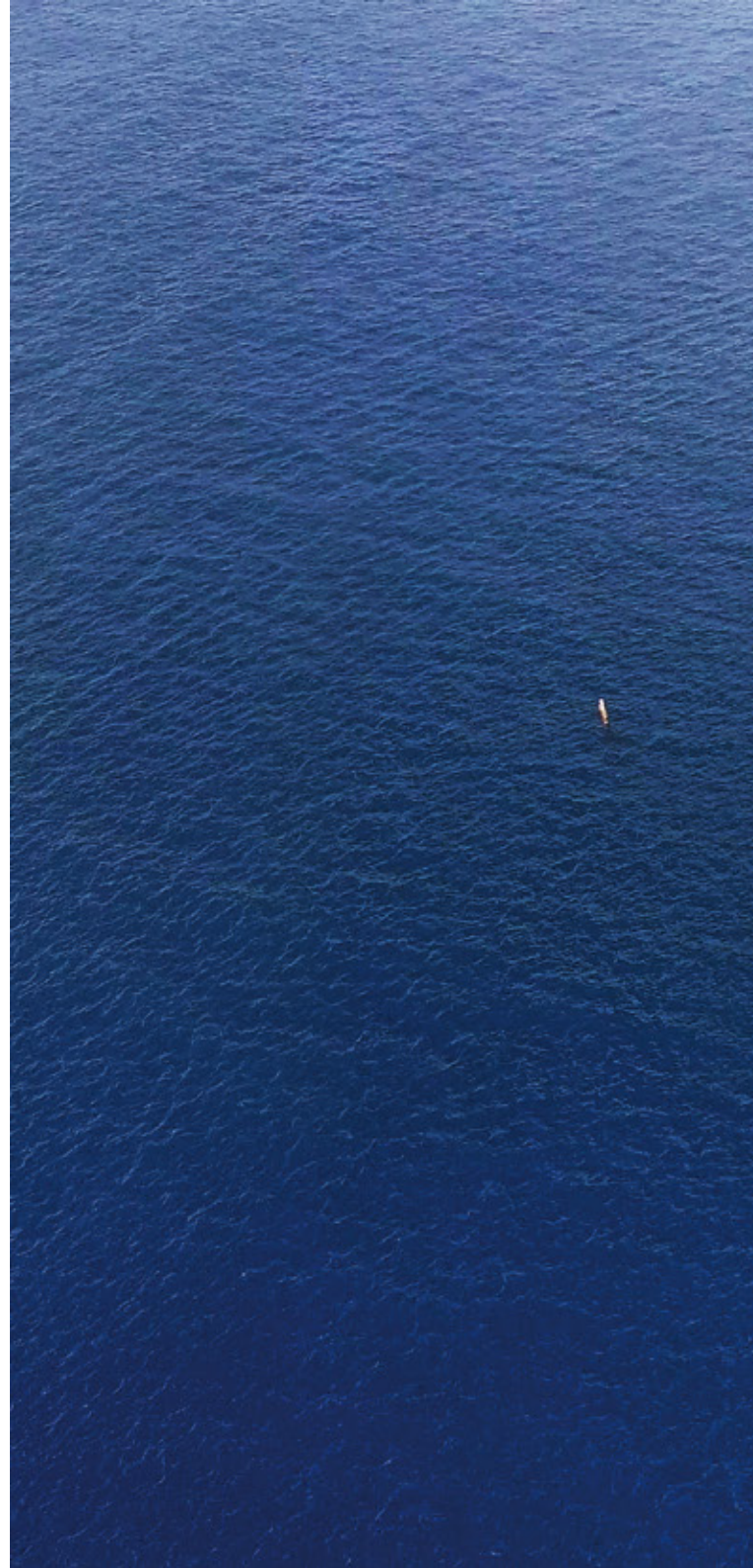
Tel: +82 70-8799-8950

E-mail : bizoverseas@krs.co.kr



THE GUIDELINE FOR

# CONTAINERS LOADING ON BULK CARRIERS



**KR (KOREAN REGISTER)**

36, Myeongji Oeancity 9-Ro, Gangseo-Gu, Busan, Republic of Korea, 46762

**Tel** +82-70-8799-7114, 8114

**Fax** +82-70-8799-8999

[www.krs.co.kr](http://www.krs.co.kr)

©2021 KR All Rights Reserved

