

# **2026 International Workshop**

## **on the Safety Investigation into Marine Casualty**

DATE

**18 - 19 June 2026**

VENUE

**Lavalse Hotel, Busan, Republic of Korea**



Ministry of Oceans and Fisheries

**Korea Maritime Safety Tribunal**





# 2026 International Workshop

on the Safety Investigation  
into Marine Casualty

## Schedule

Thursday 18<sup>th</sup> June 2026

| Time                                                                            |                                                                                              | Contents         |         |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------|---------|
| Opening of the meeting                                                          |                                                                                              |                  |         |
| 09:30-10:40                                                                     | Registration                                                                                 | All              |         |
|                                                                                 | Welcome Speeches                                                                             | KMST             |         |
|                                                                                 | Official Photograph                                                                          | All              |         |
| Session 1. Case of Safety Investigation into accidents involving cargo securing |                                                                                              |                  |         |
| 10:40-12:00                                                                     | Case of Safety Investigation                                                                 | Australia ATSB   | 20 min. |
|                                                                                 | Case of Safety Investigation                                                                 | China MSA        | 20 min. |
|                                                                                 | Case of Safety Investigation                                                                 | Singapore TSIB   | 20 min. |
|                                                                                 | Case of Safety Investigation                                                                 | ROK(KMST)        | 20 min. |
| 12:00-13:30                                                                     | Lunch                                                                                        |                  |         |
| 13:30-15:00                                                                     | Introduction to the CSS Code & Calculation methods for external forces and securing strength | ROK(KR)          | 30 min. |
|                                                                                 | Introduction to 2026 CIC                                                                     | ROK(MOF)         | 20 min. |
|                                                                                 | Panel Discussion / Q&A                                                                       | Chair & Speakers | 40 min. |
| 15:00-15:30                                                                     | Coffee/tea Break                                                                             |                  |         |
| Session 2. Enclosed space accidents & Revised IMO recommendations               |                                                                                              |                  |         |
| 15:30-17:10                                                                     | Case Study : Golden Sunny Hana                                                               | ROK(KMST)        | 30 min. |
|                                                                                 | Revised IMO Recommendations(MSC.581)                                                         | ROK(KR)          | 30 min. |
|                                                                                 | Panel Discussion / Q&A                                                                       | Chair & Speakers | 40 min. |
| Closing of the Sessions                                                         |                                                                                              |                  |         |
| 17:10-17:30                                                                     | Summary of Session 1 & 2 Discussion                                                          | Chair            | 20 min. |



# 2026 International Workshop

on the Safety Investigation  
into Marine Casualty

## Contents

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### Session 1.

Case of Safety Investigation into accidents involving cargo securing

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| China MSA                                                                                                         |       |
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| <b>Case of Safety Investigation</b> .....                                                                         | p. 39 |
| ROK(KMST)                                                                                                         |       |
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| <b>Introduction to 2026 CIC</b> .....                                                                             | p. 63 |
| ROK(MOF)                                                                                                          |       |

### Session 2.

Enclosed space accidents & Revised IMO recommendations

|                                                   |       |
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| <b>Revised IMO recommendations(MSC.581)</b> ..... | p. 83 |
| ROK(KR)                                           |       |







**2026**  
**International**  
**Workshop**  
on the Safety Investigation  
into Marine Casualty

Session 1.

# **Case of Safety Investigation**

Australia ATSB





# Case Studies — ATSB investigations involving container losses overboard: *APL England, YM Efficiency & Pacific Adventurer*

**Presented by**  
Captain Alroy DCosta  
Transport Safety Investigator

AVIATION | MARINE | RAIL

[atsb.gov.au](https://www.atsb.gov.au)

## ***APL England (MO-2020-002)***



- Date of occurrence: 24 May 2020
- Departure: Ningbo, China
- Destination: Melbourne, Australia
- Cargo Capacity: 5,780 TEU
- Flag: Singapore
- IMO: 9218650
- Damage: Substantial (50 containers lost overboard)



## APL England

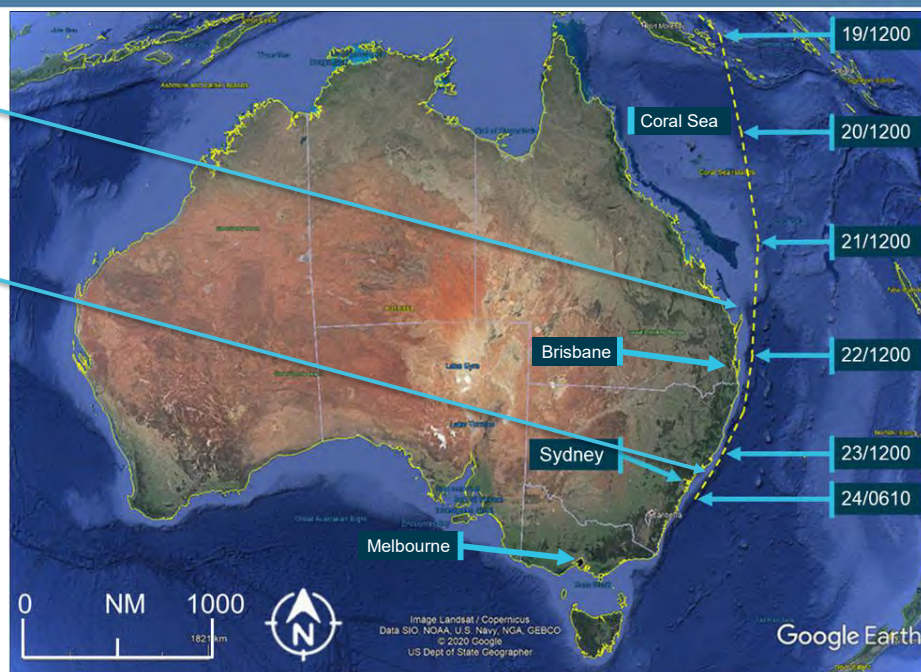
ATSB

22 May

- Low pressure high swell off SE Australia

24 May

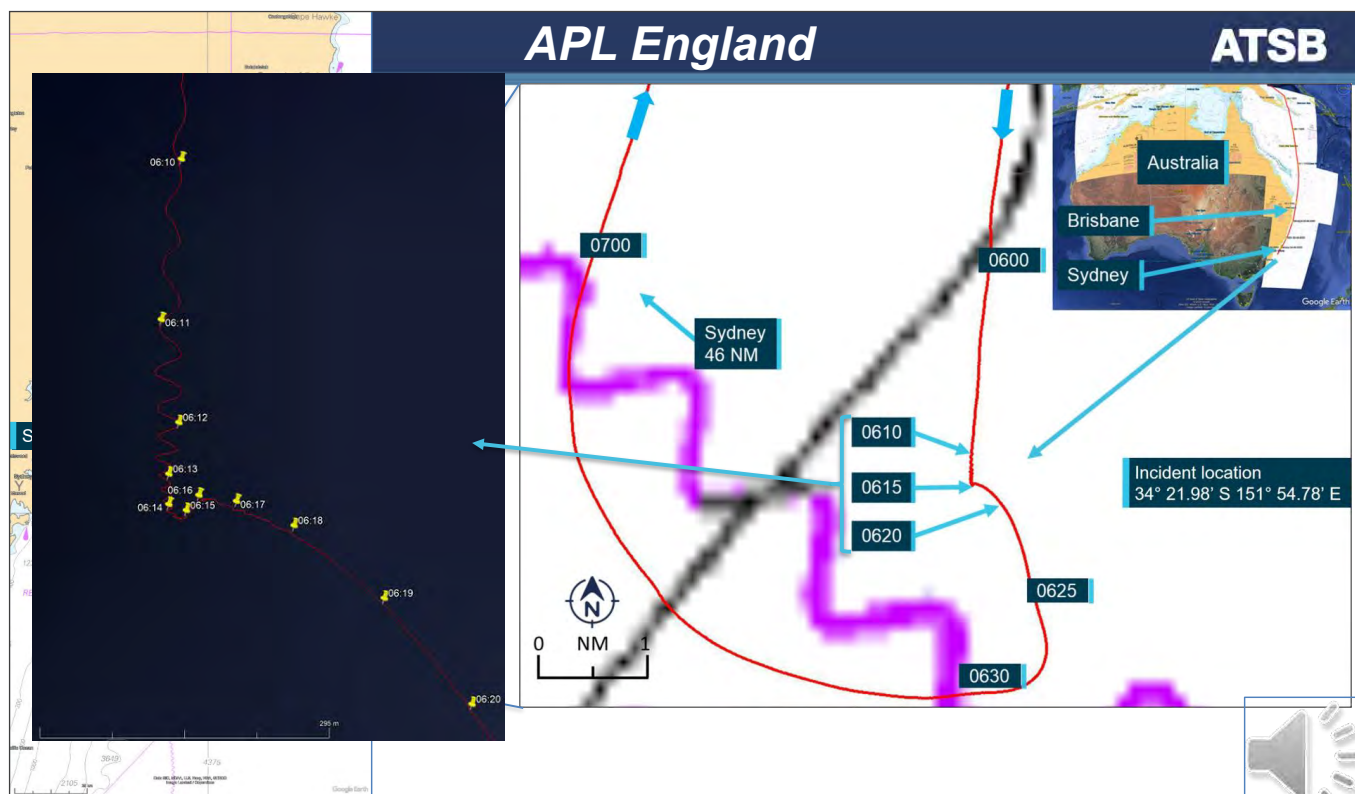
- 0215 hrs — very heavy rolls
- Course changes
- 0610 hrs — very heavy rolling
- 46 NM SE of Sydney
- Speed 7 knots
- Force 9, Sea state 7
- Swell 4.5 m
- ME stop



3

## APL England

ATSB



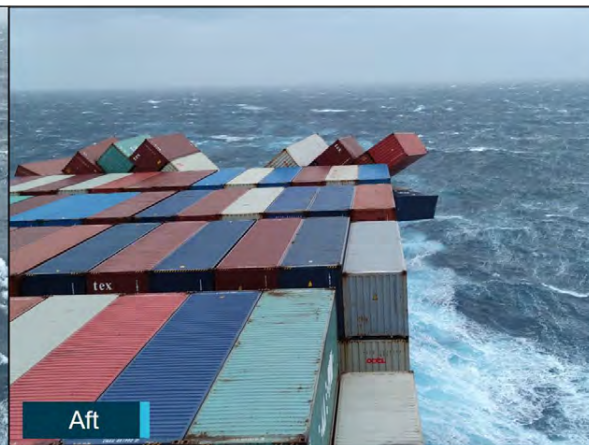
4

50 containers lost overboard: A view from the bridge...

0700  
24 May



Bay 30



Bay 62

5

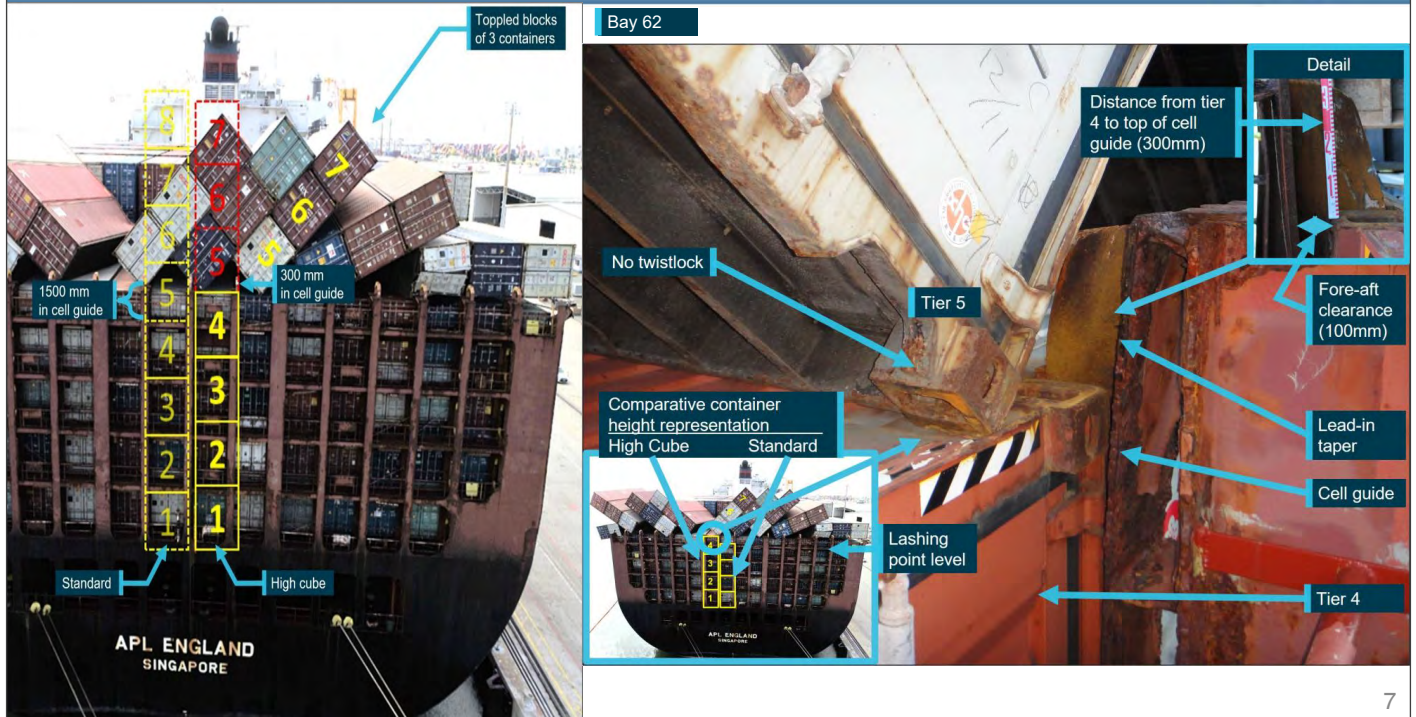
## Findings

- Badly corroded container securing devices (Bay 30)



6

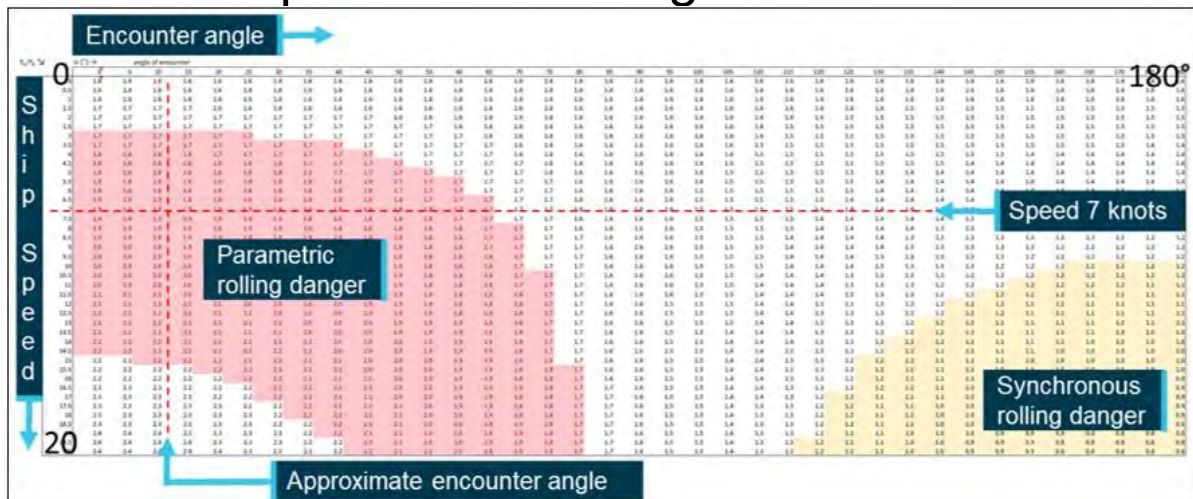




7

# Findings

- Possible parametric rolling



8

# YM Efficiency (MO-2018-008)



- Date of occurrence: 1 June 2018
- Departure: Kaohsiung
- Destination: Sydney
- Capacity: 5,780 TEU
- DWT: 52,773 t
- Flag: Liberia
- Class: ABS
- IMO: 9353280
- Damage: 81 containers lost overboard, 62 containers damaged, significant damage to ship's accommodation ladder, superstructure and cargo structures

## FINAL REPORT

INVESTIGATION  
MO-2018-008





# ***Pacific Adventurer (MO-2009-002)***

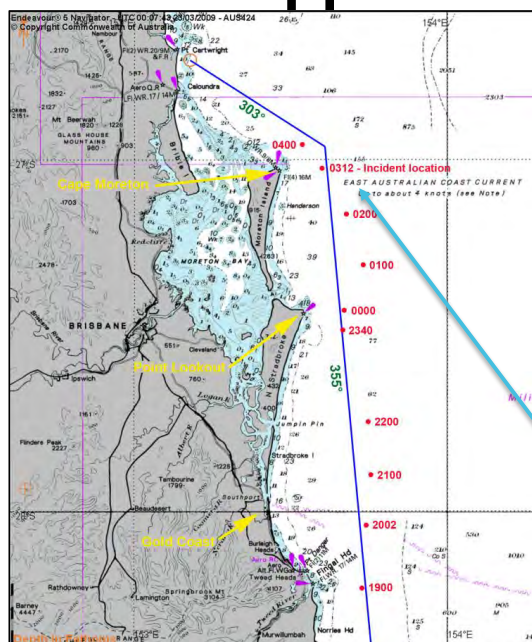
- Date of occurrence: 11 March 2009
- Departure: Newcastle
- Destination: Brisbane
- Capacity: 1,123 TEU
- DWT: 23,737 t
- Flag: Hong Kong China
- Class: LR
- IMO: 9003847
- Damage: Ship (minor), oil pollution 270 t



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## ***Pacific Adventurer***

### **What happened?**



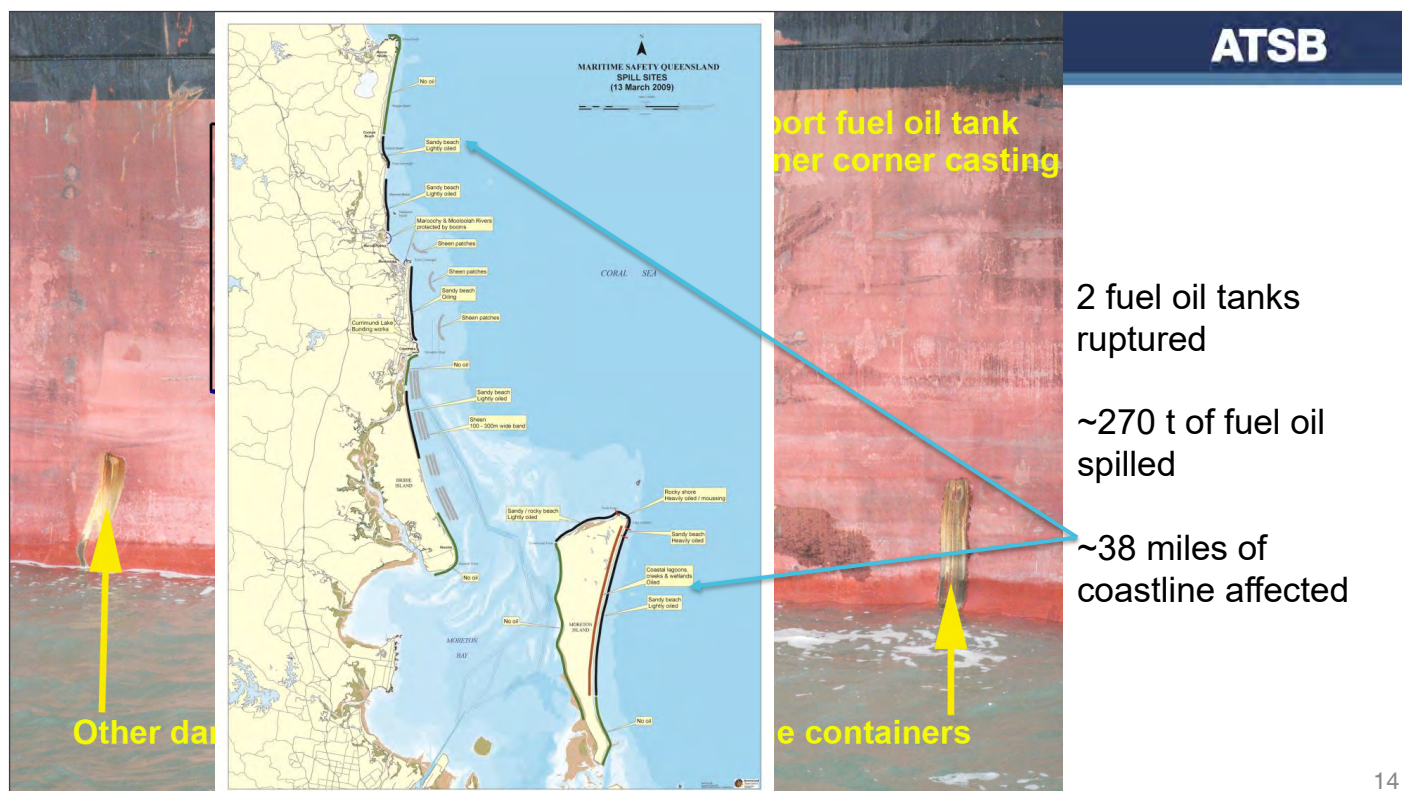
- 9 March 2009:  
50 TEUs of  $\text{NH}_4\text{NO}_3$  prills loaded on deck (for discharge in Indonesia)
- 10 March 2009:  
Severe weather (tropical cyclone Hamish)  
Extreme rolling near Cape Moreton

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## **Why it happened?**

- Probable synchronous (resonant) rolling
- Full consideration not given to course changes and ballast distribution
- Poor condition and inconsistent application of lashing equipment
- Packaging and hatch cover securing vulnerabilities
- Inspection and maintenance of equipment inadequate (NO THIRD-PARTY OVERSIGHT)

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## **Key safety messages**

- Early decisions strongly influence escalation and environmental consequences
- IMDG Code compliance for packaging is critical
- Cargo securing systems must be maintained, inspected, and applied consistently
- Pivotal role of coastal States, flag States and classification societies with regular inspections

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## Container losses - what's being done?

- IMO: Mandatory reporting of ANY lost /drifting containers (2026)
- Administrations: Focused inspection campaigns



## The Australian perspective:

### AMSA Focused Inspection Campaigns (FIC)

- 1 Aug to 31 Oct 2020 (208 inspections)
  - 12 ships exceeded max permissible stack weights (5.8%)
  - 8 ships did not comply with weight distribution (3.8%)
  - 8 ships with inadequately secured cargo (3.8%)
  - 2 ship detentions (incorrect use of portable lashing equipment; hold pontoons securing pins defective)



# World Shipping Council 2025 update:

- 576 containers lost at sea in 2024, out of 250 million transported
- Increase since 221 in 2023
- Well below 10-year average of 1,274/yr

## 3-year averages:

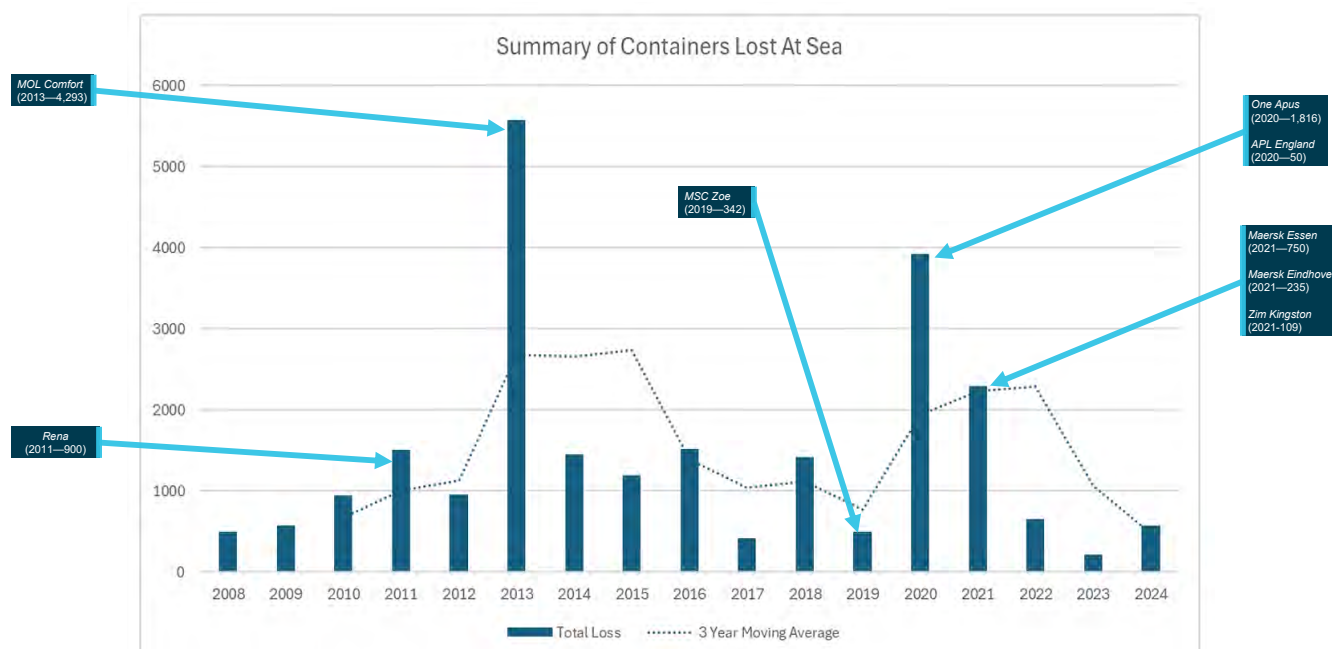


(2020-2022) 2,301/yr

(2021-2023) 1,061/yr

**(2022-2024) 489/yr**

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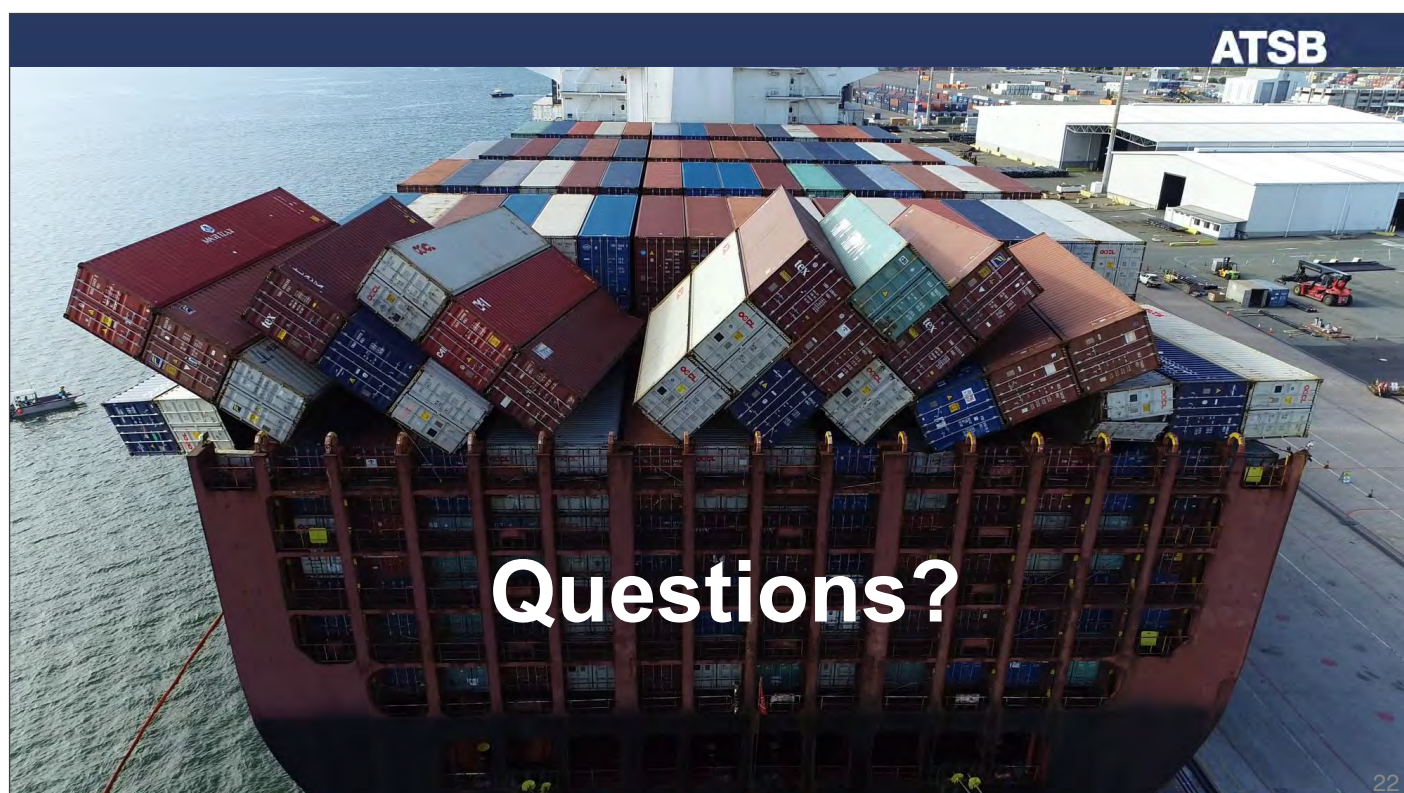
World Shipping Council

20

## Australia (AMSA's) continued focus...

- Attending to ongoing failures of fixed physical securing arrangements. [Read more...](#)
- Continued PSC focus (including 2026 CIC by Tokyo MOU/ Indian Ocean MOU)
- Detainable deficiencies per year (cargo):
  - 2025: 2 (lashing materials; containers on deck)
  - 2024: Nil
  - 2023: 2 (missing cross-lashings, another tanker ops)
  - 2022: 2 (both lashing materials)

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Session 1.

# **Case of Safety Investigation**

China MSA



# Risks and Case Analysis Related to Cargo Securing

Zhang Hui , Senior Investigator  
China MSA



中华人民共和国海事局

Maritime Safety Administration of the People's Republic of China

## 目录 CONTENTS

**1** Defects in Lashing Scheme Design

**2** Lashing Operation Casualty Risks

**3** Case Sharing



# 1

## Defects Related to Cargo Securing



### Defects in Lashing Scheme Design



#### Incorrect force calculation

The force of lashing equipment is not accurately calculated according to cargo weight, center of gravity and dimension, and only estimated by experience. Insufficient quantity and excessive spacing of lashings lead to inadequate overall securing strength.



#### Neglect of cargo characteristics

Lack of awareness of special securing requirements for slippery goods (steel coils, steel plates), rolling goods (pipes, wheeled equipment), heavy oversized and over-height goods. No auxiliary measures such as chocks, skid stops and shores are arranged.



#### Mismatch between stowage and lashing

Irregular stowage (heavy goods on light ones, eccentric stowage) causes inherent instability, which cannot be remedied by subsequent lashing.



## Hidden Dangers of Lashing Tools



### Improper Selection

Rated load of lashings, shackles and eye plates fails to match actual stress; tool materials are incompatible with cargo features.

### Defective Equipment

Wire ropes with broken strands/corrosion, aged/worn synthetic lashing belts, cracked shackles and slipped turnbuckles are still used beyond standards.

### Accessory Issues

Lack of anti-slip mats and corner protectors; mixed use of lashings in different types and specifications; iron wires and hemp ropes are used instead of professional lashing tools.

## Non-standard On-site Lashing Operation



### Irregular procedure

Formal lashing starts without temporary cargo fixing; uneven tension of lashings; fasteners not locked or safety locked.



### Wrong lashing method

Only surface lashing without layered reinforcement; unreasonable force angle of lashings; unprotected sharp edges easily cut lashings.



### Violation operation

Single person conducts high-risk lashing; rough pulling of lashings; failure to wear safety protective equipment as required.

# Absence of Inspection and Maintenance During Voyage



Inadequate routine inspection

Lashing condition not inspected at specified intervals; no re-inspection after heavy weather.



Delayed hidden danger rectification

Loosened, broken or displaced lashings are not tightened, replaced or re-lashed in a timely manner, resulting in risk escalation.

2

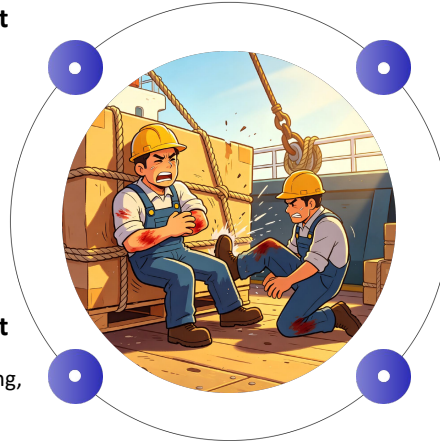
## Lashing Operation Casualty Risks



## Lashing Operation Casualty Risks

### Fall from Height

Causes: ship shaking, cargo collapse/sliding, lashing rebound and fracture, rough operation, insufficient protection.  
Consequences: personnel injury, falling overboard or even missing.



### Crush & Pinch Injury

Causes: ship shaking, cargo collapse/sliding, lashing rebound and fracture, rough operation, insufficient protection.  
Consequences: personnel injury, falling overboard or even missing.

### Struck by Object

Causes: ship shaking, cargo collapse/sliding, lashing rebound and fracture, rough operation, insufficient protection.  
Consequences: personnel injury, falling overboard or even missing.

### Cut/Scratched by Lashings

Causes: ship shaking, cargo collapse/sliding, lashing rebound and fracture, rough operation, insufficient protection.  
Consequences: personnel injury, falling overboard or even missing.

## Ship and Cargo Safety Accidents at Sea

1



Cargo sliding, collapse and damage during ship rolling and pitching;

2



Unsecured cargo strikes the hull structure, resulting in steel plate indentation, weld fractures and compartment damage.

3



Mass cargo shift alters vessel centre of gravity, impairs stability, and may result in heeling, loss of control or capsizing in heavy seas.



# 3

## Case Sharing



### Case 1

Due to the fracture of iron wires of the triangular steel structure, Group A triangular steel structure collapsed. Stevedores failed to evacuate in time and were crushed between the fallen Group A triangular steel structure and containers, resulting in the death of a Stevedore.

#### Cause

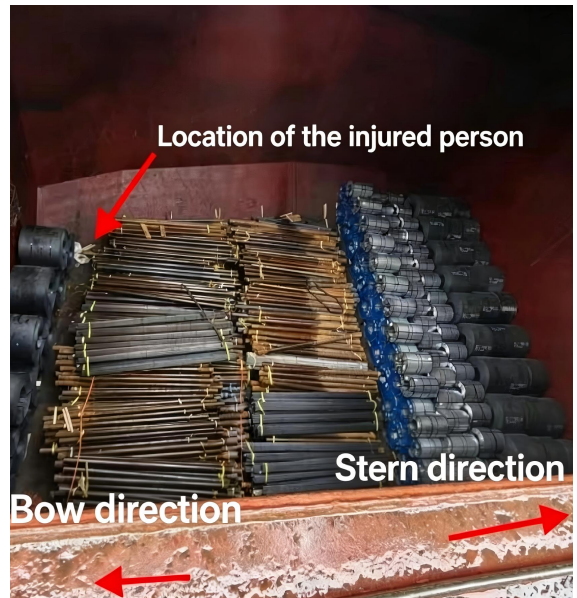
The triangular steel structure was poorly lashed. Stevedores failed to stow cargo strictly in accordance with loading-unloading procedures, leading to loose stowage. Lacking safety awareness, they walked beneath the steel structure during loading and were crushed to death by the collapsed and sliding steel frame.



## Case 2

Stevedore A directed a gantry crane to lower round steel bars into No.1 cargo hold. After unhooking, he stood near the starboard bulkhead.

When the crane retracted its chains, a round steel bar rolled sideways and crushed his left leg, causing serious injuries.



## Case 3

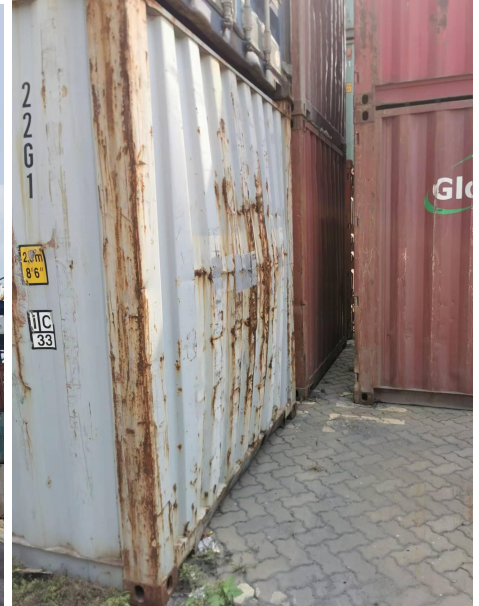
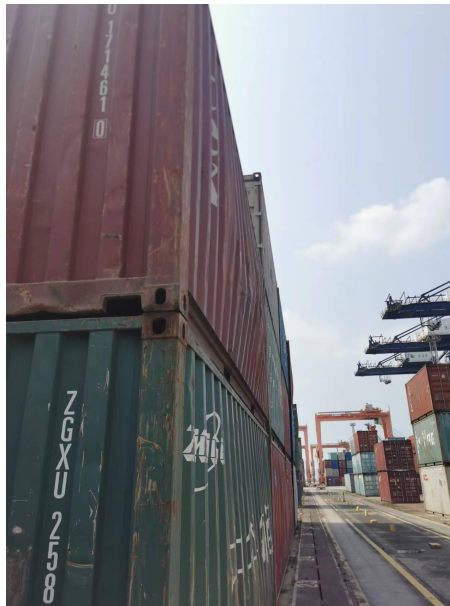


On October 20, 2022, the Chinese-flagged domestic trading sea-going vessel 'Xin Rong Shun' sailed from Guangdong to Guangxi. During the voyage, it encountered rough seas which caused container shifting in its holds. The vessel subsequently sank, resulting in 4 crew lost their lives.





Sidewall bulging and deformation occur to containers from repeated loading of bulk cargo, scrap steel and similar materials.



## Vessel Sinking Incident Analysis

### Underlying Causes

The vessel carried bulging containers that could not be secured with bridge fittings. The Master sailed on Oct 19 despite known Typhoon Nesat risks and unaddressed container shifting hazards.

### Sequence of Failure

Initial portside container shifting caused a starboard list. (4°)  
**Improper ballasting operations led to a port list, followed by massive container shifting or collapse.**  
The vessel lost stability and sank rapidly.



## Core Preventive Measures for Cargo Lashing and Securing Accidents

### Strengthen

#### Operation Control & Safety

Strengthen operation control and safety awareness: Strictly implement loading and unloading operation procedures, enhance all-staff safety training and on-site supervision, eliminate violative operations, and prevent personal injury accidents from the source.

### Standardize

#### Stowage & Securing Plans

Standardize stowage and securing plans: Scientifically formulate cargo stowage plans, design precise lashing and securing schemes based on cargo characteristics, focus on strengthening anti-shifting measures for slippery, rolling and heavy oversized goods, and ensure cargo stability under severe sea conditions.

### Improve

#### Equipment Life Cycle Mgmt

Improve full life cycle management of securing equipment: Establish a regular inspection, maintenance, scrapping and replacement system for lashing gear, strictly prohibit the use of defective equipment, and ensure that all securing equipment is always in good technical condition.

### Enforce

#### Standardized Equipment Use

Enforce the use of standardized matching equipment: Prohibit the mixed use of lashing gear of different types and specifications, and strictly forbid replacing professional lashing equipment with non-specialized tools such as iron wires and hemp ropes, so as to guarantee the overall strength of the securing system.

# Thank you.



Email: [zhanghui@gd.msa.gov.cn](mailto:zhanghui@gd.msa.gov.cn)



## 中华人民共和国海事局

Maritime Safety Administration of the People's Republic of China







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Session 1.

# **Case of Safety Investigation**

Singapore TSIB



# When it is not cargo:

## FATAL LESSONS IN ONBOARD STORAGE

### from the *China Ace* investigation (2024)

**Capt. Dorothy Sim**

Transport Safety Investigation Bureau | Singapore

18 June 2026

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## 01 | Incident overview

A routine task

A familiar space

**A fatal occurrence**

 Engine Cadet, male, 24 years old

 ~10 months sea time

 1.9 months onboard

 Pinned under ~1,350 kg steel plates



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AI generated image



## 02 | The vessel



### **CHINA ACE**

Bulk carrier

IMO number 9957634

Built 2023

Gross tonnage 108,985

Length overall 299.9m

Breadth 50.0m

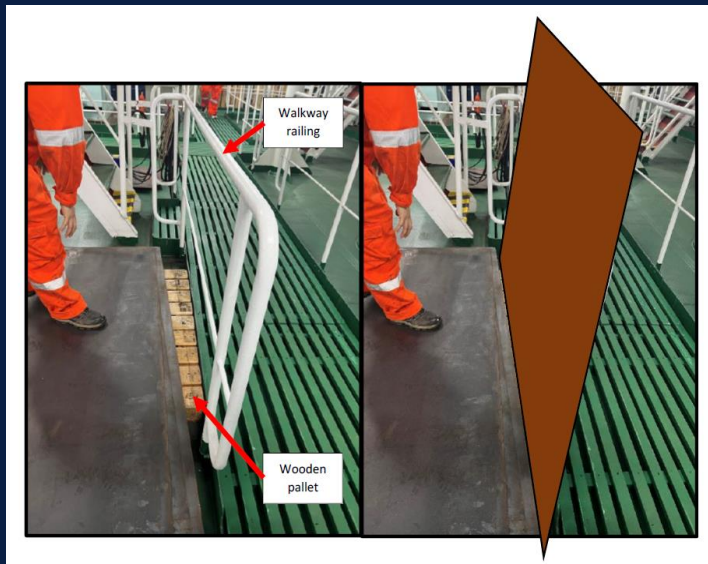
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## 03 | Steel plates (delivered at shipyard and stored onboard the vessel since April 2024)

| No. of plates | Dimensions (mm)<br>(thickness x width x length) | ~ Weight (kg) per plate | ~ Total weight (kg) | Remarks                                                   |
|---------------|-------------------------------------------------|-------------------------|---------------------|-----------------------------------------------------------|
| 4             | 2 x 914 x 1829                                  | 26                      | 105                 | Sheet B <small>(partitions)</small>                       |
| 1             | 5 x 1510 x 2000                                 | 142                     | 142                 | Sheet A <small>(base footing)</small>                     |
| 2             | 6 x 1510 x 2000                                 | 170                     | 340                 | -                                                         |
| 17            | 3 x 1510 x 2000                                 | 55                      | 930                 | -                                                         |
| 1             | 3 x 1510 x 2000                                 | 76                      | 76                  | Back most of the plate stack, leaning against the railing |

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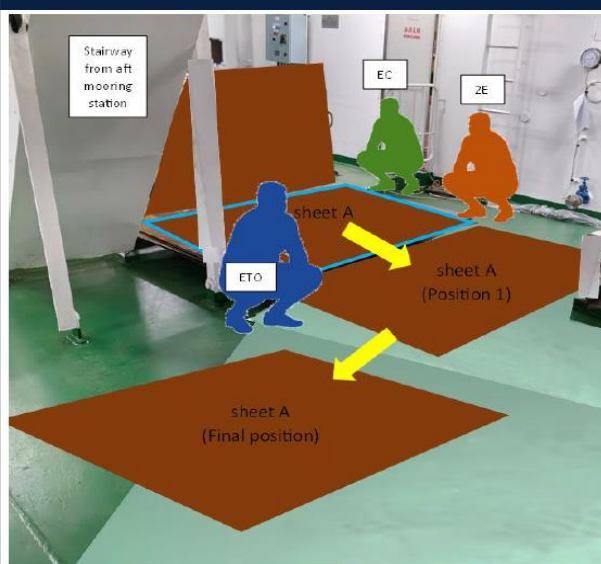
## 04 | The set up



- Vertically stacked on a wooden pallet in the steering gear room and secured to a railing by a rope
- Rope removed to select plates and **remaining plates were not re-secured**

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## 05 | Issues missed during risk assessment



- **Assumed task duration**

Selection, lifting and relocation of steel plates expected to be brief

- **Unrecognised hazard**

Falling risk from remaining leaning plates not anticipated

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## | Issues missed during risk assessment



Hazards and control measures recorded as very **unlikely to cause harm** with a **moderate severity of harm**.

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## 06 | Analysing the issues

1



Plates stored near stairway made access and rigging of lifting (rescue) equipment difficult

2



Risk Assessment treated as formality

3



Environmental conditions not fully considered

4



Remaining plates not re-secured as brief move expected, but weight of selected plates caused delays

5



Plates exceeded 25 kg per person (COSWP reference on maximum weight for manual lifting)

Remove any one issue – and the incident likely does not occur.

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## 07 | Safety actions by the Company



Fleet wide safety campaign



Purpose build storage rack



Revised Risk Assessment process



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## 08 | Safety takeaways

**S**

Crew focused on end task and missed safety hazards



System

**E**

Rough seas and pitching were not considered



Environment

**C**

Steel plates left unsecured after selection



Control

**U**

Human strength, weight, fatigue, visibility



Understand

**R**

Update continuously for changing task stages and sea states



Reassess

**E**

Cadet tried to stop falling plates (reactive instinct)



Expect

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## 09 | Summary

**S**



See the entire **system**

---

**E**



Evaluate the **environment**

---

**C**



**Control** the hazards before the task starts

---

**U**



**Understand** the real limits

---

**R**



**Reassess** continuously

---

**E**



**Expect** human instincts

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Session 1.

# **Case of Safety Investigation**

ROK(KMST)



# Investigation into Accidents involving Cargo Securing

Korea Maritime Safety Tribunal



Ministry of Oceans  
and Fisheries



**KEUM YANG 6** sinking



# KEUM YANG 6

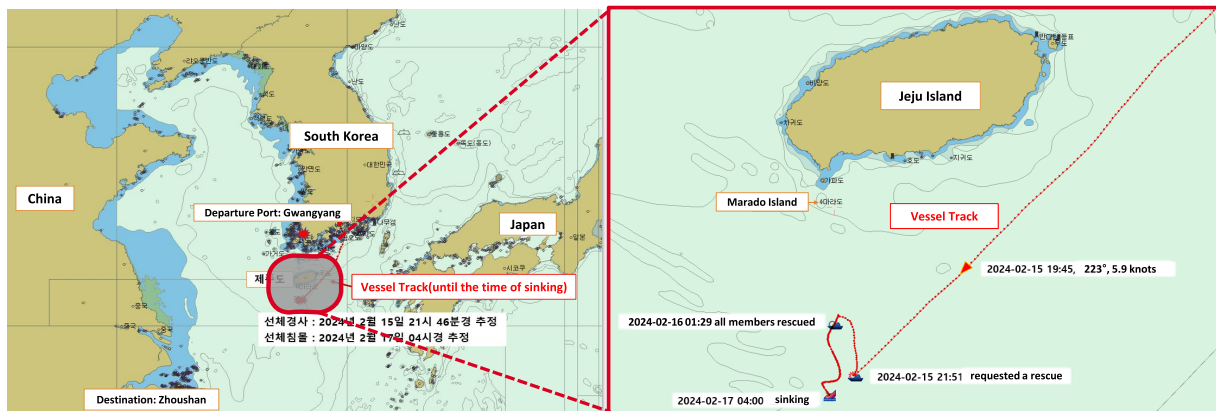
sinking



## (1) Case Summary

Feb 15, 2024, at approx. 21:51

While sailing from Gwangyang to China carrying steel plates, the vessel was **struck by large waves** caused by deteriorating weather conditions. **The hull listed to the port side**, leading to a complete loss of stability and subsequent sinking. All 11 crew members were successfully rescued.



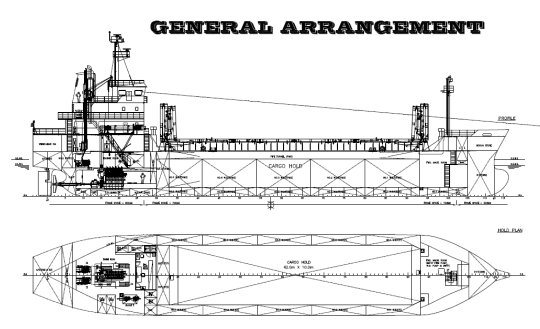
# KEUM YANG 6

sinking



## (2) Ship Particulars

| Ship name   | Vessel Type | GT    | Length/Breadth/Depth (m) | Launch        | Owner / Inspection Authority                       |
|-------------|-------------|-------|--------------------------|---------------|----------------------------------------------------|
| KEUM YANG 6 | Cargo       | 2,347 | 75.05 / 13.40 / 7.50     | March 2, 2017 | Keumyang Shipping Co., Ltd. / Korean Register (KR) |



## (3) Causes of the Accident

### ① Deficiencies in Cargo Stowage and Securing Management

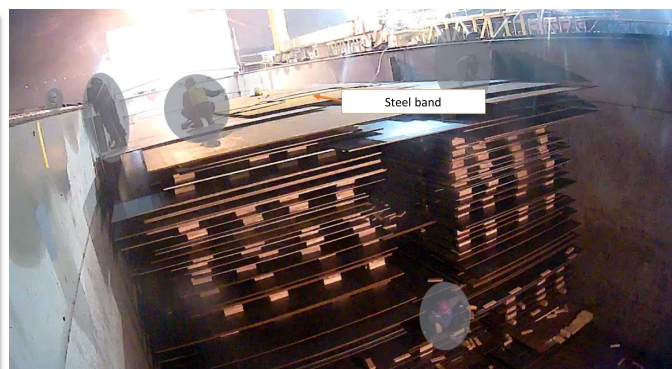
- Despite the anticipated adverse weather and potential for inadequate lashing, the Chief Officer **failed to instruct stevedores to reinforce the cargo** using additional dunnage or blocking, which could have prevented shifting.
- The loading process relied heavily on the workers' **customary practices** and **generic work standards** rather than specific guidelines for heavy plates. Furthermore, general instructions for the stowage and securing of steel plates were **never formally shared**.
- Proper consideration for safe stowage and securing methods was lacking, as cargo data was provided by the shipping company **only a day before arrival**. Consequently, loading operations commenced **without a comprehensive or detailed** cargo stowage plan in place.

★ These failures resulted in **unfilled void spaces** between the stowed steel plates.  
Ultimately, the vessel departed for its next port of call with these critical safety hazards **left unrectified**.

## (3) Causes of the Accident

### ① Deficiencies in Cargo Stowage and Securing Management

★ These failures resulted in **unfilled void spaces** between the stowed steel plates.  
Ultimately, the vessel departed for its next port of call with these critical safety hazards **left unrectified**.



# KEUM YANG 6

sinking



## (3) Causes of the Accident

### ② Inappropriate Response to Adverse Weather

- According to the vessel's Cargo Management Procedures, the crew **must prioritize cargo safety**-even if it necessitates changing the ETA-to prevent damage during heavy weather.
- Operational manuals **mandate** that the Master request weather-related navigation control from the company's safety manager when encountering or anticipating severe conditions.
- Meteorological data confirmed a Gale Advisory in the Jeju waters where the vessel was sailing, which was later upgraded to a **Gale Warning**.

★ Despite being aware of the deteriorating weather, the Master **failed to** take evasive action or request navigation control, relying instead on **personal judgement**.

# KEUM YANG 6

sinking



## (4) Comprehensive Summary of Causes

- **Inadequate Securing:** The vessel departed with approximately 3,190 tons of steel plates (within capacity) that were poorly secured due to **a lack of specific guidelines** and **insufficient measures** to prevent cargo shifting.
- **Adverse Weather Response:** The vessel continued its voyage through a Gale Advisory **without seeking** shelter(evasive action) or **requesting** operational control.
- **Loss of Stability:** Impacted by two successive large waves on the starboard bow, the internal cargo shifted into the existing void spaces. This caused the vessel's center of gravity to **shift to the port side**, leading to a terminal loss of stability.

\* given that the vessel remained afloat for approximately 30 hours while listing, **seawater ingress** into the cargo hold **is not considered a primary cause** of the sinking.



# THANK YOU

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Email) lhnice80@korea.kr

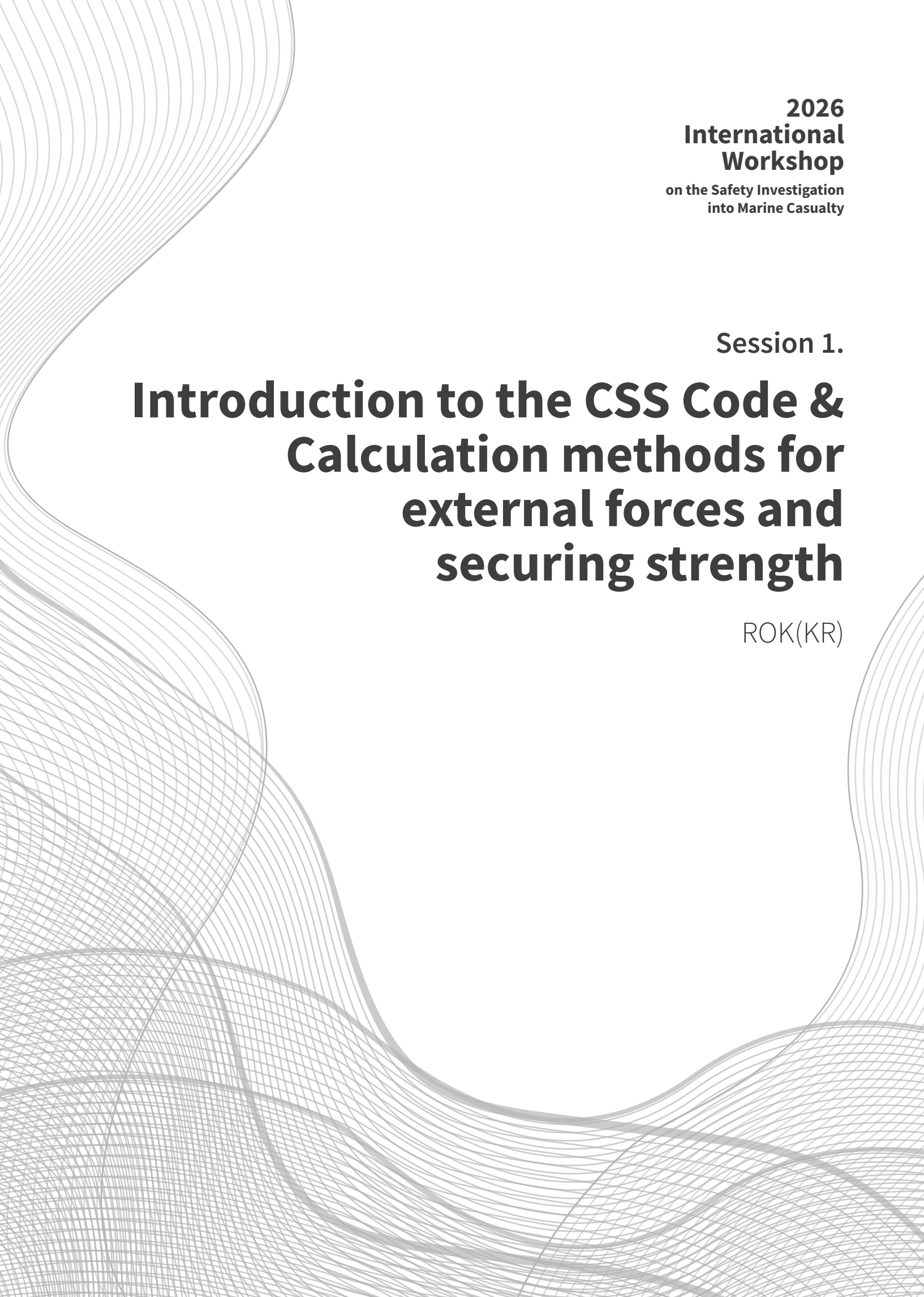


Ministry of Oceans and Fisheries  
Korea Maritime Safety Tribunal









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Session 1.

# **Introduction to the CSS Code & Calculation methods for external forces and securing strength**

ROK(KR)



# CSS Code

*Code of Safe Practice for Cargo Stowage and Securing*

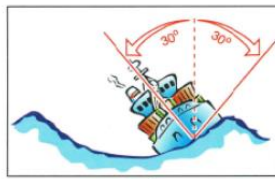
## CONTENTS

- 1 General
- 2 Contents of CSS Code
- 3 CSS Code Annex 13 (Calculation Method)
- 4 Summary



## General Information

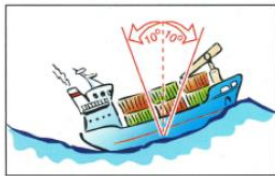
### - Why the CSS Code is needed?



roll



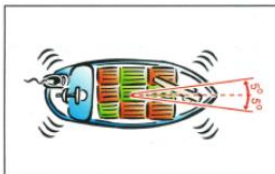
sway



pitch



surge



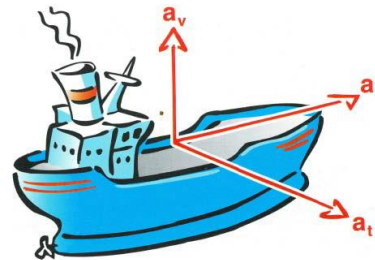
yaw



heave



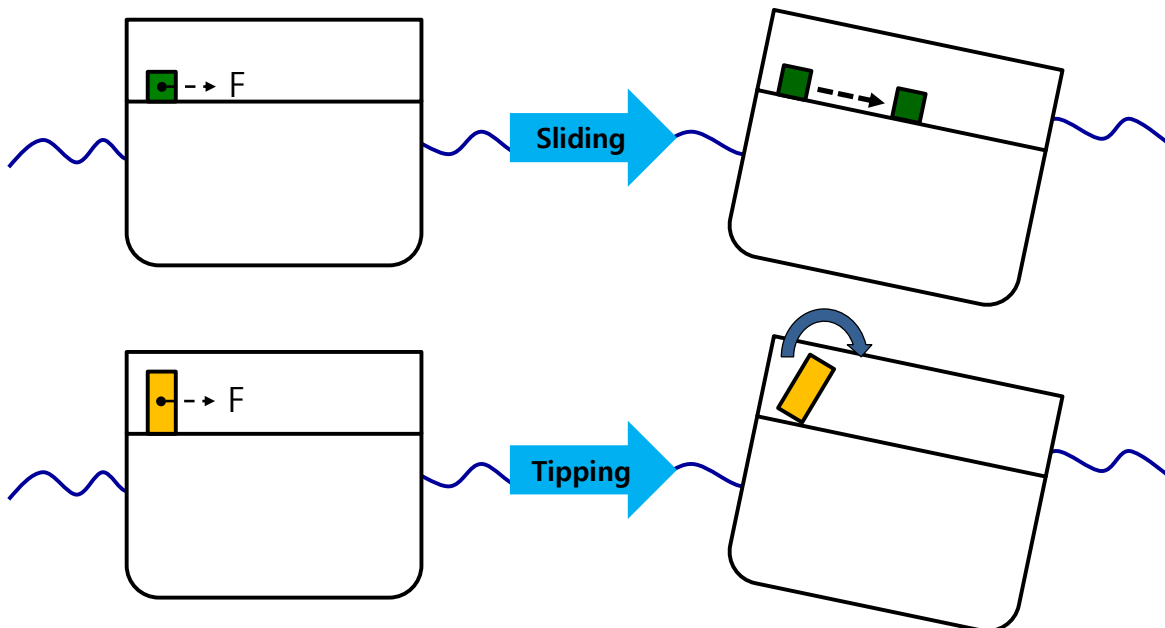
"Ship Motion"



The **CSS Code** provides guidelines for the safe storage and securing of cargoes by accounting for the dynamic accelerations caused by Ship Motion during sea transport

## General Information

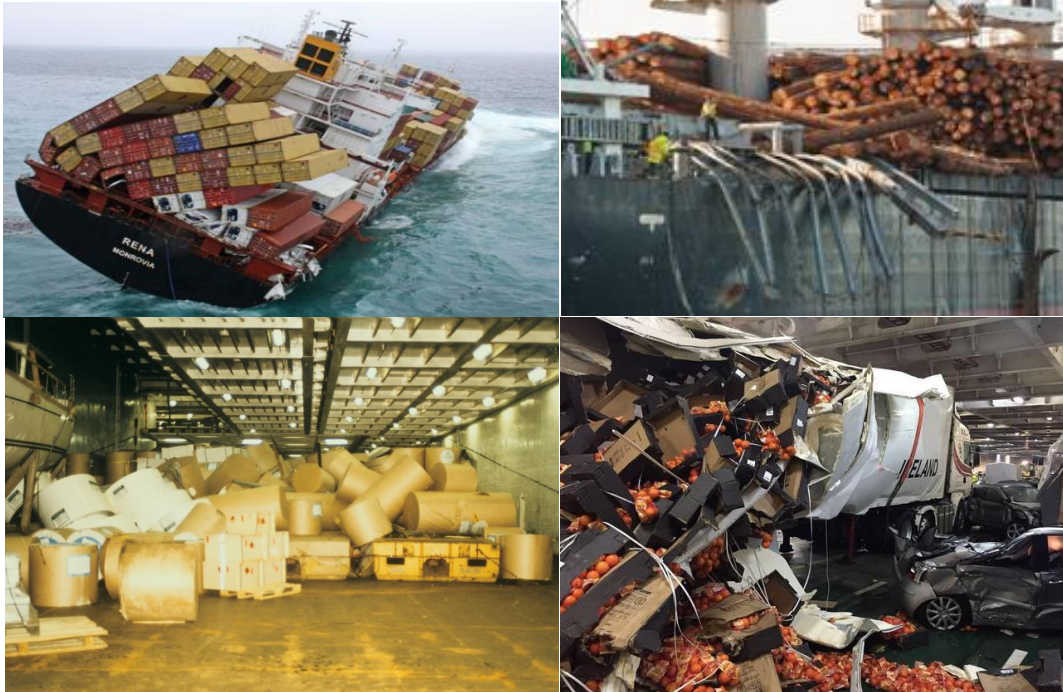
### - Why the CSS Code is needed?



## General Information



### - Why the CSS Code is needed?



## General Information



### - Relevant regulations : SOLAS

#### **SOLAS Ch.VI Reg.5 "Stowage and Securing"**

**All cargoes**, other than solid and liquid bulk cargoes, cargo units and cargo transport units shall be **loaded, stowed and secured throughout the voyage** in accordance with the Cargo Securing Manual approved by the Administration. In ships with ro-ro spaces, as defined in regulation II-2/3.41, **all securing of such cargoes**, cargo units and cargo transport units, in accordance with the Cargo Securing Manual, **shall be completed before the ship leaves the berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to** relevant guidelines developed by the Organization\*\*\*.

\*\*\*Refer to the Guidelines for the preparation of the Cargo Securing Manual [MSC/Circ.1353](#).

#### **SOLAS Ch.VII Reg.5 "Cargo Securing Manual"**

Cargo, cargo units\* and cargo transport units, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration. The cargo Securing Manual shall be drawn up to a standard at least equivalent to the guidelines developed by the Organization.\*\*

\* **Resolution A.714(17)**

\*\* [MSC/Circ.1353](#).



**Cargo Securing Manual** approved by the Administration shall be provided on board all international voyage vessels that loaded all cargoes other than solid and liquid bulk cargoes.

## General Information



### - Relevant regulations

- MSC Cir.1352 : Amendments to the code of safe practice for cargo stowage and securing
- **MSC Cir.1353 : Revised guideline for the preparation of the CSM**  
(OLD MSC. Circ.745)
- Res. A. 489(12) : Safe stowage and securing of cargo units and other entities in ships other than cellular container ships
- Res. A. 533(13) : Elements to be taken into account when considering the safe stowage and securing of cargo units and vehicles
- Res. A. 581(14) : Guidelines for securing arrangements for the transport of road vehicles on Ro-Ro Ships
- Res. A. 714(17) : Code of safe practice for cargo stowage and securing
- **CSS Code : Code of safe practice for cargo stowage and securing**

## CONTENTS



- 1 General
- 2 Contents of CSS Code
- 3 CSS Code Annex 13 (Calculation Method)
- 4 Summary

## Contents of CSS Code



- CHAPTER 1 – General (Ship's particulars)
- CHAPTER 2 – **Securing Devices and Arrangements**
- CHAPTER 3 – Stowage and Securing of Containers and Other Standardized Cargo
- CHAPTER 4 – Stowage and Securing of Semi-Standardized Cargo
- CHAPTER 5 – Stowage and Securing of Non-Standardized Cargo

- Annex 1 - Containers on non-container ships
- Annex 2 – Portable tanks
- Annex 3 - Portable receptacles
- Annex 4 – Wheel-based cargoes
- Annex 5 – Heavy cargo items
- Annex 6 – Coiled sheet steel
- Annex 7 – Heavy metal products
- Annex 8 – Anchor chains
- Annex 9 – Metal scrap in bulk
- Annex 10 – Flexible intermediate bulk containers
- Annex 11 – Under-deck stowage of logs
- Annex 12 – Unit loads
- Annex 13 – Semi-standardized and Non-standardized cargo

## Contents of CSS Code



### - Definition

- **Standardized Cargo** means cargo for which the ship is provided with an approved securing system based upon cargo units of specific types.
- **Semi-standardized Cargo** means cargo for which the ship is provided with a securing system capable of accommodating a limited variety of cargo units, such as vehicles, trailers, etc.
- **Non-standardized Cargo** means cargo which requires individual stowage and securing arrangements.
- **Maximum Securing Load (MSL)** is a term used to define the allowable load capacity for a device used to secure cargo to a ship.

## Contents of CSS Code



### - Specification for fixed cargo securing devices

- The number, locations, type and MSL of the fixed devices used to secure cargo should be indicated on this section
  - 1) a list or/and plan should include information as applicable regarding;
    - ① name of manufacturer
    - ② type designation of item
    - ③ material(s)
    - ④ identification marking
    - ⑤ strength test result
    - ⑥ result of non-destructive testing
    - ⑦ maximum securing load (MSL)
  - 2) Arrangement, type and MSL for fixed cargo securing device
  - 3) Inspection and maintenance schemes
- Existing ships(K/L until 1998.01.01) => only Arr't & MSL
- Supporting structures under fittings shall be confirmed.
- The securing devices shall be Classification Societies' type approved ones.
- It should be approved by Classification Society, if there are any revision.



or Certificate issued by KR



## Contents of CSS Code

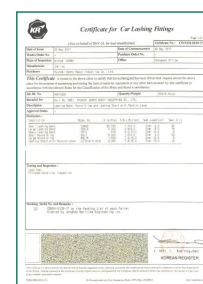


### - Portable securing devices – list, arrangement, detail drawing

- Specification for portable cargo securing devices
  - 1) A list and/or plan of the portable cargo securing devices
    - ① name of manufacturer
    - ② type designation of item
    - ③ material(s)
    - ④ identification marking
    - ⑤ strength test result
    - ⑥ result of non-destructive testing
    - ⑦ maximum securing load (MSL)
  - 2) Arrangement and MSL for portable cargo securing device
  - 3) Inspection and maintenance schemes
- Container vessel shall be fitted with KR type approved ones.
- Information for the use and maintenance of each type of devices
- Certificate or appropriate documents for each portable fitting for cargo securing on board the vessel is to be supplemented to CSM as far as practicable under responsibility of the Master.



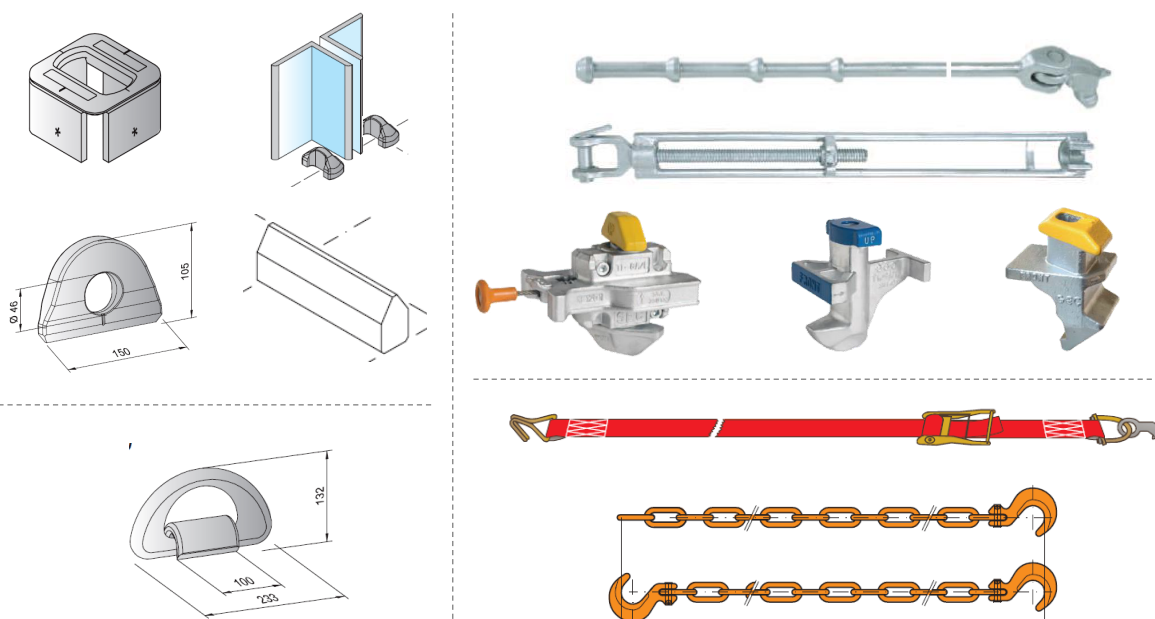
or Certificate issued by KR





## Contents of CSS Code

**- Fixed/Portable cargo securing device**



## Contents of CSS Code

### - Inspection and maintenance schemes & Record book

- **Inspection and maintenance** should be carried out **regularly**.
- **Record book** should contain **procedures for accepting, maintaining and repairing or rejecting cargo securing devices and record of inspections**.

MAINTENANCE SCHEDULE TABLE  
보수유지 계획표

[illegible]

|     |                                       |        |
|-----|---------------------------------------|--------|
| M/V | RECORD BOOK<br>CARGO SECURING DEVICES | Page : |
|-----|---------------------------------------|--------|

[illegible]

## Contents of CSS Code



### - Regulation based on cargo type

| Cargo type                                                     | Safe Stowage and Securing (CSS Code)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Non-Standardized Stowage</b><br><b>(General Cargo Ship)</b> | 1) Containers on deck of ships which are not specially designed and fitted for the purpose of carrying containers (Annex 1)<br>2) Portable tanks (Annex 2)<br>3) Portable receptacles (Annex 3)<br>4) Wheel-based (rolling) cargoes (Annex 4)<br>5) Heavy cargo items such as locomotives, transformers, etc. (Annex 5)<br>6) Coiled sheet steel (Annex 6)<br>7) Heavy metal products (Annex 7)<br>8) Anchor chains (Annex 8)<br>9) Metal scrap in bulk (Annex 9)<br>10) Flexible intermediate bulk containers (Annex 10)<br>11) The under-deck stowage of loss (Annex 11)<br>12) Unit loads (Annex 12)<br>13) Semi-standardized and Non-standardized cargo (Annex 13) |
| <b>Semi-Standardized Stowage</b><br><b>(Ro-ro Ship)</b>        | <b>Wheel-based (rolling) cargoes (Annex 4)</b><br><b>Guidelines for Securing Arrangements for the Transport of Road Vehicles on Ro-Ro Ships (Appendix 4)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Standardized Stowage</b><br><b>(Container Ship)</b>         | <b>Cargo Safe Access Plan (CSAP) (Annex 14)</b><br><b>Container Securing Arrangement (CSA)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## CONTENTS

- 1 General
- 2 Contents of CSS Code
- 3 CSS Code Annex 13 (Calculation Method)
- 4 Summary



## CSS Code Annex 13



### - Calculation example for securing (General Cargo Ship)

| Transverse acceleration $a_y$ in $m/s^2$ |     |     |     |     |     |     |     |     |     | Longitudinal acceleration $a_x$ in $m/s^2$ |
|------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------------------|
| on deck, high                            | 7.1 | 6.9 | 6.8 | 6.7 | 6.7 | 6.8 | 6.9 | 7.1 | 7.4 | 3.8                                        |
| on deck, low                             | 6.5 | 6.3 | 6.1 | 6.1 | 6.1 | 6.1 | 6.3 | 6.5 | 6.7 | 2.9                                        |
| 'tween-deck                              | 5.9 | 5.6 | 5.5 | 5.4 | 5.4 | 5.5 | 5.6 | 5.9 | 6.2 | 2.0                                        |
| lower hold                               | 5.5 | 5.3 | 5.1 | 5.0 | 5.0 | 5.1 | 5.3 | 5.5 | 5.9 | 1.5                                        |
| Vertical acceleration $a_z$ in $m/s^2$   |     |     |     |     |     |     |     |     |     |                                            |
| 7.6 6.2 5.0 4.3 4.3 5.0 6.2 7.6 9.2      |     |     |     |     |     |     |     |     |     |                                            |

Table 2. Basic acceleration data

The basic acceleration data is to be considered as valid under the following operational conditions;

- 1) Operation in unrestricted area
- 2) Operation during the whole year
- 3) Duration of the voyage 25 days
- 4) Length of ship 100m
- 5) Service speed 15 knots
- 6) B/GM  $\geq 13$

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## CSS Code Annex 13



### - Calculation example for securing (General Cargo Ship)

- For ships of a length other than 100 m and a service speed other than 15 knots, the acceleration figures should be corrected by a factor given in table 3 (CSS/Annex 13.7).

| Length(m)<br>Speed(kn) | 50   | 60   | 70   | 80   | 90   | 100  | 120  | 140  | 160  | 180  | 200  |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|
| 9                      | 1.20 | 1.09 | 1.00 | 0.92 | 0.85 | 0.79 | 0.70 | 0.63 | 0.57 | 0.53 | 0.49 |
| 12                     | 1.34 | 1.22 | 1.12 | 1.03 | 0.96 | 0.90 | 0.79 | 0.72 | 0.65 | 0.60 | 0.56 |
| 15                     | 1.49 | 1.36 | 1.24 | 1.15 | 1.07 | 1.00 | 0.89 | 0.80 | 0.73 | 0.68 | 0.63 |
| 18                     | 1.64 | 1.49 | 1.37 | 1.27 | 1.18 | 1.10 | 0.98 | 0.89 | 0.82 | 0.76 | 0.71 |
| 21                     | 1.78 | 1.62 | 1.49 | 1.38 | 1.29 | 1.21 | 1.08 | 0.98 | 0.90 | 0.83 | 0.78 |
| 24                     | 1.93 | 1.76 | 1.62 | 1.50 | 1.40 | 1.31 | 1.17 | 1.07 | 0.98 | 0.91 | 0.85 |

Table 3. Correction factors for length and service speed

- In addition, for ships with B/GM less than 13, only the transverse acceleration figures should be corrected by a factor given in table 4 (CSS/Annex 13.7).

| B/GM          | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13 or above |
|---------------|------|------|------|------|------|------|------|------|------|------|-------------|
| on deck, high | 2.64 | 2.28 | 1.98 | 1.74 | 1.56 | 1.40 | 1.27 | 1.19 | 1.11 | 1.05 | 1.00        |
| on deck, low  | 2.18 | 1.93 | 1.72 | 1.55 | 1.42 | 1.30 | 1.21 | 1.14 | 1.09 | 1.04 | 1.00        |
| 'tween deck   | 1.62 | 1.51 | 1.41 | 1.33 | 1.26 | 1.19 | 1.14 | 1.09 | 1.06 | 1.03 | 1.00        |
| lower hold    | 1.24 | 1.23 | 1.20 | 1.18 | 1.15 | 1.12 | 1.09 | 1.06 | 1.04 | 1.02 | 1.00        |

Table 4. Correction factors for B/GM

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## CSS Code Annex 13



### - Calculation example for securing (General Cargo Ship)

- **MSL(Maximum Securing Load):** Allowable load capacity for a device used to secure cargoes to a ship

| Material                                                                                                    | MSL                      |
|-------------------------------------------------------------------------------------------------------------|--------------------------|
| Shackles, deckeyes, twistlocks, lashing rods, D-rings, stackers, bridge fittings, turnbuckles of mild steel | 50% of breaking strength |
| Fibre rope                                                                                                  | 33% of breaking strength |
| Wire rope (single use)                                                                                      | 80% of breaking strength |
| Wire rope (re-useable)                                                                                      | 30% of breaking strength |
| Steel band (single use)                                                                                     | 70% of breaking strength |
| Chains                                                                                                      | 50% of breaking strength |
| Web lashings                                                                                                | 50% of breaking strength |

- **Safety Factor**

Calculated Strength(CS) of securing devices = MSL/S.F (Safety Factor = 1.5)

e.g. MSL(90 ton) -> CS(60 ton)

- **Friction Coefficients**

Friction contributes towards prevention of sliding

| Materials in contact         | Friction coefficient, ( $\mu$ ) |
|------------------------------|---------------------------------|
| timber-timber, wet or dry    | 0.4                             |
| steel-timber or steel-rubber | 0.3                             |
| steel-steel, dry             | 0.1                             |
| steel-steel, wet             | 0.0                             |

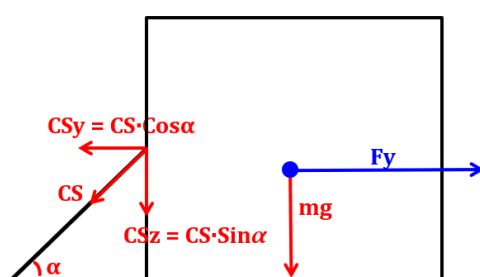
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## CSS Code Annex 13



### - Calculation example for securing (General Cargo Ship)

#### Transverse & Longitudinal Sliding



$$F_y \leq \mu \cdot m \cdot g + CS_y + \mu \cdot CS_z$$

$$\leq \mu \cdot m \cdot g + CS \cdot \cos \alpha + \mu \cdot CS \cdot \sin \alpha$$

$$\leq \mu \cdot m \cdot g + CS(\cos \alpha + \mu \cdot \sin \alpha)$$

$$\leq \mu \cdot m \cdot g + CS \cdot f$$

$$F_y \leq \mu m g + CS_1 f_1 + CS_2 f_2 + \dots + CS_n f_n$$

$$F_x \leq \mu (m g - F_z) + CS_1 f_1 + CS_2 f_2 + \dots + CS_n f_n$$

| $\alpha$ | -30° | -20° | -10° | 0°   | 10°  | 20°  | 30°  | 40°  | 50°  | 60°  | 70°  | 80°  | 90°  |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 0.3      | 0.72 | 0.84 | 0.93 | 1.00 | 1.04 | 1.04 | 1.02 | 0.96 | 0.87 | 0.76 | 0.62 | 0.47 | 0.30 |
| 0.1      | 0.82 | 0.91 | 0.97 | 1.00 | 1.00 | 0.97 | 0.92 | 0.83 | 0.72 | 0.59 | 0.44 | 0.27 | 0.10 |
| 0.0      | 0.87 | 0.94 | 0.98 | 1.00 | 0.98 | 0.94 | 0.87 | 0.77 | 0.64 | 0.50 | 0.34 | 0.17 | 0.00 |

$$f = \mu \cdot \sin \alpha + \cos \alpha$$

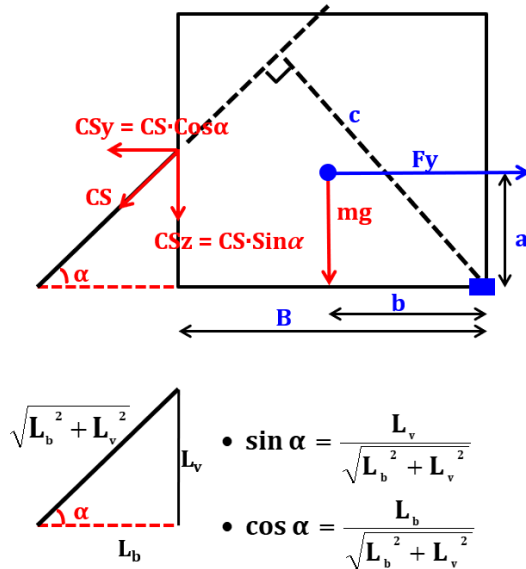
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## CSS Code Annex 13



### - Calculation example for securing (General Cargo Ship)

#### Transverse Tipping



$$\begin{aligned}
 F_y \cdot a &\leq m \cdot g \cdot b + CS_y \cdot L_v + CS_z \cdot B \\
 &\leq m \cdot g \cdot b + CS \cdot \cos \alpha \cdot L_v + CS \cdot \sin \alpha \cdot B \\
 &\leq m \cdot g \cdot b + CS (\cos \alpha \cdot L_v + \sin \alpha \cdot B) \\
 &\leq m \cdot g \cdot b + CS \left( \frac{L_b}{\sqrt{L_b^2 + L_v^2}} \cdot L_v + \frac{L_v}{\sqrt{L_b^2 + L_v^2}} \cdot B \right) \\
 &\leq m \cdot g \cdot b + CS \frac{L_v}{\sqrt{L_b^2 + L_v^2}} (L_b + B) \\
 &\leq m \cdot g \cdot b + CS \cdot \sin \alpha \cdot (L_b + B) \\
 &\leq m \cdot g \cdot b + CS \cdot c
 \end{aligned}$$

$$F_y a \leq b m g + CS_1 c_1 + CS_2 c_2 + \dots + CS_n c_n$$

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## CSS Code Annex 13



### - Calculation example for securing (General Cargo Ship)

#### (Calculation Example)

**Calculated example 1**  
(Refer to paragraph 7.2, balance of forces and moments.)

Ship: L = 120m B = 20m GM = 1.4m Speed = 15kn  
Cargo: m = 62t dimensions = 6 · 4 · 4m Stowage at 0.7L on deck low

**Securing material:**  
Wire rope: breaking strength = 125kN; MSL = 100kN  
Shackles, turnbuckles, d-rings: breaking strength = 180kN; MSL = 90kN  
Stowed on dunnage boards:  $\mu = 0.3$ ,  $CS = \frac{90}{1.5} = 60kN$

**Securing arrangement:**

| Side | n | CS | a   | f    | c |
|------|---|----|-----|------|---|
| STB  | 4 | 60 | 40° | 0.96 | - |
| PS   | 2 | 60 | 40° | 0.96 | - |
| PS   | 2 | 60 | 40° | 1.04 | - |

**External forces**  
 $F_x = 2.9 \cdot 0.89 \cdot 62 + 16 + 8 = 184kN$   
 $F_y = 6.3 \cdot 0.89 \cdot 62 + 24 + 12 = 384kN$   
 $F_z = 6.2 \cdot 0.89 \cdot 62 = 342kN$

**Balance of forces (STB-arrangement)**  
 $384 < 0.3 \cdot 62 \cdot 9.81 + 4 \cdot 60 \cdot 0.96$   
 $384 < 412$  This is ok!

**Balance of forces (PS-arrangement)**  
 $384 < 0.3 \cdot 62 \cdot 9.81 + 2 \cdot 60 \cdot 0.96 + 2 \cdot 60 \cdot 1.04$   
 $384 < 422$  This is ok!

**Balance of moments**  
 $384 \cdot 1.8 < 2 \cdot 62 \cdot 9.81$   
 $691 < 1216$  No tipping, even without lashings.

Front view  
Top view



## Calculation for standardized cargoes

### - Classifications' activities on Lashing Software

1. Securing calculation for standardized cargoes (containers) is to be complied with requirements of Classification Societies.
2. Calculations are performed using lashing software developed by each Society.
3. The software includes roll prediction tools which incorporate hydrodynamic data and hull shape to assess roll behaviour.
  - **Mis-declared cargo weight leads to improper cargo distribution, which can significantly affect ship's center of gravity and alter the roll motion characteristic!**
4. IACS has recently published new IACS Resolutions to prevent container loss at sea.
  - **UR C6: Requirements for lashing software (Implemented from 1 July 2025)**
  - **UR C7: Approval and certification of container securing systems (Implemented from 1 July 2025)**
  - **UR C8: Allowable wear, tear and corrosion of container securing systems (Under development)**
5. On going work: Harmonization of container stack assessments
  - **Focus on harmonizing design loads with different container tier**
  - **Discussion under way at IMO: revision of MSC.1/Circ.1353 Rev.1 to include a harmonized standard for lashing software to permit lashing software as a supplement to the Cargo Securing Manual**
  - **IMO CCC/DG report will be submitted to CCC12 in June 2026.**



## CSS Code Annex 14

### Guidance on providing safe working conditions for securing of containers on deck

The Annex provides the guidance on producing a **Cargo Safe Access Plan (CSAP)**.

❖ *Scope: Ships which are specifically designed and fitted for the purpose of carrying containers on deck*

- Introduced by 2010 Amendments with implementation date of 1 January 2015.
- Should be reviewed in an integrated manner on the early design stage (requiring close cooperation among the Shipowner, Shipbuilder and Classification Society).

#### ✓ Design Considerations

- Can personnel safely access the lashing positions?
- Is the working space provided with sufficient width and clearance?
- Are the storage locations and operating positions of lashing equipment arranged in a practical manner?
- Can personnel work ergonomically without excessive or awkward posture?
- Is rapid evacuation and rescue access possible in an emergency?
- Is adequate lighting provided for night work or restricted-visibility conditions?



# CSS Code Annex 14



## Guidance on providing safe working conditions for securing of containers on deck

### MSC Circ. 1353

- Hand Rails;
- Platforms;
- Walkways;
- Ladders;
- Access Covers;
- Location of Equipment Storage Facilities
- Lighting Fixtures;
- Container Alignment on Hatch Covers/Pedestals;
- Fittings for Specialized Containers, such as refer plugs/receptacles;
- First aid Stations and Emergency Access/egress;
- Gangways; and
- Any other arrangements necessary for the provision of safe access

### SUPPLEMENT

#### CONTAINER SECURING DIMENSIONS

| Dimension (see figure) | Description                                                                                            | Requirement (mm) |
|------------------------|--------------------------------------------------------------------------------------------------------|------------------|
| A                      | Width of work area between container stacks(see figure 1)                                              | 750 minimum      |
| B                      | Distance between lashing plates on deck or on hatch covers (see figure 1)                              | 600 minimum      |
| C1                     | Distance from lashing bridge fencing to container stack (see figure 2)                                 | 1100 maximum     |
| C2                     | Distance from lashing plate to container stack (lashing bridge) (see figure 2)                         | 220 minimum      |
| C3                     | Distance from lashing plate to container stack (elsewhere) (see figures 1 and 4)                       | 130 minimum      |
| F                      | Width of lashing bridge between top rails of fencing (see figure 2)                                    | 750 minimum      |
| F1                     | Width of lashing bridge between storage racks, lashing cleats and any other obstruction (see figure 2) | 600 minimum      |
| GL                     | Width of working platform for outboard lashing – fore/aft (see figure 3)                               | 750 minimum      |
| GT                     | Width of working platform for outboard lashing – transverse (see figure 3)                             | 750 minimum      |
| I                      | Width of work platform at end of hatch cover or adjacent to superstructure (see figure 4)              | 750 minimum      |
| J                      | Distance from edge of hatch cover to fencing (see figure 4)                                            | 600 minimum      |
| K                      | Width of lashing bridge between top rails of fencing (see figure 2)                                    | 750 minimum      |
| K1                     | Width of lashing bridge between the pillars of the lashing bridge (see figure 2)                       | 600 minimum      |

#### NOTES

B - Measured between the centres of the lashing plates.  
C1 - Measured from inside of fencing.  
C2, C3 - Measured from centre of lashing plate to end of container.  
F, K - Measured to inside of fencing.  
GL - Measured from end of container to inside of fencing.  
GT - Measured to inside of fencing.  
I - Measured to inside of fencing.  
J - Measured to inside of fencing.

### CSS/Annex 14 Supplement

# CONTENTS

- 1 General
- 2 Contents of Cargo Securing Manual
- 3 Special note of Vehicle Loading Plan
- 4 Summary



## Summary



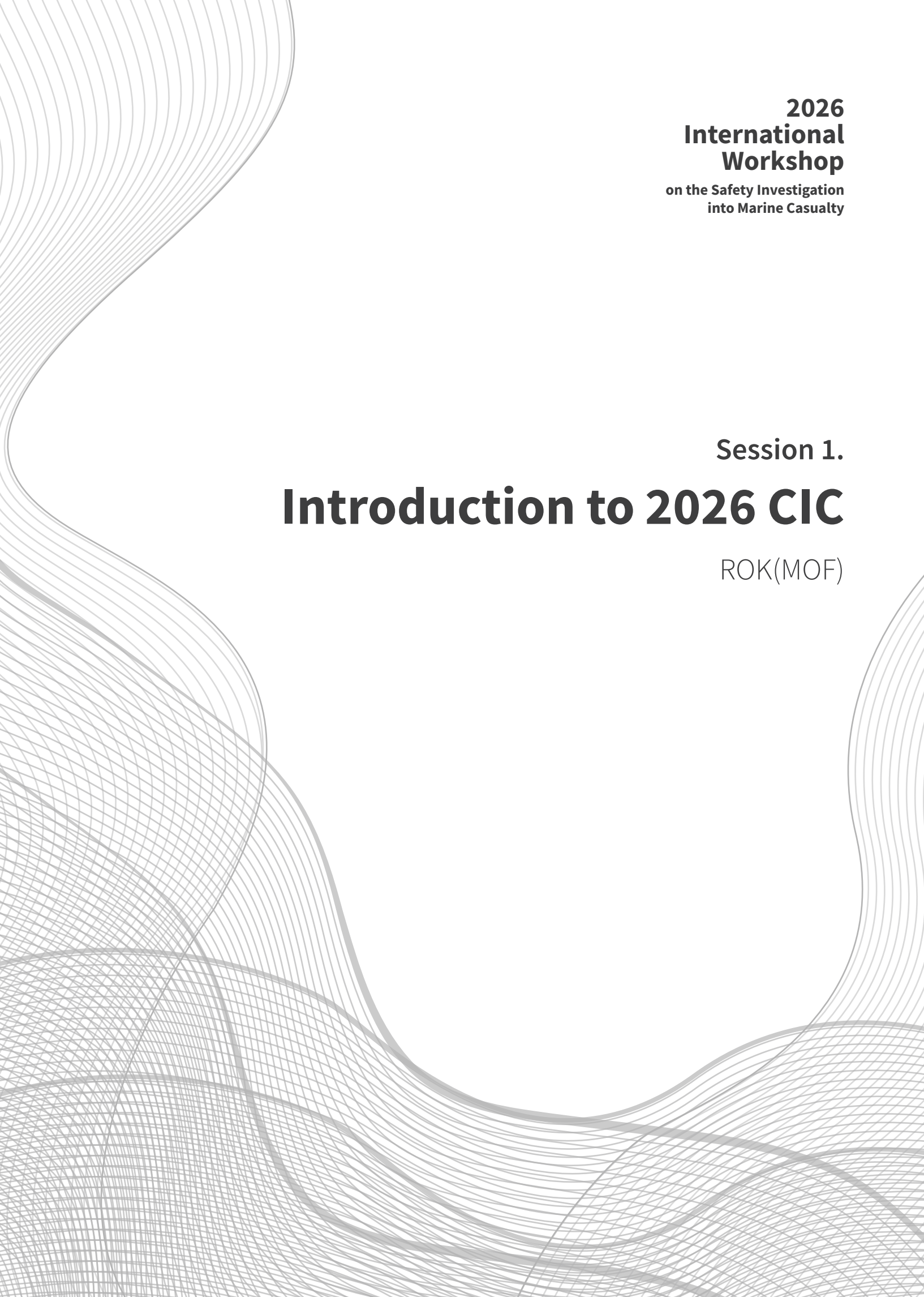
- “**Cargo Securing Manual**” shall be provided on board all international vessels loaded all cargoes other than solid and liquid bulk cargoes.
- The manual shall comply with the **CSS Code** and **be approved** by Societies, if there is any revision to cargo securing devices.
- The CSS Code includes annexes to provide guidance for securing various types of cargo.
- “**Cargo Safe Access Plan(CSAP)**” shall be inserted into the Cargo Securing Manual for **ships carrying containers on deck**, keel laid on or after 1 January 2015.
- The securing calculation for semi-standardized & non-standardized cargoes shall be carried out in accordance with CSS Code Annex 13 and for standardized cargoes(containers), shall be performed based on requirements of Societies, using lashing software.
- **At IMO**, the development on **harmonizing container stack loads** among Societies is currently underway.

**Thank You for your attention!**

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

Lee Kyungmo/ Ship Technology 1 Team

[hull1@krs.co.kr](mailto:hull1@krs.co.kr)



**2026**  
**International**  
**Workshop**  
on the Safety Investigation  
into Marine Casualty

Session 1.

# **Introduction to 2026 CIC**

ROK(MOF)





2026년 국제 해양사고조사 워크숍

## 26년 항만국통제 집중점검(CIC) 소개 - Cargo Securing 분야 -



이현욱 검사관



## Contents

1. 2026년 항만국통제 집중점검(CIC) 개요
2. 2026년 항만국통제 집중점검(CIC) 중점 점검 사항
3. PSC 결함 지적 사례



## 2026 항만국통제 집중점검(CIC) 개요

### 개요

#### (1) CIC 란?

- 항만국통제(PSC)에서 특정 분야를 일정 기간 집중적으로 점검하는 특별 점검 활동 (Concentrated Inspection Campaign)

#### (2) 2026년 CIC 개요

1) 시행기간: 2026.9.1. ~ 11.30.

2) 대상: SOLAS 제VI장 제5규칙에 따라 Cargo Securing Manual 을 보유하고, 화물 운송 유닛 또는 화물 유닛(컨테이너)를 운송하는 모든 선박에 적용

#### 3) 목적

- 화물 고박 안전성 확인
- Cargo Securing Manual 준수 여부 확인
- 선원 Familiarization 확인

|

## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

### ① Cargo Securing Manual (CSM) 점검 사항



1. 선박의 승인된 CSM 보유 여부
2. 해당 CSM의 적절성 (선내에서 발생하는 모든 특정 적재 상황에 대한 명확한 고박 지침을 포함 여부)
3. 최신화 개정 유지

#### (1) 협약 근거: SOLAS VI /Regulation 5.6

- All cargoes, other than solid and liquid bulk cargoes, cargo units and cargo transport units shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration.

|

## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

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3. 최신화 개정 유지

#### (2,3) 협약 근거 : SOLAS VI /Regulation 5.6

- In ships with ro-ro spaces, as defined in regulation II-2/3.41, all securing of such cargoes, cargo units and cargo transport units, in accordance with the Cargo Manual, shall be completed before the ship leaves the berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to relevant guidelines developed by Organization

|

## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

### ② Cargo Securing Manual (CSM) 준수 여부



1. 화물이 cargo plan에 따라 고박 되어 있으며 그 계획이 적합한지 여부
2. 화물 고박에 사용될 Lashing Device가 CSM에 설명된 장비인지 여부
3. 이전 적재 기록을 검토하여 선박에 운송 되었던 모든 유형의 컨테이너가 CSM에 따라 운송이 허용된 것인지 확인

#### (1) 협약 근거 : SOLAS VI /Regulation 5.1

- Cargo, cargo units and cargo transport units carried on or under deck shall be so loaded, stowed as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

|

## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

**CARGO SECURING MANUAL**

Vessel Name: **UFS-ENAM** PRINCESS FATMA

IMO Number: **9533385**

Official No.: **334016** 9252

Port of Registry: **PORT KLANG** PORT SAID

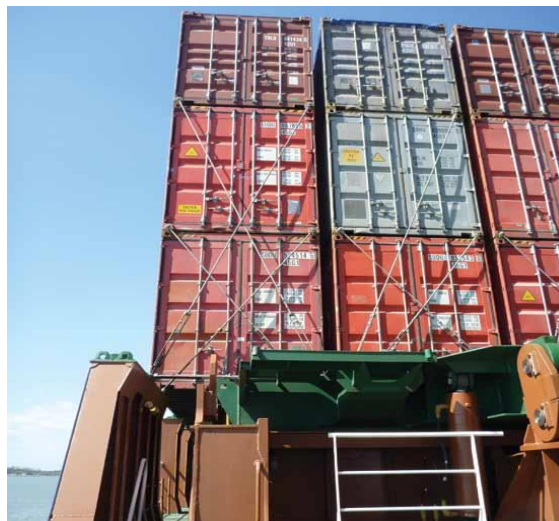
Vessel Type: **ANCHOR HANDLING TUG & SUPPLY VESSEL**

Flag: **MALAYSIA** SCOTT

Built: **2009**

Date: **APRIL 2009**

**ABS** APPROVED FOR CARGO SECURING BY THE ABS CLASSIFICATION SOCIETY ON 13-MAY-2009



## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

### ③ Cargo Securing Manual (CSM) 에 따른 유지/보수

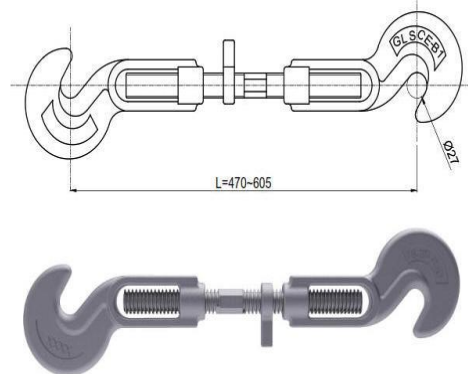
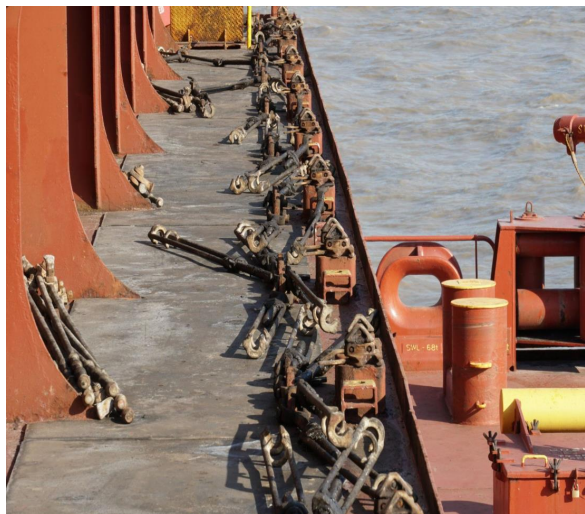


1. 승인된 CSM에 명시된 바에 따라 충분한 Portable cargo securing device와 예비 공급품이 있는지 여부
2. CSM 또는 관련 문서가 securing device의 검사 및 정비 체계 기록에 관한 세부사항을 포함하고 있는지 여부
3. 검사기록을 이용할 수 있으며, 검사 및 정비 체계가 준수되고 있는지 여부 (교체의 경우 선내 기존 자재와 일치)

#### (1) 협약 근거 : SOLAS VI /Regulation 5.1

- Cargo, cargo units and cargo transport units carried on or under deck shall be so loaded, stowed as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

## 2026 항만국통제 집중점검(CIC) 중점 점검 사항



Material : Heat Treatable Steel  
Finish : Hot Dip Galvanized  
Weight : 5.14 kg

Min. B.L. Tension : 200 kN  
Min. B.L. Shear :  
Min. B.L. Compression :



## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

④ 화물 적재 상태는 선교 시계 요건에 적합



1. Cargo stow plan이 bridge visibility를 고려하고 있는지 여부
2. 실제 cargo stow가 예정 항해에 대한 bridge visibility 요건에 적합한지 여부
3. 협약의 내용을 쉽게 설명하면 조타 위치(conning position)에서 전방 해면의 시야 가림 거리가 선박 길이의 2배 또는 500m 중 작은 값을 초과하면 안되며



(1) 협약 근거 : SOLAS V /Regulation 22 (Bridge Visibility)

- 1.1 The view of the sea surface from the conning position shall not be obscured by more than two ship lengths, or 500m, whichever is the less, forward of the bow to 10° on either side under all conditions of draught, trim and deck cargo;



## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

### ④ 화물 적재 상태는 선교 시계 요건에 적합



4. 협약에 따르면 또한 컨테이너 등으로 인해 생기는 개별 사각구역(blind sector)은 10도를 초과하면 안됨, 그리고 전체 사각 구역 합계는 20도 초과 금지

#### (1) 협약 근거 : SOLAS V /Regulation 22 (Bridge Visibility)

- 1.2 No blind sector caused by cargo, cargo gear or the wheelhouse forward of the beam which obstructs the view of the sea surface as seen from the conning position, shall exceed 10 degrees. The total arc of blind sectors shall not exceed 20 degrees. The clear sectors between blind sectors shall be at least 5 degrees. However, in view described in .1, each individual blind sector shall not exceed 5 degrees;

## 2026 항만국통제 집중점검(CIC) 중점 점검 사항

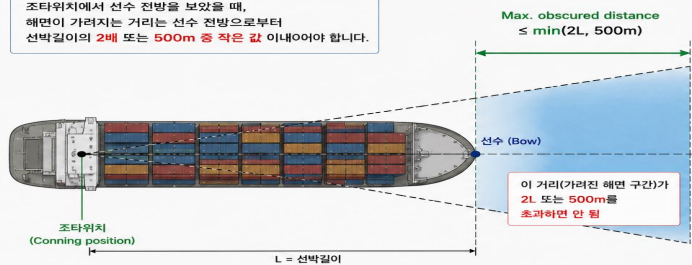
### ④ 화물 적재 상태는 선교 시계 요건에 적합

#### Bridge Visibility Requirements (SOLAS V/22)

조타위치(conning position)에서 선수 전방의 해면 시야 확보 요구사항

##### 1 전방 해면 시야 가림 거리 제한

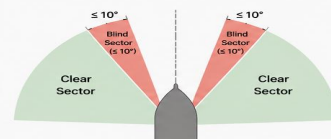
조타위치에서 선수 전방을 보았을 때, 해면이 가려지는 거리는 선수 전방으로부터 선박길이의 2배 또는 500m 중 작은 값 이내여야 합니다.



※ 해면 시야 가림 거리 = 선수(Bow) 전방으로부터 시야가 가려지는 해면 구간

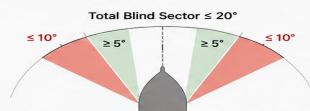
##### 2 Blind Sector (사각구역) 제한

화물, 화물장비 등으로 인해 발생하는 개별 사각구역은 10도를 초과하면 안 됩니다.



##### 3 전체 사각구역 합계 제한

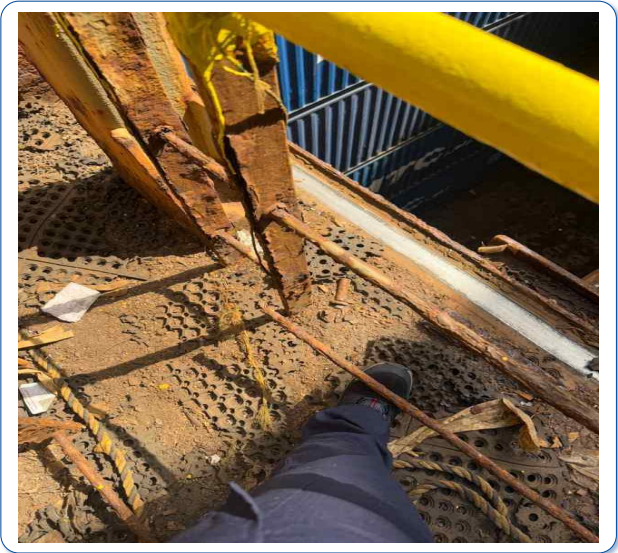
- 전체 사각구역의 합계는 20도를 초과하면 안 됩니다.
- 사각구역 사이의 Clear Sector는 최소 5도 이상 확보되어야 합니다.



##### ! 중요 포인트

- '선수(Bow) 전방' 기준으로 측정합니다.
- 모든 흘수(draught), 트림(trim), 데크 화물 상태에서 요구사항을 만족해야 합니다.
- Hi-cube, 고단적재, 과도한 화물 적재 시 시야가 가려질 수 있어 PSC 지적 대상이 될 수 있습니다.

PSC 결함 지적 사례 (Cargo safe access plan 관련 화물 구역으로의 접근)



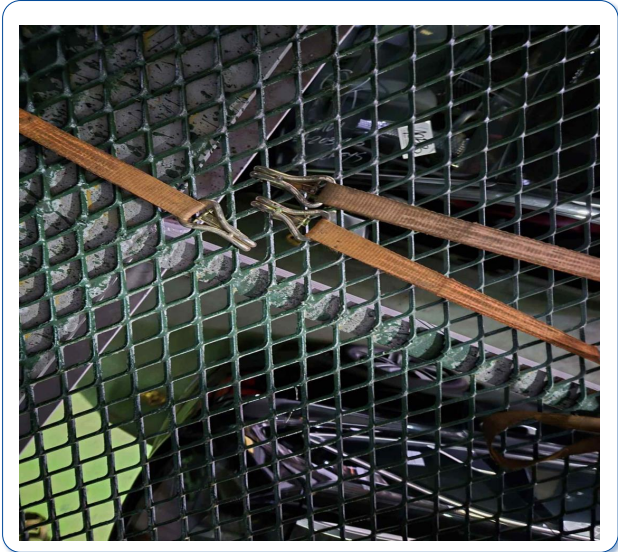
PSC 결함 지적 사례 (CSM에 따른 Portable cargo securing device 미사용)

Настройка по предельно грузам - 1/х "Adel-5" - Д3050-901-001 26  
Cargo Securing Manual m/v "Adel-5"

Continuation of Table 2.2 - Portable devices for securing cargoes

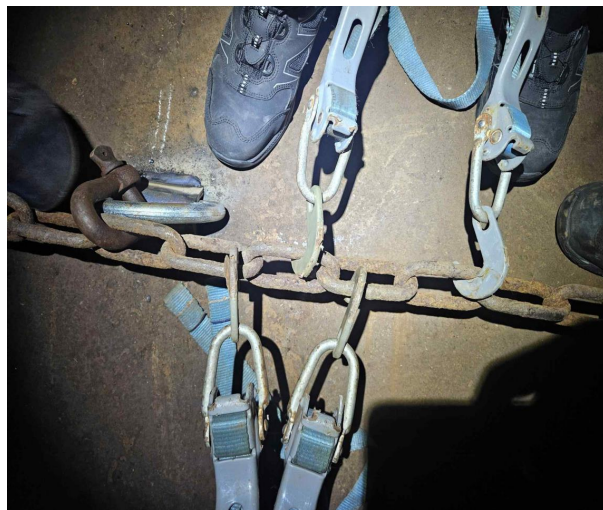
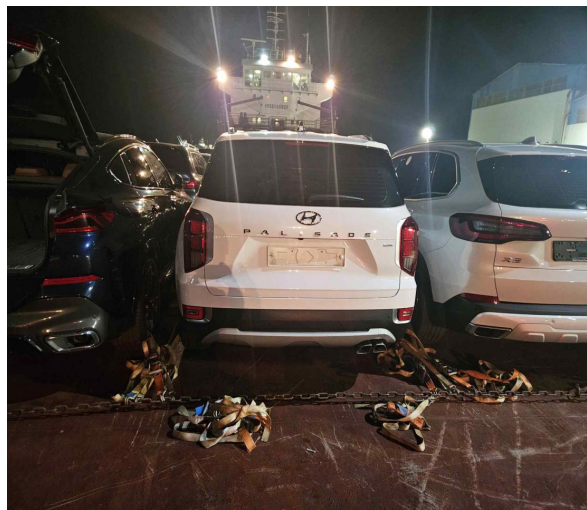
| Kind of the equipment                 | Type of the equipment                      | Quantity, Pieces | SWL, kN | Mark |
|---------------------------------------|--------------------------------------------|------------------|---------|------|
| Pressure element 84-87/183/15         |                                            |                  | 650     |      |
| Double stacker 8-2/421/115            |                                            |                  | 560     |      |
| Single lashing eye 08-5/55            |                                            |                  | 160     |      |
| Tension lever C-1/J-20                |                                            |                  | 80      |      |
| Demountable devices of cars > 5 ton   |                                            |                  |         |      |
| 1 Lash                                | Wire cable Ø14 mm L = 3 m                  |                  | 24*     |      |
| 2 Turnbuckle                          | Chain L = 6,0 m Ø 10 mm                    |                  | 49*     |      |
| 3 Shackle                             | Type "eye-eye"                             |                  |         |      |
| 4 Clip                                | Ø14 mm                                     |                  |         |      |
| Demountable devices of cars < 5 ton   |                                            |                  |         |      |
| 1 Chain                               | L = 6,0 m Ø 10 mm                          |                  | 49*     |      |
| 2 Shackle                             |                                            |                  | 24*     |      |
| 2 Lash                                | Sling tape with a lock L = 4 m             |                  | 24*     |      |
| Demountable devices of timber cargoes |                                            |                  |         |      |
| 1 Lash                                | Wire cable 18-T-B-K-ЛН-1370(140) L = 8,5 m | 50               | 48*     |      |
| 2 Turnbuckle load                     |                                            | 25               | 63      |      |
| 3 Clip                                |                                            | 300              |         |      |
| 4 Chain                               | L = 6,0 m Ø 10 mm                          |                  | 49*     |      |
| 5 Shackle                             |                                            |                  | 50      |      |

\* - breaking load of cable



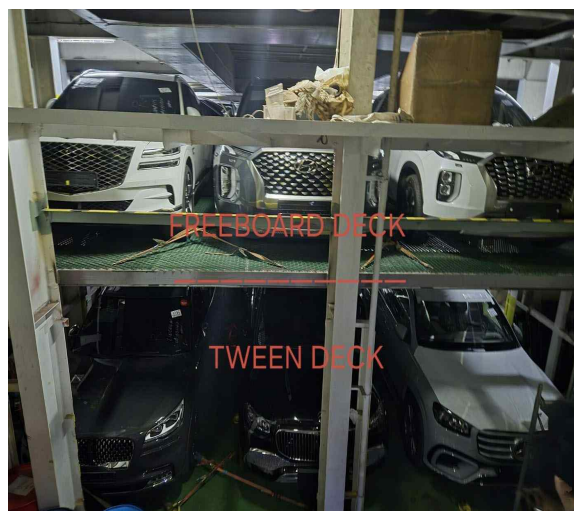
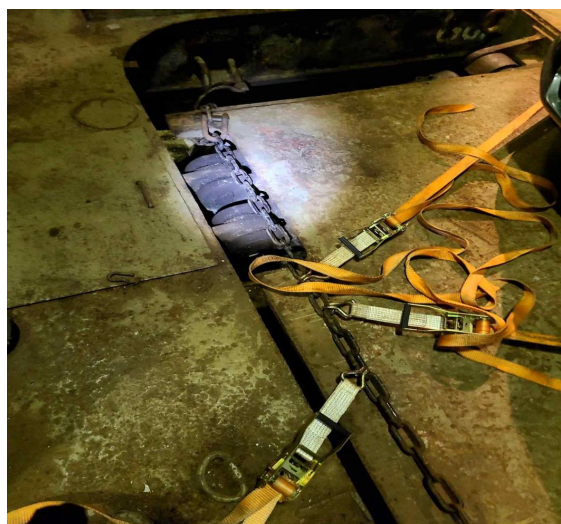


PSC 결함 지적 사례 (CSM 에 따라 고박하지 않음)



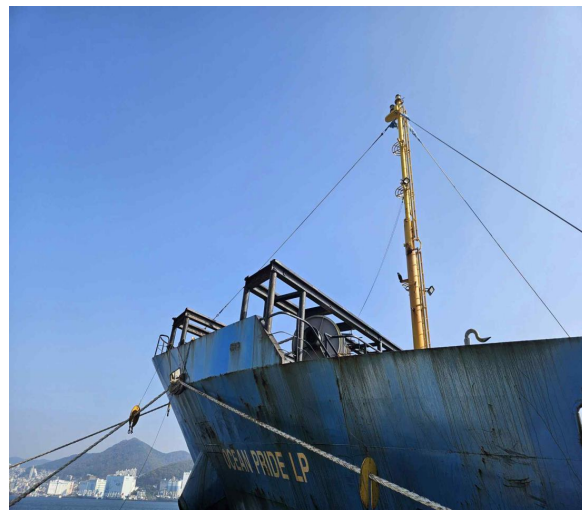
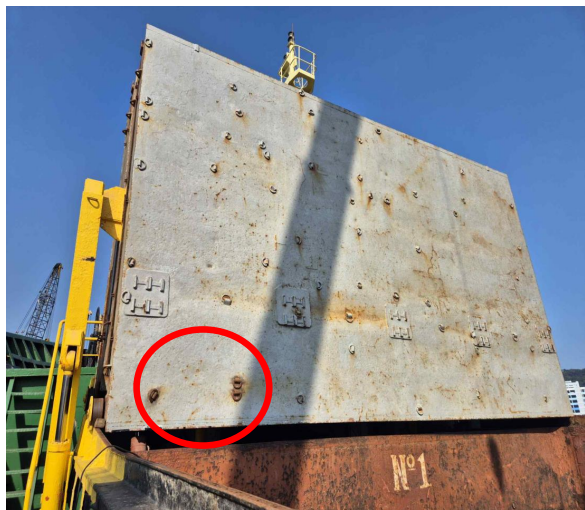
|

PSC 결함 지적 사례 (CSM에 따라 고박 하지 않음)



|

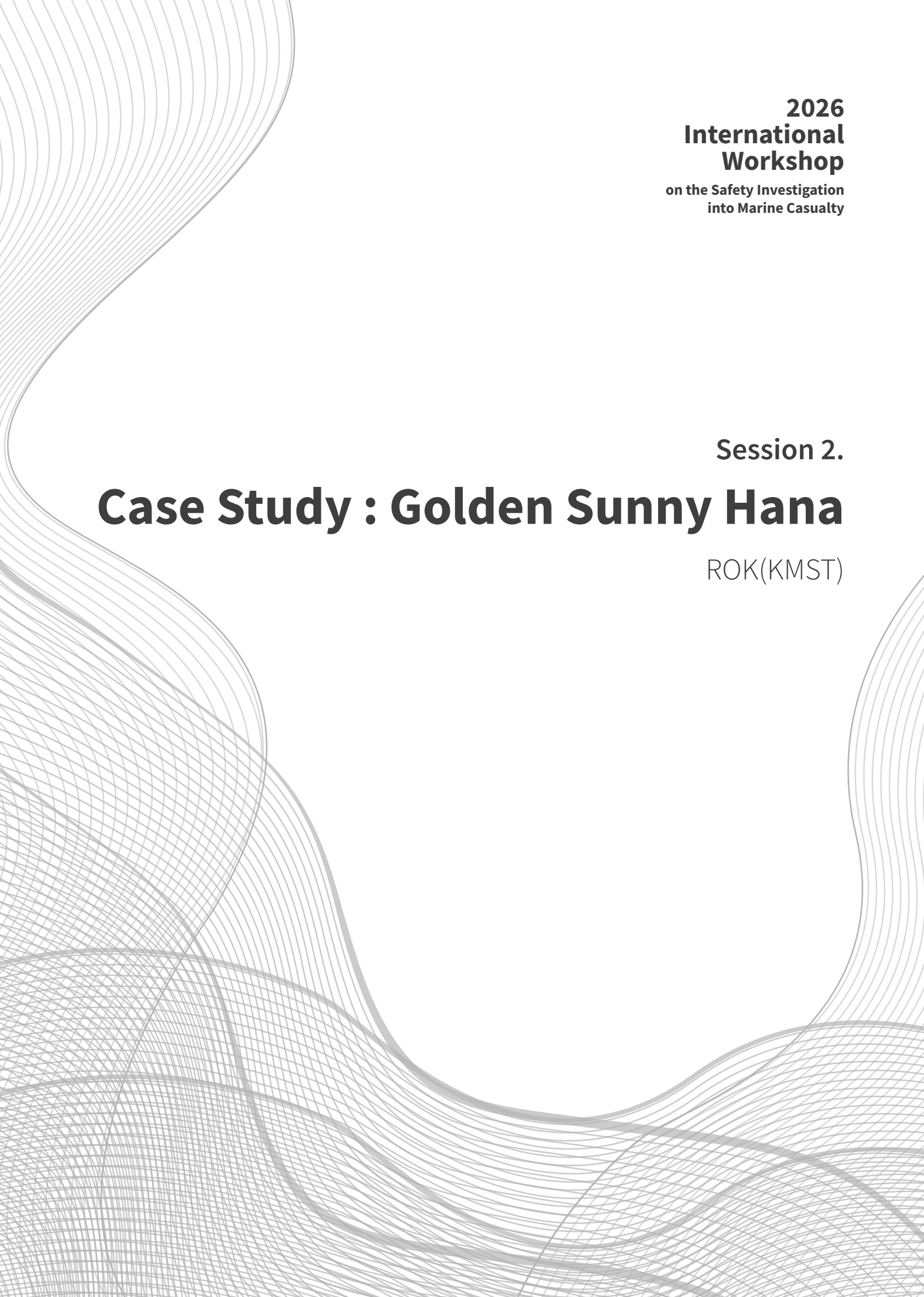
PSC 결함 지적 사례 (승인되지 않은 Fixed cargo securing device 설치 등)



감사합니다







**2026**  
**International**  
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on the Safety Investigation  
into Marine Casualty

Session 2.

# **Case Study : Golden Sunny Hana**

ROK(KMST)



# Investigation into Enclosed Space Accidents

Korea Maritime Safety Tribunal



Ministry of Oceans  
and Fisheries



**| GOLDEN SUNNY HANA** casualty

# GOLDEN SUNNY HANA

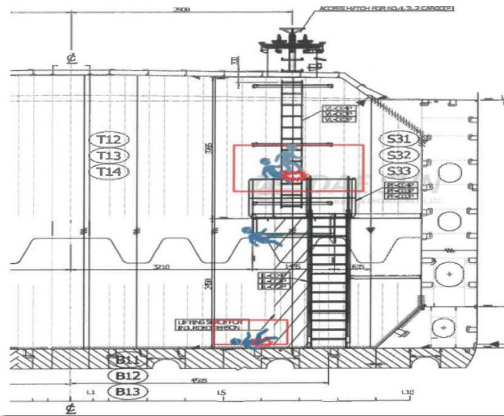
casualty



## (1) Case Summary

Jun 20, 2025, at approx. 13:55

While the Chief Officer was entering the cargo hold via a vertical ladder, he **lost his grip and fell** approximately 4.5 meters to the bottom of the cargo hold. The Chief Officer sustained fatal injuries and passed away.



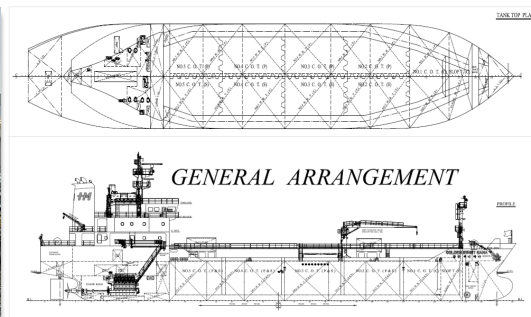
# GOLDEN SUNNY HANA

casualty



## (2) Ship Particulars

| Ship name         | Vessel Type     | GT    | Length/Breadth/Depth (m) | Launch     | Owner / Inspection Authority           |
|-------------------|-----------------|-------|--------------------------|------------|----------------------------------------|
| Golden Sunny Hana | Chemical Tanker | 2,688 | 84.64 / 14.40 / 7.80     | 2017.07.28 | HNCC Co., Ltd. / HANA MARINE Co., Ltd. |





# GOLDEN SUNNY HANA

casualty



## (3) Causes of the Accident

### ① Assessment of Enclosed Space Atmosphere

- Prior to the accident, the oxygen concentration inside the cargo hold was measured at 20.9%, and no toxic gases were detected.
- Two crew members were already working inside the cargo hold before the Chief Officer entered.

★ It is determined that the accident was not caused by oxygen deficiency or toxic gas poisoning within the enclosed cargo hold.

| Enclosed space | Date & Time | Check Code | Result of Checking Atmosphere |           |           |          | Last Cargo or Other Toxic Gas (If need) |           |              | Checked by attendant<br>출입구감시자 |
|----------------|-------------|------------|-------------------------------|-----------|-----------|----------|-----------------------------------------|-----------|--------------|--------------------------------|
|                |             |            | O2 (%Vol)                     | HC (%LEL) | H2S (ppm) | CO (ppm) | Name                                    | TLV (ppm) | Result (ppm) |                                |
| 1C             | 1200        | 1H1        | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |
| 2P             | 1208        | 1H1        | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |
| 3D             | 1217        | 1H1        | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |
| 4P             | 1224        | 1H1        | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |
| 5P             | 1230        | 1H1        | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |
| 1C             | 1243        | BR         | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |
| 2P             | 1325        | BR         | 20.9                          | 0         | 0         | 0        | METHANOL                                | 200       | -            | BSN                            |

# GOLDEN SUNNY HANA

casualty



## (3) Causes of the Accident

### ② Review of Potential Influence from Fatigue or Drugs

- No abnormalities were found in the First Officer's physical examination or drug tests.
- Prior to the accident, the First Officer frequently entered the cargo tanks for every port call. However, it was confirmed that the ship had been on standby at the berth for two days at the time of the incident, providing the officer with sufficient rest.

★ The First Officer's physical capabilities, fatigue or drugs are judged to be unrelated to the occurrence of the accident.



# GOLDEN SUNNY HANA

casualty



## (3) Causes of the Accident

### ③ Non-use of Safety Equipment

- While descending the vertical ladder, the crew member was wearing Personal Protective Equipment(PPE) such as a safety helmet and safety shoes, but **was not wearing** protective gloves.
- Most notably, he **was not wearing** a safety belt or harness, which could have directly prevented a fall.

★ It is judged that the First Officer fell while entering the cargo hold after **losing his grip or slipping while descending** the vertical ladder.



# GOLDEN SUNNY HANA

casualty



## (3) Causes of the Accident

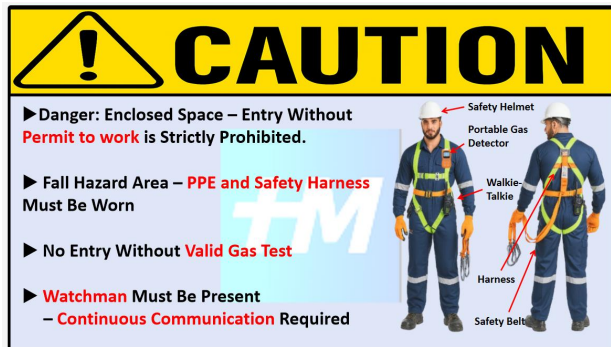
### ④ Violation of Safety Protocol

- Contrary to what was documented in the Enclosed Space Entry Permit, **no standby watchkeeper(attendant)** was stationed when the First Officer entered the cargo tank.
- Contrary to the procedures outlined in the Enclosed Space Work Permit, the First Officer **failed to report to** the Officer on Watch(OOW) on the bridge prior to entering the cargo tank.

★ Safety measures that were confirmed for implementation **were not carried out** during the actual operation.

## (4) Comprehensive Summary of Causes

- **Failure to Wear Safety Equipment:** Although safety shoes and a safety helmet were worn, **protective gloves** were not. Furthermore, **a safety belt and harness**, which could have directly prevented a fall, were not used.
- **Violation of Safety Protocols:** Contrary to the details specified in the Enclosed Space Entry Permit, **no watchkeeper was stationed** and **no report was made** to the bridge. Safety measures agreed upon for the actual operation were not implemented.

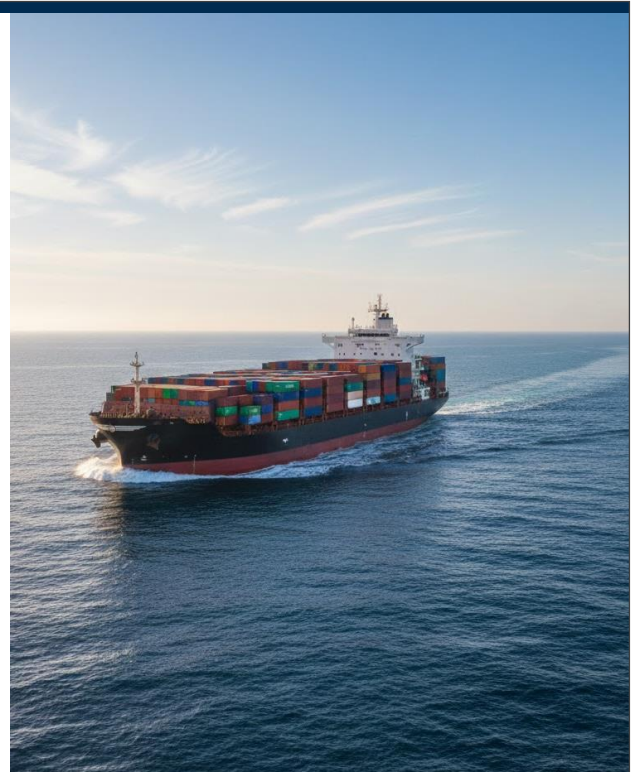


# THANK YOU

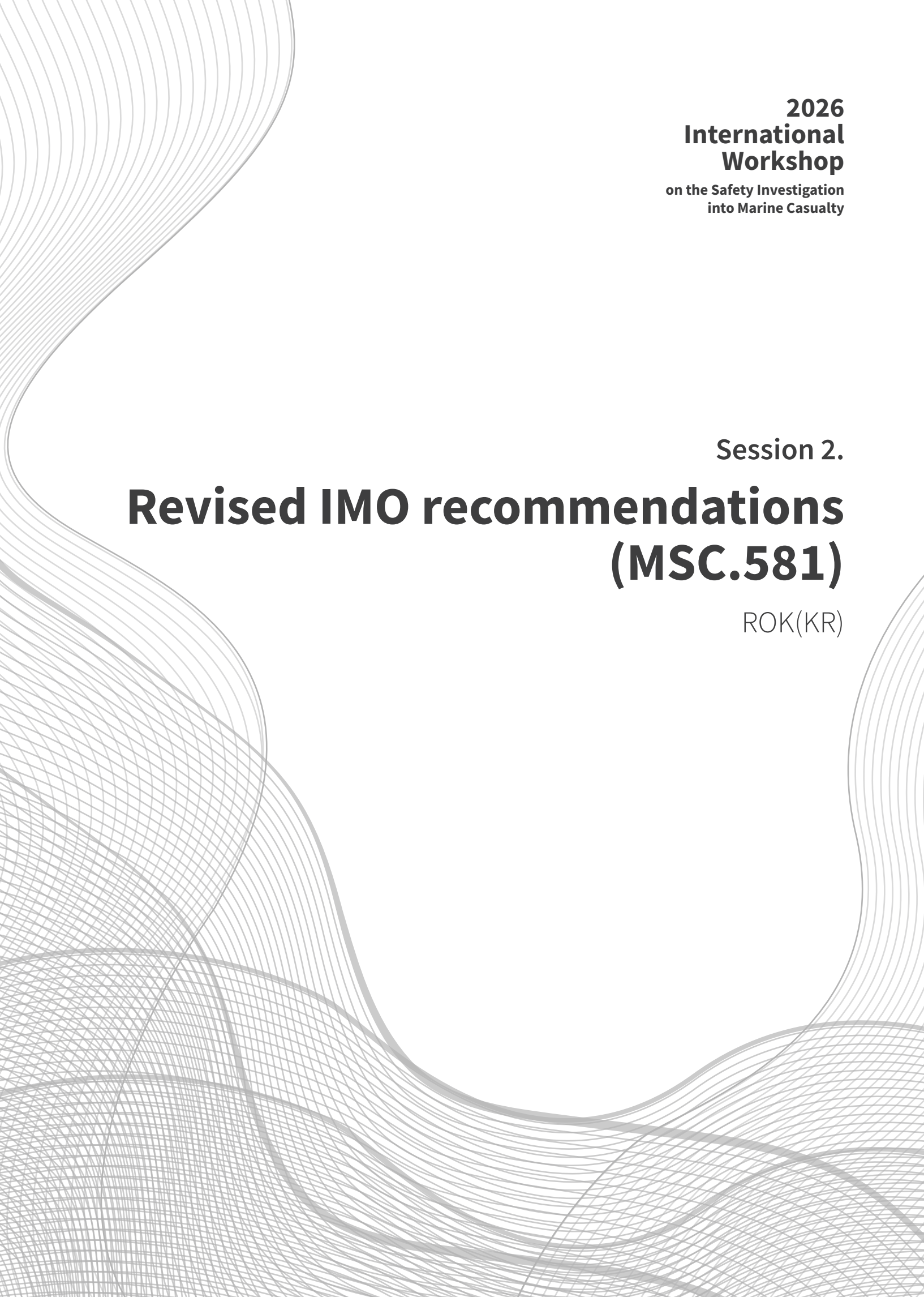
Korea Maritime Safety Tribunal  
Deputy Director  
Taehyung Cho  
Tel) +82-44-200-6216  
Mob) +82-10-7134-2712  
Email) choth@korea.kr



Ministry of Oceans and Fisheries  
Korea Maritime Safety Tribunal







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# **Revised IMO recommendations (MSC.581)**

ROK(KR)







# IMO Res MSC.581(110)

## Revised Recommendation for Entering Enclosed Space Aboard Ships

.....

2026. 06. 19.

KR Statutory System Certification Team

2026 International Workshop

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IMO Res MSC.581(110)  
Revised Recommendation for Entering Enclosed Space Aboard Ships

### CHAPTER 01

#### Introduction & Background

- > Overview of IMO MSC.581(110)

### CHAPTER 02

#### Flag State Guidance and Main Changes

- > Flag Requirements Comparison
- > Main Changes and Actions

### CHAPTER 03

#### PSC Issues & FAQ

- > Recent PSC Inspection Focus Areas
- > FAQ Case study
- > Practical Implications of seafarers



IMO Res MSC.581(110)

## CHAPTER 1

### Introduction & Background

#### CHAPTER 01 Introduction & Background



#### ▶ IMO Res MSC 581(110)

##### History



Res A.864(20)

Recommendations for entering enclosed spaces aboard ships



Res A.1050(27)

Revised Recommendations for entering enclosed spaces aboard ships



##### Newly Adoption



Res A.581(110)

Revised Recommendations for entering enclosed spaces aboard ships



##### Maintenance of the existing Convention



SOLAS Reg III/19.3.6

Enclosed space entry and Recue drill



SOLAS Reg XI-1/7

Carrying of atmosphere testing instrument for enclosed spaces



SOLAS Chap IX and ISM Code

Require management for the safe operation of ships

 IMO Res MSC 581(110)

- ① This guidance aims to **prevent casualties and enhance safety** in enclosed spaces by establishing appropriate procedures and sound working practices, and by providing structured response guidelines tailored to the characteristics of each vessel in emergency situations.
- ② The primary causes of incidents include **inadequate hazard identification, insufficient risk assessment, and failure** to comply with established procedures. In addition, challenging working conditions arising from complex space configurations can also contribute to accidents. In this regard, leadership both onboard and ashore plays a critical role.
- ③ This guidance applies to all types of vessels and relevant personnel and is intended to complement applicable regulations. Even where full implementation is not practicable, appropriate measures should be taken to reduce risks to an acceptable level.

 Meaning of Enclosed Space

A space **which may contain a hazardous atmosphere or lack of oxygen and has any of the following characteristics:**

- 1) limited openings for entry and exit;
- 2) inadequate ventilation; or
- 3) not designed for continuous human occupancy.

This includes but **is not limited to spaces that are diverse in their characteristics** such as cargo holds, bilge spaces, ballast and other tanks, pump-rooms, chain lockers and engine crankcases.

## ▶ Safety Management for Entry into Enclosed Space

### ① Risk Management & Preventive Measures

- Establish a **ship-specific enclosed space register** for **hazard identification and risk assessment**
- Evaluate atmospheric risks considering **internal contents, adjacent spaces, cargo, gases, and oxygen deficiency**
- Define **risk mitigation measures prior to entry**
- Provide cargo hazard information (per relevant Codes) in a **format understandable to seafarers**

 **Identify and fully eliminate all hazards prior to entry**

### ② SMS-Based Control & Organizational Management

- Include enclosed space entry as a **critical onboard operation within the SMS**
- Verify compliance through **internal and external audits**
- Establish additional risk controls for simultaneous operations, including assessment of **available manpower and resources in emergencies**

 **Controlled under the SMS (Safety Management System)**

## ▶ Safety Management for Entry into Enclosed Space

### ③ Training, Drills, and Competency Management

- Enclosed space safety training for all crew members
- Role-specific training for authorized personnel, responsible officers, and attendants
- Training on the use and calibration of gas detection equipment, with qualified personnel management
- Regular rescue drills (including PPE, communication, gas monitoring, rescue, first aid and Tripod)

 **All personnel must not only understand, but be capable of performing the tasks in practice**

### ④ Equipment Availability and Operational Conditions

- Ensure sufficient time is allocated for the task (no time pressure)
- Provide all essential equipment, including ventilation, gas detectors, respiratory protection, and rescue equipment
- Maintain all equipment in a ready-for-use condition and ensure proper training in its use

 **Controlled under the SMS (Safety Management System)**

## Risk Assessment & Control

### ① Identification & Register Management

- Identify all enclosed spaces through **risk assessment**
- Maintain updated **Enclosed Space Register (ship & shore)**
- **Emergency Response Plan** & Re-assess when cargo/atmospheric conditions change
- **Enclosed Space Register** includes Access/escape routes & layout, Physical hazards (ladders, lighting, heat, etc.), Connections with adjacent spaces, Ventilation, gas detection, lighting, equipment & rescue equipment

### ② Pre-Entry Risk Assessment

- Consider **cargo, ventilation, coating condition** & Identify **key hazards** Flammable/toxic gases (CO, CO<sub>2</sub> etc.)
- Record in **standard format in accordance with company procedures**

### ③ Risk-Based Entry Control : Apply controls based on risk level

- Always assume **unsafe until proven safe**

## Authorization of Entry

### ① Authorization & Compliance

- No opening or entry without **master or designated person approval**
- Must follow **ship-specific safety procedures**

### ② Permit to Work

- Entry must be **planned and risk-assessed in advance**
- Use **entry permit with checklist (Append Section 2)**
- Permit must be **issued before entry and strictly followed**
- Validity **must not exceed 8 hours**

### ③ Additional Permits (as applicable)

- Isolation, Electrical, Hot work, Working at height
- Provide **enclosed space hazard information** to shore personnel(Stevedores etc)

#### Section 2 – Pre-entry checks (To be checked by each person entering the space)

Yes No

- I have received instructions or permission from the master or responsible person nominated by the master to enter the enclosed space
- Section 1 of this permit has been satisfactorily completed by the master or responsible person nominated by the master
- I have agreed and understood the communication procedures
- I have agreed upon a reporting interval of -----minutes
- Emergency and evacuation procedures have been agreed and are understood
- I am aware that the space must be vacated immediately in the event of ventilation failure or if atmosphere tests show a change from agreed safe criteria.



## General Precautions

### ① Access Control & Information

- Strict control of entry (**crew & shore personnel**), Clearly communicate **entry procedures & hazards**
- Display ship plan with **Safe / Unsafe markings**

### ② Pre-Entry Preparation & Control

- Pre-entry **risk assessment (cargo, task, space)**, Keep access **secured until declared safe**

### ③ Entry Authorization Checklist

- Hazards identified and controlled, Ventilation & atmosphere tested (**~20.9% O<sub>2</sub>**)
- Communication, lighting, PPE, gas detectors ready, Attendant assigned & rescue equipment ready & Entry **permit issued**

### ④ Training & Equipment

- Only **trained person**, Training includes (Oxygen depletion, toxic gases, Cargo-related hazards, Rescue, first aid, CPR)
- No entry for rescue without proper equipment
- Equipment **checked and fully operational**
- Ensure **standby personnel for emergencies**

## Testing Atmosphere

### ① Gas Detection Equipment

- Use equipment **suitable for cargo (based on MSDS/ IMSBS, IBC, IGC Codes)**
- Must function **in oxygen-deficient atmospheres**
- Minimum **2 sets required (additional if needed)**

### ② Testing Requirements

- By **trained personnel with calibrated equipment**
- **Test before entry and continuously during work (Multiple levels, remote sampling)**

### ③ Acceptance Criteria (Safe Entry Conditions) All of the following conditions must be met

- Oxygen **~20.9% by volume**
- CO<sub>2</sub> **< 0.5% (5,000 ppm)**
- Flammable gas **< 1% of LFL**
- Toxic gases **< 50% of OEL**

## Testing Atmosphere

### ④ Actions for Unsatisfactory Results

- **Conduct gas testing only after ventilation is stopped and conditions have stabilized** to ensure accurate atmosphere measurements.
- **Use appropriate toxic gas/vapor detection in addition to oxygen and flammability testing**, ensuring exposure levels remain below occupational exposure limits (OEL).
- **Always consider the potential for localized oxygen-deficient pockets**, even when a space has been declared safe, especially where ventilation may be obstructed.

## Precaution During Entry

### ① Continuous Atmosphere Monitoring & Ventilation

- Frequently monitor atmosphere while personnel are inside
- Maintain continuous ventilation; re-test atmosphere before re-entry
- Evacuate immediately if conditions deteriorate or ventilation fails

### ② Personal Protection & Changing Conditions

- Provide calibrated personal gas detectors to entrants
- Increase monitoring when work or conditions change (e.g. hot work, sludge disturbance, coating, trim/list changes)
- Continue work only based on acceptable test results

### ③ Emergency Response Preparedness

- Attendant must not enter for rescue before assessment/support arrives
- Rescue only by trained and properly equipped personnel

 Precaution During Entry**① Enhanced Risk Controls Before Entry**

- Treat untested spaces as unsafe
- Conduct careful risk assessment and apply mitigation measures before entry

**② Special Protective Measures**

- Use positive-pressure breathing apparatus (SCBA) where required
- Carry personal gas detectors, wear rescue harness/lifeline and protective clothing as applicable
- Air-purifying respirators, dust masks, canister masks, and EEBDs are not suitable for entry

**③ Preparedness for Evacuation and Emergency**

- Ensure immediate means for evacuation are available
- Emergency response arrangements must be established and ready

 Hazards Related to Specific Ships and Cargo**① Cargo-Specific Atmospheric Hazards**

- Packaged, liquid bulk and solid bulk cargoes may create **flammable, toxic, corrosive or oxygen-deficient atmospheres**
- Refer to **IMDG/IMSBC Codes, SDS and cargo information** for hazard identification and controls
- Especially, Nitrogen inerting presents a severe **oxygen depletion** risk

**② Connected Spaces & Access Trunk Risks**

- Access trunks and spaces connected to cargo holds may contain the **same hazardous atmosphere as cargo spaces**
- Treat connected spaces as enclosed spaces; ventilate, test and control access before entry
- Use gas detection, harnesses and emergency arrangements for cargo hold access

**③ Special Risks from Bulk/Organic Cargoes and Fumigation**

- Cargoes such as coal, timber, concentrates, scrap and seed cake may cause **oxygen depletion, CO<sub>2</sub> build-up, fire or toxic gas release**
- **CO<sub>2</sub> can be fatal even before severe oxygen deficiency occurs**; continuous monitoring may be required
- Fumigated cargoes and adjacent spaces require **strict controls and continuous atmosphere monitoring**

## Emergency Response & Conclusion

### ① Emergency Response Principles

- Follow the ship-specific **enclosed space emergency response plan** and established rescue procedures
- **Do not attempt impulsive rescue entry**; many fatalities occur during unplanned rescue attempts
- Ensure ship and shore personnel clearly understand agreed emergency response arrangements

### ② Preparedness and Rescue Equipment

- Maintain a **practiced and effective emergency response plan** within the SMS
- Ensure availability of Atmosphere testing and verification equipment/Rescue team safety equipment/Casualty recovery equipment

### ③ Key Conclusion

- Failure to identify hazards and entry risks can lead to **rapid fatal accidents**
- Strict adherence to procedures, risk assessment and preventive controls is essential for safe enclosed space entry



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## CHAPTER 2

### Flag States Guidance and Main Changes

## Flag States Guidance



### Liberia Flag Instruction

Flag instruction issued and implemented MSC.581(110)  
Marine Notice SAF-003, Issued Jan 2026



### Marshall Island Flag Instruction

Marine Notice No. 7-041-1, Issued Jan 2026  
Verify the suitability of sampling hoses (including length) for gas testing in double bottom spaces  
Include instrument calibration procedures, in accordance with the manufacturer's instructions



### Danish Flag Instruction

Before 2026.7.1 : Applicable A.1050(27)  
After 2026.7.1 : Applicable MSC.581(110)  
**Danish-flagged vessels and vessels calling at Danish ports**



### Panama Flag Instruction

No flag State guidance has been issued

“ More flag States are expected to issue flag instructions on MSC.581(110) in the future ”

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## Main Changes and Actions

### Technical & SMS Aspect

- 01** CO2 Monitoring & Limit
- 02** Enclosed Space Register
- 03** Risk Assessment & Emergency Response Plan

### Operational SMS Aspect

- 04** Enclosed Space Entry Permit
- 05** No Single - Person Entry
- 06** Training and rescue drill



## Main Changes in MSC.581(110)

### Technical Aspects

#### Co2 Monitoring

- ✓ Atmosphere testing should include carbon dioxide (CO<sub>2</sub>), in addition to oxygen, flammable gases or vapours, and toxic gases, based on the risk assessment and the cargo involved.

#### Co2 Limit

- ⦿ CO<sub>2</sub> concentration should be less than 0.5% by volume (5000 ppm) before entry

### Safety Management System Aspects

#### Enclosed Space Register

- ⚙️ All enclosed spaces identified on board the ship through a risk assessment should be recorded in a ship-specific Enclosed Space Register listing all enclosed, connected and adjacent spaces, their hazards, and ventilation methods and rescue equipment.

#### Enclosed Space Emergency Response Plan

- 🔍 Enclosed Space Register and risk assessment should form the basis of the development of the Enclosed Space Emergency Response Plan, which should be ship-specific, detailing clear rescue roles.

### Operational Aspects

#### Enclosed Space Entry Permit

- 📄 The validity of the permit should be specified based on the risk assessment and should never be longer than 8 hours, requiring re-evaluation afterward

#### No Single-Person Entry

- ✅ The Company should ensure that single person entry into an enclosed space is not permitted

#### Training and Rescue Drill

- 👥 Crew members should be trained in the use of equipment necessary to facilitate rescue from an enclosed space, and a record of this training should be maintained. Rescue drills should be undertaken regularly for enclosed spaces identified in the Enclosed Space Register.

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## CHAPTER 3

### PSC Issues and FAQ

PSC Issues

It has been noted that some Flag States have identified deficiencies related to MSC.581(110) during PSC inspections.

This appears to be a measure intended to enhance the “safety of ships and seafarers at sea”, and where even a potential risk exists, appropriate measures should be taken to address it



**Safety of Ships and Seafarers**

Measures intended to enhance shipboard safety



**Preventive Risk Management**

Appropriate measures where even potential risks exist



**Emergency Response**

Strengthening preparedness for enclosed space emergencies



**SMS-Based Safety Assurance**

Embedding safety measures through the Safety Management System

FAQ Case Study

## Inquiry from Shipowners maintain onboard Gas Detector

“This is a matter of shipowners discretion for the implementation of SMS”

**Mandatory?**

This is a recommendatory document  
Therefore, although it is not a mandatory requirement, regarding recent PSC deficiencies,

Our Classification Society is advising it as having a strongly recommend proactive implementation for minimizing unnecessary issues

**Reflect in SMS?**

ISM Companies are recommended to review and, where appropriate, update their Safety Management System (SMS) to align with the revised recommendations in MSC.581(110)

Particularly in relation to the **Risk Assessment** Process, the **Enclosed Space Register**, and the ship-specific **Enclosed Space Emergency Response Plan**.

**ISM Audit?**

As these recommendations are not yet mandatory in nature, KR would not be raised as non-conformities during ISM audits

However, it may be verified whether the company has reviewed the need to revise relevant documentation in accordance with ISM Code Sections 1.2 and 11

Also, where Flag State guidance has been issued, they may be recorded as observations

**Model & Spec?**

There is no specific guidance on equipment. However, the equipment used should be capable of detecting all gases identified in MSC.581(110), and gas testing should be carried out in a manner that minimizes risk. Where necessary, remote measuring equipment or sampling devices may be used

In addition, personnel entering an enclosed space should carry portable gas detection equipment capable of measuring O<sub>2</sub>, CO<sub>2</sub>, flammable gases or vapours, and toxic gases including CO

An attendant should be stationed outside the enclosed space, and rescue equipment (such as SCBA, lifeline, harness, recovery hoist, stretcher, tripod, etc.) should be made available for emergency response. Where necessary, atmosphere conditions should be continuously monitored

## CONCLUSION



**This Notice provides an overview of the Revised recommendations for entering enclosed spaces aboard ships in IMO Resolution MSC.581(110)**

**This Resolution supersedes Resolution A.1050(27) revoked in December 2025 which is included in the list of codes, recommendations, guidelines and other safety and security-related non-mandatory instruments (MSC.1/Circ.1371/Add.2) referred to in paragraph 1.2.3.2 of the ISM Code, requiring that a Company's Safety Management System (SMS) should ensure that applicable codes, guidelines, and standards recommended by the IMO, Administrations, classification societies, and maritime industry organizations are taken into account**

**In this context, the mandatory requirement remains the relevant provision of SOLAS regulation XI-1/7; nonetheless, the revised recommendations in IMO Resolution MSC.581(110) should be given due consideration in the context of the ISM Code**

**These revised recommendations aim to update safety measures, definitions, and procedural requirements to reduce fatalities during enclosed space entry.**



## Thank you

**KR Statutory System Certification Team**  
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