

Enhance Maritime Container Transport Safety

Status Update = January 2024

TopTier Status Update – January 2024

In the TopTier JIP more then 40 partners work together to avoid loss of containers from containerships.

This document is intended for anyone who is not directly involved in the project but interested in results and development.

This document provides a high-level status update and contains an introduction, organizational changes, status in the work packages, an overview of public available information.



Information on MARIN Top Tier Project





Click <u>here</u> to watch the 1 min project introduction video.

Introduction to TopTier

The winter of 2020-21 saw an unusually high number of weatherrelated incidents for container shipping. Triggered by these events, maritime actors across the supply chain work together in the MARIN TopTier project to enhance container safety.

The project is tasked to identify and recommend improvements for transport, stowing and securing containers and provide the technical understanding that is needed for safe designs and innovations in the future.

This project runs over three years and uses scientific analyses, studies, and desktop as well as scale tests and real-life measurements and data collection to develop and publish specific, actionable recommendations to reduce the risk of containers lost overboard.

The project has six working groups focused on specific issues/risks:

- WG1: Realistic safety margins for gear
- WG2: Uncertainty in stow planning & loading
- WG3: Motions at sea & onboard measurements
- WG4: Securing Loads
- WG5: Crew Governing Role & Control
- WG6: Regulatory Reform

Top Tier members all contribute with funds, and according to their ability with staff engagement and materials. The project is led and managed by MARIN, an independent research organization specializing in maritime matters. Members participate in workgroups focused on different aspects of the research needed to understand the main drivers of incidents with containers lost at sea.

General Announcements

- The International Maritime Organisation (IMO) joined TopTier as observer.
- The International Association of Classification Societies (IACS) is invited to join TopTier as observer.

On the Agenda:

- 8/9 April 2024 Steering Group meeting during Blueweek (https://blueforum.org/) in Venice, Italy.
- Several individual WG meetings.
- Submission to IMO CCC-10 (June 2024).
- December 2024 Finalization of project.



Public Deliverables:

Besides internal project deliverables some public information can be found on <u>TopTier | MARIN</u>:

- CCC 9/INF.25 19 July 2023 Update on the progress of the Top Tier Joint Industry Project (JIP) on container losses.
- MSC 106/INF.16 30 August 2022 Update on the progress of the MARIN Top Tier Joint Industry Project (JIP) on securing container safety.
- Notice to Mariners: This information gives guidance to crew and operational staff of container ships on how to plan, recognize and act to prevent parametric rolling in following seas.
- TopTier, seakeeping and container cargo securing safety, J. Koning, Proceedings of the 18th International Ship Stability Workshop, 13-15 June 2022, Gdańsk, Poland 1.





WG1-TUHH

Hamburg University of Technology

Strength of Containers & Lashing Gear

Identify how the aging and wear of the container corner castings and twist locks influence the strength of the connection between the containers.

- Material tests are done to know the material strength limits of (used) equipment.
- A dedicated test rig has been build, first tests December 2023.
- Test results are used to validate high fidelity models of the connection between containers.

Outcome: Limit loads and safety margins.









WG2 – MARIN

Maritime Research Institute Netherlands

Shore Ship Interface

Discrepancy between actual and planned stow configuration.

Onboard survey of actual deck stow shows that 15-20% of containers are mis-stowed depending on company and terminal. There are strong concerns about VGM, declared content and the structural condition of containers.

- The effect of mis-stows is evaluated and especially a concern in high utilized stacks.
- A Workshop with terminals was held May 2023 to identify & discuss improvements.
- A follow-up workshop is planned.

Outcome: Recommendations to ensure compliance of departure stow plan to the actual stow for VGM and stow position.







WG3 – MARIN

Maritime Research Institute Netherlands

Vessel motions

Assess the motion response of large container ships and provide insight in how to avoid extreme motions.

- Incident review identified excessive motions as root cause of large scale incidents.
- Seakeeping model tests with 10kTEU and 15kTEU vessels confirm the risk on parametric roll and synchronous roll in 3-4m wave height.
- On board measurements on 3 vessels characterize the normal in design motions.
- Numerical simulations to determine out-ofdesign guidelines are ongoing.

Outcome: Definition of "in design" and critical parameters leading to "off-design".









WG4 – MTI Monohakobi Technology Institute

Securing Loads

Reliability of lashing software force calculations in planning stage .

- Scale model tests to provide reference data of stack behavior and loads are completed.
- High fidelity numerical calculation of tested conditions are ongoing.
- Scale model test results are provided to class societies to evaluate their approaches with coarse calculation models as used in stow planning.

Outcome: Recommend baseline requirements for container stack load solvers and safety margins.





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WG5 – MARIN

Maritime Research Institute Netherlands

Crew Governing Role and Control

Assess how ships crew can prevent and anticipate "off design" conditions

- Notice to mariners distributed to increase the awareness on the risk of parametric roll, with videos and a low fidelity calculation tool.
- Crew Survey provides insight in challenges:
 - It is difficult for crew to keep an overview of the loading process of thousands of containers.
 - Roll natural period is an important factor in decision making, yet the reliability and accuracy is limited.
 - Mariners claim to know how to prevent, recognize and act on parametric roll but very few experienced it and the actions described are diverse.
- Define functional requirements to prevent out-design roll conditions in operation (pending feasibility of using with moving base simulator).

Outcome: Proposal for best practice on information required to prevent off design conditions in operations.









WG6-AMSA

Australian Maritime Safety Authority

Regulatory Reform

Recommend amendments to relevant regulatory frameworks to proactively support adoption of best practices in the industry.

- Relevant effective rules are identified.
 - Introduce minimum requirements to planning, loading and transit stages wrt transparancy, control and audit.
 - Mandatory status for loading/lashing software and baseline requirements.
- Informative papers submitted to CCC-9 and MSC- 106.
- Preparing for submission to CCC-10 (June 2024) based on inputs from results of the working groups.
 - 1. SOLAS VI, Reg.5, IMO -Conceptual proposed additional clause as 5.5.1
 - 2. SOLAS VI, Reg.5, IMO -Conceptual proposed additional clause as 5.7.
 - 3. Harmonised system of survey and certification (HSSC), 2017 (CA) 2.2.1.30.1).
 - 4. Revision to MSC.1/Circ. 1353/Rev.2:
 - 5. Standard Training Certification and watch keeping (STCW) Chapter V.
 - 6. Regulatory Proposal #3 Regulation: 14 –Safe Manning ~ Resolution A.1047(27).



