National Transportation Safety Board

Damage Control and Stability Information

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Overview

- Damage control plan and booklet
- Stability book
- Computer program damage stability module

Damage Control Information

- Clear information on ship's watertight subdivision
- Equipment related to maintaining boundaries and effectiveness of subdivision
- Proper precautions to take to prevent progressive flooding through openings
- Effective action that can be taken to quickly mitigate and, where possible, recover ship's loss of stability

Damage Control Plan and Booklet

- Ship's watertight boundaries
- Means to correct list

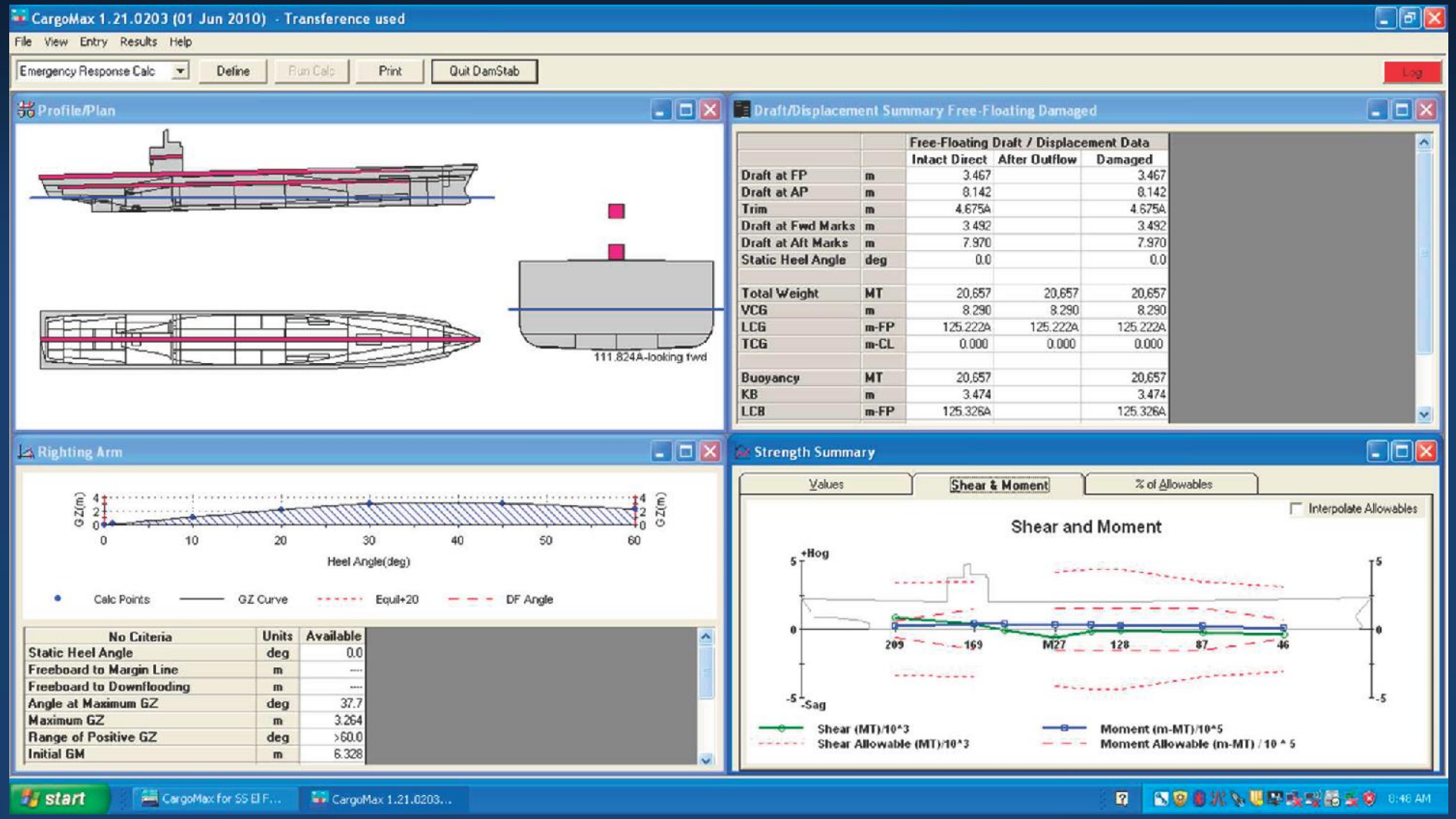
Damage Control Plan and Booklet Information

- Watertight and weathertight closures
- Pump capacities and piping diagrams
- Advice to master to obtain shore assistance
- Visual guidance to master

Damage Control Plan and Booklet

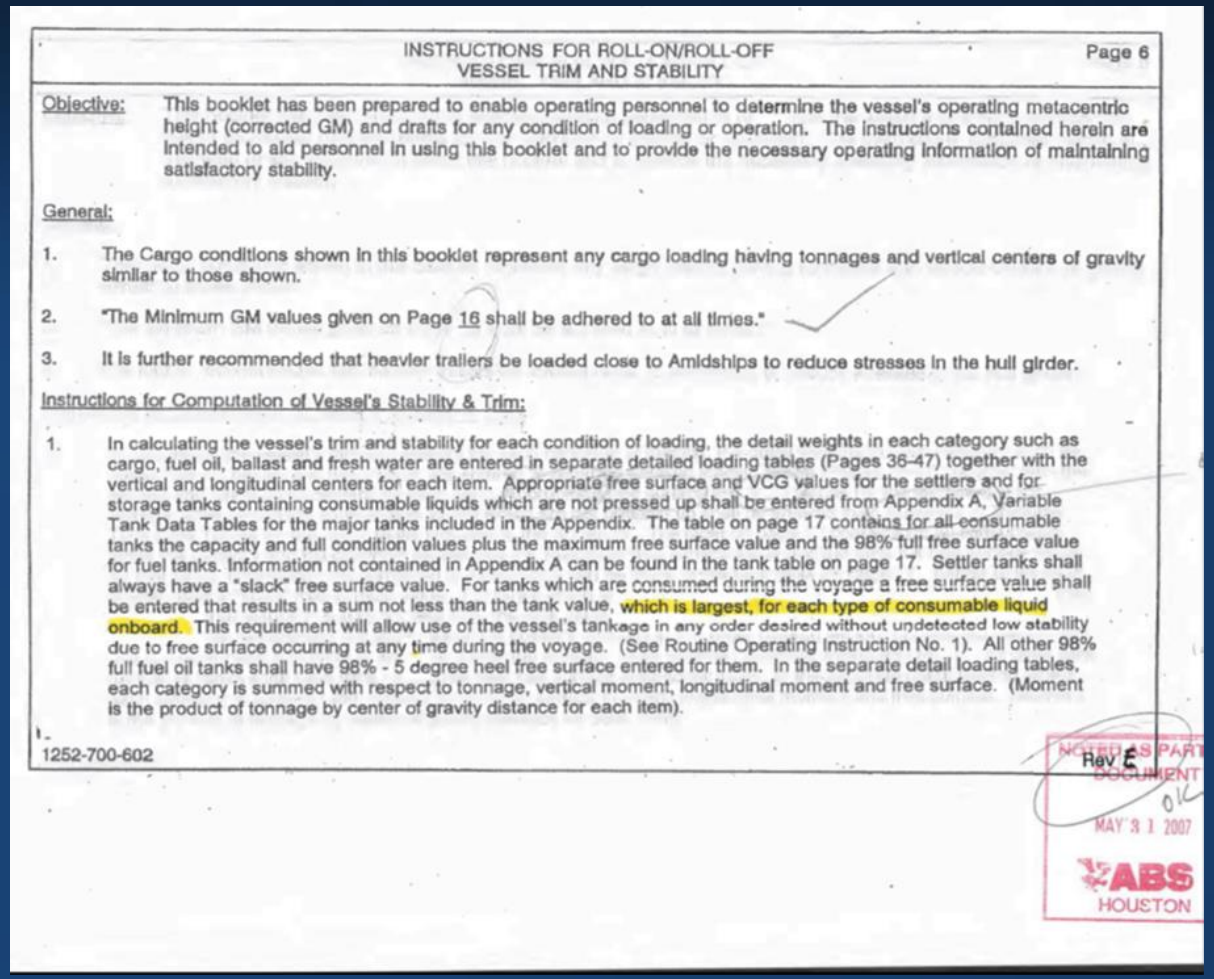
- Assist in planning for and addressing flooding
- All cargo vessels should have
- Classification societies should review and approve
- Available from computer software

Damage Control Module to CargoMax



Stability Book

- Must contain sufficient information to master
- Unintentional flooding and operation during emergency situations to be “considered”



INSTRUCTIONS FOR ROLL-ON/ROLL-OFF
VESSEL TRIM AND STABILITY

Page 6

Objective: This booklet has been prepared to enable operating personnel to determine the vessel's operating metacentric height (corrected GM) and drafts for any condition of loading or operation. The instructions contained herein are intended to aid personnel in using this booklet and to provide the necessary operating information of maintaining satisfactory stability.

General:

1. The Cargo conditions shown in this booklet represent any cargo loading having tonnages and vertical centers of gravity similar to those shown.
2. "The Minimum GM values given on Page 16 shall be adhered to at all times."
3. It is further recommended that heavier trailers be loaded close to Amidships to reduce stresses in the hull girder.

Instructions for Computation of Vessel's Stability & Trim:

1. In calculating the vessel's trim and stability for each condition of loading, the detail weights in each category such as cargo, fuel oil, ballast and fresh water are entered in separate detailed loading tables (Pages 36-47) together with the vertical and longitudinal centers for each item. Appropriate free surface and VCG values for the settlers and for storage tanks containing consumable liquids which are not pressed up shall be entered from Appendix A, Variable Tank Data Tables for the major tanks included in the Appendix. The table on page 17 contains for all consumable tanks the capacity and full condition values plus the maximum free surface value and the 98% full free surface value for fuel tanks. Information not contained in Appendix A can be found in the tank table on page 17. Settler tanks shall always have a "slack" free surface value. For tanks which are consumed during the voyage a free surface value shall be entered that results in a sum not less than the tank value, which is largest, for each type of consumable liquid onboard. This requirement will allow use of the vessel's tankage in any order desired without undetected low stability due to free surface occurring at any time during the voyage. (See Routine Operating Instruction No. 1). All other 98% full fuel oil tanks shall have 98% - 5 degree heel free surface entered for them. In the separate detail loading tables, each category is summed with respect to tonnage, vertical moment, longitudinal moment and free surface. (Moment is the product of tonnage by center of gravity distance for each item).

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Rev E

NOTED AS PART OF DOCUMENT
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ABS HOUSTON

Stability Book

- VDR crew statements relating to:
  - The vessel “hanging” to one side
  - The sail area of the vessel
  - The angle at which downflooding would occur on the vessel

Stability Book

- The stability book did not identify:
  - Downflooding points
  - The angle of downflooding
  - Windheel criteria information and unintentional flooding due to list

- These items would have been useful for decision-making

Summary – Damage Control and Stability Information

- Findings
- Recommendations