Testing of Tanks and Tight Boundaries

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Background

- Requirement of hydrostatic testing for F.P.s, D.B.s and Inn. Skins dates back to 1929 or earlier (Riveting Age).
- Current SOLAS regulation II-1/11, which entered into force in Jan. 2009, specifies provisions for testing of W.T. spaces and tanks.
- There seems to be a variance among paragraphs 1, 2 and 3.

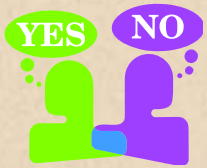
Variance?

- Para. 1 recognizes that hydrostatic testing is not practicable and mandatory for all “watertight compartments not intended to hold liquids”, including “ballast” hold.

- Para. 2 explicitly requires hydrostatic testing of “F.P., D.B. (including duct keels) and Inn. Skins”.

Variance?

- Para. 3 requires hydrostatic testing of "tanks intended to hold liquids" in order to confirm tightness and structural strength.
  - Main point at issue;
    - All W.T. compartments or (all) tanks?
    - For tightness and/or structural strength?



Variance with industry E.P.

- Current SOLAS regulation II-1/11 is also at variance with the latest established Engineering Practice of the industry such as;
  - Prefabricated hull construction (Blocks)
  - Advanced outfitting
  - Exemption from hydrostatic testing of other tanks of same construction and subsequent sister ships

Claims made by EMSA

- Classification societies had taken practical positions on hydrostatic tests based on successful experience.
- European Maritime Safety Agency (EMSA) of EC recently exposed noncompliance of classification societies (Recognized Organizations of the governments) with SOLAS.

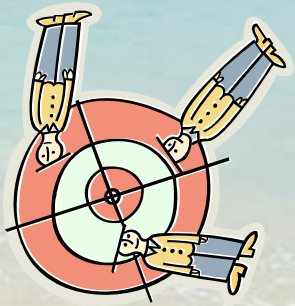
Real problems

- Hydrostatic testing mostly leads to serious damage to equipments, electric cables and/or coatings in "watertight compartments not intended to hold liquids" although they are filled with fresh water.
- It is a problem to save enormous amount of fresh water for tests.

Tragedy followed by comedy

- Some classification societies suddenly required a lot of hydrostatic tests.
- In order to avoid unrealistic tests, some classification societies and shipbuilders performed full-scale stress measurements of actual ships with a view to demonstrating the firm reliability of modern structural design techniques including 3D-FEA.

Foul balls ?



- According to the latest information, seems to concern over not the reliability of design techniques but the QA of the fabrication.
- ……IACS Rec. No.47 “Shipbuilding and Repair Quality Standard” and UR Z23 “Hull Survey for New Construction” fail to cover complete QA requirements.

New action taken by IACS

- IACS, supported by Cook Islands and Marshall Islands, proposed draft amendments to SOLAS and draft guidelines for "Procedures of Testing Tanks and Tight Boundaries" (MSC 86, June 2009).
- MSC 86 decided to entrust the task to DE.

Draft para. 5 of SOLAS II-1/11

- Notwithstanding the provisions of paragraphs 2 and 3, the hydrostatic testing of a space or tank may be waived provided that both the watertightness of all the boundaries of the space or tank is confirmed by appropriate testing, and the structural strength of such boundaries is ensured, in accordance with appropriate standards approved by the Administration based on the guidelines developed by the Organization*.

* Refer to the Guidelines - for procedures of testing tanks and tight boundaries (MSC/Circ.xxxx).

* Quoted from MSC 86/23/13, IACS et al.

Key points of draft guidelines

- Structural test should be carried out for at least one tank of same construction on each vessel subject to ….
- The subsequent vessels in the series may be exempted from structural testing for other tanks which have the structural similarity to the tested tank subject to ….
- For watertight boundaries of spaces other than tanks, structural testing may be exempted subject to ….

Observation

- According to the proposal made by IACS, actual testing to be required by the classification society will depend on QA system and actual results achieved by each shipbuilder.

- Proposals made by IACS seem to be reasonable and supportive for Shipbuilding industry, in principle.

Way forward

INTERNATIONAL MARITIME ORGANIZATION

- Warm debate on this issue will be commenced at DE in the near future.
- Shipbuilding industry had better prepare and send information on its QA system to IACS, EMSA and IMO.
- IACS is also proposing circulation of an interim guidance, considering “4-year cycle” of SOLAS amendment packages.

Thank you for your attention!