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GUIDANCE FOR CHECKING THE STRUCTURE OF BULK CARRIERS

1 The Maritime Safety Committee, at its seventy-eighth session (12 to 21 May 2004), following its decision that port States and the various port State control regimes worldwide should be strongly recommended to develop specialized training, pinpointing the vulnerable areas within the structure, in particular of older ships, and having considered the recommendation made by the Sub-Committee on Flag State Implementation at its twelfth session, approved the Guidance for checking the structure of bulk carriers, as set out in the annex.

2 Member Governments are invited to bring the annexed Guidance to the attention of all parties concerned.

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ANNEX

GUIDANCE FOR CHECKING THE STRUCTURE OF BULK CARRIERS

1 This guidance is to assist port State control officers (PSCOs) in checking the structure as well as the operational aspects of bulk carriers during port State control inspections.

2 In addition to this guidance, PSCOs should refer to the following documents:

.1 SOLAS chapter XII - Additional safety measures for bulk carriers;

.2 resolution A.862(20) - Code of Practice for the Safe Loading and Unloading of Bulk Carriers;

.3 resolution A.866(20) - Guidance to ships' crews and terminal personnel for bulk carrier inspections; and

.4 resolution A.744(18) as amended – Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers.

3 PSCOs are further invited to consult the following IACS publications, if available:

.1 Bulk Carriers: Guidelines for Surveys, Assessment and Repair of Hull Structure;

.2 Bulk Carriers: Guidance and Information on Bulk Cargo Loading and Discharging to Reduce the Likelihood of Over-Stressing the Hull Structure; and

.3 Bulk Carriers – Handle With Care.

Documentation

4 While checking the ship's documentation, PSCOs should pay particular attention to the loading plan, cargo distribution and loading/unloading sequences to ascertain that the ship is loaded in accordance with the approved loading manual.

5 PSCOs should pay particular attention to the tank top limitation, the bending moments and shearing forces as well as the cargo distribution. Past experience shows that ships often load in patterns not approved in the stability manual. For example, on board a nine-hold bulk carrier, the approved stability manual often has an annotation stating that holds 2, 4, 6 and 8 may be empty. This implies that all even number holds must be empty at the same time. In many cases, ship officers believe that such an annotation allows for any combination of these holds to be empty, which is not the case.

6 PSCOs should remember that loading patterns not included in the approved stability manual should not be accepted since this might create excessive local stress to the ship's structure regardless of the fact that the bending moments and shearing forces are within the permissible values.

7 When it is established during a PSC inspection that a ship loading pattern is not per the approved stability manuals, the PSCO should request confirmation in the first instance by the ship's officers, by the flag State administration, or the recognized organization working on behalf of the flag State, that the proposed loading plan/distribution is acceptable. In the event that a ship is found non-compliant with the approved stability manuals during unloading operations, the PSCO should inform the master and chief officer that future loading should be within the limitation of the approved stability manual.

8 Initially, a check of the survey report file may identify possible suspect areas requiring inspection. The provisions contained in resolution A.744(18) as amended, require a specific survey programme which includes access arrangements and, when necessary, the requirements for a close-up survey and thickness measurements. A survey report file is required to be held on board consisting of:

.1 reports of structural surveys;

.2 condition evaluation reports;

.3 thickness measurement reports; and

.4 survey planning document (or equivalent) containing the following information:

.4.1 main particulars;

.4.2 plan of tanks and holds;

.4.3 list of tanks and holds and usage, corrosion protection and condition of coating;

.4.4 corrosion risk in tanks; and

.4.5 design risk of structures.

Inspection

9 Ideally, inspections should be carried out by a team of at least two PSCOs and include, at least, one person with an in-depth knowledge of ship structures. In a loading port they should be ready to board the ship on arrival. In a discharge port, information on the likely discharge sequences should be obtained, where possible, so that the inspection can be carried out when holds become available.

10 Access to the upper parts of holds is problematic. Ladders may help and experience has shown that using binoculars along with high-powered torches can assist in making an initial assessment of the condition of inaccessible parts. If the condition of other parts of the hold and the hull structure in general give rise to concern, the flag State/recognized organization should be consulted to consider the need for a more detailed survey.

11 The impression of hull maintenance and general state on deck, the condition of items such as ladders, hatches, air pipes, guardrails, visible evidence of previously effected repairs, and the condition of deck machinery should influence the PSCO's decision on whether to make the fullest possible examination of the hull.

12 Special attention should be given to areas of high stress and bending moments, such as:

.1 immediately forward of the engine-room bulkhead;

.2 over the midships half-length; and

.3 no.1 hold side shell framing and top and bottom connections (panting region).

13 Particular attention should be given to areas where fracturing, cracks, distortion or excessive wastage can occur. These areas are illustrated in the diagrams in appendices 1 and 2*. The weather tight integrity of hatches and closures is particularly important on ore carriers with minimal reserve buoyancy.

14 Common defects are:

.1 cracking at hatch corners;

.2 plate panel buckling of cross deck strips and stiffening structure;

.3 cracking of hatch coamings;

.4 cracking at intersection of the inner bottom plating and the hopper plating;

.5 grab and bulldozer damage to the side shell frames lower brackets;

.6 grab damage to the inner bottom plating, hopper and lower stool plating;

.7 cracking at side shell frame bracket toes;

.8 both general and localized corrosion of side shell frames and brackets;

.9 cracking at fore and aft extremities of topside tank structures;

.10 corrosion within topside tanks; and

.11 general corrosion and cracking of transverse bulkheads.

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* Diagrams in the appendices are reproduced with the kind permission of IACS, Lloyd's Register and Nippon Kaiji Kyokai.

15 If tanks or holds are to be inspected, the PSCO should ensure it is safe to enter. The requirements of the Code of Safe Practice for Solid Bulk Cargoes, Appendix F, apply. Additional safeguards could include carrying personal devices capable of determining the safety of tank atmospheres or employing the services of a chemist to check the atmosphere.

16 Permanent seawater ballast tanks represent one of the most likely problem areas and, if inspected, the following aspects should be considered:

.1 the paint condition in coated ballast tanks and condition of anodes. In ballast tanks, rates of corrosion in the order of 1mm per year may be encountered, depending on whether they are coated or protected by anodes. In some ships, only the ullage space is coated with the remainder protected by anodes. During empty periods, this can result in corrosion on uncoated structures, which remain wet;

.2 in tanks used for ballast that may be subject to variable depths of seawater, for example forepeak tanks, it is often the case that there is little wastage top and bottom, but significant wastage over central regions. Attention should be paid to longitudinal stiffeners and brackets at the collision bulkhead to shell junction;

.3 longitudinal shell stiffeners in dedicated ballast tanks, particularly in areas adjacent to bulkheads and web frames; and

.4 underdeck longitudinals in ballast tanks. Wastage is usually the most severe close to the deckhead. This may result in the fillet welds, attaching longitudinals to the deck, being wasted thus leading to detachment of the longitudinals and consequent buckling of deck plates.

17 Where a fracture, which has not been caused by contact damage, is found in the main hull structure on one side of a ship, the corresponding structure on the opposite side should be examined to see if a similar failure has occurred. Fractures of this nature are of concern, especially where corrosion is associated with the failure and may have been a contributing factor.

18 If relevant, the PSCO may check that the necessary calculations have been made to ensure bending and shear stresses are maintained within maximum limits both during loading/discharge and the ensuing voyage. This is especially important where high density cargoes are carried or where the loading/ballasting arrangement is of a different configuration to that described in the ship's loading manual.

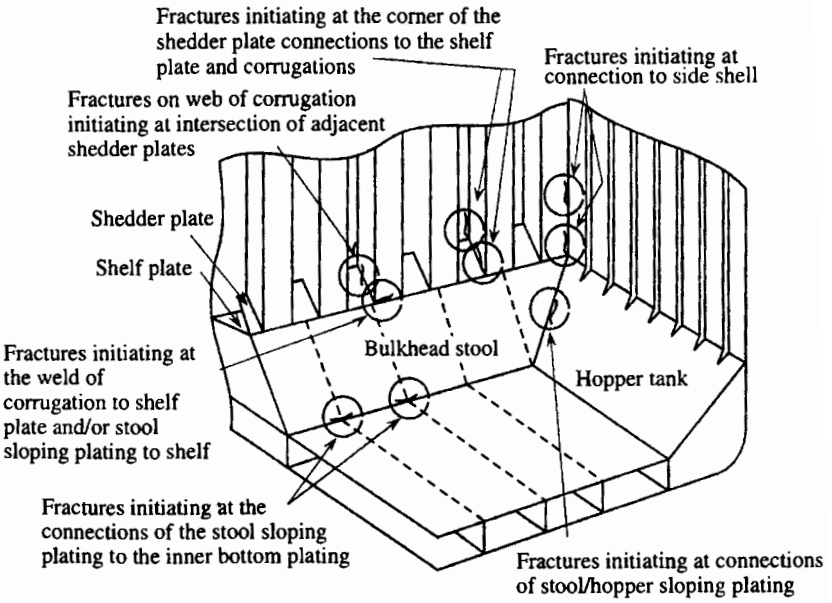
19 In reaching any decision regarding a detention, the PSCO should consider the seaworthiness and not the age of the ship, making allowance for fair wear and tear over the minimum acceptable scantlings. Where there is doubt, the classification society should advise the accepted diminution rates of structural members. Damage not affecting seaworthiness should not constitute grounds for judging that a ship should be detained, nor should damage temporarily but effectively repaired for a voyage to a port for permanent repairs. However, in his assessment of the effect of damages, the PSCO should have regard to the location of crew accommodation and whether the damage substantially affects its habitability.

20 Any proposals from the flag State or classification society should be considered carefully. Specification of repairs is the responsibility of the classification society surveyor and need only be agreed to by the PSCO. In the event that the proposals are acceptable, care should be taken to ensure that the flag State and classification society oversee the repairs and clear the ship before a request to lift the detention is made.

21 Any proposal by the flag State to allow the ship to make a single voyage to a repair yard should be in accordance with chapter 4.7 of resolution A.787(19) as amended by resolution A.882(21) on Procedures for port State control.

APPENDIX 1

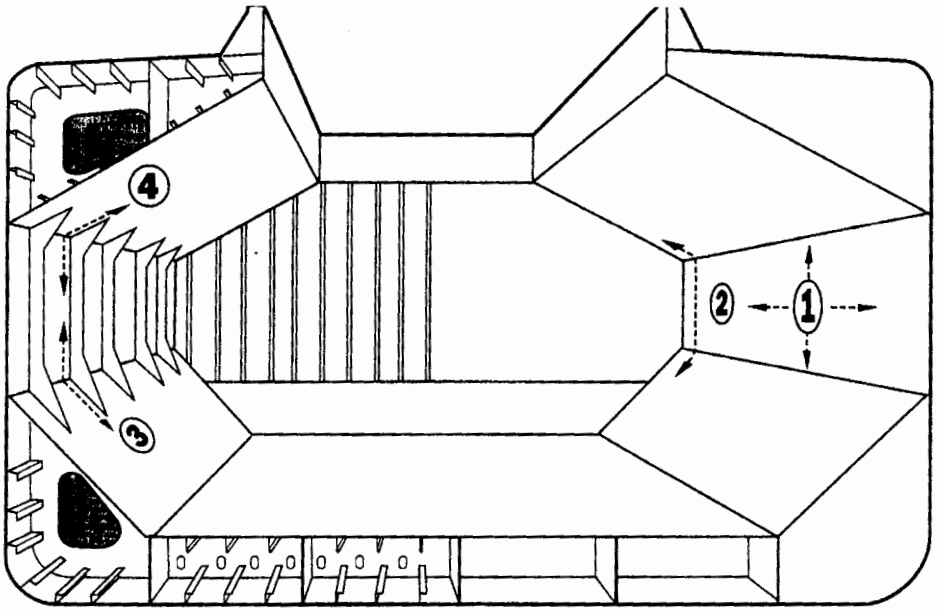
WHAT TO LOOK FOR IN HOLDS



(Note: Similar damages may occur at the upper connections of the bulkhead to the deck structure)

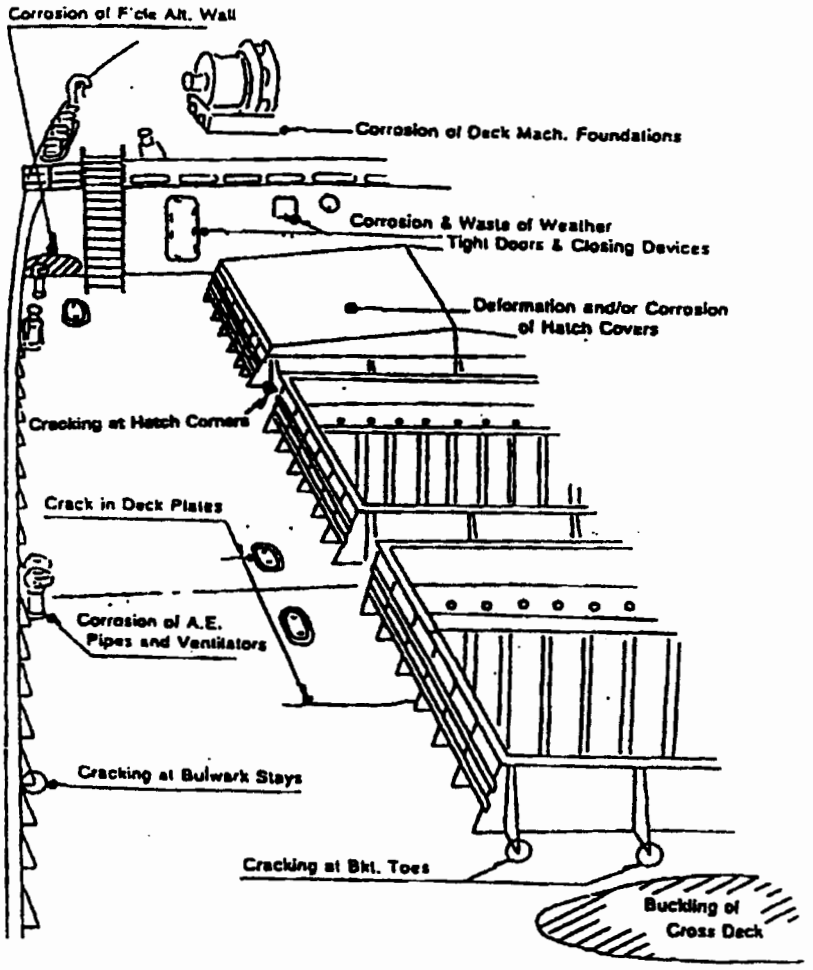
Typical fracturing at the connection of a transverse bulkhead structure

WHAT AND WHERE TO LOOK FOR IN HOLDS



Typical cross section of bulk carrier through cargo hold.

Where to look	What to look for
① Side shell plating.	Cracks in welds or plates. Leaks in welds or plates. Distortion of plating.
② Connection of bulkhead plating to side shell.	Punctured plating. Cracked plating. Heavily indented plating. Buckled plating. Corrosion and wastage.
③ Connection of side shell frames and end brackets to the shell plating and hopperside tank plating by close-up inspection.	Cracks. Corrosion and wastage. Excessively deformed frames or brackets. Detached frames or brackets.
④ Connection of side shell frames and end brackets to the shell plating and topside tank plating.	Cracks. Corrosion and wastage. Excessively deformed frames or brackets. Detached frames or brackets.

APPENDIX 2

WHAT TO LOOK FOR ON DECK