INTERNATIONAL STANDARD

ISO 15402

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Ships and marine technology — Bulk carriers — Repair quality of hull structure

Navires et technologie maritime — Vraquiers — Qualité de réparation de la structure de la coque

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 15402 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 8, *Structures*.

Introduction

The aim of this International Standard is to provide guidelines for good ship-repair conditions.

Details, where appropriate, given in this International Standard were developed with reference to applicable International Association of Classification Societies (IACS) rules and requirements.

Ships and marine technology — Bulk carriers — Repair quality of hull structure

SAFETY PRECAUTIONS — It is the responsibility of the user of this International Standard to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies the quality requirements for the hull structure maintenance and repair of steel bulk carriers. It does not apply to double-skin bulk carriers.

Requirements for the construction of steel bulk carriers are given in ISO 15401.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For a dated reference, subsequent amendments to, or revisions of, the publication do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For an undated reference, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 15401:—[1)], *Ships and marine technology — Bulk carriers — Construction quality of hull structure*.

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1
bulk carrier
ship which is generally constructed with a single deck, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk

3.2
length
L

NOTE The definition is taken from the rules of classification societies.

3.3
coating condition

3.3.1
good coating
condition with only minor spot rusting

1) To be published.

3.3.2
fair coating condition
condition with local breakdown at edges of coating of stiffeners and weld connections and/or light rusting over 20 % or more of areas under consideration, but less than as defined for **poor coating conditions**

3.3.3
poor coating condition
condition with general breakdown of coating over 20 % or more of areas or hard scale on 10 % or more of areas under consideration

4 Inspection and maintenance

4.1 Inspection

4.1.1 Inspection purposes

Inspection of the hull structure shall be carried out earnestly by specially hired inspection crews (referred to as “crew” in the following text). This is in addition to the periodical inspection by the classification society. The purpose of this inspection is to ensure the safety of a bulk carrier while on a voyage and during loading and/or unloading at the port, and to be ready for repairs in dock and/or berth. Corrosion, fracture and deformation of the hull structure and any other circumstance relating to the strength of the hull structure and the safety of the ship shall be discovered by the crews in time. The inspection should be carried out in accordance with a written established procedure valid for the characteristics of the vessel.

The loading/unloading sequence condition should be recorded.

4.1.2 Inspection items and periods

The crews' inspection shall be carried out in accordance with the requirements for the items and periods given in Table 1.

Table 1 — Items and periods of crews' inspection

No.	Area	Kind of deterioration	Main points	Maximum period
1	Shell plate	Corrosion Deformation Weld corrosion Fracture	*Corrosion* and *deformation* of side shell	6 months
2	Upper deck	Corrosion Deformation Fracture Weld corrosion	**a)** *Fracture* at the hatch corner of the deck; **b)** *Corrosion* and *fracture* at the transition from cross-deck plating to the strength-deck plating; **c)** *Corrosion* and *deformation* of cross-deck plating between hatches and the underdeck stiffeners/structure; **d)** *Fracture* at the connections of the hatch-end beams and the top-side tank; **e)** *Corrosion* and *fracture* of the deck plating around the foundations of deck fittings; **f)** *Fracture* of the deck plating at the toes of end/stay brackets of hatchway coamings; **g)** *Fracture* of the deck at the toes of the bulwark stay, especially at the expansion joints; **h)** *Corrosion* at the connections of the upper deck and air pipe, ventilation duct, filling pipe and sounding pipe.	*Fracture*: 3 months *Corrosion*: 6 months
3	Superstructure [a]	Corrosion Deformation Fracture	*Corrosion* at the lower ends of the superstructure and deck-house walls;	6 months
4	Hatch coaming	Corrosion Deformation Fracture	**a)** *Corrosion* and *fracture* in the form of cut-outs and notches of the coamings and their end/stay brackets; **b)** *Fracture* in the fillet-weld connection of the coamings to the deck, particularly at the coaming plate at the corner junction of the longitudinal and transverse hatch coamings; **c)** *Corrosion* and *fracture* at the termination of the hatch-coaming extension brackets.	3 months
5	Hatch cover	Corrosion Deformation Watertight	**a)** *Corrosion* of plating and stiffeners; **b)** *Damaged* sealing; **c)** *Damaged* moving mechanism.	Every voyage

[a] In the accommodation space, steel surfaces cannot be inspected from the inside because walls and decks are covered with linings and ceilings. Inspections can be made from the outside of the space.

Table 1 — *(continued)*

No.	Area	Kind of deterioration	Main points	Maximum period
6	Cargo hold	Corrosion Deformation Fracture Weld corrosion Detachment of frames	**a)** *Corrosion, fracture* and *detachment* of side-shell frames on their webs; **b)** *Corrosion, fracture* and *detachment* at the toes of the upper and lower brackets of the side frames; **c)** *Fracture* at the weld connections of the corrugated bulkhead to the stool; **d)** *Fracture* at the weld connections of transverse bulkheads or stool structure to boundary-deck plate, side-shell plate, sloping plate of topside tanks and hopper tanks, inner-bottom plate, etc.; **e)** *Corrosion* at the midheight and bottom of the transverse bulkheads; **f)** *Fracture* at the transition regions with fore bulkhead of engine room and collision bulkhead due to discontinuities of the longitudinal structures.	Side-shell frames of vessel above 15 years: 6 months Any other case: 12 months
7	Inner bottom Low part of bulkhead Side-shell structure	Deformation Fracture	*Damage* of inner bottom, lower part of bulkheads and side-shell structure due to loading/unloading operations.	Every voyage
8	Topside tank, hopper tank and other ballast tanks	Corrosion Deformation Fracture	**a)** *Corrosion* of the internal structure of the topside tank and inlet/outlet seawater valves due to the heat of upper deck and the moisture in the tank; **b)** *Fracture* at the corners of transverse webs in topside tank, hopper tank, and at the transverse brackets where there is no transverse web; **c)** *Fracture* at the connections of longitudinals to transverse webs, i.e., at the cut-out of transverse web in the topside tank and hopper tank; **d)** *Fracture* due to the knuckle between the inner bottom and hopper tank sloping plating; **e)** *Fracture* in the double bottom at the connections of longitudinals to floors, i.e., at the cut-out of floors and at the discontinuities of the longitudinals; **f)** *Fracture* at the edges of the unreinforced openings and manholes; **g)** *Fracture* at the connections of the deck longitudinals to the bulkheads. **h)** *Corrosion / fracture* of plating and internal stiffening of transverse tanks on top of bulkheads (if any).	Coating in ***good*** condition: 30 months Coating in ***fair / poor*** condition, or vessel above 15 years: 12 months

Table 1 — *(continued)*

No.	Area	Kind of deterioration	Main points	Maximum period
9	Engine room	Corrosion Deformation Fracture	**a)** *Corrosion* of the inner-bottom plating in the engine room; **b)** *Corrosion* and *fracture* at the weld connections of the top/bottom end of side-shell plating to the fore/aft bulkheads of the engine room.	Coating in ***good*** condition: 30 months Coating in ***fair / poor*** condition, or vessel above 15 years: 12 months
10	Forecastle spaces Bo’sun store	Corrosion Deformation Fracture	**a)** *Corrosion* at the bottom of forecastle spaces and Bo’sun store; **b)** *Corrosion* at the joint of the top of fore peak and the aft wall of forecastle; **c)** *Corrosion* and *deformation* at side-shell platings of the forecastle due to rough seas or contact with other objects such as quay, buoy or other vessels.	Coating in ***good*** condition: 30 months Coating in ***fair / poor*** condition, or vessel above 15 years: 12 months
11	Fore/aft peak	Corrosion Deformation Fracture Weld corrosion Detachment of frames	**a)** *Corrosion* at the top of fore/aft peak; **b)** *Fracture* of the side shell and damage of the internal structure in the fore peak due to collision/or sloshing; **c)** *Fracture* of the internal structure of the aft peak due to propeller vibration; **d)** Inspection of the anti-corrosion zinc plates in the fore and aft peak shall be carried out.	Coating in ***good*** condition: 30 months Coating in ***fair / poor*** condition, or vessel above 15 years: 12 months

4.1.3 Inspection reports

The inspection reports shall be written after the crews' inspection of the hull structure, and be filed on board. Personnel name, date, location, contents, result of the inspection and suggested follow-on actions shall be included in the reports. Reports with proposals for remedial actions shall be forwarded to the operator of the vessel. Follow-up procedures shall be established.

4.2 Maintenance of coating system

4.2.1 Maintenance purposes

Maintenance of the areas which affect the safety of the ship shall be carried out in time by the crew after the inspection of the hull structure. The maintenance shall be carried out within the limits of the crew's ability and the crew's safety shall be insured.