TÜRK LOYDU

Guideline on Türk Loydu Hull Inspection and Maintenance Program-Grading for Findings During Inspections

2013

This latest edition incorporates all rule changes. The latest revisions are shown with a vertical line. The section title is framed if the section is revised completely. Changes after the publication of the rule are written in red colour.

"General Terms and Conditions" of the respective latest edition will be applicable (see Rules for Classification and Surveys).

If there is a difference between the rules in English and in Turkish, the rule in English is to be considered as valid. This publication is available in print and electronic pdf version.

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GUIDELINE ON TÜRK LOYDU HULL INSPECTION AND MAINTENANCE PROGRAM-GRADING FOR FINDINGS DURING INSPECTIONS

1. Introduction

GUIDELINE ON TÜRK LOYDU HULL INSPECTION AND MAINTENANCE PROGRAM-GRADING FOR FINDINGS DURING INSPECTIONS was created solely for the use of company inspectors whose vessels are enrolled in Hull Inspection and Maintenance Program of Türk Loydu, denoted as in IACS PR-33 as Owner's Hull Inspection and Maintenance Schemes. It aims to support the companies while performing their inspections, and enable to reach a sound judgement about the actual condition of the vessel's structure.

This guideline gives details on how to evaluate the condition of structural elements in order to comply with the requirements of Hull Inspection and Maintenance Program, and summarizes the job scope, minimum reporting requirements, and the information to be gathered by the vessel or inspectors/superintendents.

Company Staff intended to be engaged in Hull Inspection Maintenance Program scheme are to be formally qualified, by successfully completing the Hull Inspection Maintenance Training Program approved by TL.

It should be noted that, owner inspections carried out in scope of Hull Inspection Maintenance Program do not replace or substitute the classification survey requirements, as stated in IACS PR-33.

This guideline is to be used in conjuction with the following Türk Loydu Rules:

- "Classification and Surveys"
- HP notation rules: "Rules for Türk Loydu Hull Inspection and Maintenance Program"

Relevant IACS publications about classification surveys, assesment and repair of hull structures for relevant ship types are also be taken into account.

2. Inspection Criteria

The Inspection Criteria are as stated below:

- Coating condition
- Presence and extensity of general corrosion
- Presence and extensity of pitting and groove corrosion, or other localized types of corrosion
- Presence of deformation of structural elements
- Presence of fractures
- Cleanliness of spaces

Each criterion is to be evaluated as GOOD,FAIR, or POOR based upon the information given further in this guideline.

3. Coating Condition

The coating condition is defined as per IACS URZ-Requirements concerning Survey and Certification.

GOOD condition with only minor spot rusting

FAIR condition with local breakdown at edges of stiffeners and weld connections light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration

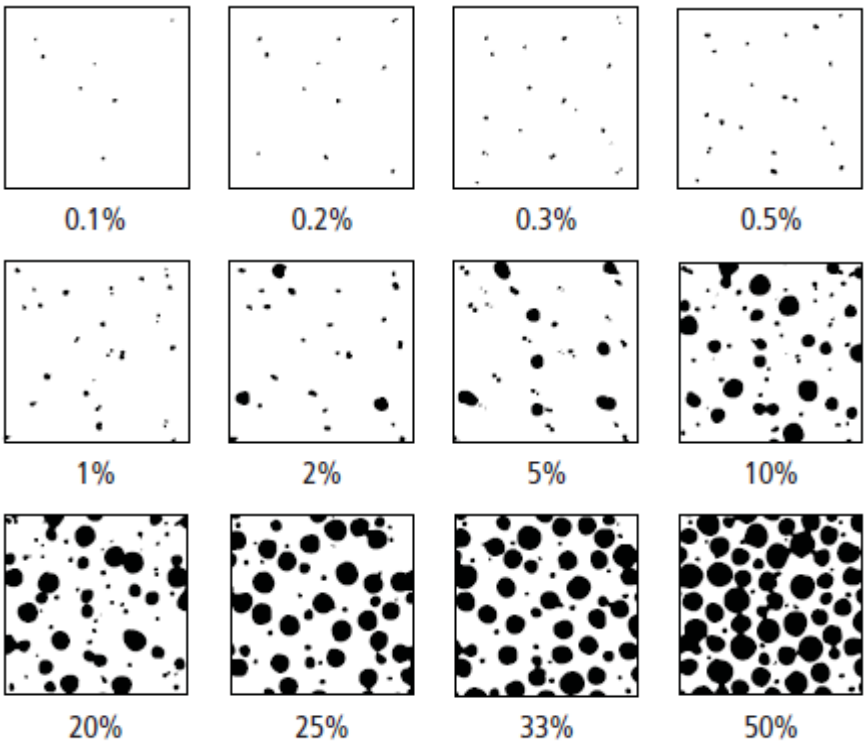


Figure 1. Scale for Breakdown of Coating

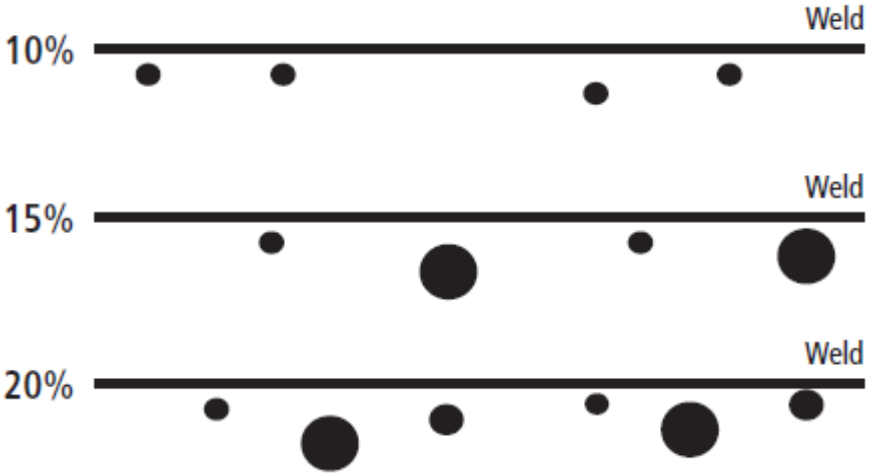


Figure 2. Diagram for Linear Extent of Pittings

Newly coated,no major coating breakdown

Minor spor rusting

Figure 3. Coating Condition-Good

With local breakdown at edges of stiffeners and weld connections light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition

Figure 4. Coating Condition-Fair

With general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration

Figure 5. Coating Condition-Poor

4. Presence and Extensity of General Corrosion

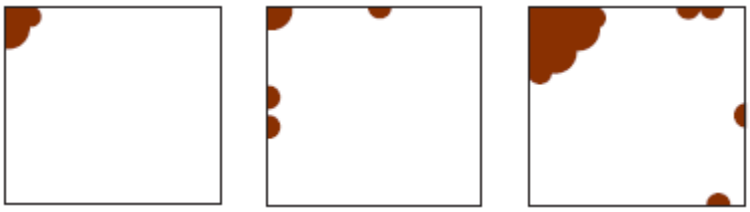
General corrosion occurs as non-protective, friable rust which can occur on internal surfaces of tanks which are not coated. If no protection applied, the rust scale continually breaks off, while fresh metal is exposed .

Spaces with no rusting to minor spot rusting are counted as GOOD- light rust shall not be more than 20% of the total area.

Spaces with more than 20% light rust and up to 30% hard scale rust are counted as FAIR.

Spaces with more than 30% hard scale are counted as POOR- Active scale is loose or tends to fall off the structure surface.

CORROSION EXTENT EVALUATION



2% Localized 2% Scattered 10% Scattered

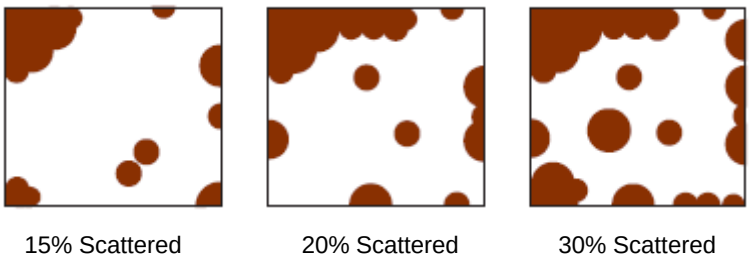


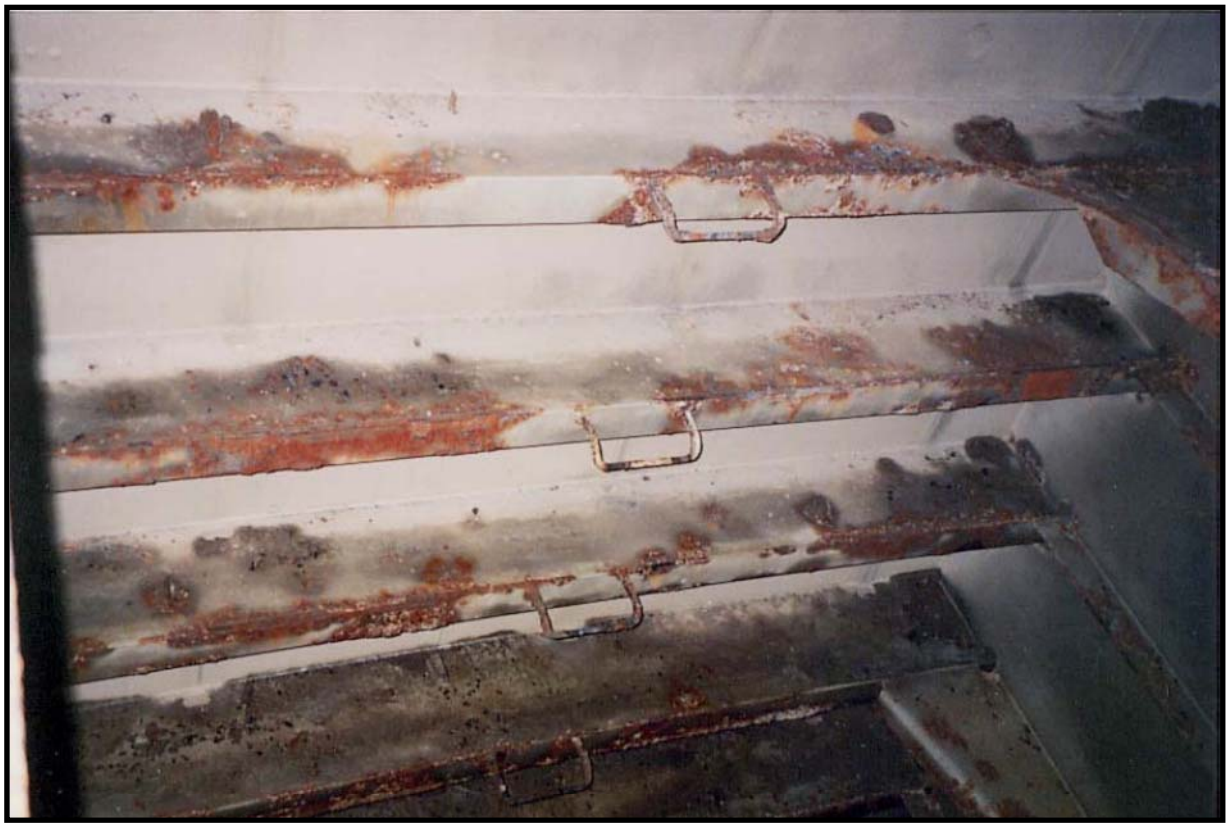
Figure 6. Local Corrosion Evaluation Diagram

5%	
10%	
25%	
50%	
80%	

Figure 7. Linear Corrosion Evaluation Diagram

Spaces with no rusting to minor spot rusting are counted as GOOD- light rust shall not be more than 20% of the total area

Figure 8. General Corrosion-Good Condition



Spaces with more than 20% light rust and upto 30% hard scale rust are counted as FAIR

Figure 9. General Corrosion-Fair Condition

Spaces with more than 30% hard scale are counted as POOR- Active scale is loose or tends to fall off the structure surface

Figure 10. General Corrosion-Poor Condition

5. Presence and Extensity of Pitting and Groove Corrosion, or Other Localized Types of Corrosion

Pitting corrosion is a commonly encountered type of corrosion, that can be noted, especially in ballast tanks, where water is trapped or the flow of water is followed. Horizontal surfaces, such as bottom plating, are locations, where deep pitting can occur. Pittings on coated surfaces are commonly in small diameters, but deep. Attack of the pitting corrosion can result as holes on shell plating. On uncoated surfaces, the pittings are shallow, but wide, so it resembles the condition of general corrosion.

Figure 11. Pittings on Bottom Plating Inside A Ballast Tank

Grooving corrosion is a localized and linear corrosion, which occurs at welds or heat affected zones along abutting stiffeners, and at stiffener or plate butts or seams. Extensive groove corrosion causes the structural member to rupture from the attached structure in due course, causing also secondary problems for the attached structure, such as panel plating.

Figure 12. Holes on A Vertical Shell Plating Member Caused By Groove Corrosion

Shallow pits/grooves with depth less than 1/3 of the original thickness and with intensity less than 15% of the zone are considered as GOOD.

Shallow pits/grooves with depth less than 1/3 of the original thickness and with intensity more than 15%of the zone.

Deep pits with depth more than 1/3 of the original thickness and with intensity less than 15%of the zone are considered as FAIR.

Deep pits/grooves with intensity of 15% of the zone, where the depth of the pits are more than 1/3 of the original thickness the remaining but where the remaining thickness of the zone is more than 6 mm.

Deep pits/grooves, where the remaining thickness of the zone is less than 6mm,regardless of the intensity, are considered as POOR.

If pits/grooves cover a large surface, the maximum allowable diminutions for the applicable area is to be considered in order to evaluate the condition.

Shallow pits/grooves with depth less than 1/3 of the original thickness and with intensity less than 15% of the zone are considered as GOOD.

Figure 13. Pitting and Groove-Good Condition

Shallow pits with intensity of more than 15%,depth less than 1/3 of the original thickness

Deep pits with more than 1/3 of the original thickness, intensity less than 15%

Figure 14. Pitting and Groove-Fair Condition

Pits covering a large surface causing a total diminution of the plating over the limits as defined by society's rules

Deep pits/grooves, where the remaining thickness of the zone is less than 6mm, regardless of the intensity, are considered as POOR

Figure 15. Pitting and Groove-Poor Condition

6. Presence of Deformation of Structural Elements

Deformation is caused by impact loads, contact or overloading. Depending upon the cause of it, deformation may be local or global. Permanent buckling is easily identified and may result from overloading, reduction of thickness due to corrosion or contact damage. Elastic buckling may be identified from coating damage, stress lines and/or shedding of scale.

The panel is defined as the area between adjacent transverse frames and adjacent longitudinal stiffeners.

A bay is the area between adjacent transverse frames from longitudinal bulkhead to longitudinal bulkhead or side shell.

Deformations within the panel are generally accepted, the set-in depth is generally considered as not more than 5 times the thickness of the original panel plating-such deformations may be considered as GOOD.

Deformations within the bay, together with the associated internals, where the set-in depth is not more than 5 times the thickness of the original plating, may be considered as FAIR.

Tripped brackets&internals may also be considered as FAIR.

Deformations within bay, with buckled-indented-tripped internals, where the set-in depth is less than 5 times the original thickness of the associated structures may be considered as POOR.

Deformations within multiple bays with buckled-indented-tripped internals are also considered as POOR.

Deformations within the panel are generally accepted, the set-in depth is generally considered as not more than 5 times the thickness of the original panel plating-such deformations may be considered as GOOD.

Figure 16. Deformation-Good Condition

Tripped/buckled internals

Figure 17. Deformation-Fair Condition

Deformation within bay-buckled/indented internals

Multiple bays-deformed/tripped internals

Figure 18. Deformation-Poor Condition

7. Presence of Fractures

Fractures are categorized based on the location and on the possible effect to the hull integrity.

No fracture- GOOD condition.

Weld fractures –Fractures on flanges of brackets, internals, stiffeners-Fractures of Webs of Frames, Floors, brackets, stiffeners and internals- FAIR CONDITION.

Fractures on Transverse&Longitudinal Bulkheads, Primary Structural members and Side shell, Bottom Plating and Deck are considered as POOR CONDITION.

Fracture on shell frame inside a side tank

Fracture of web frame inside the topside tank

Figure 19. Fracture-Fair Condition

Fracture of weld joint on main deck

Fracture on bottom plating

Fracture on transverse watertight hold bulkhead

Figure 20. Fracture-Poor Condition

8. Cleanliness & Inspection Safety

Cleanliness is the first step for a meaningful and safe inspection.

Judgement may be based on following:

- General cleanliness of the space
- Condition of piping and supports
- Condition of Access hatchways, ladders, manholes etc.

Clean spaces-space may be considered as in new-built condition – GOOD CONDITION.

Generally clean, free from excess water-local cleaning may be necessary- FAIR CONDITION.

Spaces with residue, loose scale and sediments-surfaces not visible- POOR CONDITION.

Spaces with means of access-no safe entry-POOR CONDITION.

Space clean-free from sediments/loose scales

Figure 21. Cleanliness and Inspection Safety-Good Condition

Local cleaning required, small amount of water around the bellmouth

Figure 22. Cleanliness and Inspection Safety-Fair Condition

Large amount of sediments and water, bottom plating not visible

No safe access, and meaningful inspection not possible

Figure 23. Cleanliness and Inspection Safety-Poor Condition

9. Notifying Superintendent & Class

Class Society and Superintendents should be informed about the deformations and fractures immediately after their discovery.

When a space transition from good to fair condition, class society should be informed at the next planned survey.

When a space transition from fair to poor condition,class attendance should be requested at the next port of call.