Guide for

Rebuilding Vessels Less Than 90 meters (295 feet) in Length and Barges of Any Length

November 2014

GUIDE FOR

REBUILDING VESSELS LESS THAN 90 METERS (295 FEET) IN LENGTH AND BARGES OF ANY LENGTH NOVEMBER 2014

American Bureau of Shipping
Incorporated by Act of Legislature of
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Foreword *(1 November 2014)*

This Guide is offered by ABS to assist Owners in carrying out "REBUILDING" Surveys on vessels less than 90 meters (295 feet) in length and barges of any length.

"REBUILDING" as used in this Guide, is the necessary survey, analysis and repair to enable a vessel to continue active service past its normal life (20-25 years). This Guide may be applied to vessels less than 20 years of age if requested by Owners, provided all aspects of the Guide are complied with.

ABS developed this Guide using experience ABS and others have gained through involvement in the construction, survey and repairs of vessels of various types. These guidelines are of both a prescriptive and a general nature.

To be considered for "REBUILDING" (**RB** Notation) the actual existing structural scantlings of the vessel must be determined by ultrasonic thickness measurement (gauging). ABS will not accept structure without renewal if the corrosion pattern found indicates wastage in excess of the limit specified in Section 5 of this Guide.

The vessel must be properly "cleaned" and properly prepared to facilitate a detailed examination with the "REBUILDING" Survey. All areas subject to corrosion are to be cleaned by sand blasting or high pressure water blasting.

Note:

It is not the intent of this Guide to modify any future survey requirements. Classification surveys are determined by the actual age of the vessel.

This Guide becomes effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of this Guide is the most current.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.

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SECTION 1
General

1 *(1 November 2014)*

At the Owner's request, ABS reviews and surveys an ABS Classed vessel in accordance with this Guide. ABS issues a report titled "REBUILDING SURVEY" which becomes part of the vessel's Record. Successful completion of "REBUILDING SURVEY" is to be identified in the ABS *Record* by the letters **RB** together with date of the survey (month and year).

3

It is recommended that the Owner review all previous Classification records and that a detailed preliminary survey of the vessel be carried out before starting "REBUILDING" work. "REBUILDING" is not a classification requirement. "REBUILDING" is an independent and thorough survey of a vessel.

5

It is presumed that "REBUILDING" work will be carried out at the same time the vessel is under survey for Classification purposes. When requested, Classification surveys completed with the "REBUILDING" will be credited to the vessel's Record.

7

Before starting "REBUILDING" work, the Owner is to submit his proposal in writing to the ABS Office responsible to attend the shipyard where the vessel will be surveyed. The proposal is to detail how the "REBUILDING" work will be conducted.

SECTION 2
Hull

1 *(1 November 2014)*

It is important that the internals of the vessel as well as the external plating be completely "cleaned". Wooden sheathing on decks and linings in superstructures should be removed as required to facilitate the examination. To do this properly, the vessel is to be placed on drydock. All shell plating, openings in the shell plating, freeboard and superstructure decks, the superstructures and deck houses, the coamings and covers, the vents and air pipes and water and oil tight bulkheads are to be "cleaned", examined and gauged. In order to determine immediate repairs, the gauging results are to be reviewed by the attending Surveyor. All repairs found necessary are to be prompt, thorough, and carried out to the satisfaction of the attending Surveyor. The exterior of the hull is to be recoated.

3

Many support vessels use keel cooling systems that cover a large extent of the vessel's bottom shell area. Where these cooling systems extend beneath ballast spaces or cofferdams, particular attention is to be given to accurately determine the condition of the shell plating in way of the coolers. This may be done by visual examination and gauging. As a minimum, it is required that gauging and hydrostatic testing of the keel coolers, is conducted, after the plating has been "cleaned". Hydrostatic testing is to be 1.5 times the maximum allowable working pressure (MAWP) of any individual item of machinery that uses the cooling system.

5

Rudders and stocks are to be removed from the vessel. Unless there is negligible wear, all rudder stock and pintle sleeves, liners and bushings are to be renewed. Stocks, pintles and skeg, where fitted, must be examined by suitable nondestructive test methods. Rudder plating is to be "cleaned", examined and ultrasonic thickness gauged. In the case of double plate rudders, suitable access openings are to be cut in one side of the rudder to facilitate internal inspection.

7

Hawse pipes are to be "cleaned" and examined. Anchors and chains are to be ranged, "cleaned" and measured. All anchor chain components found worn 10% below the Rule required diameter are to be renewed. All connecting links and shackles are to be opened and examined, Chain lockers are to be "cleaned", examined and ultrasonic thickness gauged. Cable holdfast and chain stoppers are to be opened and examined. Anchor windlasses are to be removed from foundations and reconditioned. Windlass foundations are to be "cleaned", examined, gauged.

9

All sea chests are to be opened, "cleaned", ultrasonic thickness gauged. Sea chest strainer plate fastenings are to be renewed. Spool pieces between sea chest and shell plating are to be renewed.

11

All sea valves, sanitary and other overboard discharge valves, are to be removed to a shop, and there be opened, "cleaned", examined and be reconditioned or renewed and then be reinstalled, in good order, using new fastenings.

13 (*1 November 2014*)

All closing appliances, associated with the conditions of the loadline assignment (i.e., doors, hatch covers, windows, port-lights, skylights, ventilators, air pipes) including their retaining and securing devices are to be examined and overhauled.

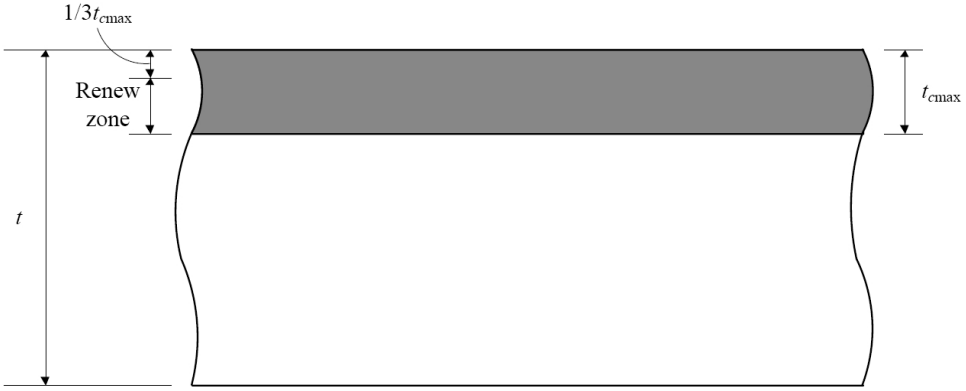
15 *(1 November 2014)*

All of the vessel's tanks including cargo, saltwater ballast tanks, and void spaces are to be "cleaned" (refer to 7-3-1/3.5 of the ABS *Rules for Survey After Construction (Part 7)*), examined and all tank internals are to be ultrasonic thickness gauged and, where found to be deficient, made satisfactory.

All saltwater ballast tanks and void spaces are to have coating in "GOOD" condition (refer to 7-1-1/3.5 of the ABS *Rules for Survey After Construction (Part 7)*). Uncoated ballast tanks and void spaces, or those ballast tanks and void spaces in which the coating is in less than "GOOD" condition, are to be blasted, prior to the tank internals being ultrasonic thickness gauged, and surfaces hard coated to a "GOOD" coating condition.

The actual existing structural scantlings of the vessel are to be determined by ultrasonic thickness measurement (gauging). Members with corrosion pattern found indicates wastage exceeding the maximum wastage allowances are to be renewed. The maximum allowed plate wastage for REBUILDING is to be less than $^1/_3 t_{cmax}$, as illustrated in 2/15 FIGURE 1:

FIGURE 1
Maximum Plate Wastage Loss Allowance for RB *(1 November 2014)*



where

t = as built plate thickness

t_{cmax} = normal maximum wastage allowance

= as indicated in 7-A1-4/35.3 TABLE 2 of the ABS *Rules for Survey After Construction (Part 7)* for vessels under 90 m (295 ft), or

= as indicated in 7-A-4/TABLE 1 of the ABS *Rules for Survey After Construction (Part 7)* for barges of 90 m (295 ft) and over

The above wastage criteria apply to all vessels requested for REBUILDING survey, regardless if they use wastage allowances applicable to other IACS members. The gauged thicknesses are to be addressed in line with the requirements specified in the relevant sections of the most recent ABS *Rules for Survey After Construction (Part 7)*, as applicable.

17 *(1 November 2014)*

All lockers and storage areas must be “cleaned” and examined. Plating and internals plate thickness is to be ultrasonic gauged.

19 *(1 November 2014)*

Engine room tank tops, machinery platforms, steering gear flats and machinery foundations are to be “cleaned”, examined and ultrasonic thickness gauged. All shell plating and bulkheads connected to tank tops or machinery platform are to be "cleaned", examined and ultrasonic thickness gauged. Machinery spaces are to be coated or have existing coatings placed in good condition including:

- Bilges wells and sea chest plating
- Shell plating and frames/brackets below lower engine room floor plates

21

All internal shell plating in way of sea chest and overboard connections is to be “cleaned”, examined, ultrasonic thickness gauged.

23

All moving parts of the steering gear must be disassembled, examined, and clearances found excessive are to be restored to original. Foundation bolts are to be examined, sounded and refitted if found slack.

25 *(1 November 2014)*

An inclining experiment is to be carried out upon completion of any major structural steel renewals and/or if major modifications have been carried out and new stability information provided to the vessel.

If stability is a requirement of Classification, or if ABS is issuing the Load Line Certificate, then the inclining experiment is to be witnessed by the ABS Surveyor.

The experiment results and calculations for subdivision and stability are to be submitted to ABS for review.

SECTION 3
Machinery

Due consideration will be given to well documented evidence of machinery that has been maintained under a manufacturer's supervised scheme of preventative maintenance. Machinery thus maintained, found in good order and well within the limits of operating hours required for opening (less than 50% of maximum allowed hours) may be accepted for the purposes of "REBUILDING", provided the vessel continues the maintenance, with Surveyor approval, of its machinery under the most recent version of the 7-A1-14, "Surveys Based on Preventative Maintenance Techniques" of the ABS *Rules for Survey After Construction (Part 7)*.

1

In connection with the above, lubricating oil samples are to be taken from all machinery that is to be considered for "REBUILDING". The samples are to be sent to a reputable laboratory for spectral analysis of the lubricating properties and the contaminants that the oil may contain. Results of the analysis are to be reviewed by the attending Exclusive Surveyors, with a view to determine which machinery may require further overhaul.

3

Tailshafts are to be drawn and examined together with bearings. If fitted, seals and liners are to be repaired or renewed and the lube oil system is to be flushed. All protective coverings are to be inspected, spark tested or removed to facilitate the examinations.

5

Fixed and controllable pitch propellers are to be examined.

7

Main propulsion-diesel engines are to be opened out and examined by the manufacturer's licensed service representative, and be overhauled to original specification. This may require removal of the engines from the vessel.

9

Main reduction gears are to be opened for examination and gear teeth contact checked. Lube oil sump is to be drained and the sump, together with the entire lube oil system, is to be drained and flushed. Any indications of excessive wear will require further opening out of the gear to determine the cause.

11

Main thrust bearing and lineshaft bearings are to be examined and oil sumps drained.

13

All pumps and compressors are to be opened, examined, and reconditioned.

15

All heat exchangers are to be opened and examined. All essential heat exchangers must be hydrotested to 1.5 times maximum allowable working pressure.

17 ***(1 November 2014)***

Unless there is no evidence of corrosion or pitting, all of the vessel's fire, bilge and ballast piping and associated valves may be required to be renewed. It is noted that many support vessels made use of carbon steel piping for all ship systems and that screwed fittings were often used in critical systems such as compressed air and oil systems. Therefore, particular attention is to be given to bringing the piping systems into compliance with the most recent ABS Rules. All non-metallic, flexible expansion pieces in salt water systems are to be renewed.

All non-metallic expansion pieces to be renewed:

i) If in salt water systems

ii) If more than five years of age

All piping systems are to be:

i) Free of leaks, and

ii) Gaskets are to be confirmed compatible with system fluid.

19

All evaporators and auxiliary boilers are to be examined, reconditioned, hydrostatically tested to 1.5 times MAWP.

21

All essential engine room pressure gauges are to be recalibrated or renewed as necessary. All safety and relief valves are to be demonstrated after reinstallation.

23

Generator engines and gears are to be opened out and examined, by the manufacturer’s authorized representative and overhauled to original specifications (as far as possible)

25

All motors and generators are to be examined, revarnished, baked, and shop tested by an electrical repair facility.

27 ***(1 November 2014)***

All exposed electrical cables and fittings on deck are to be examined and megger tested and renewed where necessary. Dead end cables are to be removed. Where cables pass through watertight or fire-rated bulkheads or decks, the stuffing tubes, transit devices or pourable materials of the cable penetrations are to be examined for alterations and continued effectiveness.

29

All other electrical cabling and fittings are to be examined and subjected to a minimum of three sets of megger tests. Any cables which show evidence of breakdown are to be renewed. All junction points must be examined.

31

All switchboards and motor controllers are to be examined, cleaned, and connections tightened. All switchboard meters must be recalibrated.

33

The automation systems, if fitted, are to be examined, completely reconditioned, tested by the manufacturer's licensed representative and proven satisfactory.

35

At completion of the rebuilding work, all machinery spaces are to be cleaned and suitable dock and sea trials must be carried out to the Surveyors' satisfaction.

SECTION 4

Fire Fighting Appliances

Fire-extinguishing apparatus required for Classification are to be examined and/or tested and placed in satisfactory condition.

SECTION 5

Special Service Vessels

For vessels which have received a special classification notation, due consideration is to be given to the rebuilding of items as related to the vessel's class notation. The Owners must present a plan for overhaul of such items, for review by ABS, prior to conducting the rebuilding.