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An American National Standard

Standard Guide for Doubler Plate Repairs for Non-Classed Ship Structures[1]

This standard is issued under the fixed designation F2991; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers information for designing permanent steel doublers for surface ships that are not classed with any classification society, and not load line certified. It is not intended to supersede any classification or statutory requirements.

1.2 This guide provides owners, operators, shipyards, and designers with information for designing and using doubler plates so that the damaged structure regains its original local strength.

1.3 When the steel is to be welded a welding procedure suitable for the grade of steel and intended use or service is to be utilized. See Appendix X3 of Specification A6/A6M for information on weldability.

1.4 The values stated in metric units (SI) are to be regarded as the standard. The values given in parentheses (inch/pound) are provided for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

A36/A36M Specification for Carbon Structural Steel

A131/A131M Specification for Structural Steel for Ships

2.2 *Other Documents:*

AWS D 1.1 Structural Welding Code[3]

NVIC 7-68 Navigation and Vessel Inspection Circulars[4]

SSC-443 Design Guidelines for Doubler Plate Repairs of Ship Structures[5]

3. Terminology

3.1 *Definitions:*Definitions of Symbols Specific to This Standard:

3.1.1 *combustible liquid*—liquid having flashpoint above 80°F (Grade D and E liquid).

3.1.2 *corrosion*—a state of deterioration in metals caused by oxidation or chemical reaction.

3.1.3 *doubler plate*—a plate lap welded to damaged part of a structure to regain its original local strength.

3.1.4 *flammable liquid*—liquid having flashpoint at or below 80°F (Grade A, B and C liquid)

3.1.5 *fracture*—fracture occurs when metal experiences stresses that exceed ultimate strength.

3.1.6 *tank vessels*—all vessels (tank barges and tankships) carrying combustible or flammable liquid cargo in bulk.

4. Introduction

4.1 The intent of this guide is to design and weld a doubler plate to the damaged portion of the structure so that the damaged structure regains its original local strength. This guide should be used to design a specific doubler plate for a specific damage.

4.2 These guidelines are based on the study performed on behalf of Ship Structure Committee (SSC) and are published in the report SSC-443.

[1] This test method is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.01 on Structures.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American Welding Society (AWS), 550 NW LeJeune Rd., Miami, FL 33126, http://www.aws.org.

[4] Available from the United States Coast Guard (USCG) website: http://www.uscg.mil/hq/cg5/nvic/

[5] Available from the Ship Structure Committee website: http://www.shipstructure.org/