

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

COMMANDANT (MMT)
U.S. COAST GUARD
WASHINGTON, D.C. 20226

25 January 1966

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 1-66

Subj: Requirements for Hull Structural Steel - Structural Continuity

1. Purpose. This circular is intended to point out the need for special consideration whenever it is proposed to use steels other than ordinary ship steel or specially approved steels in hull construction. It also points out the need for recognizing that fittings, etc. attached by welding to any part of the ship's structure generally tend to share the stress borne by that part of the structure.
2. Background. The basic requirements for hull steel are given in Section 39 of the American Bureau of Shipping Rules for Building and Classing Steel Vessels. Additionally, the American Bureau of Shipping has specially approved certain steels for this purpose. Cases have recently come to attention, however, where steels not complying with Section 39 and not entirely suitable have been used or are proposed for use.
3. Discussion. In order to be suitable for use in ships' hulls, steel needs to be suited to ship fabrication procedures, to have sufficient strength, and to have sufficient ductility and notch toughness for the ambient temperatures which may occur. To be adequate it should sufficiently meet each of these conditions, i.e. an excess ability in any one respect does not satisfactorily compensate for a deficiency in any other. Considering these requirements, it is necessary to recognize that even items which are intended to serve no structural function and which are totally disregarded in the making of strength calculations, need to be regarded as structural if they are connected by welding to the more highly stressed elements of a ship's structure. This is because the continuity provided by the welding generally results in such members being subjected, at least in part, to the same stresses as the member to which they are attached. Thus, half rounds fitted around hatch coamings bear the same stress as the adjoining coaming material, etc. Evidently with the thought that short members are not subjected to full stress, items such as car or crane rails have sometimes been fitted in short lengths with gaps between each section. While the stress in the portion of such members farthest removed from the plating to which they are attached may be less than that in the plating, the stress along the line of attachment is the same as that in the plating. In addition, the stress concentration and conditions of restraint existing at each end of each section provide a potential fracture source at each such point.

Referring particularly to the application of car or crane rail: on vessel and barge deck:, direct welded connection of such members to decks may not be satisfactory. This is because the higher carbon content of rail steel and other properties which may be at variance from those specified for ship steel may appreciably reduce the notch toughness. While there may be some instances of apparently satisfactory performance of such installations, it is believed that these may be simply fortuitous, and may reflect the fact that the properties of some of these steels can vary over a pretty wide range and therefore may sometimes be appreciably better than the prevailing average.

4. Action. The full approval of the American Bureau of Shipping (or other classification society recognized by the Coast Guard) and of the Commandant (MMT) shall be obtained whenever steels other than those complying with the requirements of Section 39 of the American Bureau of Shipping Rules are proposed for use either directly in the hull structure or in subsidiary items attached by welding to the higher stressed portions of the Rain hull structure such as the deck, upper side shell, bilge or bottom. For such an application to be considered, full details shall be furnished as to the physical properties (including notch ductility and fatigue and corrosion data, when pertinent) and chemical properties of the steel in question together with pertinent related structural details.



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Diet. (8DL No.82)

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