

**DEPARTMENT OF TRANSPORTATION  
UNITED STATES COAST GUARD**

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NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 2-80

Subj: Poured-Metal Socket Connections for Lifeboat Falls

Ref: (a) Code of Federal Regulations, Title 46-Shipping: 75.33-5, 94.33-5, 108.507, and 192.33-5  
33.10-10,

1. PURPOSE. This Circular points out the hazards that can result from errors made in the installation of socket fittings used as the end connections of wire rope lifeboat falls.
2. BACKGROUND. The Coast Guard has received growing evidence that the technique of installing sockets of the molten metal-type as the end fittings of wire rope is not always understood or safely accomplished. Three casualty reports over the last year bear out this conclusion, two involving damaged equipment and a third resulting in severe injuries to drill rig personnel. The events reported include "Bitter end of wire rope falls pulled out from poured socket... Some question as to type of metal used in pouring existed... The lead-poured socket was replaced with a standard eye splice and thimble connection... Mr. (X) advised... that none of the personnel were qualified to make the (socket) repair and that it should be fixed in the shop ashore... Mr. (Y) has no training in the pouring of babbitt materials. He had noted the babbitt material being removed during repairs seemed harder than that replacing it... The usual babbitt material which was available for routine repairs was used..." All of which taken together show a lack of knowledge about the correct kind of poured metal to be used with these fittings.
3. DISCUSSION.
  - a. In the inspection requirements for merchant vessels, reference (a), poured-metal socket connections are treated as "fastenings" installed with lifeboat falls, the assemblies of which must carry a load with a minimum factor of safety of six on the basis of the maximum toad applied to the wire. (For example, with a 10,000-lbs.) load on a one-part fall, the breaking strength of the wire rope or that of an attached socket fitting would have to be 60,000 lbs.) Poured-metal socket connections have been used extensively on merchant and naval vessels for decades. As far back as 1930 the U.S. Navy described them (when properly installed) as the most efficient form of end connection available for wire rope, with an efficiency of approximately 100%. Despite the long standing use of these fittings, their application cannot be taken for granted; the three casualties show the danger that inaccurate information, lack of quality control or bad workmanship can produce.
  - b. The manufacturers of wire ropes describe the correct method of making these socketed connections in their technical handbooks and product literature, all of which specify zinc as the metal for bonding the individual wires at the end of a rope to the socket fitting. Although the steps to do this are not overly complicated, it is doubtful if the average merchant vessel or drill rig has the correct equipment and materials for doing the work in

accordance with the recommendations of the wire rope manufacturers. As -discussed above, it is clearly a gross error to substitute metals such as lead, babbitt, type metal, solder, etc. for the zinc required. Furthermore, the sizes of the socket and its wire rope, the removal of a rope's fiber core, the degreasing of the wires, the use of acid to each steel wires (but not those coated with aluminum), the neutralization of the acid after the etching, the brooming out of the wires within the socket, and the pouring of the zinc are all details that must not be glossed over if a 100% socket connection is to result. The danger inherent to errors made in carrying out or omitting any of the required steps should not be underestimated. The instructions of the wire rope manufacturers should be carefully applied in making these socketed connections.

4. ACTION. The Coast Guard recommends that management and operating personnel in the marine industry give their attention to the precautions needed with the above fittings in order to prevent accidents similar to those described.