In-service Inspection of Mooring Hardware for Floating Structures

API RECOMMENDED PRACTICE 2I
THIRD EDITION, APRIL 2008

REAFFIRMED, SEPTEMBER 2020

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Upstream Segment

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Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

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Introduction

The third edition of API RP 2I is an extension of the second edition, which addresses in-service inspection of mooring components for MODUs only. Major changes of this edition include:

— inspection guidelines for steel permanent moorings on permanent floating installations are added;

— inspection guidelines for fiber ropes used for permanent and MODU moorings are included;

— special guidance for MODU mooring inspection in the areas of tropical cyclones is provided.

The third edition was developed in response to the need for inspection guidelines of permanent and fiber rope moorings in addition to MODU moorings. The additional guidelines are based on study results of joint industry projects (JIPs) and industry experience accumulated in the last 15 years operating a large number of MODUs and permanent floating installations. This document compiles factors that are best understood and can be quantified at this time. The information in this document will be updated after further experience and knowledge are gained. Accordingly, comments and suggestions toward broadening and refining these guidelines are encouraged.

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1 Scope

1.1 General

This recommended practice provides guidelines for inspecting mooring components of mobile offshore drilling units (MODUs) and permanent floating installations. Although this document was primarily developed for the moorings of MODUs and permanent floating installations, some of the guidelines may be applicable to moorings of other floating vessels such as pipe-laying barges and construction vessels. Furthermore, some of the guidelines may be applicable to secondary or emergency moorings such as moorings for jack-up units, shuttle tanker moorings, and dynamic positioning (DP) vessel harbor mooring.

The applicability of this document to the moorings of other floating vessels is left to the discretion of the user.

1.2 Purpose

The need for rigorous, effective inspection of mooring hardware is apparent because most of the mooring failures involved faulty mooring components including corroded or physically damaged wire-rope or chain, defective connecting links, or mooring hardware of inferior quality. This document should be useful to engineers and operating personnel concerned with the following:

a) planning a mooring inspection;

b) conducting or supervising a mooring inspection;

c) deciding whether to reject, repair, or replace mooring hardware;

d) communicating with others concerning acceptable mooring hardware.

1.3 Inspection Philosophy and Exception to This Document

1.3.1 Inspection Philosophy

The inspection philosophy of this document is to remove a mooring component with excessive deterioration from service. Based on this philosophy, a criterion of limiting the strength reduction to 10 % minimum breaking strength (MBS) was established in the first edition of this document. This criterion has been used by the industry for more than 20 years with generally satisfactory results, and it has become a long standing and widely accepted criterion.

1.3.2 Inspection and Design Check

It should be emphasized that this document does not address the critical design issues such as tension factor of safety and fatigue, although some discussion is given to the design issue of corrosion allowance. Any attempt to link inspection with these critical design issues will make discard criteria a moving target, depending on design assumptions, analysis software used, margin of safety, and location of the operation, etc. Setting an industry inspection standard in this case is impossible. The design check should be conducted separately. If the design check indicates that the reliability of the mooring system can be overly compromised, the acceptance of a mooring component that passes the discard criteria should be carefully re-evaluated. On the other hand, if the design check indicates that the mooring component is significantly over-designed, and it can tolerate much more damage than allowed by this document, design calculations should be submitted to the appropriate authority asking for permission