Recommended Practice for Procedures for Inspections, Maintenance, Repair, and Remanufacture of Hoisting Equipment

API RECOMMENDED PRACTICE 8B
SIXTH EDITION, DECEMBER 1997

EFFECTIVE DATE: MAY 1998

American
Petroleum
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Exploration and Production Department

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Recommended Practice for Procedures for Inspections, Maintenance, Repair, and Remanufacture of Hoisting Equipment

1 Scope

1.1 OBJECTIVE

The objective of this publication is to provide owners and users of equipment listed below guidelines for inspection, maintenance, repair, and remanufacture procedures that may be utilized to maintain serviceability of the covered equipment.

1.2 EQUIPMENT COVERED

This Recommended Practice covers the following drilling and production hoisting equipment:

a. Crown block sheaves and bearings.
b. Traveling blocks and hook blocks.
c. Block to hook adapters.
d. Connectors and link adapters.
e. Drilling hooks.
f. Tubing and sucker rod hooks.
g. Elevator links.
h. Casing, tubing, drill pipe and drill collar elevators.
i. Sucker rod elevators.
j. Rotary swivel bail adapters.
k. Rotary swivels.
l. Power swivels.
m. Power subs.
n. Spiders when capable of being used as elevators.
o. Wireline anchors.
p. Drill string motion compensators.
q. Kelly spinners when capable of being used as hoisting equipment.
r. Riser running tool components when capable of being used as hoisting equipment.
s. Wellhead running tool components when capable of being used as hoisting equipment.
t. Safety clamps when capable of being used as hoisting equipment.

1.3 PROCEDURE DEVELOPMENT

The owner and user together with the manufacturer should jointly develop and update inspection, maintenance, repair and remanufacture procedures consistent with equipment application, loading, work environment, usage, and other operational conditions. These factors may change from time to time as a result of new technology, equipment history, product improvements, new maintenance techniques and changes in service conditions.

If the manufacturer of the equipment no longer exists or is unable for any reason to provide suitable recommendations, the owner or user should develop inspection, maintenance, repair and remanufacture procedures consistent with widely accepted industry practices.

1.4 PERSONNEL QUALIFICATIONS

Inspection, maintenance and repair procedures should be carried out by personnel qualified by professional trade and verified by widely accepted or recognized standards covering the specific skills or knowledge required.

1.5 DOCUMENTATION

1.5.1 Records

The equipment owner or user should maintain a record-keeping system, which contains pertinent information regarding equipment. Records may include the following:

a. Information provided by the manufacturer.
b. Inspection records.
c. Maintenance records.
d. Repair records.
e. Remanufacture records.

1.5.2 Identification

Unit serial number or identification marking provided by the manufacturer should be maintained on the equipment and recorded in the equipment record. Identification marking should be provided by the owner or user for unidentified equipment which requires the maintenance of records.

1.5.3 History

Changes in equipment status which could affect equipment serviceability or maintenance should be recorded in the equipment record.

1.5.4 Record Identification

Entries in the equipment record should include the date and the name of the responsible person(s) involved in the inspection, maintenance, repair, or remanufacture.

2 Definitions

2.1 critical area: A highly stressed region of a primary load carrying component as defined by the manufacturer.

2.2 expendable parts: Parts normally used up or consumed in service, such as seals; gaskets; filters; packing; v-belts; covers; guards; breathers; drains; and miscellaneous hardware and fasteners.

2.3 equipment performance: Operational capability of a piece of equipment relative to expected or predetermined parameters or standards.

2.4 inspection: Comparison of equipment conformity to predetermined standards, followed by a determination of action required.

2.5 load test: A procedure wherein a load is applied to verify the serviceability of equipment.

2.6 maintenance: Actions, including inspection; adjustments; cleaning; lubrication; testing; and expendable parts replacement necessary to maintain the serviceability of the equipment.

2.7 manufacturer: A term denoting individuals or companies who make or process equipment or material for which API standards have been or are being formulated.

2.8 owner: An individual, legal entity or organization holding legal title to the equipment.

2.9 primary load: The axial load to which the equipment is subjected in operations.

2.10 primary load carrying components: Those components of the covered equipment through which the primary load is carried.

2.11 remanufacture: Actions performed on equipment that involve a special process or machining.

2.12 repair: Actions performed on equipment that involve replacement of parts (other than expendables), but exclude remanufacturing operations.

2.13 serviceability: The condition of a piece of equipment at any point in time that affects the ability of the equipment to perform its function(s) as intended.

2.14 special process: An operation which may change or affect the mechanical properties, including toughness, or the materials used in equipment.

2.15 testing: Actions that are carried out on a piece of equipment to insure that it can perform a required function.

2.16 users: A term denoting individuals or companies who use equipment or material, or implement Recommended Practices.

3 Inspection

3.1 INSPECTION CATEGORIES

3.1.1 Category I

Observation of equipment during operation for indications of inadequate performance.

3.1.2 Category II

Category I inspection, plus further inspection for corrosion; deformation; loose or missing components; deterioration; proper lubrication; visible external cracks; and adjustment.

3.1.3 Category III

Category II inspection, plus further inspection, which should include NDE of exposed critical areas and may involve some disassembly to access specific components and identify wear that exceeds the manufacturer's allowable tolerances.

3.1.4 Category IV

Category III inspection, plus further inspection where the equipment is disassembled to the extent necessary to conduct NDE of all primary load carrying components as defined by the manufacturer.

3.2 FREQUENCY

The owner or user of the equipment should develop his own schedule of inspections based on experience, manufacturer's recommendations, and consideration of one or more of the following factors: environment; load cycles; regulatory requirements; operating time; testing; repairs; remanufacture. As an alternative the owner or user may use Table 1.

3.3 RESULTS OF INSPECTION

3.3.1 Acceptance Criteria

Acceptance criteria should be established based on experience and manufacturer's recommendations. Worn equipment, which does not meet acceptance criteria, should not be accepted for operation at reduced load unless an analysis is made in accordance with the governing API Equipment Specification.

3.3.2 Rejected Equipment

Rejected equipment should be marked and removed from service for further evaluation or until deficiencies are corrected.

3.4 RECORDS

Records of Category III and Category IV inspections should be entered in the equipment record. Testing related to or indicating the load carrying capacity of the equipment should be entered in the equipment record.

Table 1—Periodic Inspection and Maintenance Categories and Frequencies

Equipment	Daily	Weekly	Monthly	Semi Annually	Annually	Other Frequency
Hooks (other than sucker rod hooks)	I	II		III		IV (5-year)
Traveling blocks, hook block, block to hook adapter, and crown block sheaves and bearings	I	II		III		IV (5-year)
Connectors and link adapters	I	II		III		IV (5-year)
Sucker rod hooks	I	II		III	IV	
Elevator links	I			III	IV	
Casing, tubing, drill pipe and drill collar elevators	II			III	IV	
Sucker rod elevators	II			III	IV	
Swivel bail adapters	I	II		III	IV	
Rotary swivels	I	II		III		IV (5-year)
Power swivels	I	II		III		IV (5-year)
Power subs	I	II		III		IV (5-year)
Spiders capable of being used as elevators	II			III	IV	
Dead line tie downs/wire line anchors	I	II		III		IV (5-year)
Drill string motion compensators	II			III		IV (5-year)
Kelly spinners capable of being used as hoisting equipment	I	II		III		IV (5-year)
Riser and wellhead running tools capable of being used as hoisting equipment	II			III	IV	
Safety clamps when capable of being used as hoisting equipment	I	II		III	IV	

Note: The above frequencies apply to equipment in use during the period specified.

4 Maintenance

4.1 PROCEDURES

In addition to the procedures developed in accordance with Paragraph 1.3, the manufacturer should define any special tools, materials, measuring or inspection equipment, and personnel qualifications necessary to perform the maintenance procedures. The manufacturer should also specify those procedures that should be performed solely by the manufacturer's representative, within the manufacturer's facility or by other qualified facilities.

4.2 METHODS

Maintenance actions may include any of the following: inspections; adjustments; cleaning; lubrication; testing; and parts replacement.

4.3 CRITERIA

Maintenance actions may be initiated based on, but not limited to, one or more of the following criteria: specific time intervals; measurable wear limits; load cycle accumulation; non-performance of equipment; environment; experience (history); regulatory requirements; and other measurable limits.

4.4 RECORDS

Maintenance activities involving the replacement of any primary load carrying component should be entered in equipment record. Testing related to or indicating the load carrying capacity of the equipment should be entered in the equipment record.

5 Repair

5.1 PROCEDURES

Manufacturers should provide adequate inspection criteria to allow the equipment owner or user to identify the nature of repairs that may be required. If repairs are not performed by the manufacturer, they should be performed using methods or procedures established in accordance with Paragraph 1.3.

5.2 BEARINGS

Bearings play an important part in the serviceability of equipment. The most likely causes for bearing replacement are: loose or bent cages (rolling element retainers); corrosion; abrasion; lubrication problems; and spalling from fatigue. Internal clearance in excess of manufacturer's allowance may indicate improper adjustment or assembly, which should be corrected. Repair of anti-friction bearing should not be

attempted by field or shop personnel. Consultation with the equipment manufacturer is recommended in the event of unexplained or repeated bearing failure.

5.3 REPLACEMENT PARTS

Replacement parts should meet or exceed the original equipment manufacturer's criteria.

5.4 RECORDS

Entries describing all repair activity, with the exception of those under Paragraphs 6.3.1 and 6.3.2a, should be included in the equipment record.

6 Remanufacture

6.1 PROCEDURES

Remanufacture of equipment should be performed using methods and procedures developed in accordance with Paragraph 1.3. Equipment found to be unsuitable for remanufacture should be destroyed.

6.2 VERIFICATION

Following remanufacture NDE shall be performed to verify the serviceability of the equipment. If load tests are performed, NDE should be performed after the load test.

6.3 SURFACE INDICATIONS

Surface indications identified by NDE may be allowable or non-allowable, depending on the size, shape, and location as defined by the manufacturer.

6.3.1 Allowable Surface Indication

Allowable surface indications are surface indications of size, shape and location that need not be removed.

6.3.2 Non-allowable Surface Indications

Non-allowable surface indications may be classified as follows:

a. Minor Surface Indications

Minor surface indications may be removed by a limited degree of filing or grinding within limits specified by the manufacturer. Caution should be exercised to prevent heating to an extent that could change the mechanical properties, including toughness, of the material.

b. Major Surface Indications

Major surface indications, which require material removal beyond the limits specified by 623.3.2a should be corrected by remanufacture.

6.4 RECORDS

Entries describing all remanufacture activity should be included in the equipment record.

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