



RP 4.0: INSPECTION AND CERTIFICATION OF OVERHEAD EQUIPMENT

A Recommended Practice (RP) for the
Canadian Well Servicing Industry

CANADIAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS
RECOMMENDED PRACTICE 4.0
INSPECTION AND CERTIFICATION OF OVERHEAD EQUIPMENT (SR)

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INTRODUCTION

The Canadian Association of Oilwell Drilling Contractors (CAODC) Engineering & Technical (E&T) Committee has developed a Recommended Practice (RP) for overhead equipment. This document dated October 2016 supersedes all prior editions of this Recommended Practice.

The information contained herein is a recommendation only of certification schedules for overhead equipment currently utilized in the Canadian well servicing industry. An attempt has been made to establish some practical recommended operating practices for overhead equipment in the Canadian well servicing industry.

The recommendations contained in this document should be considered in conjunction with the requirements of the original equipment manufacturers (OEM). Companies should operate and maintain the equipment within the operating limitations, such as load ratings, as designed by the OEM.

If the OEM stipulates increased levels of inspection or accelerated inspection/certification cycles, the contractors must follow the OEM guidelines unless granted approval to follow this CAODC Recommended Practice by a Professional Engineer (P. Eng).

CAODC has produced this Recommended Practice based on industry experience. However, this document should be considered in conjunction with all relevant legislation and the requirements of provincial regulatory authorities. This document should not be construed as a legal opinion, and users are advised to seek legal counsel to address their specific facts and circumstances.

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REVIEW PROCESS

CAODC Recommended Practices are reviewed and revised, reaffirmed, or withdrawn at least every three years. A one-time extension of up to two years may be added to this review cycle. Email any comments or items of concern to rpfeedback@caodc.ca.

RP REVISION SCHEDULE

| Revision Date | Revision Details |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| October 2013 | Section 4 (b) Sheaves: previous wording <i>“Bearing races must be removed”</i> revised to: <i>“Bearing races may be removed at the certifying engineer’s discretion”</i> . |
| | Section 4(c) Sheaves: previous wording <i>“Sheaves must be either sandblasted or acid dipped to remove all paint”</i> revised to <i>“Sheaves surface must be prepared as required for suitable NDT inspection”</i> . |
| October 2014 | Introduction revised to standardize all RP’s. |
| October 2016 | Content standardized for alignment and reformatted into new RP template. |

1. **SCOPE – OVERHEAD EQUIPMENT**

The overhead equipment for service rigs covered in this Recommended Practice is as follows:

- Travelling block;
- Hook;
- Elevators (tubing elevators, rod elevators, and rod transfers);
- Bails or links;
- Load clevis;
- Rod hook;
- Swivels;
- Load path items on power swivel.

1.1 **MASTS AND CROWNS**

Refer to CAODC RP 1.0 Inspection and Certification of Masts.

1.2 **SUBSTRUCTURES**

Refer to CAODC RP 1.0A Inspection and Certification of Substructures.

2. **INSPECTION TYPES**

To ensure that equipment is properly maintained and serviceable, four levels of inspection are recommended:

2.1 **LEVEL I INSPECTION**

A Level I inspection is a visual observation of the equipment prior to, and/or during operation, and/or during routine maintenance.

2.1.1 **LEVEL I INSPECTION PERSONNEL**

Level I inspections are to be performed by the rig crew.

2.1.2 **LEVEL I INSPECTION DOCUMENTATION**

Level I inspections shall be recorded in the tour sheet.

2.2 **LEVEL II INSPECTION**

A Level II inspection is a Level I inspection that includes a more thorough inspection of, but not limited to, load bearing components that includes checking for:

- Proper lubrication;
- Obvious external cracks;
- Damage and/or premature wear or deterioration;
- Missing parts or guards.

2.2.1 LEVEL II INSPECTION PERSONNEL

Level II inspections should be carried out by the Driller or Rig Manager.

2.2.2 LEVEL II INSPECTION DOCUMENTATION

Level II inspections shall be recorded in the tour sheet.

2.3 LEVEL III INSPECTION

A Level III inspection requires rig equipment to be thoroughly checked in the field to determine serviceability. This may, at the owner's/inspector's discretion, include Non Destructive Testing (NDT) techniques on load bearing components, and may require some minor disassembly of guards.

Upon reaching the required number of operating days, as outlined in [Section 3 - Inspection Frequency](#), overhead equipment shall be Level III inspected. At a minimum, the following procedure is required to determine the condition of the equipment:

- A thorough visual inspection of the following critical components:
 - Load areas;
 - Pickup points;
 - Pins;
 - Wear tolerances;
- Inspection of applicable and corresponding equipment outlined in the CAODC Level III Inspection Form.

Any repairs required will be done as described in [Section 5 – Repairs, Maintenance and Documentation](#).

2.3.1 LEVEL III INSPECTION PERSONNEL

Personnel qualified to supervise and/or provide technical assistance for Level III inspections include:

- Inspection Personnel as described in [Section 6.1.1](#);
- NDT Technicians as described in [Section 6.1.3](#);
- Professional Engineer's as described in [Section 6.1.4](#).

2.3.2 LEVEL III INSPECTION DOCUMENTATION

Level III inspections must be documented in the CAODC Mast and Overhead Equipment Log Book, or suitable alternative.

2.4 LEVEL IV INSPECTION AND CERTIFICATION

A Level IV inspection requires the equipment to be disassembled as required to do a complete inspection, and may, at the owner's/inspector's discretion, include NDT of all critical load bearing components.

Any repairs required will be done as described in [Section 5 – Repairs, Maintenance and Documentation](#).

2.4.1 SHEAVES

As part of each Level IV block certification, the sheave cluster must be completely disassembled and the sheaves and shaft inspected. At a minimum, the following procedure is required:

- Sheaves must be:
 - Removed from the travelling block shaft;
 - Gauged using a sheave gauge;
 - Measured for tread thickness, depth of groove and proper groove sizing;
 - Measured for wall thickness (thinnest wall under the 150 degree arc that defines the tread);
 - Sandblasted or acid dipped to remove all paint;
- Sheaves surface must be prepared as required for suitable NDT inspection;
- Bearing races may be removed at the certifying party's discretion;
- With the exception of polymer crown sheaves, an NDT inspection for cracks must be performed.

2.4.2 LEVEL IV INSPECTION AND CERTIFICATION PERSONNEL

Personnel qualified to perform a Level IV inspection typically include:

- Professional Engineer's as described in [Section 6.1.4](#);
- OEM Agents as described in [Section 6.1.6](#).

2.4.3 LEVEL IV INSPECTION AND CERTIFICATION DOCUMENTATION

A certification document will be provided by the certifying party and should include the following:

- Document author;
- Date and period of certification;
- Overhead equipment serial number (if available);
- Name of manufacturer (if available);
- Date of manufacture (if available);
- Capacity rating (daN) and/or (lbs);
- Results of the Level IV inspection;
- Location of repairs (if applicable).

Additionally, Level IV inspections must be documented in the CAODC Mast and Overhead Equipment Log Book, or suitable equivalent, and signed by the certifying party.

Sample - Overhead Equipment Certification

for
ABC WELL SERVICING COMPANY

RIG 1

Travelling Hook/Block

Date: March 1, 2012

The Hook Block Ratings are as follows:

Manufacturer: XXX Manufacturing

Serial No: XX-XXX

Rating: XXX,XXX lbs / XXX,XXX daN

The following items were inspected prior to reassembly:

- | | |
|--------------------|-----------------|
| 1 Hook Body | 7 Shank |
| 2 Spacer Block | 8 Keeper |
| 3 Side Plates (2x) | 9 Nut |
| 4 Main Latch | 10 Pins |
| 5 Cap | 11 Sheaves (4x) |
| 6 Springs | 12 Main Shaft |

During February 2012 the ABC WELL SERVICING'S Rig 1 hook block was refurbished in ABC's yard in Nisku, Alberta. Repairs to defects as identified by XYZ Engineering's P.Eng and MPI Company (file no. xxxx) were repaired by the ABC Mechanical Staff and DEF Machine Shop. The Sheaves were disassembled by ABC replacing all of the bearings with new ones.

Based on these repairs and inspections, it is my opinion that the Hook Block is safe to operate within its rated capacity when used in accordance with manufacturers specifications and/or industry standards provided that the owner performs routine inspections as/per the CAODC RP4.0 Guidelines. This certification is valid for 5 Calendar years or until such time that the Hook Block is damaged by operations, handling, or transportation.

XYZ Engineering Ltd.

John Smith, P.Eng
123 Avenue Street
Edmonton, Alberta, XXX-XXX
Phone: (XXX) XXX-XXXX
Fax: (XXX) XXX-XXXX
File No: XXXX

Engineer's Stamp
with Appropriate
Jurisdiction

Permit to Practice Stamp
or Permit Number

3. INSPECTION FREQUENCY

At a minimum, the inspection frequency of overhead equipment shall be conducted in accordance with the schedule below.

Note: *should circumstances, OEM recommendations or individual experience dictate otherwise, CAODC member companies may conduct these inspections at greater frequencies.*

| EQUIPMENT | DAILY | WEEKLY | ANNUAL | 6 YEARS |
|------------------------|--------------|---------------|---------------|----------------|
| Block* | I | II | III | IV |
| Hook | I | II | III | IV |
| Swivel | I | II | III | IV |
| Power swivel | I | II | III | IV |
| Bails | I | II | III | IV |
| Elevators/rod and pipe | I | II | III | IV |
| Rod Hook | I | II | III | IV |
| Load clevis | I | II | III | IV |

* A complete Level IV inspection must be conducted on McKissick blocks every five (5) years as recommended by the OEM.

Note: *one operating day = 24 accumulated operating hours from spud to rig release.*

4. LOAD DERATING

Load derating of used equipment, such as links (bails), will be either by an acceptable OEM’s chart or by the opinion of a Professional Engineer. Items that are derated must have identifiable markings showing the new rating and reflect the words “LOAD DERATED”.

5. REPAIRS, MAINTENANCE AND DOCUMENTATION

Occasionally repairs and/or maintenance following a Level III or IV inspection may be required to retain the operating integrity of overhead equipment. Any damage that requires repair will be categorized as minor or major as follows:

5.1 MINOR DAMAGE

Minor damage includes the repair of:

- Guards;

- Non-loaded attachments;
- Cosmetic repairs to sheaves and API connections etc.

5.1.1 **MINOR DAMAGE REPAIR PERSONNEL**

Minor repairs may be completed by Operating Personnel (as described in [Section 6.1.2](#)) at the discretion of the Rig Manager or higher authority, and do not require re-inspection.

If there is any question as to whether the damage is minor or major, one of the following must be consulted:

- Professional Engineer as described in [Section 6.1.4](#); or
- OEM Agent as described in [Section 6.1.6](#).

5.2 **MAJOR DAMAGE**

Major damage includes:

- All weld repairs to any load bearing component;
- Any modification to load bearing components such as:
 - Oversizing or undersizing pin fits, and
 - Sheave regrooving;
- Any replacement of load bearing components such as:
 - Hook shanks;
 - Axles;
 - Pins, etc.

All major damage must be repaired and requires a Level IV inspection specific to the equipment that was repaired. Repairs may be completed in a field environment provided they can be performed adequately and are accessible for NDT inspection.

Note: *all major repairs shall be done following a Professional Engineer or OEM Agent procedure. The certifying party would supply the repair facility with an engineering procedure and so note on the repair documentation.*

5.3 REPAIR AND MAINTENANCE DOCUMENTATION

All repairs and maintenance performed shall be documented in the CAODC Mast and Overhead Equipment Log Book, or suitable alternative, and include the following information:

- Date repairs and/or maintenance was conducted;
- Description of repairs and/or maintenance that was completed;
- For minor repairs:
 - Operating Personnel (as described in [Section 6.1.2](#)) that performed the repair and/or maintenance;
- For major repairs:
 - Certifying party of the repair, including signature.

Note: *all components, where practical, should have serial numbers or unique identifiers stamped on them to verify the documentation.*

5.3.1 MAJOR REPAIR DOCUMENTATION (RECERTIFICATION)

The certifying party will provide a certification document for the equipment requiring major repairs.

Any repair certification issued is for the repair of actual damage and is intended to maintain Level IV certification. It does not extend the Level IV certification requirements unless a complete Level IV inspection is conducted in accordance with [Section 2.4 - Level IV Inspection and Certification](#).

6. PERSONNEL QUALIFICATION, TRAINING AND DOCUMENTATION

6.1 PERSONNEL QUALIFICATIONS

6.1.1 INSPECTION PERSONNEL

Typical Inspection Personnel are considered to be senior operations personnel designated by the company that have:

- Knowledge of working principles of the equipment referenced in this RP;
- Mechanical competency in the disassembly of the equipment type and model;

- Experience and knowledge in service rig maintenance.

Examples of senior operations personnel include: Field Superintendents, Rig-up Superintendents and Operations Managers).

6.1.2 OPERATING PERSONNEL

Typical Operating Personnel are considered to be members of the rig crew that have:

- Knowledge of working principles of the equipment referenced in this RP;
- Experience and knowledge in service rig maintenance.

6.1.3 NDT TECHNICIANS

At a minimum, NDT Technicians are required to have Level II, Canadian Government Standards Board (CGSB) certification or other approved certification/training at the discretion of the certifying party.

6.1.4 PROFESSIONAL ENGINEERS

Professional Engineer's shall have:

- Previous experience and training in structural and/or mechanical analysis;
- A practical working knowledge of equipment referenced in this RP;
- Previous experience and training in the repair of the equipment referenced in this RP;
- Experience with general quality control standards;
- Professional status in Canada.

6.1.5 ORIGINAL EQUIPMENT MANUFACTURERS (OEM)

The company who built the original piece of equipment under inspection.

6.1.6 ORIGINAL EQUIPMENT MANUFACTURER AGENT

A designate of the OEM that has a practical working knowledge of the specific equipment under inspection.

6.1.7 WELDERS

Welders must hold a valid Journeyman Welder certificate and have previous experience in service rig maintenance.

6.2 PERSONNEL TRAINING

To satisfy provincial regulations and ensure that equipment will operate in the manner for which it was designed, Inspection and Operating Personnel (as described in [Section 6 - Personnel Qualification, Training and Documentation](#)) shall be adequately trained to conduct inspections (including visual) in accordance with this Recommended Practice. At a minimum, training should outline the inspection criteria for all critical components outlined in this Recommended Practice.

6.3 PERSONNEL DOCUMENTATION

Companies shall have a process in place that documents and retains all training administered to company personnel referenced in this Recommended Practice and should include:

- Date training took place;
- Who was in attendance.