
# RP 11.0: INSPECTION AND CERTIFICATION OF CARRIER MOUNTED EQUIPMENT

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

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**SANCTION DATE:** May 18, 2016

**CANADIAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS**

**RECOMMENDED PRACTICE 11.0**

**INSPECTION AND CERTIFICATION OF CARRIER MOUNTED 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 carrier mounted equipment. This document dated May 2016 supersedes all prior editions of this Recommended Practice.

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

I. In November 2003 all content relevant to substructures was removed from RP 3.0A Inspection and Certification of Substructures, Drawworks, and Carriers and the practices of RP 1.0A - Inspection and Certification of Substructures was adopted. The rationale for this decision was due to the small number of substructures currently utilized in the Canadian service rig industry;

II. In May 2016 all content relevant to drawworks was removed from RP 3.0A Inspection and Certification of Substructures, Drawworks, and Carriers and the practices of RP 11.0 - Inspection of Drawworks Brake Load Path Components were adopted. The rationale for this decision was the lack of inspection standards specific to drawworks brake load path components;

III. Removing drawworks related content from this RP allowed the E&T Committee to address some of the cause and effect factors related to the condition, operation and design of carriers and carrier mounted equipment, including:

- High stresses induced during lowering and raising of the derrick at attachment points of raising rams;
- Wind load stresses transferred through the carrier equipped with a free standing structure;
- High stresses transferred through rigid drawworks-carrier connections during operations with high hook loads;
- Operational stresses at the mast-carrier attachment points due to the carrier frame being utilized as a load bearing structure;
- Vibrations and impact effects on joints during transport and rig moves of mobile rigs;
- Age of carrier and condition of suspension;
- Inspection of frame/load points;
- Terrain of the move, types of wells serviced and frequency of moves.

Upon formal release to industry, RP 11.0 — Inspection and Certification of Carrier Mounted Equipment (SR) replaces RP 3.0A Inspection and Certification of Substructures, Drawworks, and Carriers, rendering RP 3.0A obsolete.

## RANGE OF OBLIGATION

Throughout this RP the terms ‘must’, ‘shall’, ‘should’, ‘may’, and ‘can’ are used as indicated below:

| TERM | USAGE |
|---|---|
| MUST | A specific or general regulatory and/or legal requirement that must be followed. |
| SHALL | An accepted industry practice or provision that the reader is obliged to satisfy to comply with this RP |
| SHOULD | A recommendation or action that is advised |
| MAY | An option or action that is permissible within the limits of the RP |
| CAN | Possibility or capability |

## 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 |
|---|---|
| Edition 1 | May 2016, sanctioned |

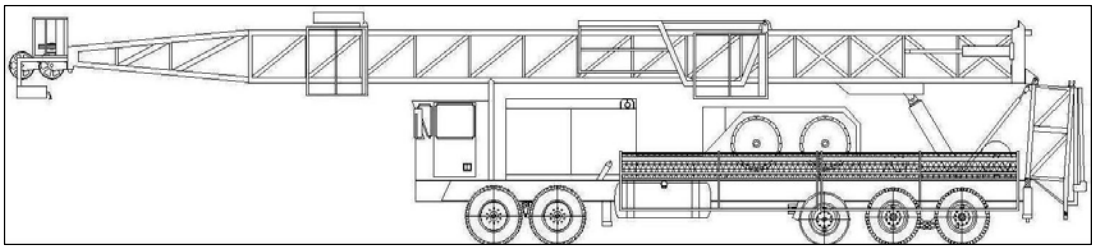
## 1. SCOPE – CARRIER MOUNTED EQUIPMENT

The scope of this RP encompasses load path components on trailer and self-propelled mobile carrier rigs, from mast pins to the ground, and typically includes:

- Free standing packages;
- A-legs;
- Headache rack;
- Outriggers;
- Cylinder mounts;
- Deadline anchors (if applicable).

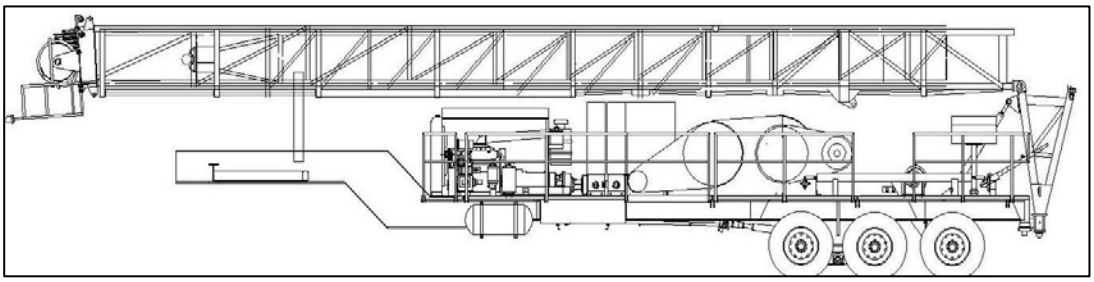
**Note:** *this RP does not replace the regulatory requirements of provincial vehicle inspection programs (i.e. CVIP or PMVI).*

### 1.1 SELF-PROPELLED MOBILE CARRIER



Self-Propelled Mobile Carrier

### 1.2 RIG TRAILER



Rig Trailer

### 1.3 SUBSTRUCTURES

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

### 1.4 DRAWWORKS BRAKING COMPONENTS

Refer to CAODC RP 10.0 - Inspection of Drawworks Brake Load Path Components.

## 2. INSPECTION TYPES

To ensure that carrier mounted 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 including a visual inspection of:

- Free standing packages;
- A-legs;
- Headache rack;
- Outriggers;
- Cylinder mounts;
- Deadline anchors (if applicable).

#### 2.1.1 LEVEL I INSPECTION PERSONNEL

Level I inspections are performed by the rig crew and should also be included as part of the daily rig walkaround carried out by the Driller or Rig Manager.

#### 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 the equipment that includes checking for:

- Proper lubrication;
- Obvious external cracks;

- Damage and/or premature wear or deterioration;
- Missing parts or guards;
- Distortion of any parts.

#### 2.2.1 LEVEL II INSPECTION PERSONNEL

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

#### 2.2.2 LEVEL II INSPECTION DOCUMENTATION

Level II documentation 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 or owner representative's discretion, include Non Destructive Testing (NDT) techniques and may require some minor disassembly of guards.

Every calendar year from the date of a Level IV inspection, or previous Level III inspection, whichever occurred last, carrier mounted equipment shall be Level III inspected. At a minimum, the following procedure is required:

- Clean the carrier as required to prepare for inspection;
- Perform a thorough visual inspection;
- Visually inspect all critical load bearing components on the carrier frame including the torque tube (raising ram connection), turnbuckle connections and rear axle connection points.

  **Note:** *cracks may form in the mast area and can lead to a catastrophic failure; as such, torque tubes (raising ram connection) may be shock loaded when the mast is raised and/or lowered.*

Any repairs required should be completed as described in Section 4 – Repairs, Maintenance and Documentation.

#### 2.3.1 LEVEL III INSPECTION PERSONNEL

Personnel qualified to conduct a Level III inspection include:

- Inspection Personnel as described in Section 5.1.1;

- Professional Engineer's as described in Section 5.1.4;
- OEM Agents as described in Section 5.1.6.

### 2.3.2 LEVEL III INSPECTION DOCUMENTATION

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

### 2.3.3 EQUIPMENT NOT-IN-SERVICE

Providing the following requirements are met, Level III inspections are not required on carriers that have been placed *not-in-service:*

- The date of the last Level III inspection exceeds 12 months;
- A Level III inspection is conducted prior to the carrier returning to service.

**Note:** *for the purposes of this RP, not-in-service status is considered a carrier that is not in active service, and should not be confused with the Commercial Vehicle Safety Alliance's definition of out-of-service status as outlined in the North American Standard Out-of-Service Criteria.*

**Note:** *CAODC members operating under the CAODC Oil and Gas Well Service Rig Permit are required to have a process in place that documents when a carrier has been placed not-in-service (e.g. the date carrier was placed not-in-service, why carrier was placed not-in-service, and the date carrier was returned to service). For further information, refer to Appendix B of the Alberta and/or Saskatchewan Memorandum of Agreements.*

## 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 certifying party's discretion, include NDT of all critical load-bearing components.

Upon reaching the required number of operating hours, as outlined in Section 3 - Inspection Frequency, carrier mounted equipment shall be Level IV inspected. The following is recommended for completing this inspection:

- Clean the carrier as required to prepare for inspection;

- Disassemble components on the carrier (mast, wheels, raising ram, etc.) and clean if required;
- Inspect the carrier frame paying particular attention to the torque tube (raising ram connection) and carrier frame between rear axles.

### 2.4.1 LEVEL IV INSPECTION AND CERTIFICATION PERSONNEL

Personnel qualified to perform a Level IV inspection typically include:

- Inspection Personnel as described in Section 5.1.1;
- NDT Technicians as described in Section 5.1.3;
- Professional Engineer's as described in Section 5.1.4;
- OEM Agents as described in Section 5.1.6.

### 2.4.2 LEVEL IV INSPECTION AND CERTIFICATION DOCUMENTATION

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

- Document author;
- Date and period of certification;
- Carrier serial number (if available);
- Name of manufacturer (if available);
- Date of manufacture (if available);
- Results of the Level IV inspection;
- Location of repairs (if applicable).

Additionally, Level IV inspections shall be documented in the CAODC Overhead Mast and Equipment Log Book, or suitable alternative, and signed by Inspection Personnel as described in Section 5.1.1.

Any repairs required will be completed as described in Section 4 – Repairs, Maintenance and Documentation.

## 3. INSPECTION FREQUENCY

At a minimum, the inspection frequency for carrier mounted 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 | 24,000 OPERATING HOURS |
|---|---|---|---|---|
| Free-standing packages | I | II | III | IV |
| A-legs | I | II | III | IV |
| Headache rack | I | II | III | IV |
| Outriggers | I | II | III | IV |
| Cylinder mounts | I | II | III | IV |
| Deadline anchors (if applicable) | I | II | III | IV |

## 4. 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 the equipment. Any damage that requires repair will be categorized as minor or major as follows:

### 4.1 MINOR DAMAGE

Minor damage of non-structural components may include the following:

- Oblong pinholes;
- Minor scarring of components;
- Rust pits;
- Cosmetic welding.

#### 4.1.1 MINOR DAMAGE REPAIR PERSONNEL

Minor repairs may be completed by Operating Personnel as described in Section 5.1.2 at the discretion of the Rig Manager or higher authority, and do not require certification.

If there is any question whether the damage is minor or major, either a Professional Engineer or the OEM as described in Section 5.1 - Personnel Qualifications) must be consulted.

## 4.2 MAJOR DAMAGE

Major damage includes the following:

- All weld repairs and/or modifications to:
  - Structural or load bearing components (e.g. A-legs welded to the carrier);
  - Torque tubes (raising ram connection);
- All hot work to any structural or load bearing components;
- Any modifications to load bearing components such as oversizing and/or undersizing pin fits;
- All repairs and/or modifications to axle attachment points.

All major damage must be repaired and requires an NDT inspection upon completion. Repairs may be completed in a field environment provided they can be performed adequately and are accessible for NDT inspection.

### 4.2.1 MAJOR DAMAGE REPAIR PERSONNEL

Repairs to major damage may only be completed as directed by a Professional Engineer or OEM Agent as described in Section 5.1 - Personnel Qualifications. Personnel qualified to complete major repairs include:

- Inspection Personnel as described in Section 5.1.1;
- NDT Technicians as described in Section 5.1.3;
- Welders as described in Section 5.1.7.

## 4.3 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 were performed;

- Description of repairs and/or maintenance completed. For the purposes of this RP, this may include:
    - Material test reports (MTR);
    - NDT reports;
    - Weld procedures.

  **Note:** *the inclusion of MTR, NDT reports and weld procedures as repair or maintenance documentation is a new industry recommendation. As such, previous documentation for these items may not be on file;*

- For minor repairs:
    - Operating Personnel (as described in Section 5.1.2) that completed the repair and/or maintenance;

- For major repairs:
    - Certifying party (as described in Section 4.2.1) of the repair, including signature.

#### 4.3.1 MAJOR REPAIR DOCUMENTATION (RECERTIFICATION)

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

Repair certification is issued 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.

### 4.4 PROVINCIAL VEHICLE INSPECTION PROGRAMS

All major damage identified during mandated commercial vehicle inspections (i.e. CVIP or PMVI), must be repaired.

#### 4.4.1 REPAIR DOCUMENTATION

All major repairs performed as a result of, or during commercial vehicle inspections must be documented in the CAODC Mast and Overhead Equipment Log Book, or suitable alternative.

**Note:** *to ensure proper documentation of major repairs, it is recommended that a copy of this RP be made available to third-party vendors performing commercial vehicle inspections.*

# 5. PERSONNEL QUALIFICATION AND DOCUMENTATION

## 5.1 PERSONNEL QUALIFICATIONS

### 5.1.1 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: Rig Managers, Field Superintendents, Operations Managers, Journeymen Heavy Duty Mechanic and/or Millwrights, OEM Agents and Mechanical and/or maintenance managers).

### 5.1.2 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.

### 5.1.3 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.

### 5.1.4 PROFESSIONAL ENGINEERS

Certifying Professional Engineer's shall have:

- Previous experience and training in structural and/or mechanical design and 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.

#### 5.1.5 ORIGINAL EQUIPMENT MANUFACTURERS (OEM)

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

#### 5.1.6 ORIGINAL EQUIPMENT MANUFACTURER AGENT

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

#### 5.1.7 WELDERS

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

### 5.2 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 5.1 - Personnel Qualifications) 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.

### 5.3 PERSONNEL DOCUMENTATION

Companies shall have a process in place to document and retain all training administered to company personnel referenced in this RP, and should include:

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