PRODUCT BULLETIN NUMBER: 99

Canrig
Drilling Technology Limited

DATE: March 21, 2005

SUBJECT:

Revised Inspection Program Section 4B of Parts Manual

SERIAL NUMBERS: **All Top Drive models**

DISCUSSION: There have been several incidents involving weld failures in the Torque Guide due to 1) fatigue, 2) abnormal loading during rig up/rig down or 3) welding defects.

In an effort to eliminate such incidents from happening, the Inspection Program Section 4B of the parts manual has been revised to include the Torque Guide, Top Drive Frame and Guard, Blower Frame, Harpoon and Grass Hopper.

RECOMMENDATION: There are Inspection maps for all Load Path and structural Components in this revised Inspection program. Ensure that all concerned personnel are aware of this Revised Inspection Program and that it must be followed. Once this revision is received, please distribute it to the appropriate personnel and update your Parts Manuals.

When in doubt, do not hesitate to contact CANRIG and ask questions.

INFORMATION:
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Magnolia, Texas 77354
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SUBSECTION 4B: INSPECTION

Recommended Inspection Program

General Inspection

Pressure test the circulating path from the Lower Well Control Valve (LWCV) to the Upper Well Control Valve (UWCV) to 200 psi to detect obvious leaks before testing at rated pressure. The test intervals may be specified by regulatory authorities, operator policies or contractor policies.

Monthly Inspection

1. Remove the LWCV and inspect the connections (including the quill pin) using magnetic particle techniques according to API RP7G.

2. Visually inspect the following for hoisting integrity:
   - Bail (if applicable)
   - Block Interface
   - Upper links
   - Main housing
   - Rotary manifold outer sleeve
   - Upper link support
   - Elevator links
   - Elevators (if applicable)
3. Visually check the welds on the top drive frame, guard, mounts and supports for cracks or damage.
4. Visually check the Top Drive unit for loose bolts.
5. Check the drive motor according to the manufacturers' publication, which is in the Electrical section of the *Component Literature* book.
6. Visually inspect the electrical cables on the Top Drive Unit.

NOTE:	**Items 2, 3, 4, 5 and 6 from the above list should also be checked after first week of operation on a new Top Drive installation.**

Inspection After Each Rig Move or Every 3 months (which ever comes first)

- Visually check the complete Torque Guide for any damage (i.e. bending or cracking).
- Visually check the integrity of all of the Torque Guide turnbuckles, pins, spherical bushings and flange connection bolts. (If applicable.)
- Visually check all the welds on the Torque Guide System including the harpoon for cracks. If suspicious cracks were found, a full Dry Magnetic Particle inspection must be

made to all the welds included but not limited to those shown in the Torque Guide Inspection Maps.

- Check for loose bolts and mountings for the blower, mast junction box, cable trays and hydraulic tubes.
- Visually check the service loop and service supports/mounts on the torque guide.
- Visually check the blower and welds on Blower Frame.
- Visually check the Grass Hopper for any damage (i.e. bending and cracking). In addition, check all the welds for cracks.

Other Inspection

- Check the clearance in the main Top Drive bearings and re-shim if necessary according to the schedule and instructions in this manual.
- Check the gap between the top of the Brake Disk and the caliper. If the Disk is rubbing against the top of the caliper, this maybe an indication that the Brake Hub had spun off.

1000 Days Inspection

The following major inspection is recommended every 1000 working days or at alternate intervals, which may be specified by regulatory authorities, operator policies, contractor policies or drilling conditions:

1. Disassemble the Top Drive unit.
2. Inspect all of the following hoisting load path components using magnetic particle techniques as specified on the Inspection Maps at the end of Section 4B:
    - Quill
    - Spindle
    - Split Ring
    - Upper link support
    - Rotary manifold outer sleeve
    - Housing
    - Upper links
    - Bail (if applicable)
    - Block Interface
    - Upper link pins (4)
3. Check all bearings, seals, seal running surfaces, gears and splines. Refurbish as necessary.
4. Inspect all the welds in the Torque Guide System using magnetic particle techniques as specified on the inspection maps at the end of Section 4B.
5. Inspect the end plates and lugs in the torque tubes for any damage and ensure that the lugs are properly aligned between sections.
6. Remove the motor and send to a qualified repair shop for inspection and repair if necessary. Refer to relevant Canrig and manufacturers' literature for recommended procedures.

Inspection Following Periods of Rough Drilling or Jarring

After periods of rough drilling, especially on surface hole, various Top Drive components can loosen due to vibration. The following inspection procedure is recommended after periods of rough drilling:

- Perform a thorough visual examination of the Top Drive, looking for any signs of damage.
- Visually inspect the mud inlet piping.
- Check all wire-locked bolts for damaged or broken wires. If broken wires are detected, check the affected bolts for tightness and rewire. Refer to the Capscrew Torque Values information in Subsection 4A of this Manual. Replace damaged wires.
- Check all external bolts that are not wired for tightness.
- Check all guards, vents, and covers for tightness.
- Ensure that all safety cables are properly and securely attached.
- Visually check the welds on the Top Drive Guard and Frame, Blower Frame and Torque Guide System.
- Visually examine inside the electrical junction boxes for loose components.
- Inspect the motor armature to ensure it has not dropped:
  - If the Brake Disk is approximately in the center of the Caliper, then this maybe an indication that the armature did not drop.
  - If the Brake Disk is rubbing on the bottom of the caliper, this maybe an indication that the armature did drop.

INSPECTION INDICATION MAP №:

Part Name: Main Housing

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

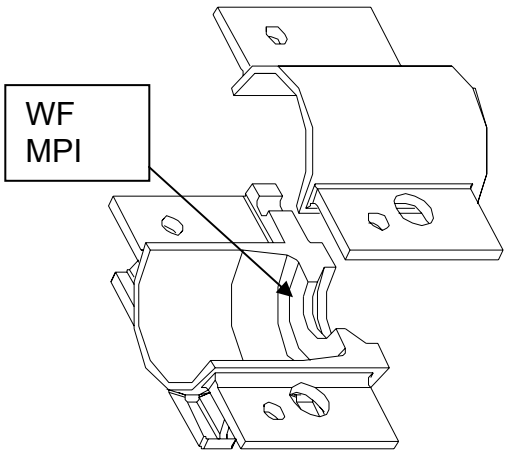


Fig. 1

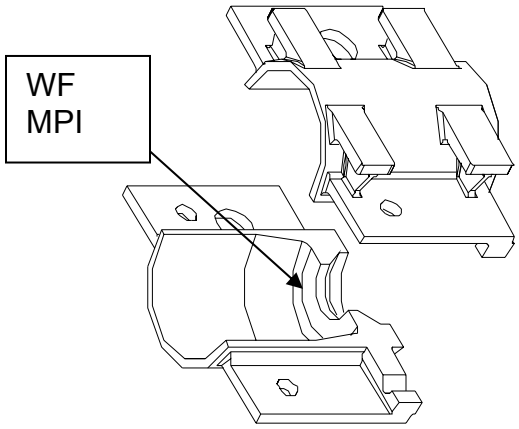
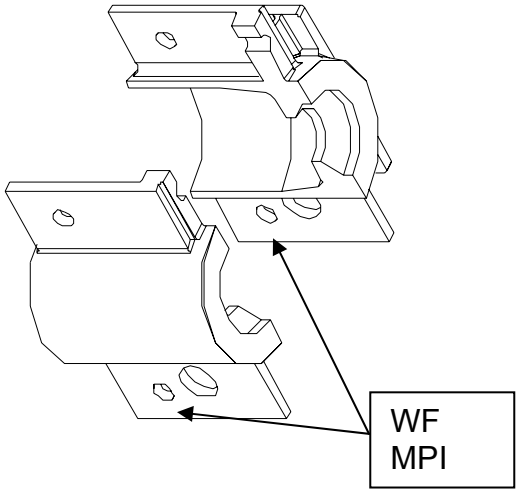
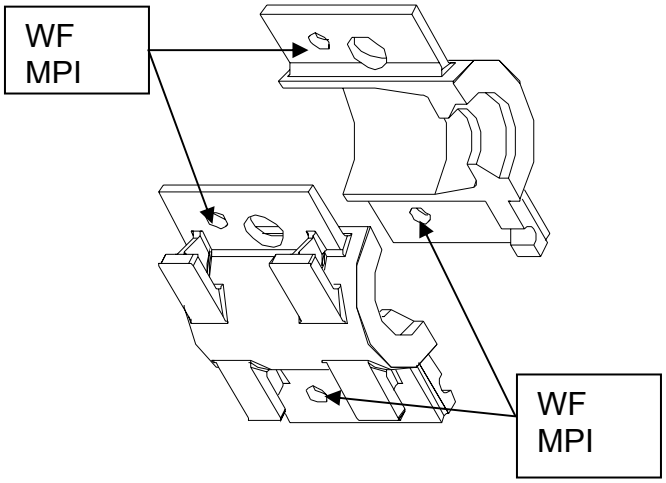


Fig. 2





INSPECTION INDICATION MAP №:

Part Name: Spindle

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

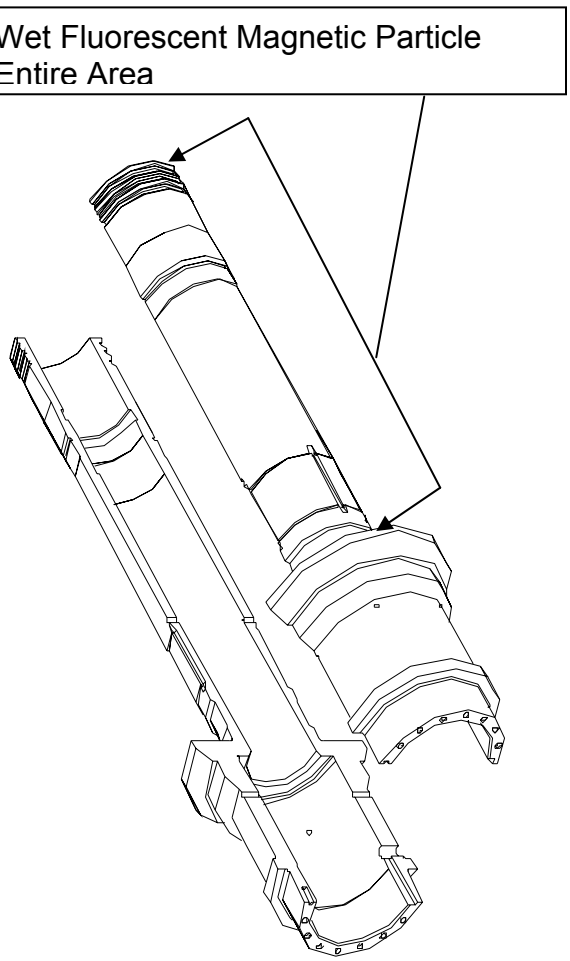


Fig. 1

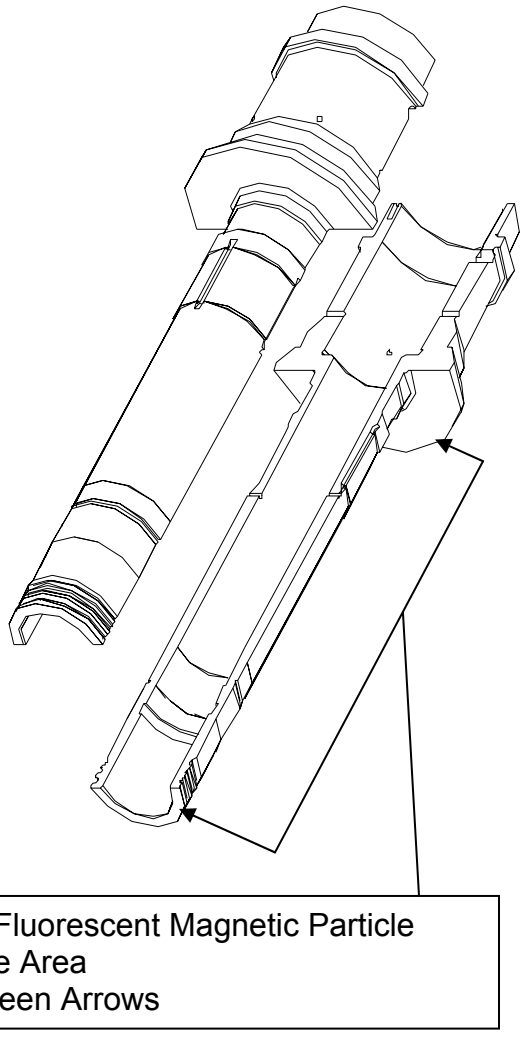


Fig. 2

Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP №:

Part Name: Split Ring

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

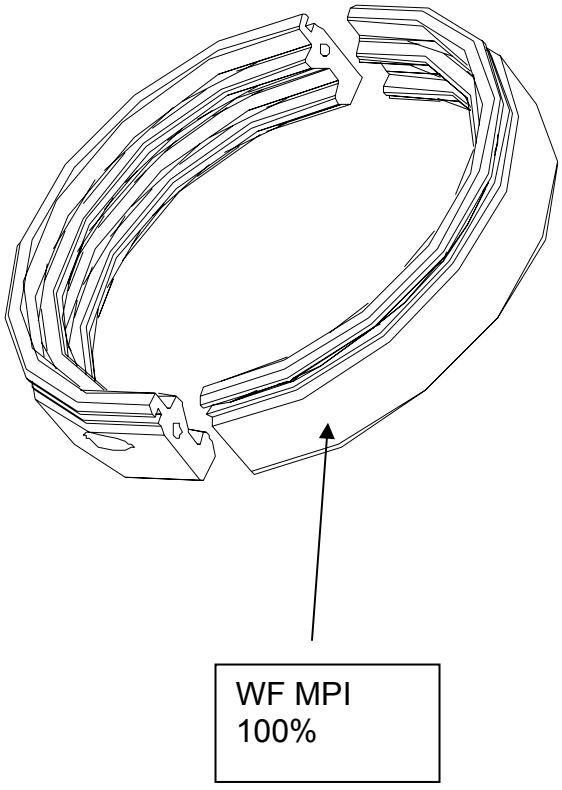


Fig. 1

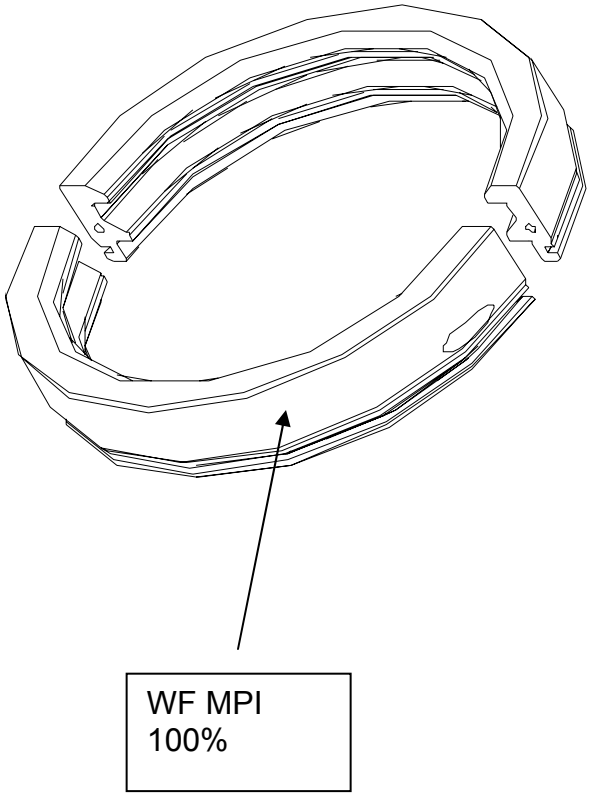


Fig. 2

Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP №:

Part Name: Quill

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

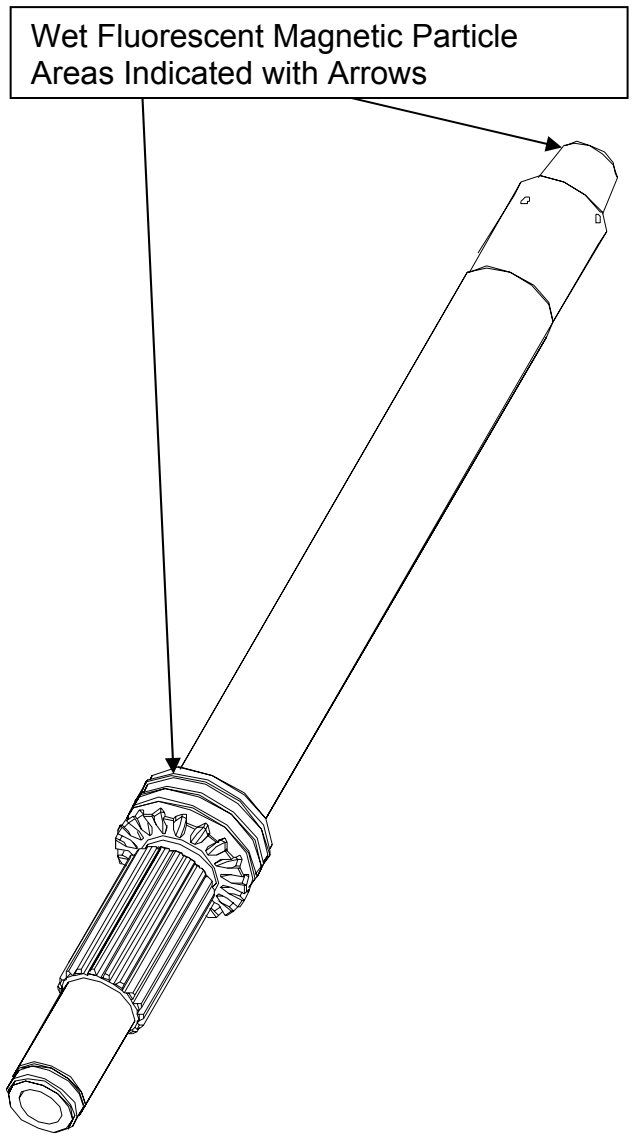


Fig. 1

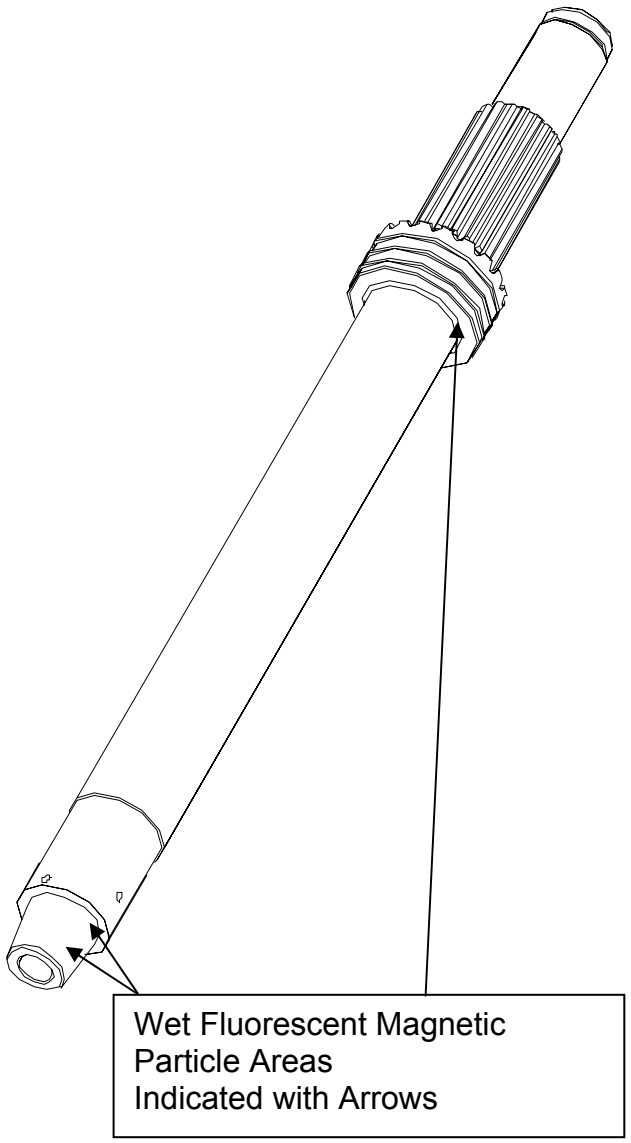


Fig. 2

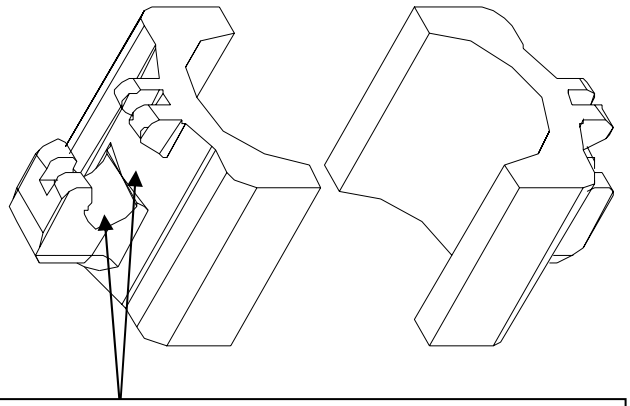
Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709.Acceptance criteria are as defined in API 8C. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP №:

Part Name: Upper Link Support

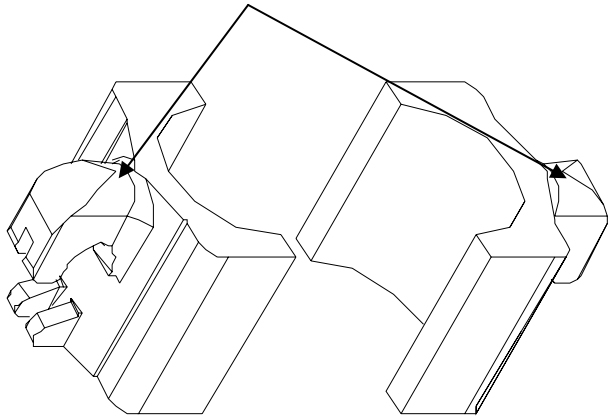
The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	



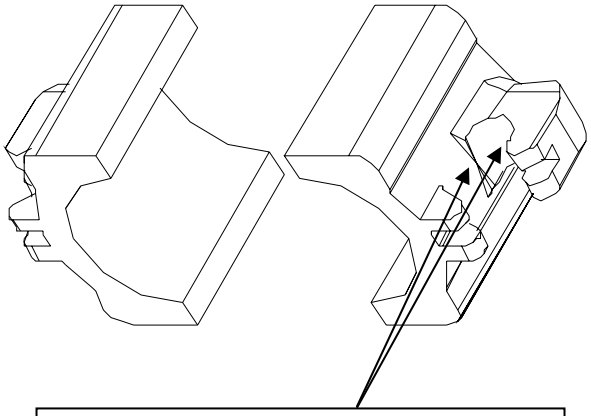
WF MPI 100% OF RADIUS ON BOTH EARS AND SURROUNDING AREA

Fig. 1



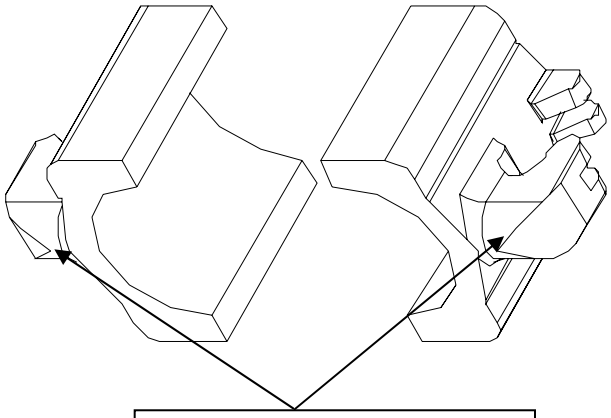
WF MPI AREAS SHOWN

Fig. 2



WF MPI 100% OF RADIUS ON BOTH EARS AND SURROUNDING AREA

Fig. 3



WF MPI AREAS SHOWN

Fig. 4

Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C PSL 2. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP №:

Part Name: Outer Sleeve

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

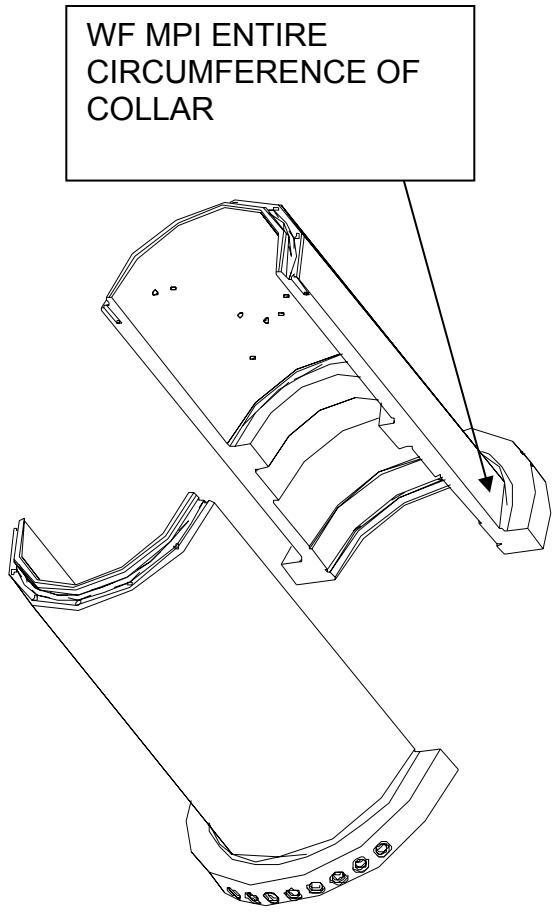


Fig. 1

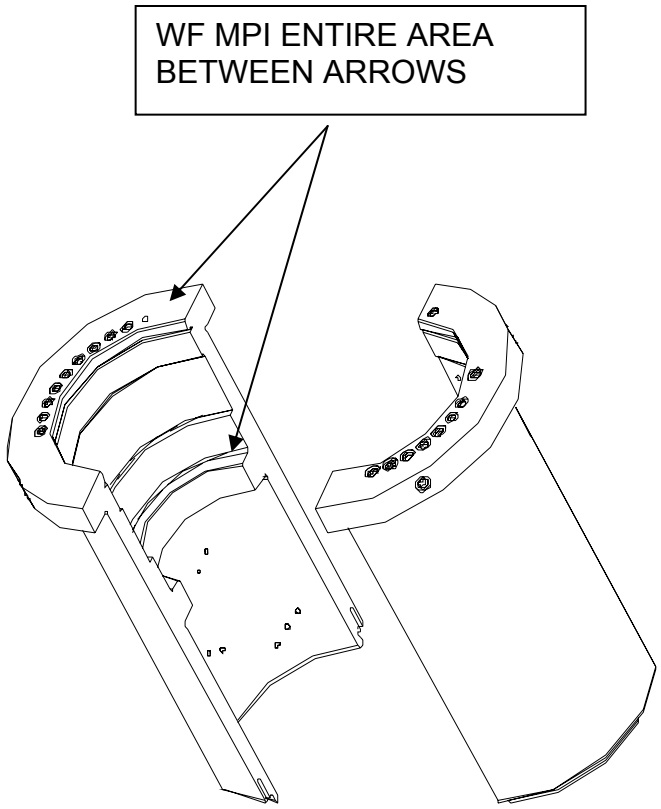


Fig. 2

Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP №:

Part Name: Upper Link Pin

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

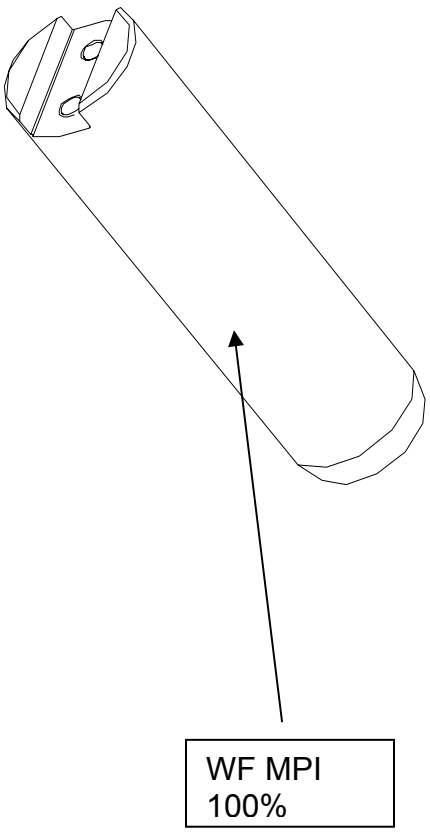


Fig.1

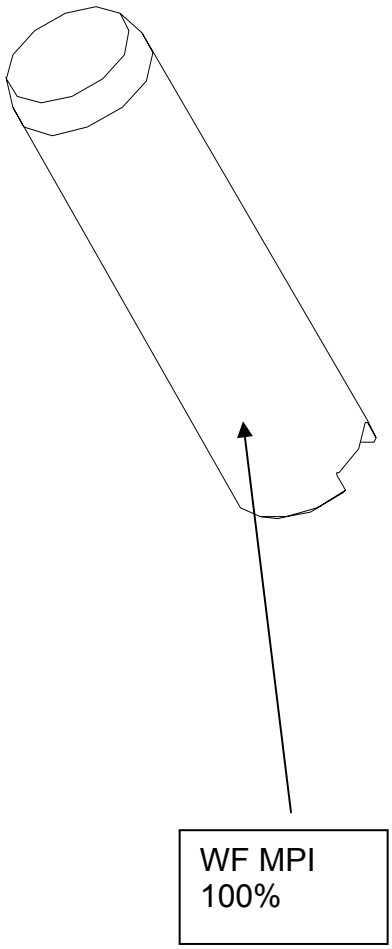


Fig.2

Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C.

INSPECTION INDICATION MAP №:

Part Name: Upper Link

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	

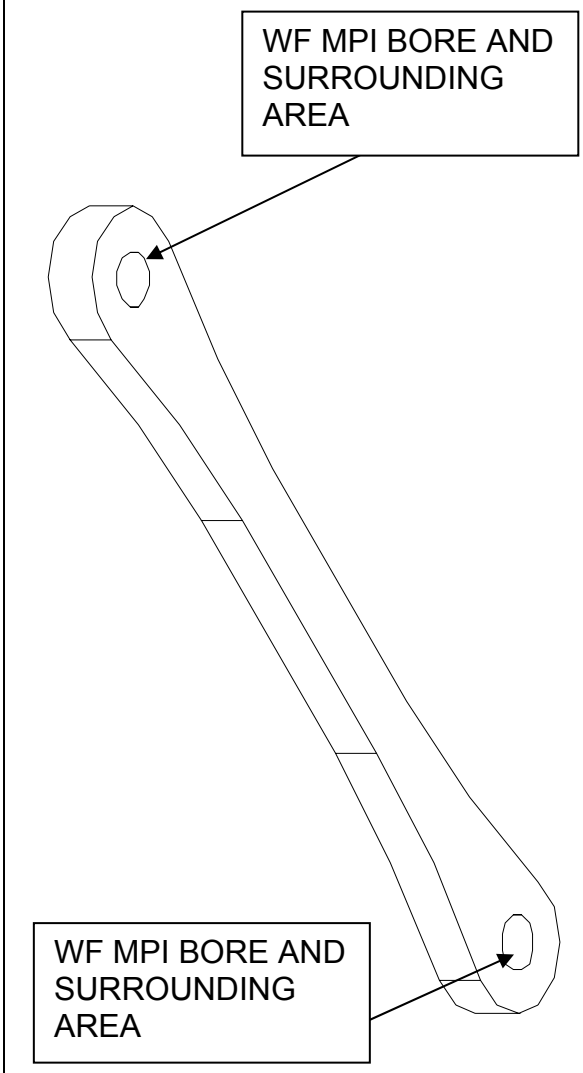


Fig. 1

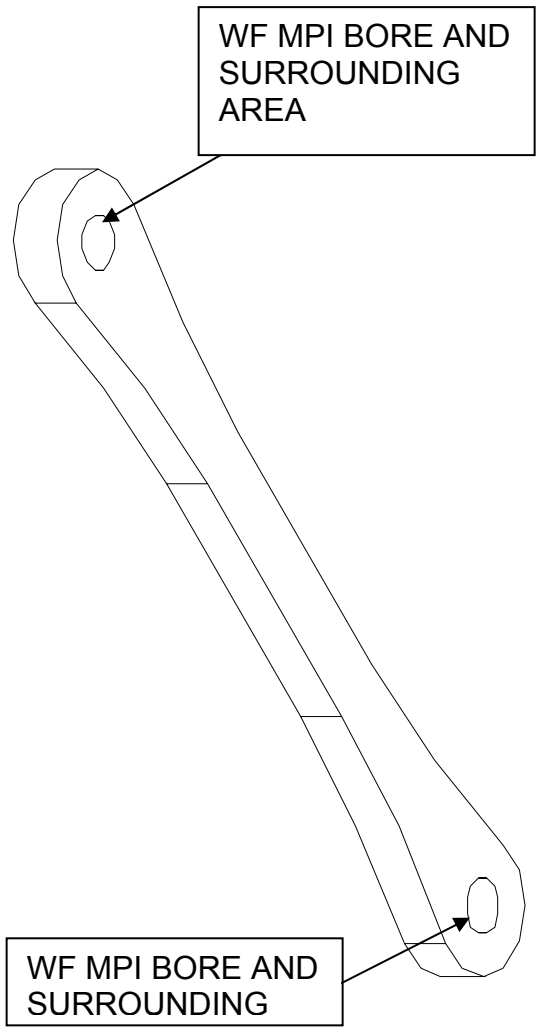


Fig. 2

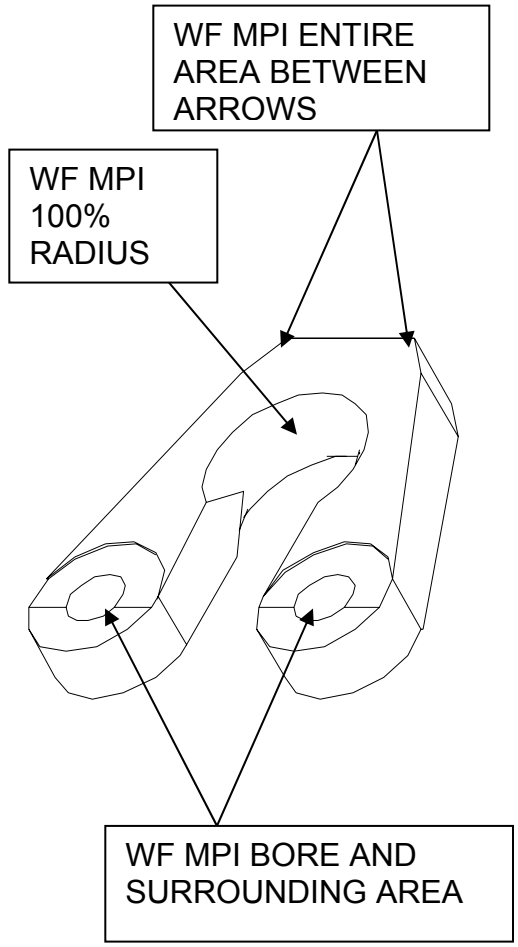
Procedure:
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C. All other areas not indicated shall be visually examined for damage and signs of fatigue.

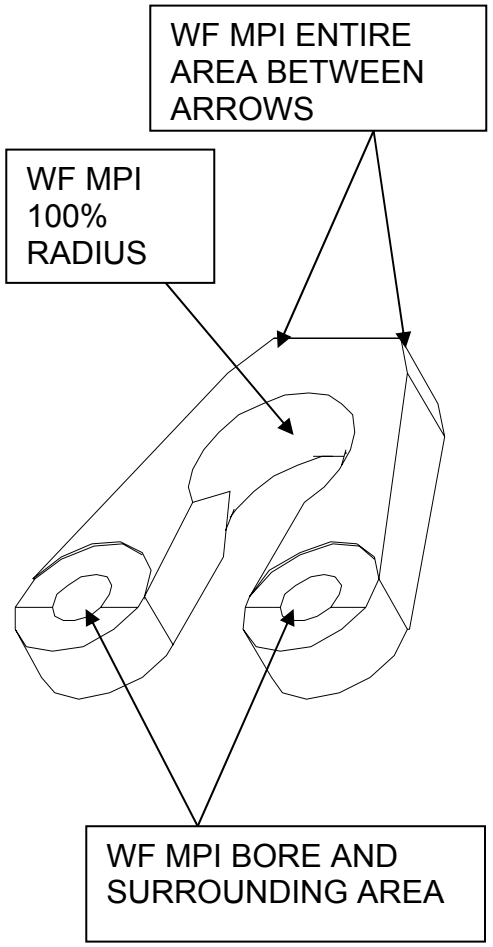
INSPECTION INDICATION MAP №:

Part Name: Bail

The following information should be supplied on the Inspection Report as a minimum:

Purchase Order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Load Path/ Serial #
Type of Inspection:	Rated Load:
Canrig Representative:	





Procedure:

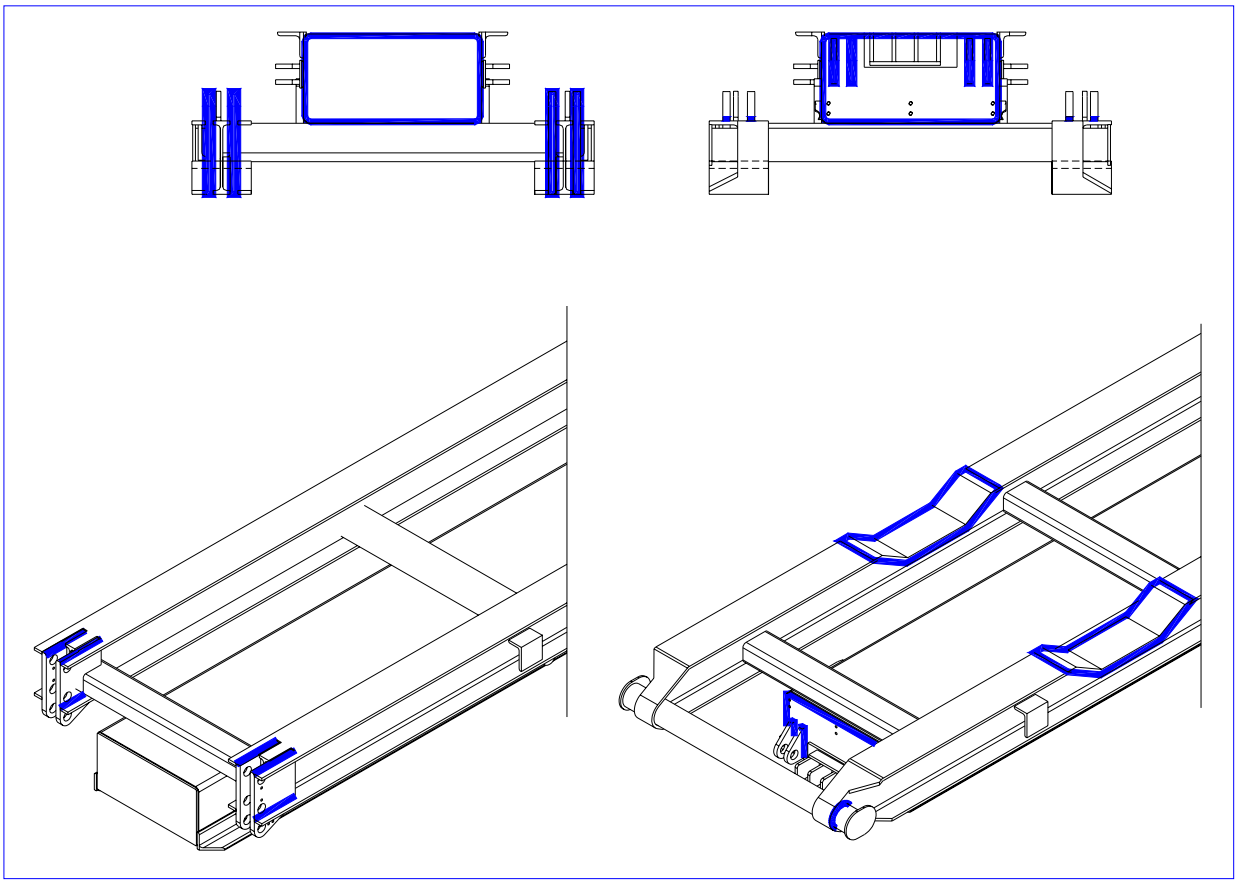
Perform Wet Fluorescent Magnetic Particle Inspection on areas shown in accordance with ASTM E709. Acceptance criteria are as defined in API 8C. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Skid/Section 1

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



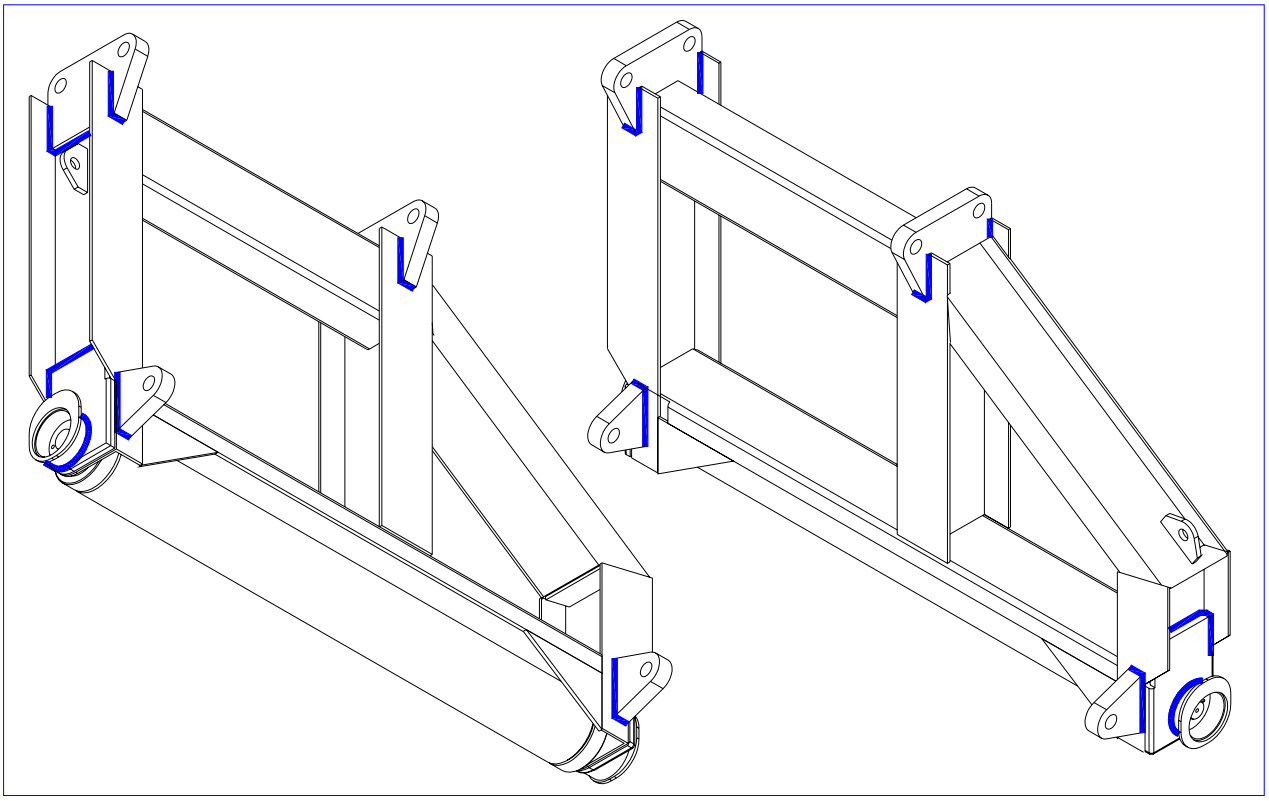
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Live Roll

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



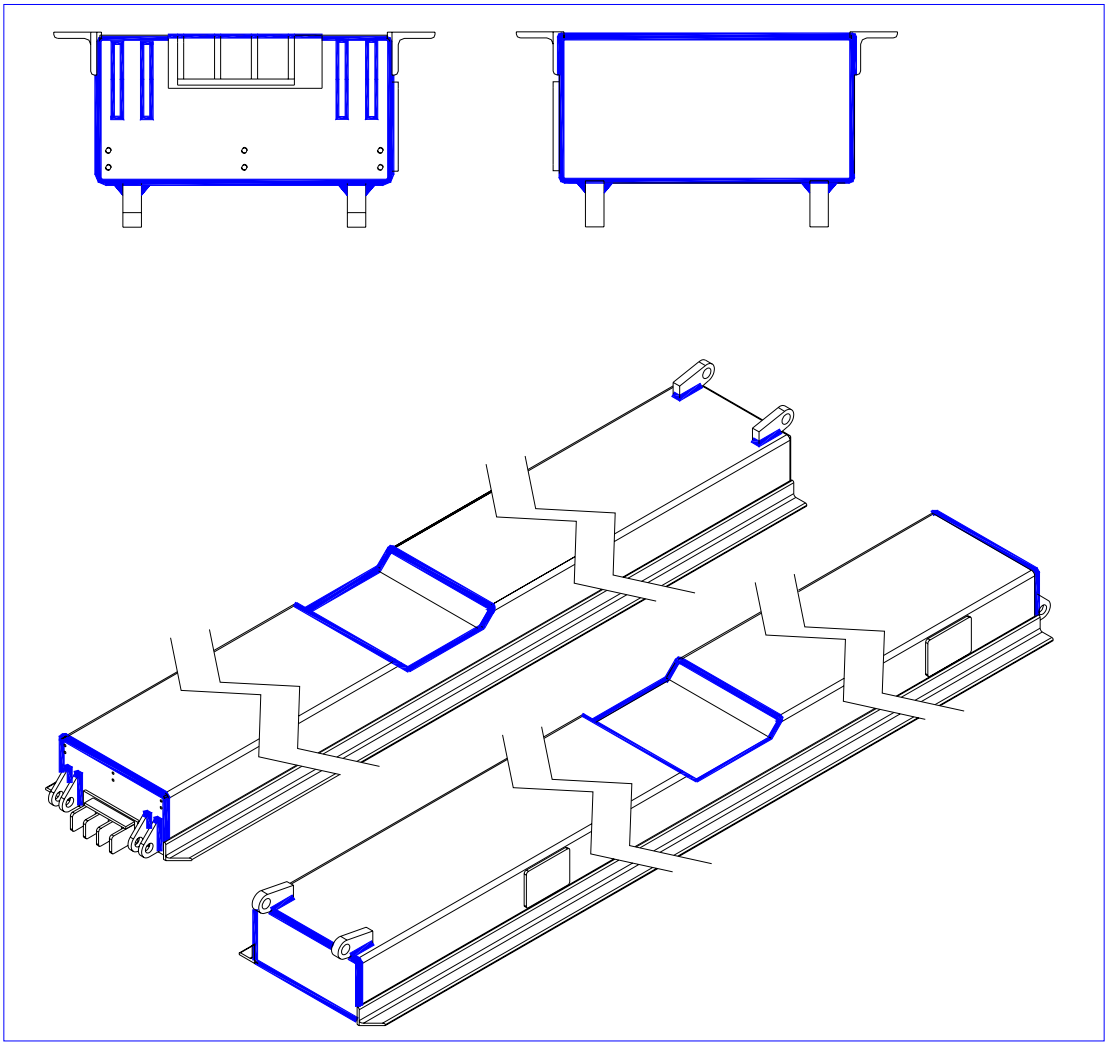
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Section 2

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



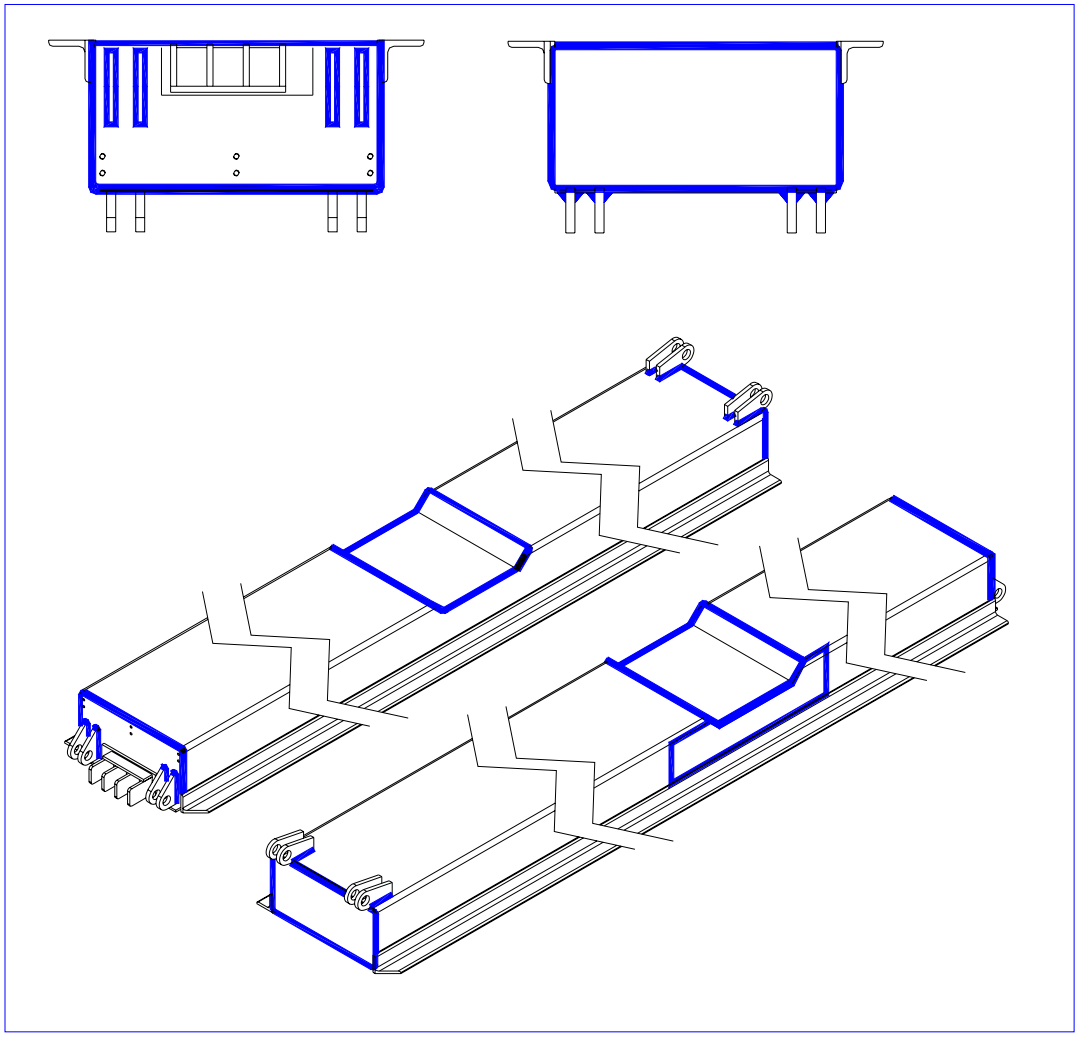
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Section 3

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



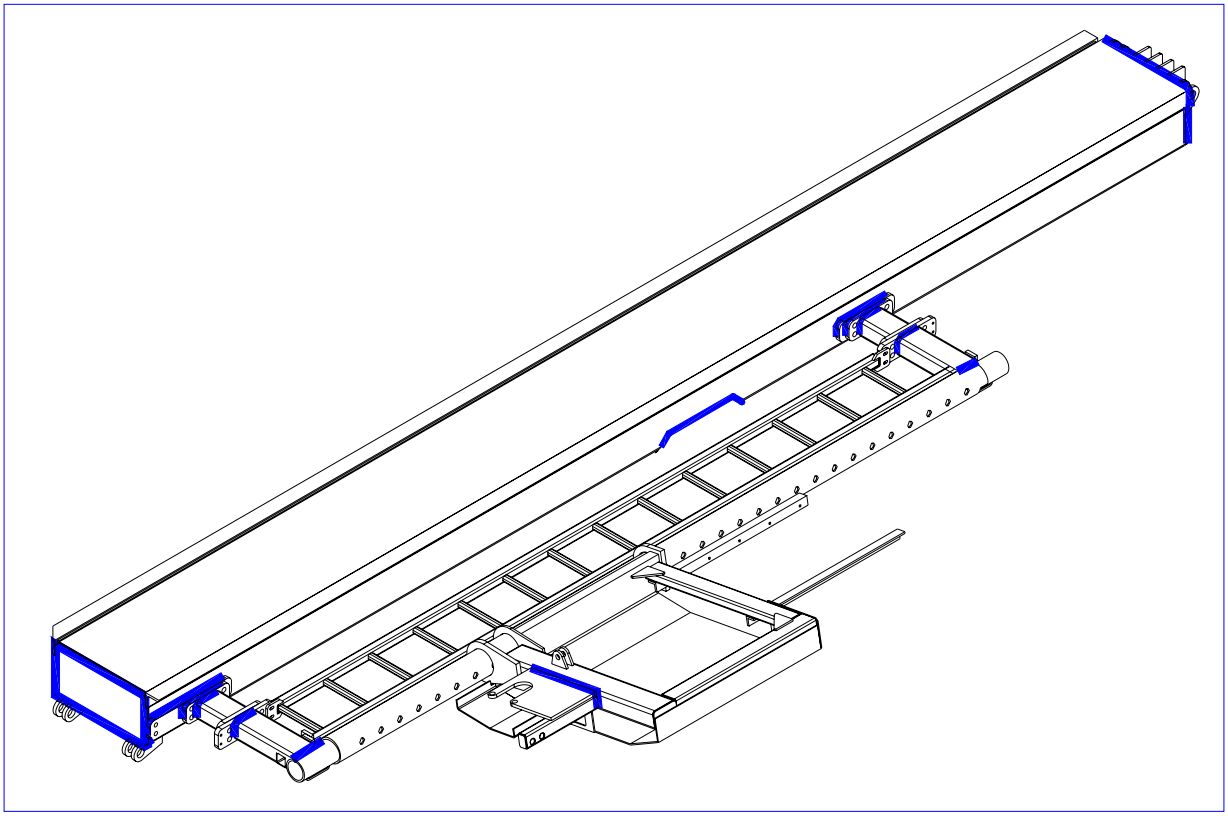
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Section 3/Service Support Frame

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



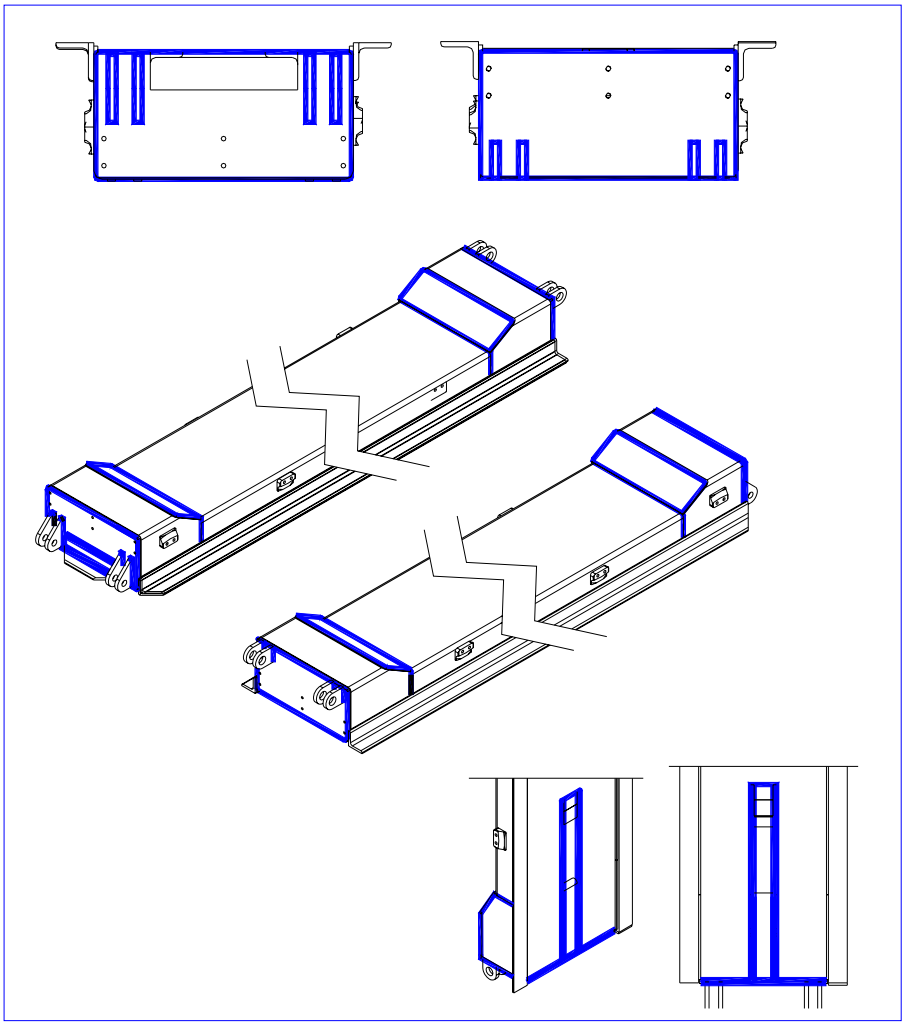
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Section 4

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



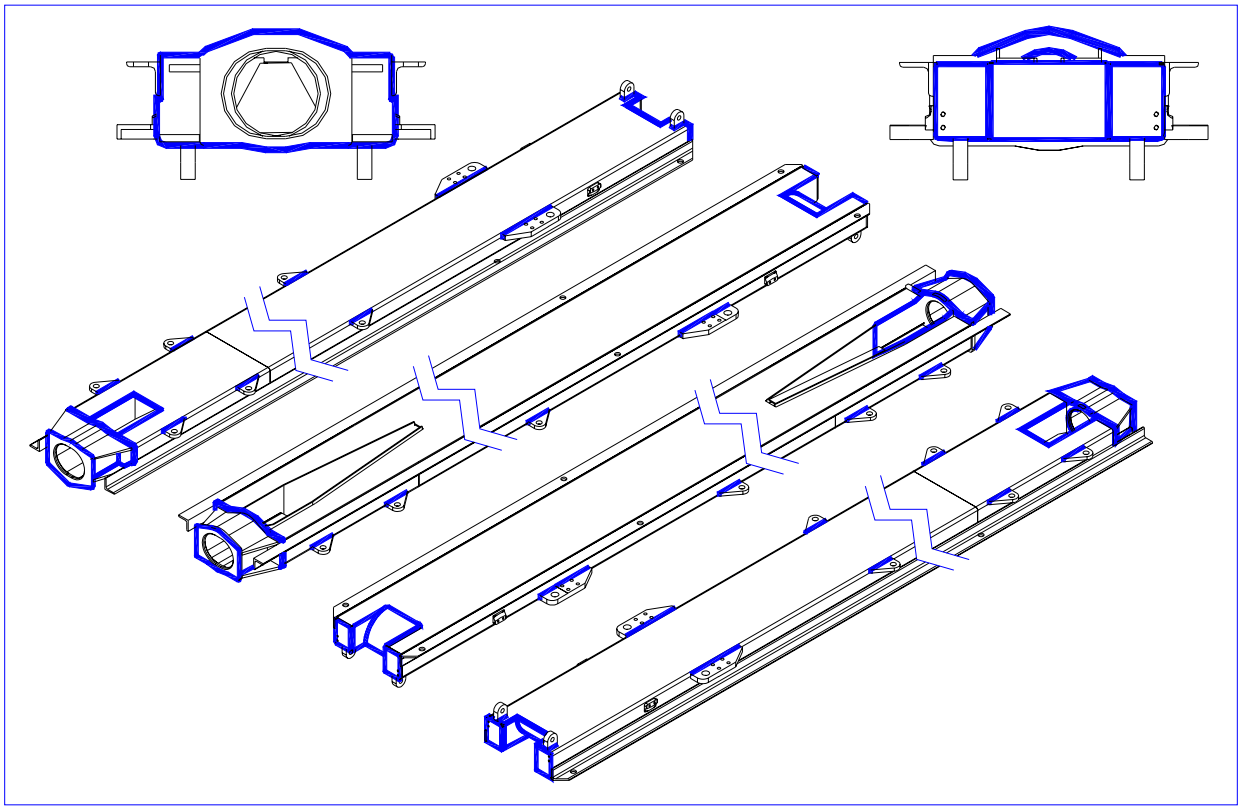
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Section 5

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



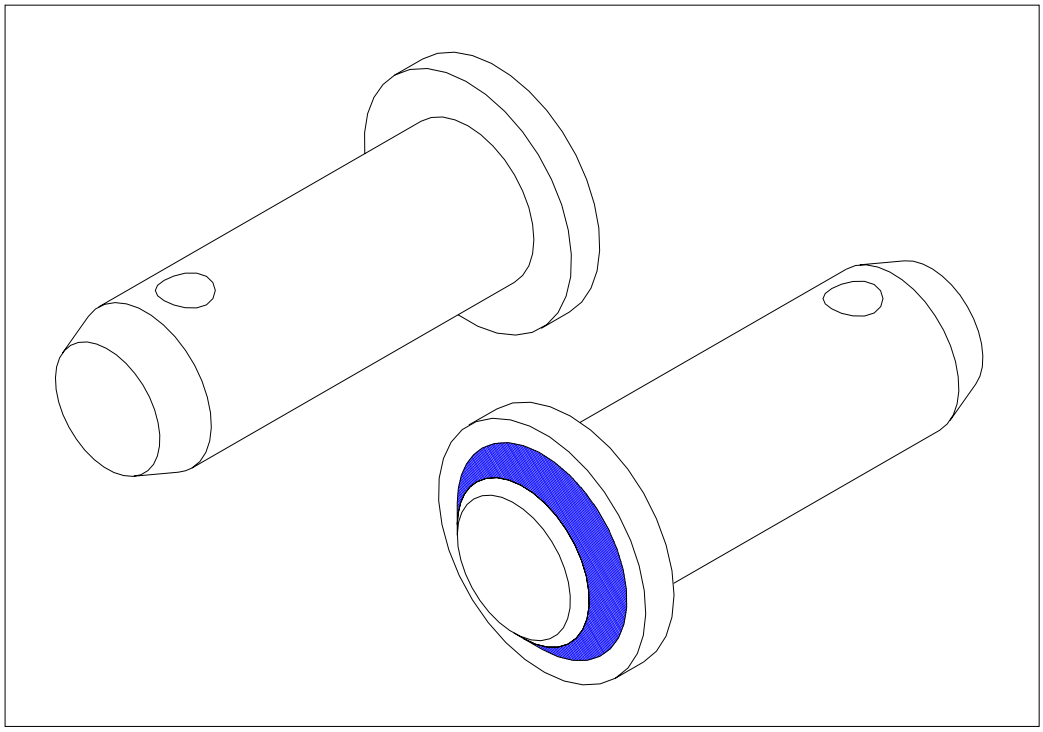
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Torque Guide Pin

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



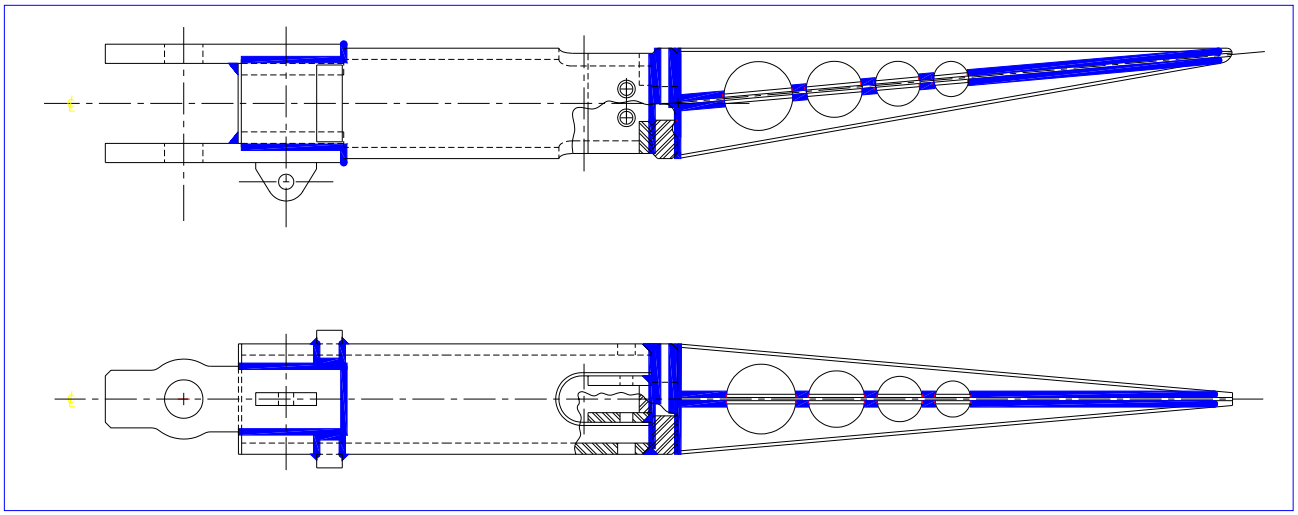
Procedure:
Perform Die Penetrant Inspection on the entire pin (including the weld) in accordance with ASTM E165. Acceptance criteria are as defined in ASTM E165.

INSPECTION INDICATION MAP No:

Part Name: Harpoon

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



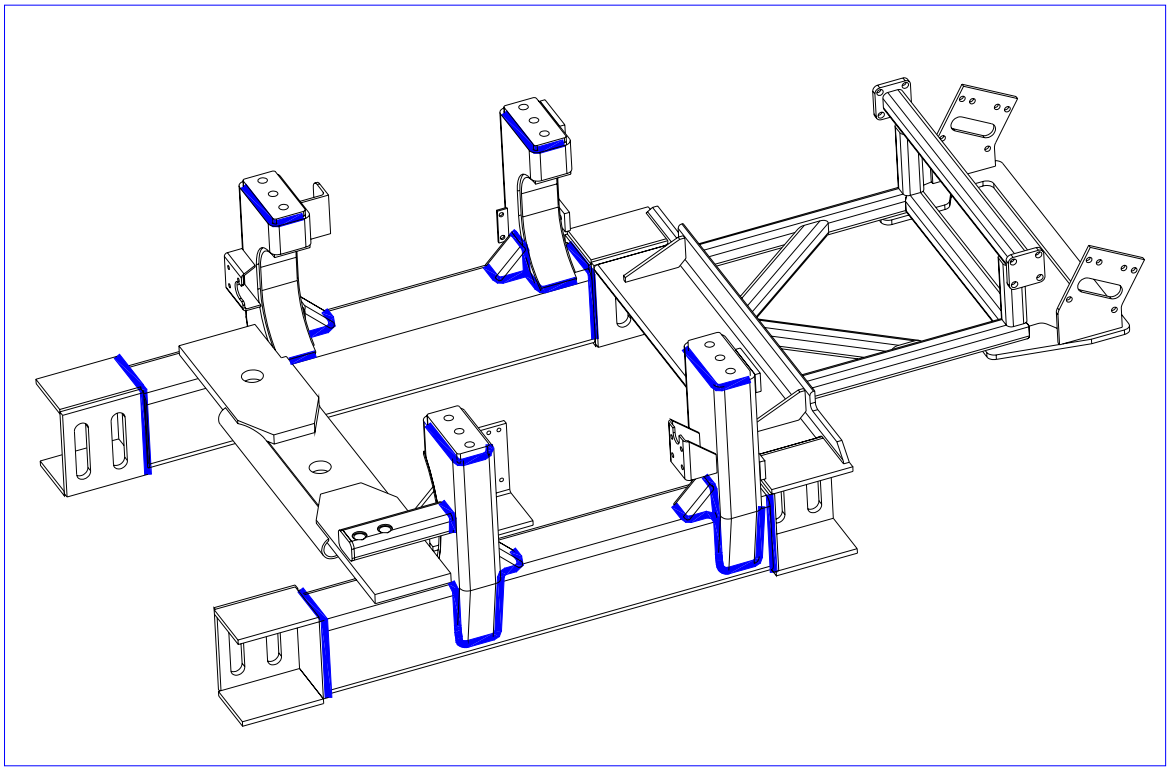
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Top Drive Frame

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



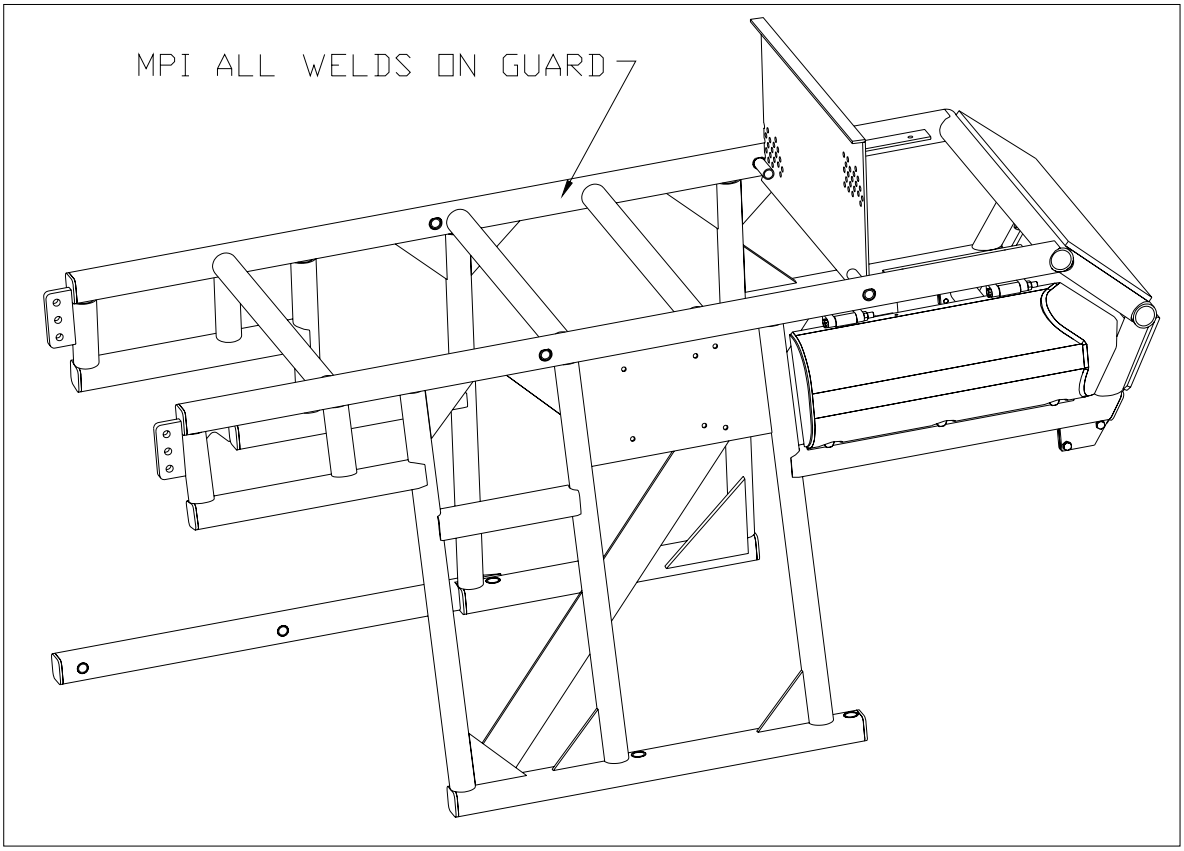
Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Top Drive Guard

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



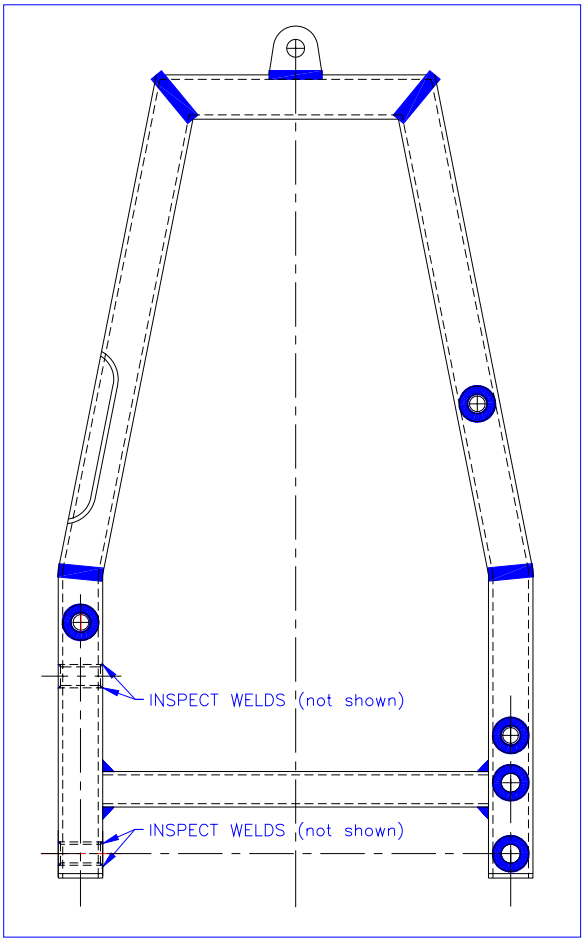
Procedure:
Perform Dry Magnetic Particle Inspection on all in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

INSPECTION INDICATION MAP No:

Part Name: Blower Frame

The following information should be supplied on the Inspection Report as a minimum:

Purchase order #	Date:
Inspection Report #	Canrig Part #
Inspector's Signature/Stamp:	Top Drive S/N:
Type of Inspection:	Canrig Representative:



Procedure:
Perform Dry Magnetic Particle Inspection on all welds shown in accordance with ASTM E709. Acceptance criteria are as defined in ASTM E709. All other areas not indicated shall be visually examined for damage and signs of fatigue.

Main Bearing End Play

Inspection Procedure

1. Remove the washpipe.
2. Place the base of the dial indicator on top of the upper seal carrier (or side of the bonnet) and the plunger on the top of the upper seal ring.
3. Load the end of the quill against the top and bottom of its free travel. (NOTE: Quill travel = 8 inches)
4. Read the end play on the dial. (Desired end play = 0.002/0.004 inches)
5. To adjust this end play, add or remove shims between the upper bearing seat and the main housing.
6. If the gear case oil becomes contaminated, the gear case should be flushed and the oil changed. The end play should be checked before resuming drilling activities. This may reveal indications of premature bearing wear.

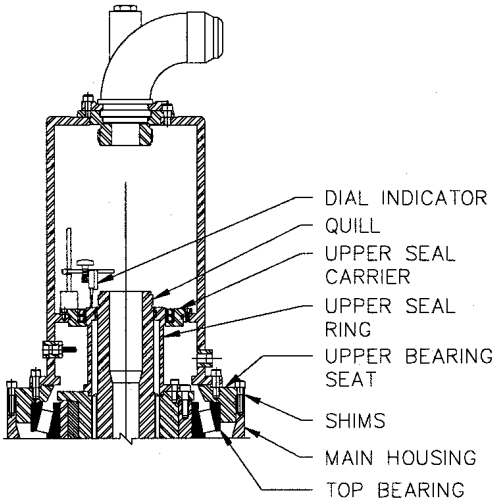


Figure 4.5

MODEL	SHIM PART #	INSPECTION FREQUENCY
6027E	966-26-1	2 – 3 months
8035E, 1035E	681-11-1	4 – 6 months
1050E, 1250AC	681-11-1	4 – 6 months
1165E, 1265AC	681-11-1	4 – 6 months
1275AC	681-11-1	4 – 6 months

Washpipe Inspection Instructions

Packing Assembly

Instructions:

1. Attach magnetic indicator base or improvised holding fixture to quill or packing box.
2. Rotate sleeve 360° and record total indicator reading (TIR) indicator positions A, B, C.

Recommended Tolerances:

A. Maximum allowable misalignment at gooseneck support bore = 0.008’ TIR
B. Maximum allowable misalignment at gooseneck pilot = 0.010” TIR
C. Maximum allowable washpipe misalignment after complete assembly = 0.010” TIR

Inspection may indicate misalignment exceeding recommended limits. Washpipe packing assemblies are designed to accommodate misalignments of quill to gooseneck and will operate with some excessive misalignment. However, to achieve maximum packing life, the alignment at the washpipe should be maintained within recommended limits.

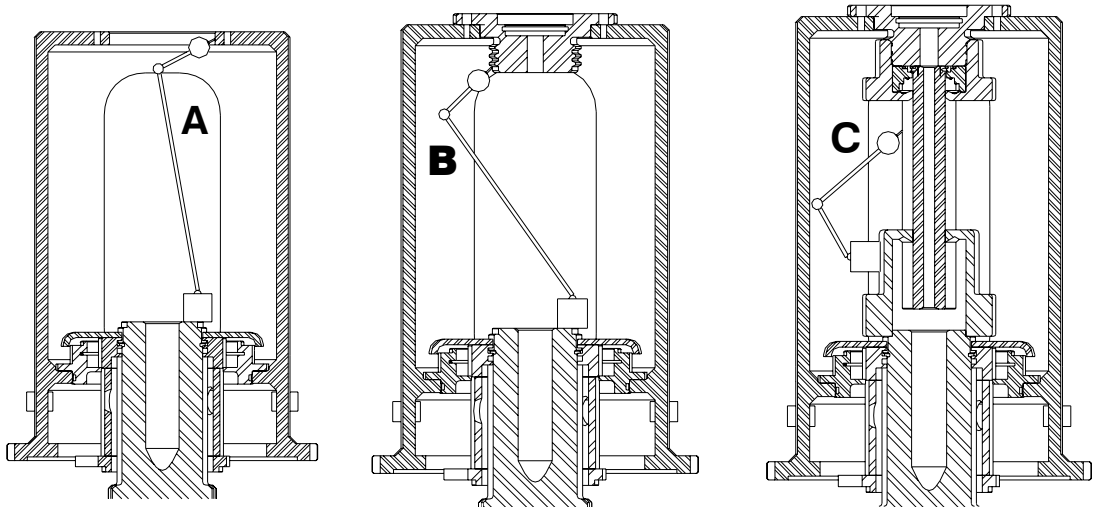


Figure 4.6

Top Drive Disc Brake Inspection

Check Brake Fluid

- Brake fluid reservoir should be visually checked on a daily basis.
- Sudden drop in oil level may indicate worn components. Be sure to only use mineral-based oil (i.e. hydraulic oil) in the brake system.

Check Brake Calipers

- Brake calipers should be checked weekly.
- A function test should be done at this time.
- There should be a minimum gap of 0.06" between the brake pads and the disc.
- In addition to premature wear, dragging brake pads can also cause excessive heat build-up in the brake compartment.
- If the brake pads are dragging, the system may require bleeding to eliminate any trapped air. See Brake Bleeding Procedure.

Manual Brake Bleeding

1. The brake actuator should be bled first, and then the brake calipers.
2. Clean area around reservoir covers (2 on GE 752 and GE B20 motors, 1 on 761 motors).
3. Remove covers.
4. Fill reservoirs to indicated FULL level. Use only mineral base oil (hydraulic oil) in the brake reservoirs. *Do not use brake fluid.* Replace reservoir cover(s) but leave loose.
5. Put the Top Drive selector switch in the AUX position and start the HPU.
6. Cycle the brakes several times by operating the Brake switch at the Top Drive Console.
7. With the brake on and the HPU running, loosen the bleed screw on the component until there is no sign of air mixed with the oil.
8. Close the bleed screw.
9. Cycle the brake off and on.
10. Repeat the process until there is no air visible in the system.
11. Top off reservoirs to indicated FULL level and replace covers tightly.

Auto Brake Bleeding

1. Clean area around reservoir covers (2 on GE 752 and GE B20 motors, 1 on 761 motors).
2. Remove covers.
3. Fill reservoirs to indicated FULL level. Use only mineral base oil (hydraulic oil) in the brake reservoirs. *Do not use brake fluid.*
4. Replace reservoir cover(s) but leave loose. If the cover is tightened the reservoir could be damaged during bleeding.
5. Open ball valve(s) (1 per reservoir) on reservoir return lines.
6. Put the Top Drive selector switch in the AUX position and start the HPU.
7. Cycle the brakes several times by operating the Brake switch at the Top Drive Console.
8. Close the ball valve(s) on the reservoir return line.
9. Top off reservoirs and replace covers tightly.

Ensure there is no air visible in the system.

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