



SAFETY ALERT

DATE: September 22, 2003

SUBJECT: Back-up Wrench – Outer Tube cylinder lug

SERIAL NUMBERS: 002 and up

DISCUSSION: An incident occurred where the weld joining the BUW positioning cylinder top lug to the BUW outer tube top mounting plate (see figure 1 and 2 of the attached inspection procedure) broke. This allowed the BUW inner tube to separate from the BUW outer tube. Upon investigation and in-depth failure analysis, it was concluded that the failure was caused by poor workmanship by a vendor.

RECOMMENDATION: *Inspect all BUW outer tubes for the condition of the welds holding the Lug in place.* Attached is a suggested Top Lug Weld Inspection procedure.

Should defects or indications be found, repairs may be performed in accordance with the attached repair procedure or contact CANRIG for further actions.

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

INFORMATION:

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Back-Up Wrench Top Lug Weld Inspection

This procedure covers the weld inspection of the Back-Up Wrench (BUW) Top Lug where the top end of the cylinder is mounted.

Inspection through the window

1. Disconnect the two hoses that are connected to the BUW cylinder through the driller side's small window in the outer tube as shown in figure 1 below. Due to the limited access, the use of Crow Foot Wrench to disconnect the hoses may be necessary.

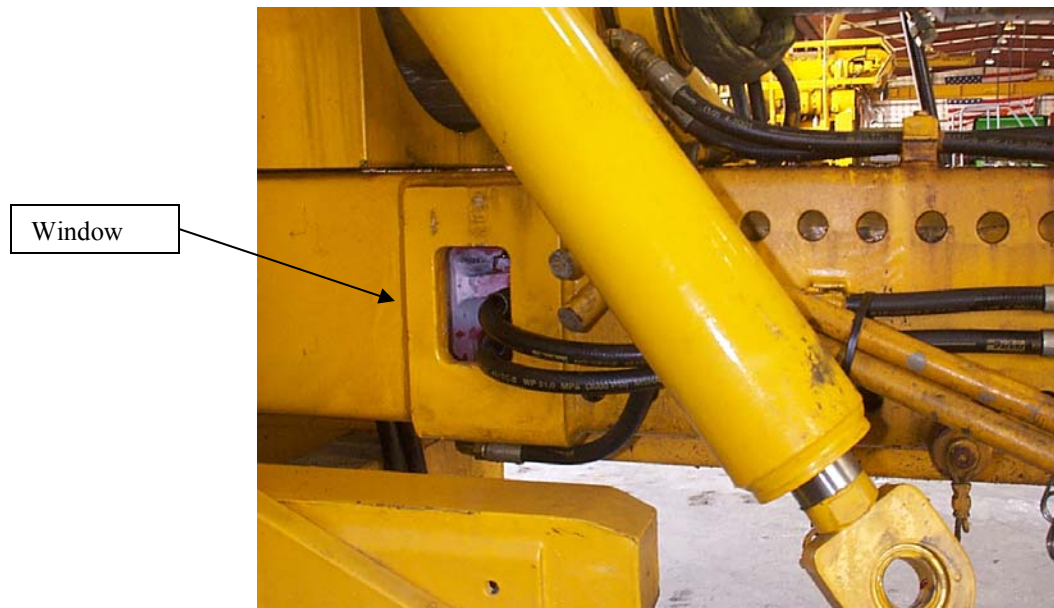


Figure 1

2. The paint on the weld around the lug must be removed by using either a 1) portable sand blaster, 2) buffing (flapper) wheel or any suitable means.
3. To ensure that all the paint has been removed, it is necessary to apply paint remover followed by brushing with a wire brush around the lug (three accessible sides, one short and two long sides of the lug, see figure 2).
4. To clean the weld thoroughly, use a cleaner/remover Ardrox 9PR50 or equivalent and let it dry.

A qualified person must perform the dye penetrant test as follows:

- a) Apply a coat of penetrant Ardrox P6R (visible water washable dye) or equivalent and let it sit for 10 minutes.
- b) Wash the dye with water until all the dye is removed.
- c) Dry the washed area using air or hand towels.
- d) Apply the developer Ardrox 9D1B or equivalent and let it sit for 10 minutes.
- e) The function of the developer is to draw the penetrant out of any imperfections in the weld where it becomes very visible. The use of flash light and a small mirror is necessary to look for the imperfections.



Figure 2

- f) The inspector will have to use his/her own expertise to determine whether or not any imperfections are acceptable.
 - g) If any cracks are found, the outer tube must be replaced. Contact your Canrig Field Service Coordinator for replacement.
5. If cracks are not found, clean the area around the lug and have it repainted.
 6. Assemble the hoses back to the BUW cylinder.

BUW Top Lug Mount Repair Procedure

This procedure covers the repair of the lug on the BUW top mount plate. There are two different designs as to the location of this lug. In the short BUW, the lug is welded directly to the cylinder top mount plate of the outer tube as shown in figure 1. In the long BUW, the lug is welded to the cylinder top mount plate inside the outer tube as shown in figure 5.

The success of this procedure will depend on the adherence to it and on the qualifications of the individual making the repairs. Therefore it is important that all necessary welding must be done by a welder certified to weld the applicable material to the joint design in accordance with AWS D1.1 or equivalent. This would involve things such as:

1. Make sure to adjust the amperage on the welding machine to give you the best penetration possible.
2. Remove the slag after each pass.

The repair procedure for the two different kinds of BUW is as follows:

1) Short Outer Tube Top Mount Lug Repair:

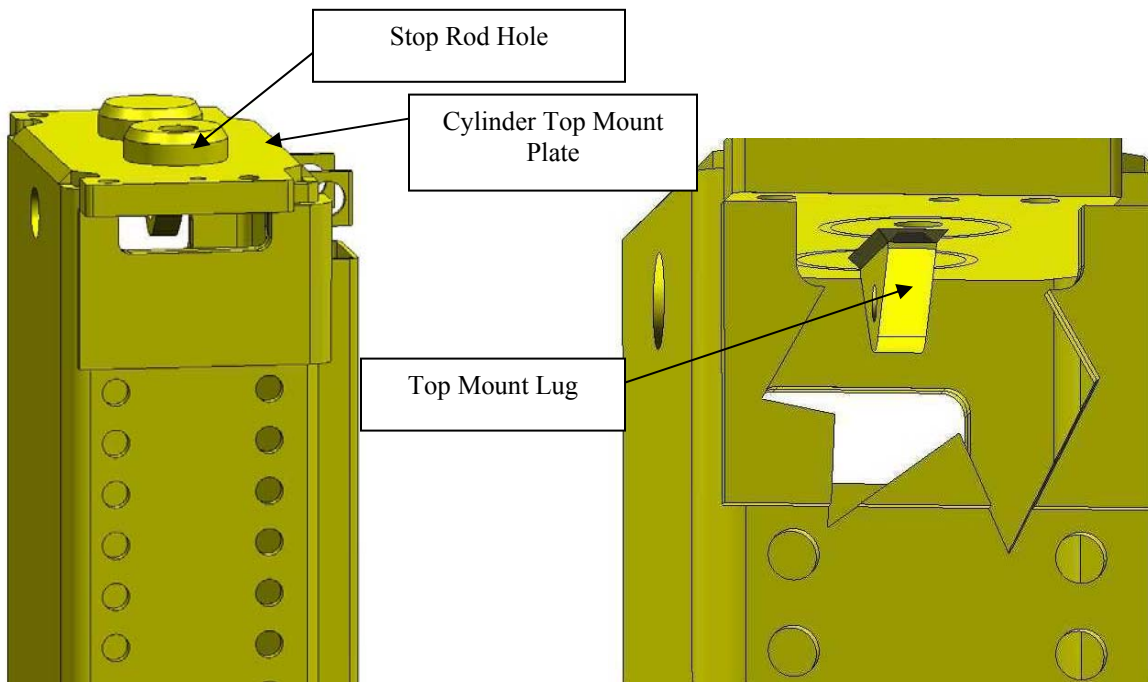


Figure 1: Short Outer Tube - Top Mount Lug

- a) Torch cut/Air arc the welds that are connecting the cylinder top mounting plate to the outer tube. Be extremely careful not to expose the outer tube to too much heat.
- b) Remove the cylinder top mount plate and grind/smoothen the torch-cut edges.
- c) Torch cut/Air arc the welds around the lug. Grind excess weld on the cylinder top mount plate.
- d) Torch-cut/grind a 1/4" bevel around the base of the lug as shown in figure 2 below.

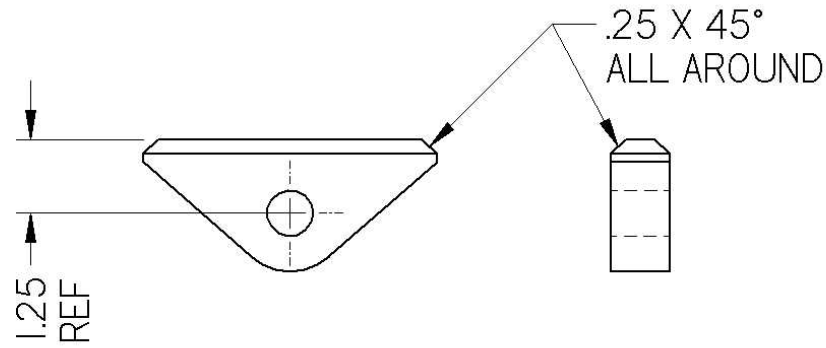


Figure 2: Top Mount Plate Lug

- e) After the cylinder top mount plate and the lug are prepped for welding, place the lug on the cylinder top mount plate as shown in figure 3 below and weld using Low Hydrogen E7018-3/32 or 1/8" welding rod. Note that the short lug side nearest to the hole should have the bevel weld only. Having a fillet weld on that short side may interfere with the nut once the stop rod is installed. Allow the cylinder top mount plate to cool slowly.

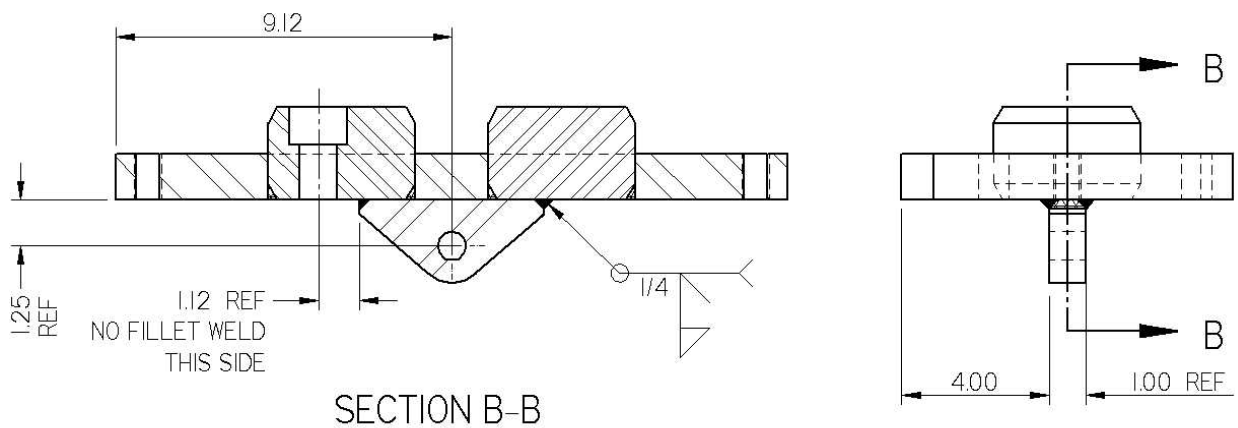


Figure 3: Welding of Lug to Cylinder Top Mount Plate

- f) Dry-MPI the weld around the lug to ensure that there are no cracks.
 g) Once the cylinder top mount plate is cool, place in the notch on top of the outer tube. Make sure that the orientation of the plate is in a manner where the stop rod hole is as shown in figure 1. Also, ensure that the plate is perpendicular to the sides of the outer tube, level if necessary.
 h) Weld a 3/8" fillet all around the top mount plate as shown in figure 4. Use Low Hydrogen E7018-3/32" or 1/8" welding rods. Allow the outer tube to cool slowly.

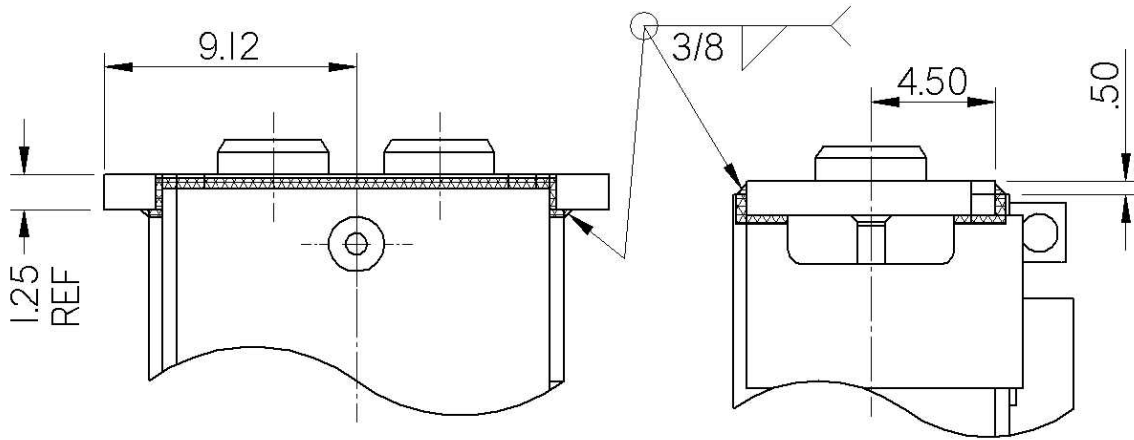


Figure 4: Welding of Top Mount Plate to Outer Tube

- i) Dry-MPI the weld around the cylinder top mount plate to ensure that there are no cracks. If cracks were found, grind the crack completely and re-weld as described above. Once again, Dry-MPI the weld to ensure that there are no more cracks.

2) Long Outer Tube Top Mount Lug Repair:

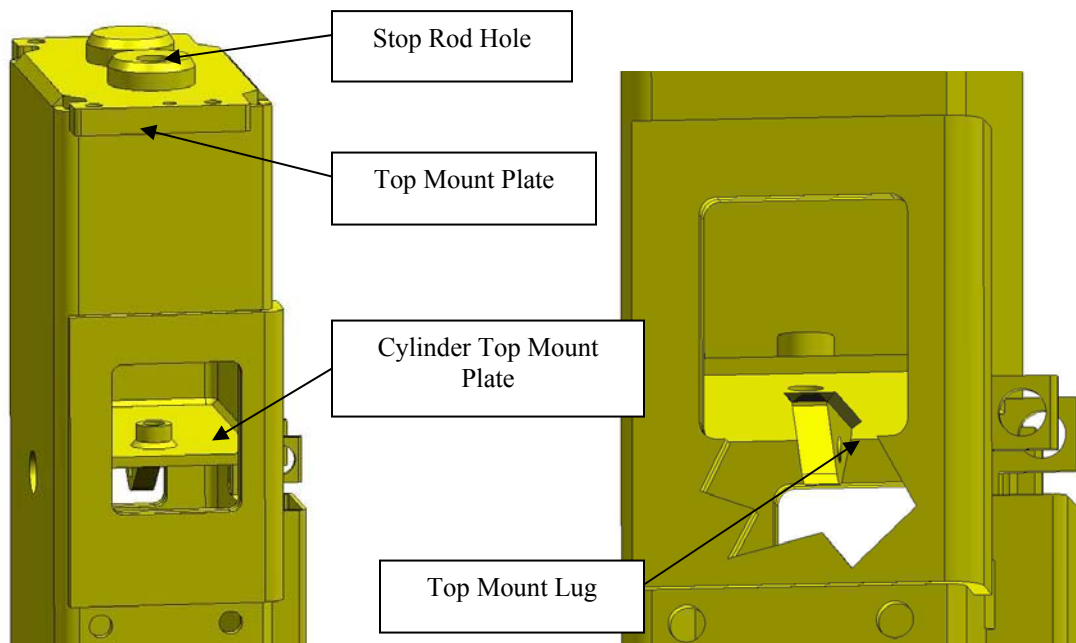


Figure 5: Long Outer Tube - Top Mount Lug

- a) Torch cut/Arc air the welds that are connecting the top mount plate to the outer tube. Be extremely careful to expose the outer tube to too much heat.
- b) Remove the top mount plate and grind/smoothen the Torch cut edges. Set this plate aside once it is prepped up. It will be re-welded back to the outer tube as shown in step j.
- c) Looking inside the outer tube, you will see the cylinder top mount plate as shown in figure 5. Torch cut/Arc air the weld around the cylinder top mount plate, and be extremely careful not to damage the outer tube or expose too much heat to it.
- d) Remove the cylinder top mount plate from the inside of the outer tube and examine it because it may have been damaged during torch cutting the weld. If the cylinder mount plate is damaged, a new plate

must be ordered from Canrig Drilling Technology before continuing with this repair procedure. The Canrig part number for this plate is 829-48-0.

- e) Once the new cylinder top mount plate is received, it should look like the plate shown in figure 6 below.

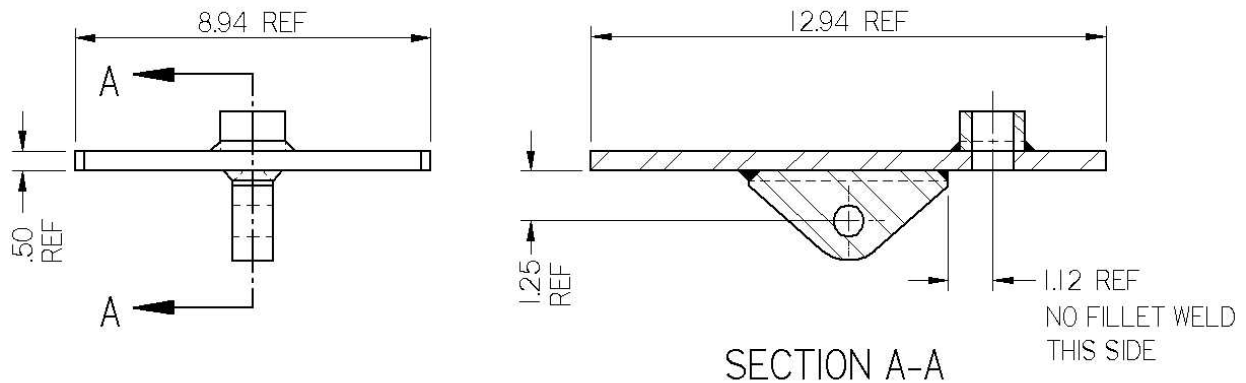


Figure 6: Cylinder Top Mount Plate – Canrig P/N 829-48-0

- f) Grind smooth the surfaces on the inside of the outer tube where the cylinder top mount plate was welded.
- g) Prior to inserting the new cylinder top mount plate P/N 829-48-0 into the outer tube, make sure that the plate is oriented with the lug towards the bottom and the stop rod hole is as shown in figure 5. Position the top of the cylinder top mount plate at 16.25 inches from the top of the outer tube as shown in figure 7. When positioning the plate, make sure it is positioned perpendicular to the outer tube.

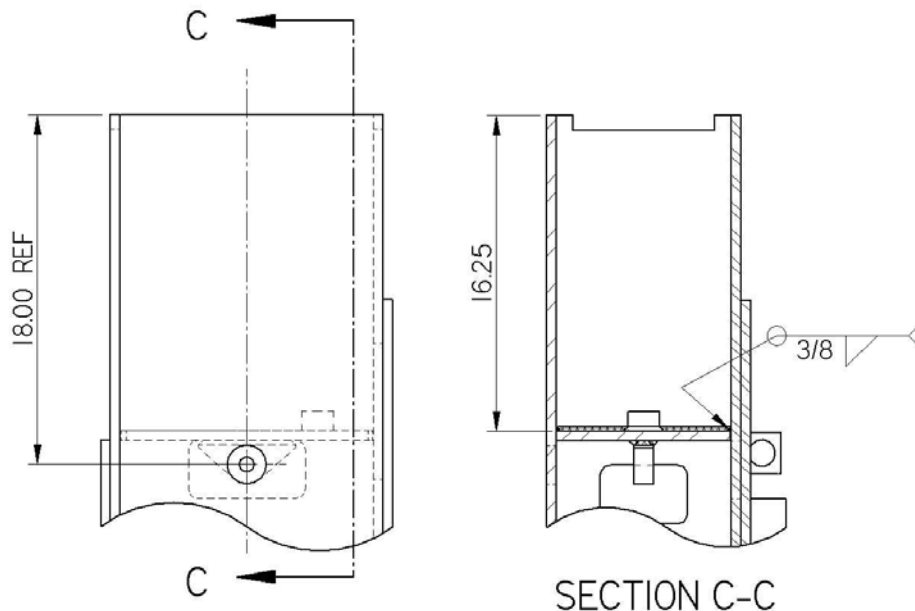


Figure 7: Welding of Cylinder Top Mount Plate

- h) Once the plate is positioned correctly, weld a 3/8" fillet weld all around the top of the cylinder top mount plate as shown in figure 8, using Low Hydrogen E7018 – 1/8" welding rods.
- i) Dry-MPI the weld around the cylinder top mount plate to ensure that the weld is free of cracks.

- j) Place the top mount plate that was ground smooth in step b in the notch on top of the outer tube. Ensure that the plate is perpendicular to the sides of the outer tube, level if necessary. Use E7018-1/8" welding rods to make a 3/8" fillet weld all around the top mount plate as shown in figure 8. Allow the outer tube and top mount plate assembly to cool slowly.

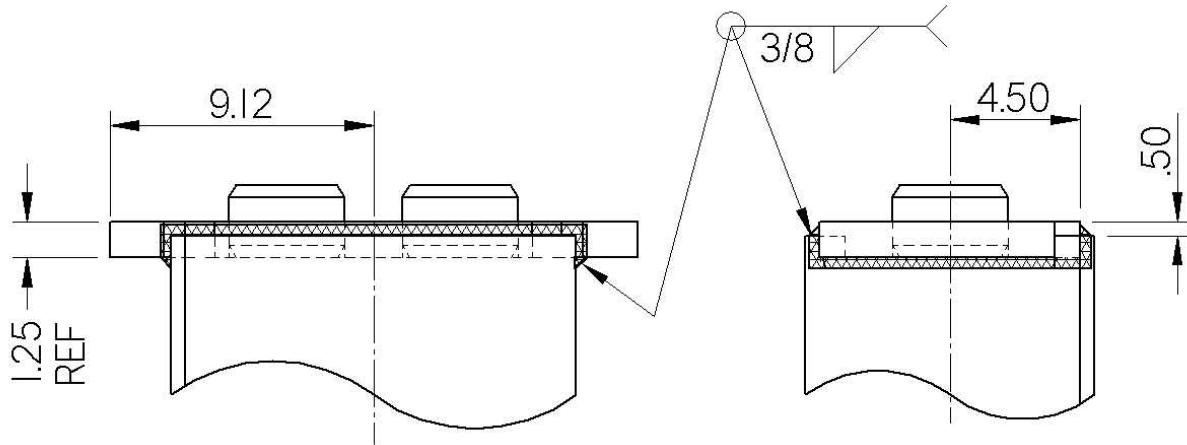


Figure 8: Welding of Top Mount Plate to Long Outer Tube

- k) Dry-MPI the weld around the top mount plate to ensure that the weld is free of cracks.

Notes:

- 1) 7018 is a Low Hydrogen welding rod with 70,000 PSI tensile strength.