COMPONENT CODE	2B

PARTS & SERVICE NEWS

REF NO.	AA01141A
DATE	April 25, 2002

This Parts & Service News supercedes the previous issuance, AA01141, dated August 31, 2001. AA01141 should be discarded.

SUBJECT:	INSPECTION AND REPAIR OF AXLE BOX
PURPOSE:	To inform the field of the Axle Box Structural Inspection and Repair Procedures.
APPLICATION:	Komatsu 930E Dump Trucks AFE48 & Up, A30019, A30026 & Up
FAILURE CODE:	2B10HB
DESCRIPTION:	Instructions for Inspecting and Repairing 930E Axle Box.

NOTE: Check the part number plate (3, Figure 1) located on the right side of the housing between the wheel motor and nose cone. The following information does not apply to axle boxes (EJ4400).

Some 930E electric dump trucks have experienced localized internal cracking in the rear axle housing. Rear axle housing cracks have been found near the Mount Ring, Internal Wrapper Plates and Gussets. The reason for this failure has been determined to be a lack of weld fusion between the wrapper plate and the wheel motor mounting ring. If the wrapper plate was short in length, then a gap was created at the wheel motor mounting ring. If the wrapper plate was too long, it was trimmed to fit, thus creating a smaller weld to the wheel motor mounting ring.

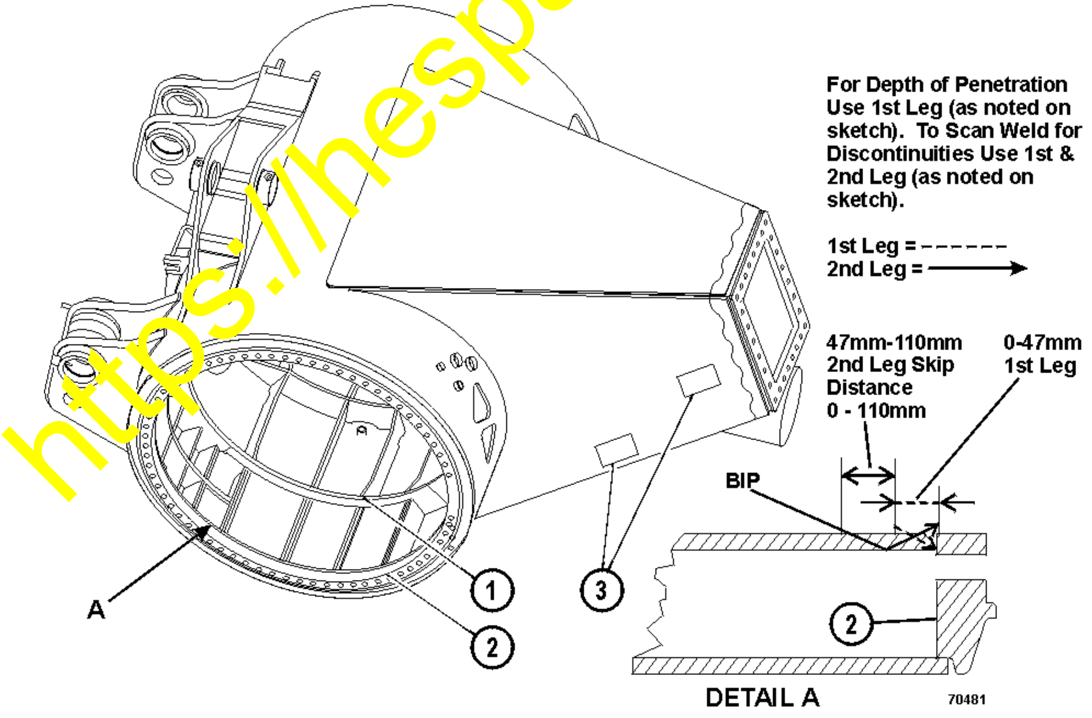


FIGURE 1. REAR AXLE HOUSING
1. Inner-Ring 2. Mount Ring 3. Part / Serial Number Plate
Detail A - Internal Wrapper Plate to Mount Ring Weld

The enclosed Borescope Procedure should be used to expose cracks inside the rear axle structure. Complete visual inspections and repairs of internal welds should be completed anytime that a wheel motor is removed. The first time that a wheel motor is removed, perform the enclosed Repair Procedure.

For trucks with under 8000 Service Meter Hours:

- Complete standard practice maintenance inspections and repairs of external cracks.
- Any wheel motor mounting ring to wrapper cracks are to be repaired using Wrapper Plate Kit (XK0011).

For trucks with over 8000 Service Meter Hours:

- Inspect internal welds every 250 hours using a Borescope. If cracks are found to have a total collective length of 16 inches, then complete the repair procedure provided using Wrapper Plate Kit (XK0011). After axle housing is repaired, discontinue Borescope inspection at 250 hour intervals.

Note: *Any time that a crack is found on the outside of the axle housing between the wheel motor mounting ring and the barrel, complete the repair procedure using Wrapper Plate Kit (XK0011).*

A new Wrapper Plate Kit (XK0011) has been developed in order to supply the materials needed to rework the rear axle housing. The contents of the kit are listed below:

Note: *Before starting repair, consult Komatsu in order to verify that the drawing and parts are current.*

Contents of Axle Housing Wrapper Plate Kit (XK0011)

Part Number	Description	Quantity
EJ6580	PLATE, WRAPPER	10
EJ6581	PLATE, WRAPPER	2
EJ6582	PLATE, WRAPPER	2
EG5038	PLATE, WRAPPER R.H.	1
EG5041	PLATE, WRAPPER L.H.	1
EJ7576	GUSSET	16
ED6921	PLATE	4
ED6922	GUSSET	4
EJ6583	BACKER	10
EJ6584	BACKER	4
EJ6585	BACKER	2
EJ4432	PLATE	4
EJ7577	PLATE L.H.	4
EH5265	BENT PLATE	4
EJ6599	PLATE, WRAPPER	2
EG5040	PLATE, WRAPPER R.H.	1
EG5042	PLATE, WRAPPER L.H.	1
EJ6500	BACKER	24
EJ3747	BACKER	8
EJ6586-4	AXLE HOUSING REWORK DRAWING	1

INSPECTION PROCEDURE:
Borescope Procedure

The Borescope Procedure is an internal visual inspection procedure that will allow the weld quality on the inside of axle structures to be examined. The detailed inspection process can be performed when the wheel motors are installed on the axle box structure. Any indications of cracks should be documented.

Note: The rear axle housing is a confined area. Ensure that all required confined space requirements are followed. It is best to have two people perform this inspection process. For scheduling purposes, be advised that the Borescope Inspection Procedure takes approximately three hours to complete.

1. EQUIPMENT:
   a. 30" reach Borescope with light.
   b. Telescopic mirror.
   c. Seal beam flashlight.
   d. 24 inch length of 1/2 inch diameter PVC pipe.
2. PREPARATION:
   a. Park the truck on a level surface. Apply the parking brake.
   b. Turn the ignition key to the "OFF" position in order to shut down the engine. Record the truck serial number, and the service meter hours.
   c. Ensure that the steering circuit has been completely bled down.
   d. Block the tires with approved wheel chocks.
   e. Mark the truck with a "Lock-Out" tag.
   f. Remove the rear bumper.
   g. Remove the rear hatch cover in order to cool the housing. The time needed to effectively cool the axle housing will be determined by the ambient temperature.
   h. Remove the hatch cover reinforcing can.
   i. Remove the rear ducting frame and the cover plates (upper and lower).
   j. Clean the axle housing. A putty knife or a wire brush taped to the end of a 1 inch diameter pipe can be used to loosen dirt, sludge and other debris. Slide either tool between the inner wrapper and the wheel motor. Once the dirt has been loosened, a shop vacuum can be used to remove the debris.
3. INSPECTION:
   a. Thread the Borescope fibre optic cable through the PVC pipe.
   b. When inspecting the Mount Ring weld to the internal wrapper, focus the Borescope on the weld at the rear. Carefully roll the PVC on the bottom wrapper plate while holding the fibre optic cable in place. If an area in question needs to be investigated more thoroughly, add additional light or use the telescopic mirror.
   c. Repeat steps 3a and 3b on the opposite side.
   d. If cracks are found to have a total collective length exceeding 16 inches (406.4 mm) then the truck should be taken out of service and repaired.
   e. If all welds are found to be within the acceptance range, then install all ducting and hatch cover components.
   f. Remove the wheel chocks and "Lock-Out" tag. Return truck to service.

HOUSING REPAIR PROCEDURE:

The Housing Repair Procedure is an itemized repair procedure for the repair and the installation of new internal wrapper plates. All field repair must be done in accordance with Parts and Service News "FIELD WELDING FOR ASSEMBLY OR REPAIR" (AA00046B). Additional specific welding information and detailed instructions can be obtained through your local Komatsu dealer or area service manager.

1. Remove the wheel motors from the axle housing structure. Refer to Section "G", Drive Axle, Spindle & Wheels, of the 930E Shop Manual for proper removal procedures.

Note: Clean the rear axle housing as needed. Weld joints are to be clean, free of oil, rust, and foreign material.

Note: All multiple pass welds must be staggered. All welds must have full craters.

Note: Weld with 052 weld wire (ER70S6), Argon with 15% CO_2 at 28.0 - 30.5 Volts and 280 - 420 Wire Feed Speed (WFS).

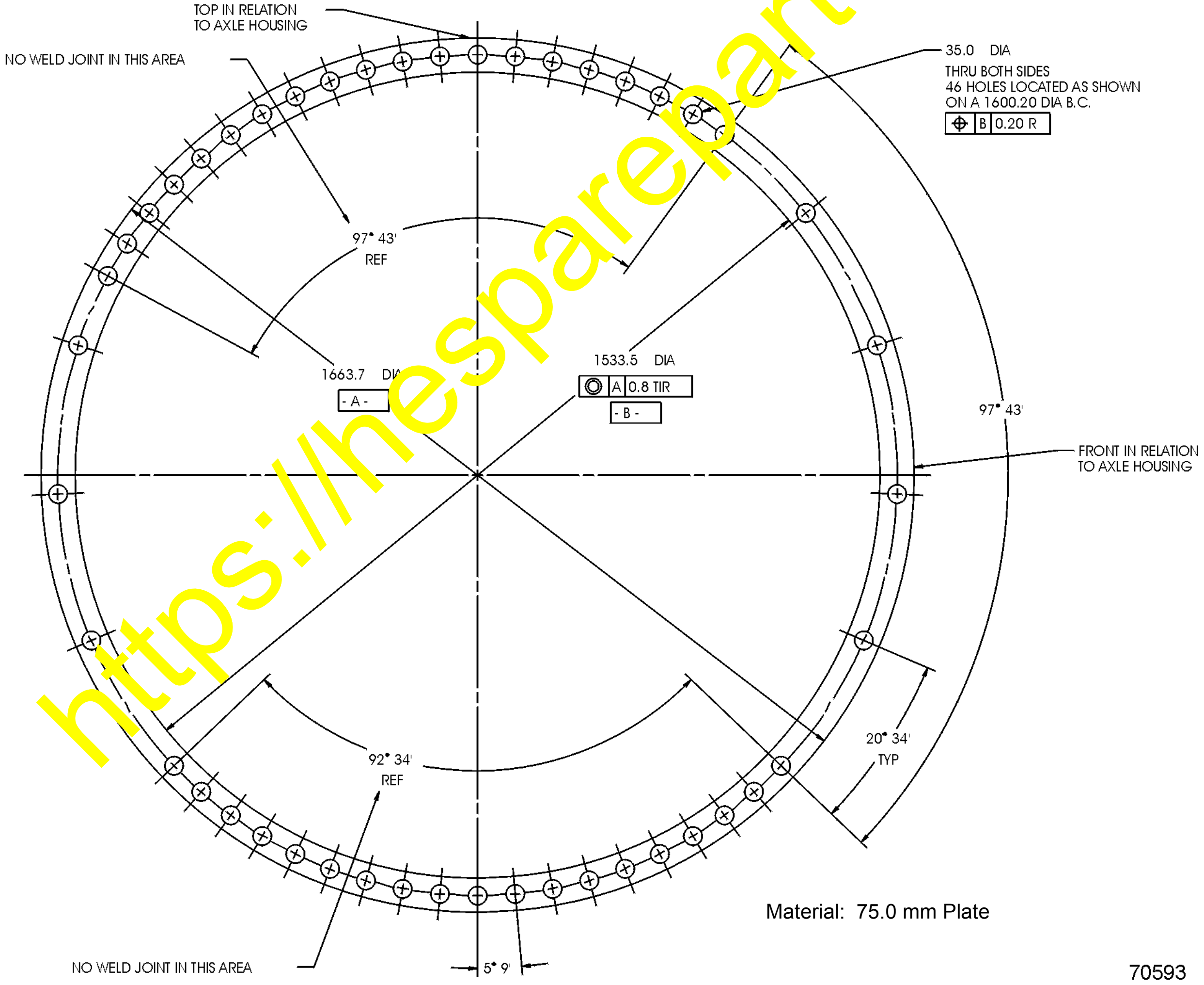


FIGURE 2. DRILLED RING (EJ4433)

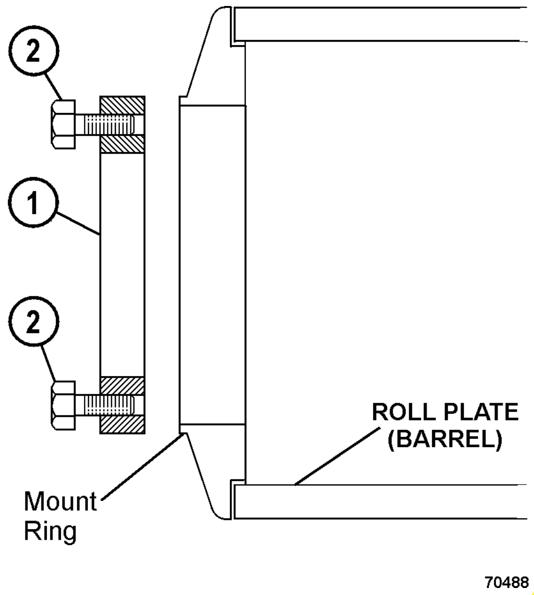


FIGURE 3. SETTING DRILLED RING
1. Drilled Ring (EJ4433) 2. Bolt (VJ3275)

2. Using a lifting device, set a drilled ring to the Mount Ring. Use at least 17 bolts to hold the drilled ring to the housing. The drilled ring retains the flatness of the Mount Ring during the repair process.

3. With a torch or air arc, cut out wrapper plates. Use the torch to trim the welds.

4. With a small grinder (4 inch wheel), grind the gussets on both sides. Restore the Mount Ring and the Inner-Ring back to their original condition.

5. The gussets may interfere with the wheel motor mounting holes. Refer to drawing (EJ6586-4) for instructions. Remove interfering gussets, grind the area, and replace with a new gusset. If one gusset requires moving others may need to be moved in order to maintain correct spacing for the internal wrapper plates.

6. Clean the internal welds with a wire brush. The internal welds are found where the Roll Plate (Barrel) and the Mount Ring join. Internal welds are also found on both sides of the gussets where the Mount Ring is attached.

7. Check all internal welds (under wrapper plates) with Magnetic Particle or Dye Penetrant. If any defects are found, then follow the guidelines that are outlined in Parts and Service News "FIELD WELDING FOR ASSEMBLY OR REPAIR" (AA00046B).

8. Form backer bar to the wrapper plate contour on inner ring end of wrapper plate. Install backer bar between the gussets, trim and grind if necessary.

9. Install wrapper plates. Trim the sides and the back of the plate. The back of the plate will be installed against the Inner-Ring. Torch cut and grind as necessary in order to maintain a 45° bevel.

10. Repeat steps 8 and 9 for plates. Fit each wrapper plate to its proper location.

11. Measure and mark 0.63 inch (16 mm) down from the top of the gussets. Set and tack weld the backer bars to the Inner-Ring below the mark.

12. Add lift bar and tie bars to set the wrapper plates. Ensure that the wrapper plate sets firmly against the Mount Ring without a gap. Tack weld all 4 wrapper plates.

13. Weld all 4 sides of each wrapper plate.

⚠ IMPORTANT ⚠

While welding, do not start and stop in the corners. Out of position weld as required on wrapper plates. Do not downhand weld.

14. Add end wrapper plate to the gusset and barrel plate. Trim and grind for fit up as required, tack weld and weld out.

15. Repeat steps 1-14 on the other side of the axle housing.

16. After the weld is complete, inspect welds with Ultrasonic testing equipment. Inspect the welds of the wrapper plates to the Mount Ring per Komatsu Mining Systems Metallurgical Procedure (MET-020).

17. Ensure that the diameter of the Mount Ring is within the specified tolerance of 65.75 ± 0.005 inches (1670.30 ± 0.13 mm).

18. If axle housing welds meet the acceptance criteria, then install the wheel motors. Refer to Section "G", Drive Axle, Spindle & Wheels, of the 930E Shop Manual for proper installation procedures.

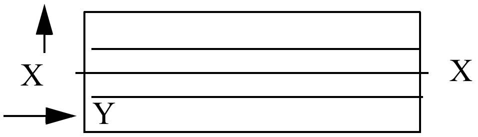
INSPECTION PROCEDURE:
Metallurgical Procedure MET-020

Metallurgical Procedure (MET-020) will ensure that the weld quality on the axle structures meets or exceeds the requirements of the American Welding Society (AWS D1.1-98). In order to examine hidden areas or the depth of an exposed surface crack, the approved ultrasonic testing procedure (MET-020) should be followed. The detailed ultrasonic inspection process should be preformed after the repair procedure has been completed. Any indications of failures should be documented with photographs.

1. EQUIPMENT:
    a. Panametrics Epoch III Ultrasonic Machine or equivalent.
    b. 2.25 MHz, 0.75 inch x 0.75 inch (19.05 mm) Diameter Contact Transducer.
    c. 70° Wedge.
    d. ASTM E-164 IIW Type I Calibration Block.
    e. Sonotech Grade 40 Ultrasonic Couplant or equivalent.
2. SETTINGS:
    a. Velocity = 0.1270 m/sec (7.62000 m/min)
    b. Angle = 70°
    c. Thickness = 0.629 inch (16 mm)
    d. Range = 0.4882 inch (12.4 mm) / Divisions
    e. Pulsar = Low
3. CALIBRATION:
    a. Couple the transducer to the test block at the "0" mark.
    b. Adjust the gain so that the calibration echoes are clearly visible (100% screen height).
    c. Locate the Beam Index Point (BIP) by peaking up on your first echo. Hold the transducer/wedge stationary and mark the side of the wedge directly over the "0" point on the test block.
    d. If the refracted angle is not as marked, position the probe over the 70° mark on the block. Move the probe back and forth in order to peak up on the echo coming from the large circular hole in the side of the block. After peaking up, hold the probe stationary and note the degree mark on the block that lines up with the BIP. Enter this degree into the Ultrasonic Testing machine. Refer to 2b.
    e. Calibrate for distance by coupling the probe over the "0" mark on the test block.
    f. Adjust the zero offset until the first echo lines up with 4.0 inch (100 mm) division and the second lines up with 9.0 inch (228.6 mm) division.
    g. Calibrate for sensitivity by coupling the transducer pointing toward the 0.06 inch (1.524 mm) side-drilled hole.
    h. Move the transducer back and forth until you peak up on the hole.
    i. Adjust the gain to bring the reference reflector signal to 60% screen height.
4. SCANNING THE WELD:
    a. Increase the gain 20 dB.
    b. Couple the transducer perpendicular to the weld.
    c. Move the transducer back and forth.
    d. Record all information in the enclosed form "Report of Ultrasonic Testing of Welds".
5. ACCEPTANCE-REJECTION CRITERIA:
    a. Depth of penetration shall be a minimum of 0.5512 inch (14 mm).
    b. Acceptance-Rejection from 0 to 0.3937 inch (0 to 10 mm) shall be in accordance with AWS D1.1-98, Table 6.3 Ultrasonic Acceptance - Rejection Criteria (Cyclically Loaded Nontubular Connections).

REPORT OF ULTRASONIC TESTING OF WELDS

Part Number / Serial Number____________ /______________ Report Number___________________________



Weld Identification________________________
Joint Configuration________________________
Weld Process_____________________________
Remarks_________________________________

Weld Number	Indication Number	Transducer Angle	From Face	Leg	Decibels				Discontinuity			Distance		Discontinuity Evaluation	Remarks
					Indication Level A	Reference Level B	Attenuation Factor C	Indication Rating D	Length	Angular Distance (sound path)	Depth from Surface	From X	From Y		

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of C of AWS D1.1, (1998) Structural Welding Codes.

Test Date:__________________Inspected By:____