
WIPP Railcar Preventive Maintenance Inspection Procedures

Preliminary Draft
based upon the
NNPP Preventive Maintenance Program
for
Illustrative Purposes Only

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WIPP Railcar 8000 Mile/Five-Year Preventive Maintenance Inspection **(Including Center Plate Inspection/Lubrication)**

INTRODUCTION

The procedures shown here are based upon the preventive maintenance inspection procedures for the Navy shipments of spent fuel. They are presented as illustrative of the types of procedures that WIPP should develop if they decide to use rail for shipments to WIPP. The actual detailed procedures would need to be developed based upon the cars used, the frequency of shipments, and the carriers maintenance facilities and procedures.

This procedure is to be used as a guideline by the carriers for the 8000 mile five year preventive maintenance (PM) of WIPP railcars. Included is the center plate inspection and lubrication (CPIL).

The performance of this inspection is normally completed following railcar shipment. The inspection is to be performed by WIPP Rail Carriers and witnessed by a DOE Quality Control (QC) Inspector.

In order to document maintenance, record repair history, and ensure performance of work in accordance with the requirements of this document, the attached checklists will be completed by the Inspector.

1. GENERAL REQUIREMENTS

A. This inspection procedure is based upon and is to be used in conjunction with:

Y Code of Federal Regulation Title 49, Part 215 and appendices
Y Code of Federal Regulation Title 49, Part 231 and appendices
Y Association of American Railroads - Interchange Rules (AAR-IR)

B. More detailed explanations, inspection procedures, and measurements shall be guided by the above references. In cases where the above documents differ, the document with the most restrictive requirement shall apply.

C. All materials or parts applied to the car shall meet AAR-IR specifications. The railcar shall be inspected for prohibited parts and materials and all such parts and materials removed from the car.

D. Inspection of the railcar shall be in accordance with this checklist. Inspections and repairs shall be completed by **Carrier** personnel and shall be completed in conjunction with the normal inspection coincident with container shipments.

E. **DOE QC** Inspector shall witness the inspection and complete the checklist as follows:

For each inspection item a check (á), indicate acceptable conditions; with a

(**X**) for a discrepant condition or a **N/A** if not applicable in the column opposite that item. When repairs have been completed to achieve acceptable conditions, note a brief description of that repair in the "REMARKS" column.

If repairs cannot be completed because of availability of parts or Union Pacific Railcar shop limitations, record person contacted, time, date, and resolution in the "REMARKS" column".

- F. On completion of all inspection items on the checklist, the **CARRIER Representative** and the **DOE QC Inspector** shall sign page 5 of 8 on the checklist indicating the inspection has been completed and the railcar is acceptable, with exceptions as noted (see E.2), in accordance with the requirements of this procedure and the requirements of the AAR-IR, for interchange.

2. AAR-IR Rule 36 Inspection

The following inspections shall be performed on WIPP railcars with roller bearings:

- A. All spent fuel railcars, a CPIL and an AAR-IR Rule-36 inspection will be performed every PM inspection or every 10 years which ever comes first. References (15 and 16)
- B. For all WIPP 39810 - 39832 series railcars not used for spent fuel, a CPIL and an AAR-IR Rule-36 inspection will be performed during every scheduled PM inspection. Reference (15)
- C. For all 39911 - 39920 series railcars, a CPIL and an AAR-IR Rule-36 inspection will be performed during every scheduled PM inspection. Reference (16)
- D. All other Program railcars will receive a CPIL and an AAR-IR Rule-36 inspection on there 10th, 20th, and 30th anniversary during the course of a scheduled PM inspection (determined by the PM closest to the anniversary using the date the car was built.) Reference (16)
- E. Performance of rule 36 is documented on the checklist item 11.1
- F. Replace any wheel sets that have wheel, axle or bearing problems that are in violation of the AAR-IR limits.

3. PROCEDURE

The maintenance inspections should be conducted in the following general sequence. The sequence is not mandatory, but should be conducted in the most efficient manner using CARRIER equipment and procedures.

- Y Measure side-bearing clearances prior to jacking
- Y Jack the railcar per section 4
- Y Perform the maintenance inspections per the checklist
- Y Perform AAR-IR rule 36 inspection per the checklist and section 2

Y Perform the CPIL per the checklist and section 5

Y Perform side-bearing inspection per the checklist and section 6

Y Perform inspections and adjustments to the Buckeye truck side frames per the checklist and section 7

Y Reassemble and retest the railcar per section 8 including final side bearing clearance measurements and air brake testing.

4. JACKING OF RAILCAR WITH AN EMPTY SHIPPING CONTAINER MOUNTED ON RAILCAR

A. The jacking operation should be performed on a straight and level section of track.

B. The railcar body is to be jacked off the trucks in accordance with this procedure to a height which will permit removal of the trucks and access to the center plate bearing assembly for inspection and maintenance. When jacking railcars, direct metal-to-metal contact should be avoided. Place a piece of wood or similar material between car body jacking pad and jack.

C. Prior to jacking, the railroad shall take precautions to preclude the possibility of another railcar or a train accidentally colliding with the jacked-up railcar, e.g., derailing devices or suitable barricades located at each end of the railcar.

D. Prior to jacking, shoring, chocks, wheel retarders, or other restraining devices (e.g., cables) shall be used at the end of the car opposite the end to be jacked to ensure that there will be no translation of the railroad car in the direction of the track during the jacking operation.

E. Prior to jacking, but after Step 4.C has been completed, bleed-off pressure from the railcar brakes, release hand brake, and disconnect the brake linkage between the truck(s) and car body. Verify that all mechanical connections between the car body and truck(s) have been disconnected.

F. Prior to jacking, measure the railcar side bearing clearances at each side bearing location. Record the measurements on the Side Bearing Measurement Data Sheet checklist page 6

G. Prior to jacking, the railcar jacking pads should be visually inspected for cracks, distortion, or other conditions which could produce failure. Remove paint, if necessary, for inspection of base metal.

H. The railroad must utilize at least two jacks in the jacking operation. Each of the jacks must have a minimum capacity of ? of the sum of the lightweight of the railcar and the weight of the cargo including tie-downs.

I. Jacks shall be functionally tested prior to start of jacking. Determine that jacks will not be overextended during jacking operations.

- J. The jacks shall be positioned on firm bases on the same end of the car. Do not use one jack, or two jacks placed diagonally across the railcar corners. The jacks shall be placed so as to apply their jacking force to the appropriate railcar jacking pads and to minimize bending of the jacking pads. Do not use three jacks in unison.
- K. As the railcar is being jacked up or down blocking or stops of adequate strength to support the railcar and its load shall be continually added or removed. These blocks are to ensure that a drop of not more than two inches could be experienced by the railcar in the event of a jack failure.
- L. While blocking and jacking the railcar body verify from the side of the railcar that there is approximately 1 to 3 inches of clearance **[not to be measured]** between the railcar body center plate and the truck bolster/span bolster center plate. There may be a center plate mating pin installed. If a pin is present, an UP Carman should use the mating pin removal tool to remove this pin. Roll the trucks from underneath the railcar body, using caution to ensure that the truck bolster does not hang up on the underside of the railcar body, or on the angle cock. Inspection and maintenance is to be performed per section 5.
- M. For railcars with double 4-wheel trucks or double 6 wheel trucks, disconnect the brake linkage between the span bolsters and the trucks. Using slings around the span bolster and striker castings, lift the span bolster assembly off the trucks and set it on stands so that it is supported under the castings and so that the 2 center plates and 4 side bearings on the underside are accessible for inspection. Do not lift or support the span bolster assembly in such a way that a load is applied to either the platform or the coupler or to any part of the brake system.
- N. Remove the frame keys, lift the trucks, and remove the wheel sets for an AAR rule 36 inspection of the wheel bearings.

5. CENTER PLATE INSPECTION

Note: Perform this inspection in conjunction with section 4.0 of the checklist.

A. Car Body or Span Bolster Male Center Plate Bearing (OD)

- (1) On WIPP 39810 - 39832 car body center plates, check condition of vertical wear ring. Cracked or broken wear rings or wear rings showing unusual wear are to be replaced. Replace vertical wear ring in accordance with Ref. (13) using Type E-309-16, E-310-16, or equivalent electrodes.
- (2) Measure the outside diameter (OD) of the center plate in four places, 45 degrees apart, record on the Center Plate Bearing Data Sheet (OD), checklist page 7.
- (3) Visually check all welds for cracks. Repair all weld cracks detected using Type E-309-16, E-310-16, or equivalent electrodes.
- (4) Check bearing surface for flatness. Acceptable bearing area limit is 70 percent of total area.
- (5) Visually check bearing surface for cracks, pits, and protrusions. Repair as necessary to provide smooth surface.
- (6) All welds and/or burrs on bearing or wear surfaces are to be ground smooth.
- (7) Record conditions and repairs in section 4.0 of the checklist.

B. Truck or Span Bolster Female Center Plate Bearing Assembly (ID)

- (1) On WIPP 38870-38893, 39810 -39832 and 39780 - 39782 trucks and WIPP 39833 - 39847 span bolsters check condition of vertical wear rings and horizontal liners. Any cracked or broken rings or liners showing excessive wear are to be replaced. Replace liners in accordance with Reference (7) for WIPP 39810 - 39832 or Reference (10) for WIPP 39833 - 39847, or Reference (8 and 9) for WIPP 39780 - 39782, using Type E-309-16, E-310-16 or equivalent electrodes. Replace liner in accordance with Reference (1 and 14) for WIPP 38870-38893 trucks or Thrall manufacturing instructions for WIPP 38870-38893 span bolsters (AAR-IR 47.E). **NOTE:** Weld all vertical liners in place with 360-degree weld.
- (2) Measure and record the inside diameter (ID) of the center plate four places, 45 degrees apart, on the Center Plate Bearing Data Sheet (ID), checklist page 7. Compare measurements with measurements recorded in Step 5.A(2) above. Minimum allowable diametrical clearance is ? inch. Maximum allowable diametrical clearance is ? inch. Replace rings as required to achieve proper

clearance. Check depth of bolster bowl. (AAR-IR 47.A.4.e)

- (3) If no horizontal liner is in place, check bearing surface as in 5.A (4) and 5.A (5) above. In lieu of repair of bearing surface, if required, horizontal liner may be installed in accordance with Reference (7) or Reference (10) and AAR-IR Rule 47, provided that side bearing clearances can be met with liner installed. If the wear of the horizontal liner has reduced the side bearing clearance to below an acceptable limit, the horizontal liner must be replaced in kind per AAR-IR rule 47.E.7.
- (4) Check center plate mating pin. Pins that are cracked, bent, or broken are to be replaced.
- (5) Visually check condition of all welds. All weld cracks are to be repaired in accordance with AAR-IR Rule 82.
- (6) All welds and/or burrs on bearing or wear surfaces are to be ground smooth. Grinding the 360 degree weld on the top surface is not required or recommended if there is sufficient clearance between the car body casting and the weld on the top surface of the vertical bearing liner.
- (7) Record conditions and repairs in section 4.0 of the checklist.
- (8) On completion of inspection and repair, clean and lubricate center plate bearing assemblies in accordance with AAR-IR Rule 47.

6. SIDE BEARINGS

- A. Visually check condition of all welds. All cracked welds are to be replaced with 360 degrees of continuous weld using Type E-309-16, E-310-16 or equivalent electrodes.
- B. Visually check condition of side bearing plates. Cracked or broken side bearing plates are to be replaced. Check roller side bearings for flat spots or damage.
- C. Record conditions in section 3.0 of the checklist.

NOTE: Side bearings are made from SAE-1095, AISI-1095, or equivalent.

7. TRUCKS and BOLSTERS

- A. All Trucks and Bolsters in general;
 - (1) Visually inspect the bolster and side frames for; cracked, broken, missing pieces, bent, patched, or wrong size.
 - (2) Bolster and side frames worn or corroded, where any section is reduced 25%, if wear is greater refer to AAR-IR rule 47 & 48

(3) Worn gibs-see Table 1 of AAR-IR rule 47

B Buckeye trucks;

For all 3 axle truck railcars (39810 - 39832, 39911 - 39920, 39980 - 39999) a side frame clearance inspection will be performed during every scheduled PM. Reference (17)

There are three separate appendices that apply to this Buckeye truck section. The Buckeye equalizing truck designs that the WIPP railcars use are each a little different than the other. You, the inspector, must recognize the differences in the truck style or type being inspected/worked on and use the correct procedures for that truck. The first appendix is for correcting the side frame clearance problems on Buckeye truck assemblies. The second and third appendices are for the disassembly and reassembly of Buckeye truck assemblies for the inspection of the wheel bearings.

Perform these inspections and enter any remarks in section 8.0 of the of checklist.

8. COMPLETION OF MAINTENANCE

- A. Verify completion of maintenance, restore span bolster on trucks (if required), and re-truck the railcar. **Cautiously** remove the blocking from under the railcar body. **Extreme care is to be exercised** in aligning and lowering the railcar body onto the truck to ensure proper mating of male (car body) and female (truck) bearing surfaces (i.e., assure that the radial bearing surfaces do not touch during this operation). Excessive lowering speed or improper engagement of the car body center plate and the truck center bearing could damage the vertical wear ring and vertical liner.
- B. Verify proper engagement and seating of the mating center bearing parts after the jacks have been lowered as follows: Measure the side bearing clearances and record measurements on the Side Bearing Data Sheet. Compare with the side bearing clearances measured in the jacking of the railcar section Step 4.F. If the mating parts are properly engaged and seated, the measurements will be repeatable. Connect the mechanical connections between the truck(s) and car body. Make certain all the blocking is removed from under the railcar body.

NOTE: A comparison of the total side bearing clearances is required, because the angular relationship of the car body can change with respect to the truck.

- C. Verify that the brake system is operating properly. This check should be made in conjunction with checking the air brake system in section 12.0 of the checklist.

9. REFERENCES

- 1.) American Steel Foundries Dwg. 51577
- 2.) Buckeye Steel Castings Dwg A-6417
- 3.) Buckeye Steel Castings Dwg A-8045
- 4.) Buckeye Steel Castings Dwg B-5920

- 5.) Buckeye Steel Castings Dwg B-5921
- 6.) Buckeye Steel Castings Dwg B-10656
- 7.) Buckeye Steel Castings Dwg C 10979
- 8.) Buckeye Steel Castings Dwg C-11825
- 9.) Buckeye Steel Castings Dwg C-11900
- 10.) Buckeye Steel Castings Dwg C-12033
- 11.) Buckeye Steel Castings Dwg E-8900
- 12.) Bill of Material, Maxson Co. Job No. 45260
- 13.) General Steel Industries, Inc. Dwg 33798
- 14.) Thrall Car Manufacturing Co. Dwg HT-001-290
- 15.) WPAD-REF-ENG-2251 dated June 30, 1995 and PNR Letter, Subject: Railcar Maintenance dated July 14, 1995.
- 16.) WPAD-REF-ENG-2328 dated October 20, 1995 and PNR letter, subject: Frequency of WIPP Railcar Roller Bearing Inspections dated November 15, 1995.
- 17.) WPAD-FSQA-CC-20473 December 15, 1995 and PNR letter, subject: Proposed Revision 22 to UFC-3 dated January 2, 1996
- 18.) American Association of Railroads Interchange Rules Field Manual (AAR-IR) latest revision

APPENDIX # 1

140-TON DEPRESSED CENTER FLATCAR (DCF) SIX-WHEEL TRUCK SHIMMING PROCEDURE

(No truck repairs required or repairs completed)

This procedure is a general set of guidelines for the shimming of the six-wheel truck assembly on both the 140-ton depressed center flatcar and the 300-ton flatcar. If the repair facility intends to destroy railcar hardware in the disassembly process, it is imperative that the hardware be replaced with hardware that is equivalent to the original design.

Use of different size hardware is prohibited.

PREREQUISITES.

- A. To establish what corrective action needs to be taken, the railcar must be on a level track.
- B. A consistent point to measure from will be a reference bar that will lie across the rails extending out past the side of the railcar. The top of the reference bar becomes that constant. The suggested material is square tube as it generally is not warped and does not sag. A piece of 2" x 2" square tube 12 feet long and two pieces of 1" x 1" square tube 8 to 12 inches long will be needed. The 1" tubes will lie on the rail with the axis parallel to the rail. The 2" tube will lie on the 1" tubes at 90 degrees and extend out past the side of the trucks. The top of the 2" tube is used as the constant point from which to measure to the center of the equalizer pin. Welding the 2" tube to the 1" tube allows the reference bar to be moved as a unit so the measurements can be taken quickly.
- C. Manufacture the following: (1) Eight ASTM A-36 steel pins, 1/2 inch in diameter. This pin should be 17" long with an additional 2" bent 90 degrees to form an "L" shape. The tip of the long end should be tapered but not pointed. (2) Temporary shims (if not already made) two of each in the following thicknesses: 1/8", 3/16", 1/4", 3/8", 1/2" from ASTM A-36 steel. (3) Permanent shim, also made of ASTM A-36, will be made up in the thickness required to level the equalizer. These shim designs are located in the procedure book, carried by the DOE QC Inspector when at the CARRIER Shop or in the NRF Railcar Examiner's file.

PROCEDURE.

- 1. Pry down on the friction wedges and pin them back with the pins made in the prerequisite step C. By releasing the friction shoes the equalizer is allowed to equalize completely so the most accurate measurement of the condition at hand can be taken.
- 2. Using the reference bar of "B" above place it between wheel set 1 and 2 and measure from the top of the 2" square tube and the center of the equalizer pin on both sides. Remove the reference bar and place it between wheel set 2 and 3. Take another set of measurements. These are your "Base" measurements. A rough rule of thumb for the first shim, use 1/2 of the difference in the height between

the equalizer pins for the truck side that is being worked. Note: Truck Side being worked not end being worked.

3. Disconnect the brake pull rod from the top of the live lever.
4. Jack the railcar. Block the railcar body. Roll the truck out from under the railcar.
5. Using a crane with the minimum capability of 8000 lbs and a four-part chain with hooks, lift the bolster. The top of the bolster should come in contact with the inside top of the side frame where the bolster passes through the side frame.
6. Place a shim of the temporary design over the spring group, on both sides, that is the side next to the **low end of the equalizer**.
7. Lower the bolster back down on the spring group. Ensure the temporary shim is in place flat against the bottom of the bolster.
8. Place the truck back under the railcar and lower the railcar back onto the truck.
9. Retake the measurements. Compare these measurements with those taken in step # 2. The goal again is to try to level the equalizer. This may not be possible. A level equalizer or an equalizer as close as possible to level will give the maximum side frame clearance. That clearance has been anywhere between 7/8" to 1 1/8".
10. Repeat steps 4 through 9 as often as required to level the equalizer.

Note : The shimming to level the equalizer may take several attempts to achieve the best side frame clearance. Both sides of the truck may not require shimming. It is vital that an accurate set of measurements are taken and recorded for both sides of the truck after each shim is installed or changed.

11. Once the equalizer has been leveled and the shim(s) thicknesses are determined, remove the truck from under the railcar again.
12. The permanent shim should be made at this time, see prerequisite C.3 above.
13. Raise the bolster. Remove all the temporary shim(s), the hydraulic stabilizer, and all the springs. Do this on the side that is being shimmed or both sides if shimming both sides.
14. With the spring group removed, the bolt that holds the spring plank to the side frame is now visible. Remove this bolt. If shimming one side, only that side needs to have the bolt removed.
15. Lower the bolster all the way down on the spring plank. Using a heavy-duty chain, wrap it around the bolster and the brake beam/spring plank.
16. Lift the bolster up. The spring plank may not come free with out some prying. The

bolster/spring plank need only be lifted high enough to install the permanent shim.

17. Install the permanent shim.

18. Lower the bolster/spring plank back onto the shim. Remove the chain.

19. Raise the bolster. Place a new bolt in the spring plank and side frame. Some prying may be required to get the bolt in as well as getting the shim to set flat against the bolster and side frame. It is **VERY IMPORTANT** that the bolster sits flat on the shim and the shim sits flat on the side frame. If it does not, the side frame measurements will be inaccurate.

20. Replace the springs and the hydraulic stabilizer. Lower the bolster.

21. Roll the truck under the railcar and lower the railcar onto the truck.

22. Connect the brake pull rod to the top of the live lever.

23. Remove the pins holding the friction wedges (step # 1)

If the other end of the railcar also requires shimming, repeat this procedure.

This completes the shimming appendix.

APPENDIX # 2

140-TON DEPRESSED CENTER FLATCAR (DCF) SIX-WHEEL TRUCK DISASSEMBLY AND REASSEMBLY PROCEDURE

This procedure is a general set of guidelines for the disassembly and reassembly of the six-wheel truck assembly on the 140-ton depressed center flatcar. Re-sequencing of the procedure is acceptable if the repair facility determines that this is more efficient and the final assembly is still in accordance with the final dimensional requirements specified herein and current AAR rules and regulations.

If the repair facility intends to destroy railcar hardware in the disassembly process, it is imperative that the hardware be replaced with hardware that is equivalent to the original design. **Use of different size hardware is prohibited.** Use these instructions in conjunction with Buckeye Steel Castings drawing B-5935, B-6392 and E-10737. Drawing E-10737 is marked to match the (Mark # ?s) in the instruction text.

PROCEDURE

1. Jack the car, remove the brake pull rod pin from the top of the live lever (**Mark #1**).
2. Pry down on the friction wedges and pin them back using 1" diameter round pins (**8 places Mark #2**). These pins should be about 17" long with an additional 2" bent 90 degrees to form an 'L' shape.
3. Roll trucks out from under the car.
4. Remove the brake shoe keys and brake shoes.
5. Remove all brake pins from the lever system, remove levers, top pull rod (**Mark #3**), bottom lever connectors, and the floating lever fulcrum bracket.
6. Remove the pins that support the brake beam leveling springs (**8 pins Mark #4**) and remove the leveling springs.
7. Remove the brake pins at the top of the brake hangers (**6 pins Mark #5**). This will let the beams drop to the ground.
8. Remove the roller bearing frame keys (**4 places Mark #6**).
9. Remove the equalizer pins (**4 places Mark #7**).
10. With an overhead crane and a four-part chain, hook into the holes in the unit bolster (**Mark #8**), gently lift the unit bolster until it just comes in contact with the side frames; DO NOT lift the side frames at this time.
11. Remove the hydraulic snubbers and springs from ALL FOUR LOCATIONS.
12. Remove the spring seat brake hangers by lifting slightly, pushing them inboard, and leave

them lying on the rails. There MAY BE a bolt to remove that fastens the hanger(s) to the side frame.

13. Lift the unit bolster side frame assembly off the wheels and set on the ground. This assembly weighs approximately 8,000 pounds.
14. Remove the side frames and lay aside, remove one outside frame from one side of the truck; then remove the outside frame from the other side of the truck, and then remove the two inside frames.
15. **Reverse the procedure, starting with this Step**, by putting the four frames on the unit bolster; both inside frames first, and then both outside frames.
16. Before placing unit bolster side frame assembly back on the axles, you may want to block under the equalizer castings on the center axle such that they are level and will not rotate on the axle.
17. With an overhead crane and a four-part chain hooked into the holes in the unit bolster at **Mark #8**, lift the unit bolster and put it back on the center axle. **NOTE: DO NOT PLACE OUTER AXLES UNDER THE BOLSTER UNIT AT THIS TIME.** When lowering the side frames onto the equalizer arms, make sure the equalizer wear blocks (**Buckeye Drawing #B-5935**), equalizer wear block seats, and the equalizer filler plate [shim plate] (**Buckeye Drawing #B-6392**) are in place. Replace the equalizer pins, cotter pins, and bolts as required (**Mark #7**).
18. Lift the unit bolster side frame assembly. Roll the outer two axles back under the bolster side frame assembly. Lower the bolster side frame assembly back on the outer axle sets making sure the side frames are properly seated on the roller bearing adapters.
19. With the side frames down in their proper position and the unit bolster lifted up as high as the frames allow, put the spring seat brake hangers back into the side frames; bolting them in place. The bolts hold the spring seat in place while the springs are replaced.
20. Put the springs and hydraulic snubbers into the spring seat brake hanger connections pin and bolt as required.
21. Lift the brake beams and put the brake pins back into the spring seat brake hanger connections (**Mark #5**), pin and bolt as required.
22. Re-apply the brake beam leveling springs and put in the pins (**Mark #4**).
23. Re-apply the brake levers, top pull rod (**Mark #3**) and bottom lever connectors, pin and cotter pin as required.
24. Re-apply roller bearing frame keys (**Mark #6**).

25. Re-apply the brake shoes and brake shoe keys.
26. Check the assembly, making sure the bolts to hold the equalizer pins and brake hanger pins are in place; check all brake pins for cotter pins, making sure all springs are seated properly; make sure side frames are seated properly on roller bearing adapters.
27. Pry down on the friction wedges and remove the pins that held them back (**Mark #2**).
28. The truck can now be placed back under the railcar.

This completes this appendix.

APPENDIX # 3

300-TON FLATCAR WITH DOUBLE SIX-WHEEL TRUCKS DISASSEMBLY AND REASSEMBLY PROCEDURE

(With Rule 36 Inspection)

This procedure is a general set of guidelines for the disassembly and reassembly of the six-wheel truck assembly on the 300-ton flatcar. Re-sequencing of the procedure is acceptable if the repair facility determines that this is more efficient and the final assembly is still in accordance with the required dimensional requirements specified herein.

If the repair facility intends to destroy railcar hardware in the disassembly process, it is imperative that the hardware be replaced with identical hardware. **Note:** The bottom tie bar hardware Reference (3) and the side frame to equalizer bolt assembly Reference (4) are somewhat unique and may require additional lead time to obtain. **Use of different size hardware is prohibited.**

PROCEDURE

1. Disconnect the brake linkage and the air hoses between the railcar deck and the span bolster. Jack the railcar body to allow clearance between the bottom of the center plate and the top of the span bolster bowl.
2. Roll the span bolster/truck assembly out from under the deck.
3. Disconnect the brake linkage and air hoses between the span bolster and the truck bolster.
4. Jack one end of the span bolster out of the truck bolster bowl to allow the truck to be rolled out away from the span bolster. Secure the span bolster and the remaining truck assembly.
5. Remove the brake shoes.
6. Jack one end of the truck bolster to allow access to the bottom tie bar assembly, Buckeye drawing E-8900, items 7 and 12, Reference (11) Ensure that the truck is blocked safely. See Buckeye drawing A-8045, Reference (3) for specific bottom tie bar hardware.
7. Remove bottom tie bar bolts. The bottom tie bar is a heavy casting. Handle with care. If hardware is to be cut during removal, vendor must ensure that identical replacements are available, Reference (3). If the hardware is intended to be reused, vendor is to ensure that the threads are not damaged during bottom tie bar disassembly. **Use of different size hardware is prohibited.**
8. Lower the truck assembly.
9. Remove the pedestal keys.
10. Remove the side frame to equalizer bolt assembly. If the hardware is to be cut, vendor must ensure that replacements that match the original design are available, see

Buckeye drawing A-6417, item 2 Reference (2). If the hardware is intended to

be reused, vendor is to ensure that the existing hardware matches the original design and the existing threads are not damaged during disassembly. **Use of different size hardware and additional bushings are prohibited.**

11. Relocate the lifting hardware and lift the truck bolster and side frame assemblies. Remove the two outboard wheel sets.
12. Remove the equalizer casting from the center axle. Care must be taken to remove the center axle-bearing adapter that is inside the equalizer casting.
13. Complete the Rule 36 inspections of all of the available wheel sets. If discrepant wheel sets are found, the repair facility should reassemble the truck assembly and the new wheel sets such that the wheel set with the largest diameter is in the position that will most improve the side frame to equalizer clearance. New wheels should be moved to the outboard positions, especially adjacent to the lowest of the equalizer bolt assemblies as specified in the 140-Ton DCF Six-Wheel Truck Shimming Procedure above, Step 3.
14. Inspect the wear blocks, wear block seats, and wear block seat shims. See Buckeye drawings B-5920 and B-5921 Reference (4 and 5). Replace any discrepant hardware as necessary.
15. If the side frame to equalizer clearances were discrepant and no wheel sets require replacement, review and complete steps 8 through 11 in the 140-Ton DCF Six-Wheel Truck Shimming Procedure above.
16. If the side frame to equalizer clearances were acceptable and no wheel sets were replaced, reassemble the truck components as shown in steps 18 through 24.
17. If wheel sets were replaced, reassemble the truck components as shown in steps 18 through 24. Remeasurement of the side frame to equalizer clearances will be required as shown in the main procedure.
18. Reassemble the bearing adapters and equalizers on the center axle.
19. Relocate the truck bolster/side frame assembly on the center axle equalizer assembly. Ensure that all of the wear blocks, wear block seats, and wear block seat shims are properly reinstalled. Keeping the equalizers level during the reassembly will ease the fit up with the side frames.
20. Reinstall the side frame to equalizer bolt/nut assembly.
21. Relocate the lift hardware and lift one end of the truck assembly to allow access to the bottom tie bar and tie bar hardware. Ensure that the truck is blocked safely. Reassemble the bottom tie bars and tie bar bolts to the truck bolster. Jacking of the center axle and bottom tie bar castings may be required to properly orient the attachment hardware

openings. Lower the end of the truck assembly.

22. Reassemble the bearing adapters for the outboard wheel sets.
23. Relocate the wheel set/bearing adapter assemblies to allow lifting of the truck bolster assembly on to the outboard wheel assemblies.
24. Reinstall the bearing retainer keys.
25. Lift the span bolster and relocate the truck assembly properly under the span bolster center plate.
26. Lower the span bolster. Raise the other end of the same span bolster and remove the truck. Disassemble, inspect, and reassemble the truck and replace it under the span bolster.
27. After both trucks have been reassembled, reconnect the span bolster brake linkages. Roll the span bolster assembly back under the railcar deck. Locate the body center plate over the bolster bowl and carefully lower the railcar body. Reconnect all of the remaining brake linkages and air hoses. Reinstall all of the remaining brake shoes.
28. Repeat the same steps for the opposite end of the railcar.

This completes this appendix.

APPENDIX # 4

Disassembly - Reassembly Procedure for the WIPP M-140 Series 200-Ton Wellcar

This procedure has been written to provide guidance to the CARRIER car men performing the disassembly and reassembly of the WIPP M-140 series 200-Ton Wellcars that are under-going the 8000 mile / five year preventive maintenance (PMs) at the repair shop. This procedure will also serve as corporate memory when there may be a gap in performing the PMs due to all WIPP railcars recently receiving this PM.

REFERENCES

- a) UFC-3 Standardized Inspections of Shipment Railcars.
- b) AAR-IR Association of American Railroads - Interchange Rules.
- c) NRF 1266.1 Standardized Inspections of Railcars.

PREREQUISITES

- 1) Minimum of two (2) heavy duty jacks capable of lifting 3/8 of the sum of the light weight of the railcar and the weight of the cargo (container) including the tie-downs IAW ref (a).
- 2) Two (2) heavy-duty jack stands and two (2) regular duty jack stands.
- 3) Eight (8) pieces of 2" plywood shims IAW ref (a).

PROCEDURE

NOTE

Refer to reference (c) for guidance how to do the various inspections. Document all inspections on the 8000-mile / 5 year P.M. form contained in reference (c).

- 1) Position the WIPP Railcar M-140 Series in the One Spot Shop.
- 2) Position the hydraulic jacks and the heavy-duty jack stands for use.
- 3) Measure and record the side bearing clearance and inspect the jacking points.
- 4) Cut **ALL** (16) frame key bolts.

CAUTION

Use caution in disassembling the 3/4" hoses **THEY ARE NOT STANDARD ITEMS!**

- 5) Disconnect **ALL** of the air hoses
 - A. Body to span bolster hoses
 - 1. Train line 1 1/4"
 - 2. Brake line 3/4"

- B. Span bolster to truck hoses.
1. 1 – 5/8" brake line per truck
- 6) Disconnect hand brake linkage on both ends.
- 7) Jack the railcar body and place the **HEAVY-DUTY** jack stands under the railcar body.
- 8) Roll the span bolster assembly from under the railcar body.
- 9) Remove the bolts for the cut lever bracket, remove the cut lever and disassemble the coupler. Remove the coupler key. Inspect the coupler internal parts.
- 10) Use a forklift and the coupler removal tool to remove the coupler from the end of car cushioning device. Inspect coupler including shank. Inspect cushioning unit.
- 11) Place coupler back in the cushioning unit and replace coupler key. Reassemble coupler internal parts. Reinstall coupler cut lever. Replace bolts in the cut lever bracket.
- 12) Use the side sill lifts / cranes to raise the platform end of the span bolster. Place standard / regular duty jack stands at the side bearing locations under the platform end.
- 13) Roll the truck from under the span bolster. Position the truck under a jib crane.
- A. Remove brake shoes
- B. Using lift clamps on the side frames lift the side frames and bolster as a unit. Roll out the wheel sets.
- C. Inspect wheels and axle; bearing adapters; side frames; bolster and brake beams. Perform AAR Rule 36 on wheel bearings.
- D. If a horizontal liner is present in the truck bolster center plate bowl remove it. Clean the bowl with a power wire brush. Inspect the bowl and measure the **I.D.** of bowl. Record the measurements. Check the side bearing measurements as these measurements may not comply with reference (a). If needed adjust the side bearing measurements by changing the thickness of the horizontal liner. Replace the liner and apply lubrication.
- E. Power wire brush the span bolster to truck center plate. Inspect the center plate and measure the **O.D.** of the center plate. Record the measurements.
- F. If a horizontal liner is present in the span bolster center plate bowl remove it. Clean the bowl with a power wire brush. Inspect the bowl and measure the **I.D.** of bowl. Record the measurements. Check the side bearing measurements as these measurements may not comply with reference (a). If needed adjust the side bearing measurements by changing the thickness of the horizontal liner. Replace the liner and apply lubrication.

- G. Power wire brush the span bolster center plate. Inspect the center plate and measure the **O.D.** of the center plate. Record the measurements.
- H. Using clamps on the side frames lift the bolster and side frames as a unit.
- I. Place wheel sets back under the truck. Return brake shoes and frame keys.
- J. Perform air test on the truck assembly. This air test is to verify the cable slack adjuster is working properly and is in proper adjustment. IF the cable slack adjuster is not working properly replace all four (4) cable slack adjuster on this WIPP railcar. If the cable slack adjusters have been replaced by a mechanical slack adjuster the air test for each truck is not required.
- K. Place truck back under the span bolster. Using the side sill lifts / cranes raise the platform end of the span bolster, remove the jack stands and lower the span bolster back onto the truck.

CAUTION

Use caution in reassembling the 3/4" hoses they are not standard items.

- L. Reconnect brake line air hose.

Note

THE INSPECTION OF THE OUTER TRUCK FOR THIS SPAN BOLSTER ASSEMBLY IS COMPLETE. THE INNER TRUCK OF THIS SPAN BOLSTER MUST STILL BE INSPECTED.

- M. Reposition the span bolster assembly so the end opposite the platform end can be raised with the jib boom and chain falls.
- N. Repeat steps 13. A to 13. E and 13. H to 13. L.
- O. Position the complete span bolster assembly back under the railcar body.

CAUTION

When the railcar body is being lowered back onto the span bolster the body bolster must be in the center of the span bolster bowl. The span bolster has a wear ring, also known as the vertical liner that is welded in place. The ring was **?V?** grooved and welded 360E. If the body bolster is not centered in the span bolster during reassembly and comes down on the wear ring, the wear ring could be bent and or the weld cracked.

- 14) Reposition the railcar. I.E. if the **?A?** end of the railcar was just inspected reposition the railcar so the **?B?** end can now be inspected.

- 15) Re-perform steps 7 through 13 N.
- 16) Perform air brake test on this railcar. Inspect the consolidated stencil to ensure it is compliance with reference (b)
 - P. Complete the five-year P.M. paper work. Bettis inspector and CARRIER inspector sign where required. Obtain copies of the CARRIER billing sheet and give the CARRIER a copy of our five-year P.M.

This completes this appendix.

WIPP RAILCAR 8000 MILE/FIVE-YEAR INSPECTION**CHECKLIST**

RAILCAR WIPP _____ CONTAINER TYPE & NUMBER _____

| DESCRIPTION OF INSPECTION | T B | T A | REMARKS |
|---|--------|--------|---------|
| <p>1.0 <u>COUPLER</u> (AAR-IR 16 & 17)</p> <p>1. When a coupler is removed from the car, for any reason, measure coupler shank length and rear of key slot to shank butt/rear wall thickness. Rule 16 fig D, Rule 17 fig A, and Rule 18 fig D. of AAR-IR</p> <p>2. Grade C coupler bodies may be applied with grade C or grade E draft keys. Grade E coupler bodies must be applied with grade E draft keys only.</p> <p>3. Grade E locks are correct repairs for all couplers</p> <p>1.1 Visually Inspect Coupler Parts</p> <p>(1) Height – loaded - 31 ?" to 33 ?."</p> <p>(2) Alignment – movement of coupler.</p> <p>(3) Body - wear plate, cracks, bent, wear.</p> <p>(4) Knuckle – wear, cracks, operation - pin and cotter.</p> <p>(5) Coupler lock and lock list - operation.</p> <p>1.2 Inspect Uncoupling Mechanism - bent, jammed, operation, and proper clearance.</p> <p>1.3 Check for prohibited couplers and appurtenances.</p> <p>1.4 Inspect Striker:</p> <p>(1) Striker – cracks securement, wear and rivets.</p> <p>(2) Coupler carrier, wear plate - wear, cracked, broken, missing, securement, proper shank clearance.</p> <p>2.0 <u>COUPLER CUSHIONING UNITS</u> (AAR-IR 59)</p> <p>2.1 (1) Broken or missing parts.</p> <p>(2) Inability to assume neutral position.</p> <p>(3) Restoring mechanism action.</p> <p>(4) Draft sill weld cracks.</p> <p>(5) Hydraulic oil leak - must form drips.</p> <p>(6) Draft key, retainer, bolt, wear, missing.</p> <p>2.2 Install Keystone push pin EOC-testing device on appropriate EOC cushioning unit which lack it, if a unit must be removed from the car for some other reason.</p> | | | |

WIPP RAILCAR 8000 MILE/FIVE-YEAR INSPECTION CHECKLIST

RAILCAR WIPP _____ CONTAINER TYPE & NUMBER _____

| DESCRIPTION OF INSPECTION | T B | T A | REMARKS |
|--|--------|--------|---------|
| 3.0 <u>SIDE BEARINGS</u> (AAR-IR 61) 3.1 Perform side-bearing inspection in accordance with section 6 of the Five-year PM procedure. 3.2 Inspect: (1) Bearing box - secure, cracked, missing. (2) Bearing plate - wear, secure, flat, missing. (3) Rollers - flat spots, cracks, missing. (4) Clearance. See page 6 of 8 for dimensions. | | | |
| 4.0 <u>CENTER PLATE</u> (AAR-IR 47) 4.1 Perform center plate inspection and lubrication in accordance with section 5 of the Five-year PM inspection procedure. 4.2 Make drawing indicating where repair welding performed, if required. Use the comment sheet for the drawing. | | | |
| 5.0 <u>CAR BODY</u> (AAR-IR 88) 5.1 No part of the car body shall be less than 2 3/4 inches above top of rail under all allowable wear and spring deflection conditions. 5.2 Inspect for cracks, breaks, weld condition, of all car body parts including end sill, center sill, stub sills, tie plate, side sill, cross bearer, stringer bolster, etc. 5.3 Check for prohibited or restricted items. | | | |
| 6.0 <u>SAFETY EQUIPMENT</u> (AAR-IR 88) 6.1 (1) Ladder - secure, broken, bent, missing (2) Platform - chains, level, no holes, secure condition (3) Placard Holder - on all four sides in good condition (4) Defect Card Holder - condition, missing (5) Grab Irons - secure, bent, missing (6) Sill Steps - secure, bent, missing (7) Handrails - secure, bent, missing, no welds allowed. | | | |
| 7.0 <u>LIGHT WEIGHT</u> (AAR-IR rule 70) When required light weight the car. | | | |

WIPP RAILCAR 8000 MILE/FIVE-YEAR INSPECTION CHECKLIST

RAILCAR WIPP _____ CONTAINER TYPE & NUMBER _____

| DESCRIPTION OF INSPECTION | | | T B | T A | REMARKS |
|--|-----|--|--------|--------|---------|
| 8.0 <u>TRUCKS and BOLSTERS</u> (AAR-IR 47 & 48) | | | | | |
| 8.1 | (1) | Side Frames and Bolsters - cracks, worn, improper repairs. | | | |
| | (2) | Side Frame Key - tight, missing. | | | |
| | (3) | Brake beam supports - cracks, worn. | | | |
| | (4) | Any section worn or corroded greater than 25% | | | |
| | (5) | <u>Buckeye 6 wheel truck only</u> - Perform side frame equalizer inspection in accordance with section 7 of the five year PM Inspection procedure. | | | |
| 7.2 | | No part of the truck shall be less than 2 3/4 inches above top of rail under maximum wear and spring deflection. | | | |
| 7.3 | | Check side frames and bolsters for prohibited and restricted types and pattern numbers. | | | |
| 9.0 <u>SPRING ASSEMBLY AND SNUBBER</u> (AAR-IR 50) | | | | | |
| 9.1 | (1) | Springs - broken, cracked, missing, tilted, bottomed out. | | | |
| | (2) | Side Frame Wear Plate - wear, securement, missing. | | | |
| | (3) | Bolster Wedge - wear, indicator, missing. | | | |
| | (4) | Hydraulic Stabilizer - oil leak, spring condition, securement, missing. | | | |
| 10.0 <u>WHEELS AND AXLES</u> (AAR-IR 41 & 43) | | | | | |
| 10.1 | (1) | Flanges for sharp, high, chipped, overheating or cracking. | | | |
| | (2) | Tread - thickness, overheating, groves, flat spots, build up and shelled. | | | |
| | (3) | Plate - cracks, gouges, holes, overheating, other damage | | | |
| | (4) | Axles - bends, rubbing, cracks, gouges & others | | | |
| | (5) | Rim - broken, spread, thin, etc. | | | |
| 10.2 | | Check for prohibited wheels and axles | | | |
| 11.0 <u>ROLLER JOURNAL BEARINGS</u> (AAR-IR 36) | | | | | |
| 11.1 | | Bearing inspection as required by section 2. N/A if not required (AAR Rule 36.A.3.a. & b., A.10 & 11) | | | |

WIPP RAILCAR 8000 MILE/FIVE-YEAR INSPECTION CHECKLIST

RAILCAR WIPP _____ CONTAINER TYPE & NUMBER _____

| DESCRIPTION OF INSPECTION | | T B | T A | REMARKS |
|---------------------------|--|--------|--------|---------|
| 12.0 | <u>AIR BRAKE SYSTEM</u> (AAR-IR 3, 4 and 5) | | | |
| 12.1 | Inspect the following for cracks, missing parts, securement. (1) Pipe and fittings (2) Vent protector (3) Reservoirs (4) Brake cylinder (5) Slack adjuster (6) Cutout cocks and "U" bolt (7) Valves, portions, pipe bracket (8) Release valve and rod (9) Retaining valve (10) Dirt collector (11) Quick service valve (12) Vent valve | | | |
| 12.2 | Inspect Hoses, Coupling (1) Hose - date, cracks, leaks, damage (2) Coupling - damage, gasket, leaks | | | |
| 12.3 | Perform single car air test in accordance with the AAR Standard S - 486, latest revision, after completion of maintenance and the railcar is un-jacked. | | | |
| 12.4 | Brake type (ABD, ABDW) stenciled on car. | | | |
| 13.0 | <u>TRUCK AND CAR BODY BRAKE RIGGING</u> (AAR-IR 6 to 11) | | | |
| 13.1 | Inspect and cause to be corrected if rubbing (1) Brake beams - cracks, wear, bends, securement, (2) Brake rods - cracks, wear, bends (3) Levers - cracks, wear, bends, poor alignment (4) Pins - wear, AAR approved cotter pins. (5) Safety hangers - cracks, wear, bends, securement, missing. (6) Guides - cracks, wear, bends securement. | | | |
| 13.2 | Check for incorrect components. | | | |
| 14.0 | <u>BRAKE SHOES</u> (AAR-IR 12) | | | |
| 14.1 | Inspect that the proper shoes are on car. (1) Cast iron shoes - WIPP 39810-39832 3/4 inch. (2) Cast Iron Shoes - minimum thickness ? inch. (3) Composition shoes - minimum thickness 3/8 inch, includes lining and backing plate. | | | |

WIPP RAILCAR 8000 MILE/FIVE-YEAR INSPECTION CHECKLIST

RAILCAR WIPP _____ CONTAINER TYPE & NUMBER _____

| DESCRIPTION OF INSPECTION | | % B | % A | REMARKS |
|---------------------------|--|--------|--------|---------|
| 15.0 | <u>HANDBRAKE</u> (AAR-IR 13) | | | |
| 15.1 | Inspect for defects and proper operation: | | | |
| | (1) Wheel | | | |
| | (2) Shaft | | | |
| | (3) Pawl | | | |
| | (4) Gear | | | |
| | (5) Trip lever | | | |
| | (6) Bell Crank or Sheave Wheel | | | |
| | (7) Chain | | | |
| | (8) Rod | | | |
| | (9) Guard | | | |
| 15.2 | Lubricate where required | | | |
| 16.0 | <u>STENCILING</u> (AAR-IR 80) | | | |
| 16.1 | Stenciling must meet DOT and AAR requirements | | | |
| 16.2 | Stenciling must meet owners reporting marks requirements | | | |

Inspection completed, with exceptions as indicated under remarks, and railcar is acceptable in accordance with the requirements of this procedure.

DOE QC Inspector Date

Signature of the Railroad representative certifies that the railcar meets the requirements of the AAR and is acceptable for interchange.

Railroad Representative Date

SIDE BEARINGS MEASUREMENT DATA SHEET

RAILCAR WIPP_____ CONTAINER TYPE & NUMBER_____

| |
|---|
| <p align="center">Prior to Jacking Railcar</p> |
| <p align="center">Inspect the four (4) Jacking Pads IAW 2.I of this procedure</p> <p>“A” end Left ____ Right ____ “B” end Left ____ Right ____</p> |
| <p align="center"><u>Car Body to Truck / Span Bolster</u></p> <p>"A" End L____ R____ "B" End L____ R____</p> <p align="center"><u>Span Bolster to Truck *</u></p> <p>"A" End OL____ OR____ "B" End OL____ OR____</p> <p> IL____ IR____ IL____ IR____</p> <p align="center">* <u>Applies only to railcars with Double Trucks.</u></p> |
| <p align="center">After Jacking Railcar</p> |
| <p align="center"><u>Car Body to Truck / Span Bolster</u></p> <p>"A" End L____ R____ "B" End L____ R____</p> <p align="center"><u>Span Bolster to Truck *</u></p> <p>"A" End OL____ OR____ "B" End OL____ OR____</p> <p> IL____ IR____ IL____ IR____</p> <p align="center">* <u>Applies only to railcars with Double Trucks.</u></p> |

Side Bearings Clearance Measurement Range

1. **Railcar Body to Truck** - 4 or 6 wheeled trucks - average of the two should be between 3/16" and 5/16"
- 2 **Railcar Body to Span Bolster** double 4 or 6 wheeled trucks - average of the two should be between 1/8" and 3/16"
3. **Span Bolster to Trucks** - the average of the two at the bolsters should be between 3/16" and 1/4"

CENTER PLATE BEARING DATA SHEET

RAILCAR WIPP _____ CONTAINER TYPE & NUMBER _____

| “A” - END OUTSIDE DIAMETERS for the following | “A” - END INSIDE DIAMETERS for the following | “B” - END OUTSIDE DIAMETERS for the following | “B” - END INSIDE DIAMETERS for the following |
|--|---|--|---|
| Car Body [1] (Large O.D.) | Truck/Span Bolster [2] (Large I.D.) | Car Body [1] (Large O.D.) | Truck/Span Bolster [2] (Large I.D.) |
| 1____ 2____ | 1____ 2____ | 1____ 2____ | 1____ 2____ |
| 3____ 4____ | 3____ 4____ | 3____ 4____ | 3____ 4____ |
| Span Bolster (outer)* [5] | Truck Bolster (outer) * [6] | Span Bolster (outer) * [5] | Truck Bolster (outer) * [6] |
| 1____ 2____ | 1____ 2____ | 1____ 2____ | 1____ 2____ |
| 3____ 4____ | 3____ 4____ | 3____ 4____ | 3____ 4____ |
| Span Bolster (inner)* [3] | Truck Bolster (inner)* [4] | Span Bolster (inner)* [3] | Truck Bolster (inner)* [4] |
| 1____ 2____ | 1____ 2____ | 1____ 2____ | 1____ 2____ |
| 3____ 4____ | 3____ 4____ | 3____ 4____ | 3____ 4____ |

* Applies only to railcars with Double Trucks.

Use the drawing on the next page to assist with the proper data placement.

After measuring the ID's & the OD's compare the clearances.

The minimum is 1/8" and the maximum is 1/2"