

AMTRAK EQUIPMENT MAINTENANCE DEPARTMENT
STANDARD MAINTENANCE PROCEDURE

SMP NO. : 46605
ISSUE DATE : 3-15-81
REVISION DATE :
TITLE : Reclamation of Truck Crossbars + Swing Hangers
EQUIPMENT TYPE: All AMT.

RECLAMATION OF TRUCK CROSSBARS AND SWING HANGERS

Please find enclosed Amtrak's "Procedure for Reclaiming Passenger Car Truck Crossbars and Swing Hangers".

All crossbars and swing hangers which are worn or defective shall be reclaimed to the attached procedure. Any parts with defects exceeding the limit specified shall be held and a copy of Drawing B-189 shall be submitted marked to show size and location of the defects. These parts worn beyond welding reclamation limits shall not be returned to service nor repaired without receipt of written authority from this office.

Please arrange to have this procedure distributed to all concerned with crossbar and swing hanger maintenance and reclamation. Marked drawings are to be sent to the following address:

Mr. F. Abate
Chief Mechanical Officer
National Railroad Passenger Corporation
400 N. Capitol St., NW
Washington, DC 20001

ATTN: D. M. Boria
Manager-Equipment Engineering

I. Inspection

- (a) Sandblast entire part.
- (b) Visually inspect for cracks, gouges, wear and corrosion.
- (c) Magnetic particle test entire part to detect surface cracks.
- (d) Heat treat all parts to be returned to service as specified in Section III. If repairs are required, heat treat after reclamation is completed.
- (e) Take Brinell Hardness Readings at the locations indicated on Figure 1. The Brinell Reading to be made on a smooth spot developed by grinding 1/32" below the surface (See Section III).

II. Marking

- (a) All parts after inspection and/or reclamation shall be stamped with 1/3" high letters. The stamping shall indicate the shop, month, and year at which these parts were inspected and/or reclaimed using shop abbreviation letters indicated below. Use low stress stamps.

SHOP ABBREVIATIONS

AL - Auto Liner Corporation
BG - Beech Grove (Amtrak)
CO - Como (BN)
MT - Mechtron Industries
PS - Pullman Standard
RM - Rocky Mount - (SCL)/(INCO)
RO - Rail Systems, Inc.
TS - Topeka Shop (Santa Fe)
WC - Woodcrest (ICG)

III. Brinell Test

- (a) Each part removed from trucks must be Brinell Tested after visual and magnuflux inspection and also after any heat treatment before re-application to the truck. Readings taken after heat treatment shall be done after parts reach room temperature. The Brinell Reading is to be made on a smooth spot developed by grinding 1/32" below the surface at locations indicated on Drawing B-189.

II. (Cont'd)

- (b) The Brinell Readings for these parts (except those of AISI-9840 or RY-200) must be in the range of 163 minimum - 212 maximum. For parts of AISI-9840 (RY-200) the Brinell Readings must be in the range of 229 minimum - 277 maximum.
- (c) When hardness readings are below the minimum allowable, the part may be re-normalized and tempered, after which it must be re-Brinell Tested. This procedure can be repeated once. If readings are still below the allowable minimum, the part must be set aside for further handling, and this office notified.
- (d) When hardness readings are above the allowable maximum, the part may be re-tempered, after which it must be re-Brinell tested. This procedure can be repeated once. If readings are still below the allowable maximum, the part must be set aside for further handling, and this office notified.
- (e) Normalizing (All Parts) - Heat in a closed furnace to 1650°F and hold at this temperature for approximately one hour per inch of maximum thickness of part. Remove from furnace and cool in still shop air, free from drafts.
- (f) Tempering (All Parts) - Heat in a closed furnace to 1150°F and hold at this temperature for approximately one hour per inch of maximum thickness of part. Remove from furnace and cool in still shop air, free from drafts.
- (g) When heating or cooling these parts, they are not to be stacked on top of one another so as to permit uniform heating and cooling otherwise distortion may result.
- (h) Parts requiring Normalizing shall be heated to the specified temperature at a rate not exceeding 500°F, temperature increase per hour.

The parts must be placed initially in furnace if temperature exceeds 700°F. Furnace temperature for heat treating must be effectively regulated and preferably be measured by use of a recording pyrometer.

NOTE: The Hardness Values are based on the Brinell Hardness Test 3000 Kg.

IV. Limits of Wear

(a) The following limits of wear for original parts from drawing dimensions will apply to all crossbars and swing hangers found by inspection or receiving repairs at any Shop or Terminal. These parts, if worn in excess of the following limits, are to be repaired only at authorized location specified in Section V.

(b) Swing Hangers: (See Drawing B-189)

1. When the slot "A" for the crossbar is worn $1/16"$ on either side or a combined wear on both sides of $1/8"$.
2. When wear on the crossbar seat "B" is $1/8"$. This can be determined by the overall length of the slot.
3. When the pin has worn through bushing - "H" - Terminal Limit. When bushing is worn $1/32"$ or more - Shop Limit.
4. When loop swing hanger is worn to a depth of $3/32"$ at the crossbar seat area - "D".

(c) Swing Hanger Crossbar: (See Drawing B-189)

1. Crossbar $1-3/8"$ or less in thickness when worn a total of $1/16"$ on both sides "E" where it is contacts swinger hanger slot.
2. Crossbar greater in thickness than $1-3/8"$ may be worn a total of $1/8"$ on both sides "E" where it contacts swinger hanger slot.
3. When worn $1/8"$ in the crossbar seat "F" which contacts the swing hanger.
4. Swing hanger crossbars when worn in excess of $3/16"$ in saddle bearing seat surface - "G".

(d) A limit of $1/16"$ per inch of sectional thickness is established for wear, corrosion, nicks, pitting, etc. for all other areas of the crossbars and swing hangers not specified in section IV (b) & (c) above.

NOTE: All crossbars and swing hangers which have not become worn or have defects within the limits specified above, and have not been condemned by magnetic particle inspection, may be re-applied after defect areas are ground smooth, within the permitted limits, to eliminate all surface irregularities.

Edges should be ground to leave a smooth radius and all ground areas blended so as to leave no abrupt change in section. All grinding to be done parallel and not transverse to contour of part. Care must be taken to avoid frictional discoloration of the surface when grinding. All bearing surfaces are to be reformed to the original contour. All finish grinding shall be done with a #80 grit.

Swing hangers and crossbars that become worn or have defects in excess of specified limits shall be reclaimed or scrapped in accordance with Section V of this procedure.

V. Reclaiming by Welding

- (a) No welding is permitted of cracks or fractures in any of these parts. When worn in excess of the specified limits, these parts can be restored to original dimensions under the following procedures, providing the material remaining in parts is not less than 80% of the original section. Welding repairs are only to be done by authorized shops for repairs within the limits in this procedure. Any parts with defects exceeding the limits specified above shall be held for further disposition. A copy of Drawing #B-189 shall be submitted marked to show size and location of the defects.
- (b) Surfaces to be welded shall be thoroughly sandblasted before welding.
- (c) Where restoration is made by welding, the manual arc process using American Welding Society Class E-9016 or 9018 Electrodes shall be used, (Except As Follows). When welding AISI-9840 (RY-200) steels, use AWS Class 11016 or 11018 Electrodes.
- (d) Prior to welding with manual arc electrodes, all parts shall be pre-heated to a temperature of 400 to 500°F and should not be allowed to cool below 400°F during welding.

IV. (Cont'd)

- (e) All worn areas shall be filled by running weld bead parallel and not transverse to the part whenever possible. Extreme care must be taken not to arc-burn any part of the swing hangers or crossbars. In welding around pinhole hanger and weld bead shall follow the contour of the hole. Sufficient weld metal must be deposited to insure that aprts can be restored to original drawing dimensions.
- (f) Finish all welded surfaces by grinding or machining, to original drawing dimensions, making sure that all scars and undercutting have been removed. All edges must be rounded leaving a smooth radius. Finish grinding must not be transverse to section and cars must be taken to prevent frictional discoloration of the surface. Finish grinding to be done with #80 grit. All surfaces are to be restored to the original contour and dimensions.
- (g) After welding, all parts must be normalized and tempered.
- 1) Parts requiring Normalizing shall be heated to the specified temperature at a rate not exceeding 500°F, temperature increase per hour.

The parts must not be placed initially in furnace if the furnace temperature exceeds 700°F. Furnace temperature for heat treating must be effectively regulated and preferably be measured by use of a recording pyrometer.
 - 2) Normalizing - Heat in closed furnace to 1650°F and hold at this temperature for approximately one hour per inch of maximum thickness of material. Remove from furnace and cool in still shop air, free from drafts.
 - 3) Tempering - Heat in a closed furnace to 1150°F and hold at this temperature for approximatey one hour per inch of maximum thickness of material. Remove from furnace and cool in still shop air, free from drafts.
- (h) When heating or cooling these parts, they are not to be stacked on top of one another and are to be properly supported so as to permit uniform heating and cooling, otherwise distortion may result.

IV. (Cont'd)

- (i) All parts are to be Brinell Hardness Tested after Heat Treatment. (Refer to Section III)
- (j) After Treatment and Brinell Hardness testing, the parts shall be magnetic particle tested.

NOTE: Only the locations listed below are authorized to perform welding repairs on crossbars and swing hangers.

Beech Grove	(AMTRAK)
Woodcrest	(ICG)
Topeka	(AT & SF)
Rocky Mount-Waycross	(SCL)/(INCO)
Como	(BN)
Metal Weld Inc./Drever Co.	
Rail Systems, Inc./J. P. Ross/Cal-Doran -	(RSI)

Additional locations will be authorized to perform welding repairs by written notification from this office.

- (k) All crossbars and swing hangers which are found to be cracked or fractured are to be scraped. These parts are to be painted with the letter "X" at various locations by the inspector with yellow paint. Also these scraped parts must be cut and mutilated to prevent their being returned to service.

LIMITS OF WEAR ON CROSSBARS AND SWING HANGERS

THE FOLLOWING LIMITS OF WEAR WILL APPLY TO ALL SWING HANGERS AND HANGER CROSSBARS FOUND BY INSPECTION OR RECEIVING REPAIRS AT ANY SHOP OR TERMINAL. SWING HANGERS AND CROSSBARS ARE TO BE RECLAIMED AT AUTHORIZED SHOPS PER PROCEDURE FURNISHED IN EXCESS OF THE FOLLOWING LIMITS:

SWING HANGERS:

1. WHEN THE SLOT "A" FOR THE CROSSBAR IS WORN $1/16"$ ON EITHER SIDE OR A COMBINED WEAR ON BOTH SIDES OF $1/8"$.
2. WHEN WEAR ON THE CROSSBAR SEAT "B" IS $1/8"$. THIS CAN BE DETERMINED BY MEASURING THE OVERALL LENGTH OF THE SLOT.
3. WHEN THE PIN HAS WORN THROUGH THE BUSHING "H", SHOPS TO REPLACE BUSHINGS WHEN WORN THROUGH.
4. WHEN LOOP SWING HANGER IS WORN IN AREA "D" TO A DEPTH OF $3/32"$ AT THE CROSSBAR SEAT.

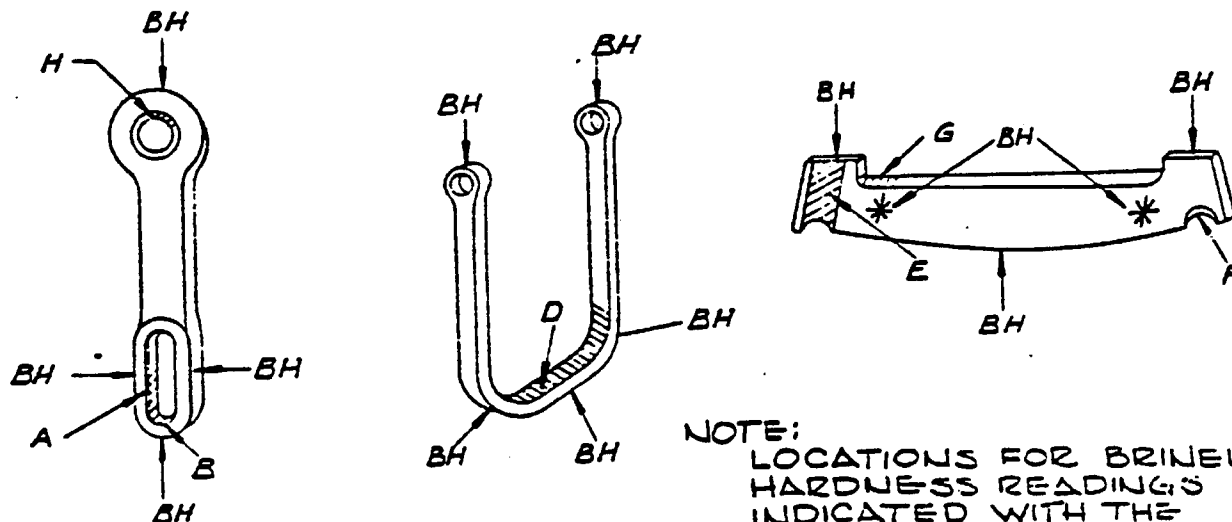
SWING HANGER CROSSBAR:

1. CROSSBARS $1-3/8"$ OR LESS IN THICKNESS WHEN WORN A TOTAL OF $1/16"$ ON BOTH SIDES, "E".
2. CROSSBARS GREATER IN THICKNESS THAN $1-3/8"$ MAY BE WORN A TOTAL OF $1/8"$ ON BOTH SIDES, "E".
3. WHEN WORN $1/8"$ IN THE CROSSBAR SEAT "F" WHICH CONTACTS THE SWING HANGER.
4. SWING HANGER CROSSBARS WHEN WORN IN EXCESS OF $3/16"$ IN SADDLE BEARING SEAT SURFACE "G".

GENERAL:

SWING HANGERS AND CROSSBARS AFTER INSPECTION AND/OR RECLAMATION SHALL BE STAMPED WITH $1/4"$ HIGH LETTERS. THE STAMPING SHALL INDICATE THE SHOP, MONTH AND YEAR AT WHICH THE PARTS WERE INSPECTED AND/OR RECLAIMED USING ABBREVIATIONS AS INDICATED IN SECTION II. OF RECLAMATION PROCEDURE (USE LOW STRESS STAMPS).

SWING HANGERS AND CROSSBARS WHICH HAVE THE BEARING SEATS NOT WORN TO THE LIMITS OF WEAR AS SHOWN, ARE TO HAVE THE BEARING SURFACES REFORMED TO THE ORIGINAL CONTOUR AND PARTS REAPPLIED.



NOTE:
LOCATIONS FOR BRINELL
HARDNESS READINGS
INDICATED WITH THE
SYMBOL "BH".