HEAD OFFICE
HINDUSTHAN ENGINEERING AND INDUSTRIES LIMITED
MODY BUILDING, 27, R.N.MUKHERJEE ROAD
KOLKATA-700001
E-mail: ho@heilindia.com

WORKS
HINDUSTHAN ENGINEERING AND INDUSTRIES LIMITED
ENGINEERING UNIT– BAMUNARI PLANT
DANKUNI, HOOGHLY, W.B.712250
E-mail: eubp@heilindia.com

Index

The manual has been made for inspection and maintenance of Hindusthan Engineering & Industries Limited makes UHD-45 Draft Gear. The information contained herein is a summary of UHD-45Draft Gear maintenance during POH or on the repair track for any reason.

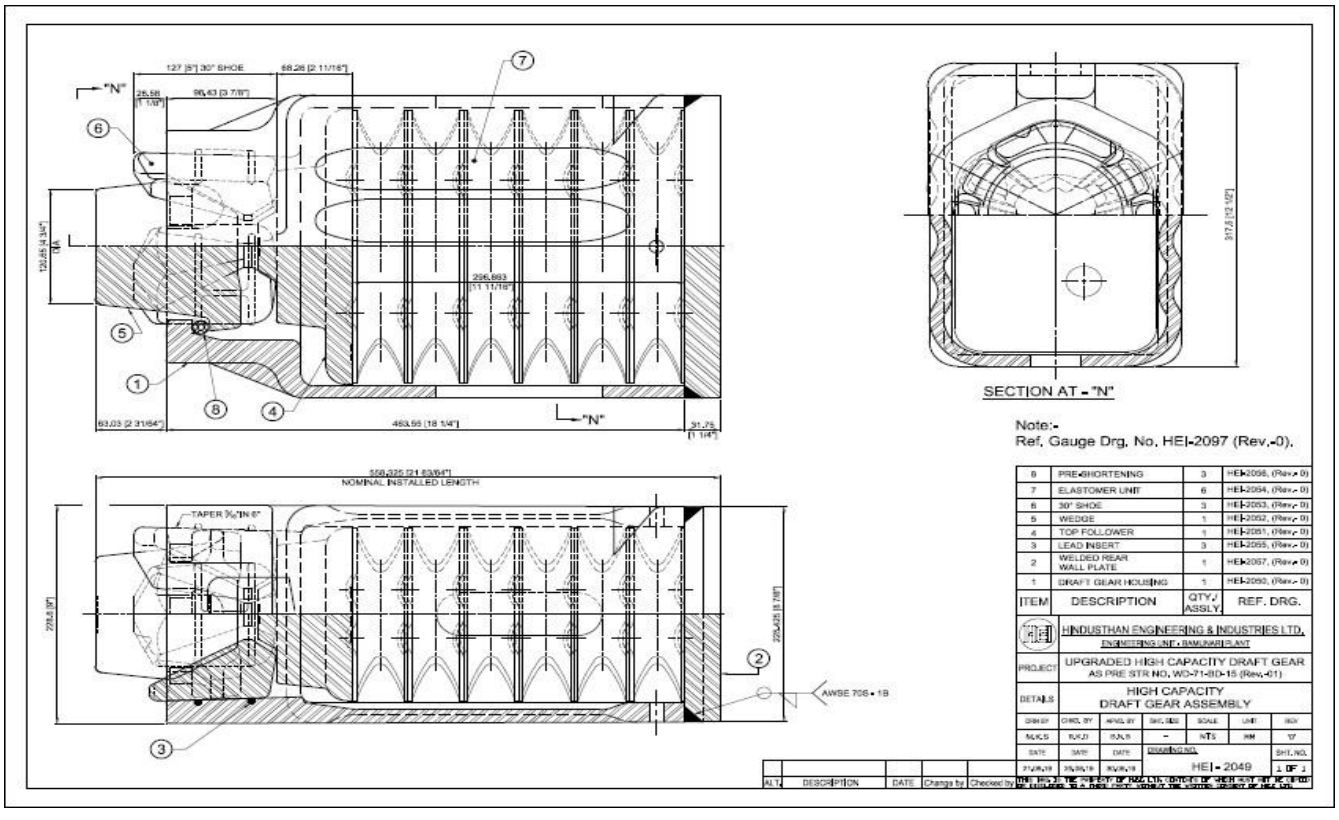
1. UHD-45 DRAFT GEAR: -

This draft gear is fully enclosed, self-contained unit assembled with pre-compression force of Rubber pads, so that all parts are tightly in relation to one another. It is suitable to all wagons with 24 ⅜" (625.5mm) standard pockets, having capacity 45000 ft-lb.

Under normal service condition the draft gear is tightly fitted in yoke with Cast follower.

2. COMPONENTS (SPARE PARTS) OF UHD-45DRAFT GEAR: -

a) Draft Gear Housing (Drg. No. HEI-2050)
b) Top Follower (Drg. No. HEI-2051)
c) Wedge (Drg. No. HEI-2052)
d) 30° Shoe (Drg. No. HEI-2053)
e) Elastomer Unit (Drg. No. HEI-2054)
f) Lead Insert (Drg. No. HEI-2055)
g) Pre-Shortening (Drg. No. HEI-2056)
h) Welded Rear Wall Plate (Drg. No. HEI-2057)
i) Cast Follower (Drg. No. HEI-2091)

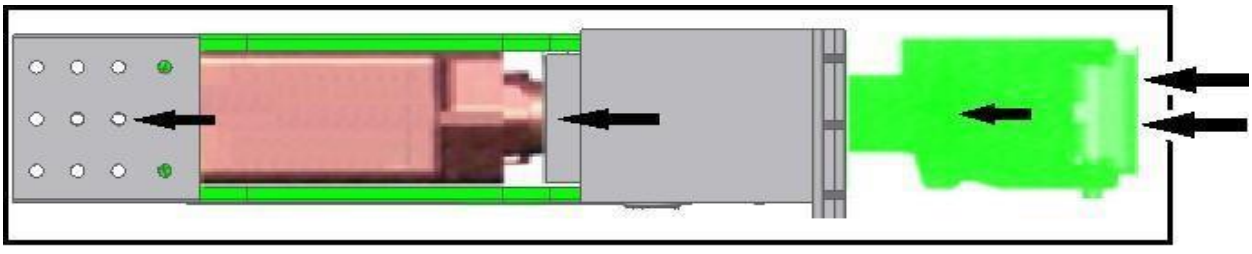


3. PRINCIPAL OF OPERATION OF DRAFT GEAR:

Draft gear can be called as the heart of draft system. It is a device that absorbs the energy of the equipment coupling together and it also provides a rebound force that maintains slack between the wagons. The device mainly works using the energy created by buff and draft forces.

3.1 DRAFT GEAR IN PUSHING/BUFF POSITION:

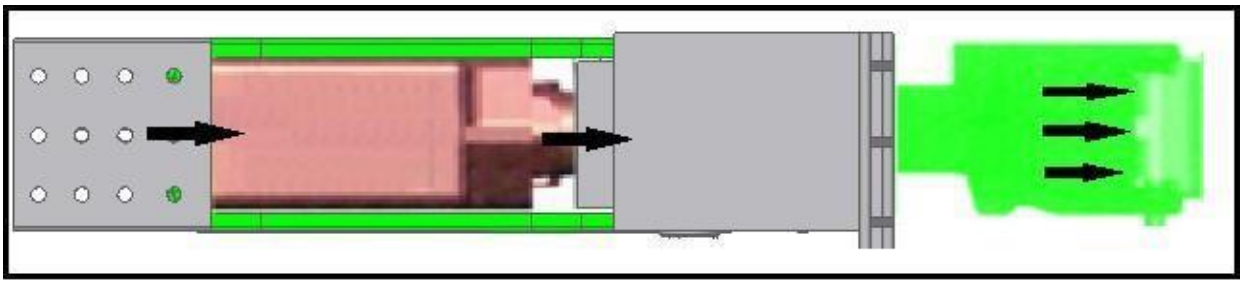
In the buff or pushing position, the wagon or locomotive is moved by pushing on the coupler. Having slack between the wagons and in the draft system allows for movement of the equipment without havingtomovethetrainsasasolidblock.Inthediagrambelowwecanseethatthepushingforceonthe front of the coupler will cause the end of the coupler shank to make contact with the cast follower. The cast follower makes contact with the front of the draft gear. At the opposite end of the draft gear are back stops or lugs attached to the center seal. They form the rear end of the draft pocket. With the cast follower forcing the front of the draft gear back, so that draft gear cannot move any further back because of the lugs. The result is the internal components of the draft gear are compressed and act as a shock absorber to the pushing / buff movement.



DRAFT GEAR IN BUFF POSITION.

DRAFT GEAR IN PULLING/DRAFT POSITION:

When moving a group of wagons or a train reach wagon is pulled by the coupler and the internal operation of the draft arrangement must work to allow the draft gear to work like a shock absorber. The coupler is connected to the yoke by a pin. When the coupler is pulled forward, the pin pulls the yoke forward inside the yoke the draft gear and the cast follower. With the yoke pulling the draft gear forward from the back end, the draft gear movement is restricted by the contact of the front cast follower. The cast follower moves forwards slightly but is now restricted by the end of striker or lugs. The result of the draft gear now gets compressed again. Thus the draft gear is compressed in both pushing and pulling action of the coupler.



DRAFT GEAR IN DRAFT POSITION.

4. INSTRUCTION FOR INSPECTION TO DETERMINE SERVICE ABILITY: -

4.1 The UHD-45 Draft gear is a high capacity, self-contained unit assembled with pre-compression force of rubber pads, so that all parts are tight in relation to one another. When installed in a 625.5 mm Draft Gear Pocket, in combination with a 57.2 mm front cast follower, the UHD-45Draft Gear tightly fills the pocket and under normal service conditions will provide years of maintenance free service.

When examination is made of the gear applied to the freight car, the device shall be condemned, if it is found that:

a) Broken or split housing, housing with cracks of any length in critical area or cracks 1" or longer anywhere in the housing, Cracks less than 1" in non-critical area shall not be considered defects.

b) A bulge in the rear wall of the housing more than 3/16".

c) Broken or cracked parts that bear on the follower at any time during the buff or draft stroke.

d) Splitting or separation of rubber from metal plates.

e) Obvious heat or fire damage to rubber.

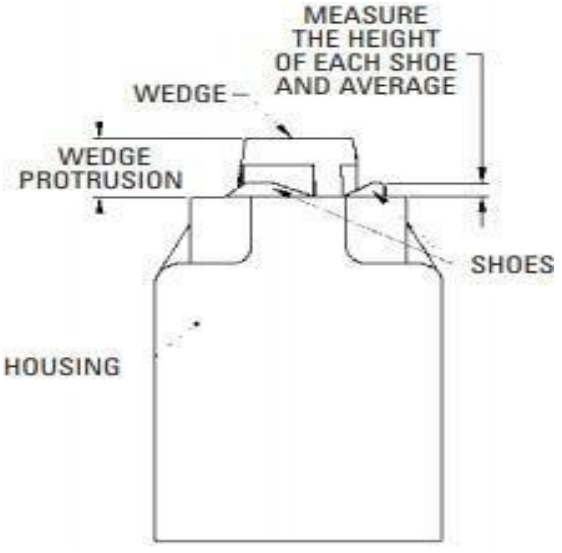
f) Installed draft gears with gear length less than specified.

The slack in the draft gear arrangement does not indicate that the draft gear is defective as this condition may be due to worn draft attachment such as yokes, yoke pin, couplers and over-size draft gear pockets should this the case, this parts should be renewed or reworked to return the draft attachments to alike new condition eliminating the free slack.

UHD-45Draft gear which has been removed from a freight car for inspection purpose is suitable for service if it is found:

a) The housing is not broken and is without cracks and without bulging.
b) The friction clutch consisting of wedge and shoes is intact.
c) The friction clutch is tight.
d) Less than 6.5mm wear in the original metal thickness at the mouth of the friction bore housing contacted by the friction shoes.

If a draft gear conforms to the above factors, will not require any work except pre- shortening.



Pre-shortening.

The assembled UHD-45Draft Gear is now ready for use in wagon, but tofacilitate installation in to the yoke and draft gear pocket, it must be pre-shortened.

Place the Gear under a 200-ton open gap press, position the pre-shortening Block, on the shoes and apply a load compress the gear until there is sufficient vertical clearance between the housing and wedge lugs to be able to apply pre-shortner. Attach tap to 3 shortners using tap lower insert through openings.

Check the pre-shortened assembled length using GO-Gauge No. -HEI-2097.

5.0 DIS-ASSEMBLY OF SHOE & WEDGE

If either the shoes or wedge are broken or clutch is not loose, the following disassembly procedure can be used to replace the broken components.

The following equipment & special tools will be required to remove the shoes and wedge from the draft gear.

200 tones vertical open gap press.
Assembly block.
Assembly ring.

A wooden taper wedge plug for the old style hollow wedge or a 76mm or 3” diameter strength magnet with special long handle for the new solid wedge.

The press should be equipped with an appropriate ram press head to facilitate removal operation.

Place the assembly ring over the top outside of the friction bore of the housing. Put the assembly block inside the assembly ring so that its three legs evenly contact three shoes. Place the magnet on top of the solid wedge, its handle protruding through the hole in the assembly block.

Press down the assembly block compressing the shoes slowly into the gear.

While continuing to press on the shoes grasps the magnet or wooden plug handle and rotate

the wedge clockwise until the wedge lugs are completely clear of the housing lugs. The top of the shoes need to be almost even with the bottom of the housing lugs before the rotation can be accomplished. Once the lugs are clear to each other compression can be released and wedge and shoes can be removed.

Re-assembly:

For re-assembly, the assembly ring is first placed over the housing. The three shoes are put in position in the bore and the wedge is placed over the shoes, with each wedge lugs resting on the angled shoulder of the shoes. Next, the assembly block is put over the wedge, so the legs of the assembly block contact the top of the shoes. Press down very slowly and carefully, pushing the shoes into the housings. When the top of the wedge has cleared the bottom of the housing lugs by either tapping the handle or slightly rotating it clock

DIS-ASSEMBLY OF ALL THE COMPONENTS FOR COMPLETE RE-CONDITIONING

If complete reconditioning of UHD-45Draft Gear is required, the following disassembly procedure can be used.

If complete dis-assembly of the gear is required, the Rear wall plate must be removed from the gear housing. The gear should be mounted in a holding fixture incorporating hydraulic press acting axially on the housing ends. Lock the hydraulic ram about 6mm longer than the housing length so that the rear plate will be able to separate from the housing during cutting. The press ram must be capable of resisting a force exerted by the rubber pad spring stack.

Cutting of the rear wall plate can be done by an abrasive cut-off wheel or by gouging.

Release the hydraulic ram to free the gear. Remove the rubber pads, top follower, shoe and wedge from the housing.

7.0 INSPECTION OF DRAFT GEAR COMPONENTS AND THEIR REPAIR.

Housing

- Housings or cylinders must not have excessive porosity, surface discontinues shrinkage and inclusions.
- The housing wall thickness at the bottom must not be less than 11.9 mm (length side) and 19.8 mm (width side).
- Inside friction bore walls must be worn equally, and the wall thickness must not be less than 20.6mm. Sharp edges due to wear must be removed by grinding. Gouged areas can be blended in if they are no more 1/16” deep * 1” long in the vertical direction. Replace inserts if they are broken.
- There must not be any bottom ridging in the bore.
- Bore taper should be smooth and any concavity must not exceed 0.8 mm. There should not be broken lugs or cracks in the housing.
- The Housing must pass through the box gauge Drawing. No. HEI-2059(Sheet 02 of 02) &Inside width gauge Drawing. No.–HEI-2062 & HEI-2063.

- Rectify as per the acceptance tolerance limit, incase welding is required in the component, pre-heating of the welding electrode shall be ensured.
- Verify that low hydrogen welding electrodes, designated for the appropriate type of material, are used exclusively for repairs. Welders should be tested and qualified in the position welding is to be performed. Weld repair must be free of any crack.
- Component shall be heat treated after welding. Furnace should be adequate to assure uniform temperature throughout. Temperature controls and recording equipment should be in proper working order. Furnace calibration equipment should be observed.
- Observe finished grinding of casting to ensure surface discontinuities resulting from weld repair are controlled to the surrounding surfaces.
- To function properly, Prior to the re-application of the Draft Gear Wagon Pocket has to be checked and to be maintained 625.5mm, +0.0, -1.55mm by welding steel shims to the back stop.
- Every part of the assembly must be free from oil, moisture and grease.
- Wedge and shoes are to be shot-blasted to remove rust and dirt before assembly.
- No sharp edges are to be permitted and they could cause cutting and gouging.
- Before assembly hardness of the case-carburized component shall be checked randomly micro-structure shall be tested in the laboratory.
- Gauging shall be carried out on each component.
- Housing not confirming to all gauges may either be rejected or rectified considering the requirement.
- Identification of repaired housing: once the housing is inspected and repaired then it should be suitably mark for proper identification.

Rubber Pads

- If any defects on elastomeric unit like tears, large material chunks, large bond failures, or extreme wear into the steel plate edges. It will be rejected.
- Rubber pads are gauged and must not be less than 54 mm as measured by a vernier caliper.
- If the steel plates are found only bent, these plates are acceptable as these will be straighten during assembly.
- Creases and folds are normal and are acceptable for reconditioning gears.
- Rubber pads must be full bonded to each of the material.
- Top and bottom surface of plates must be free of elastomer films or drops.
- Rubber pad must be free from cracks.
- Parting line flash should not exceed 0.78mm.
- Elastomeric material should be free from foreign material i.e., trapped air etc.

Static Test

- Rubber pads must be inspected carefully. Hundred percent pads are inspected visually. Squeeze each pad to a height of 37 mm and check for bond failure, chunks cracks and bubbles. These defects are causes for rejection.
- Check pads for bulge. Elastomer should not extend beyond the steel plates when squeezed to solid height.
- Pad must be returned to minimum free height of 61 mm within one minute after load is released.
- Pads must not be skewed after the load is released.

Wedge

In order to reuse the wedge from gears that have been returned from service for reconditioning, they should be shot blasted to identify following:

- No severe Cracking or spalling of the carburized case on the friction or the top of the wedge. Spall greater then (12.7mm x 12.7mm) anywhere of the wedge should be scrapped. Wedges that have more than two spalls on the shoe contact area must be scrapped. Wedges having spall on the top surface of lug must be scrapped. Wedges having more than two spall on the top surface of wedges must be scrapped. Please see figure no. 01
- No abnormal wear on any friction surface.
- No broken locking lug.
- No identification of any crack on any of the locking lug.
- Apply wedge inspection gauge.

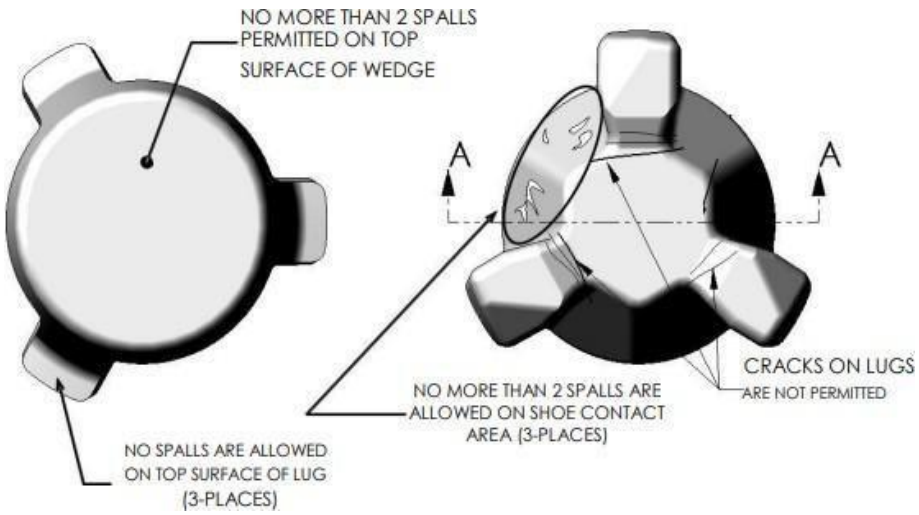


Figure No. 01

Shoes

In order to reuse the shoe from gears that has been returned from service for reconditioning, they should be shot blasted to identify following.

- No concave wear on any friction surface.
- No cracks and spalls.
- No greater than 0.8mm wears on any friction surface as figure below.
- Apply thickness gauges and flatness gauge no.
- Replace any shoes that have any of these conditions. Please see figure no. 02

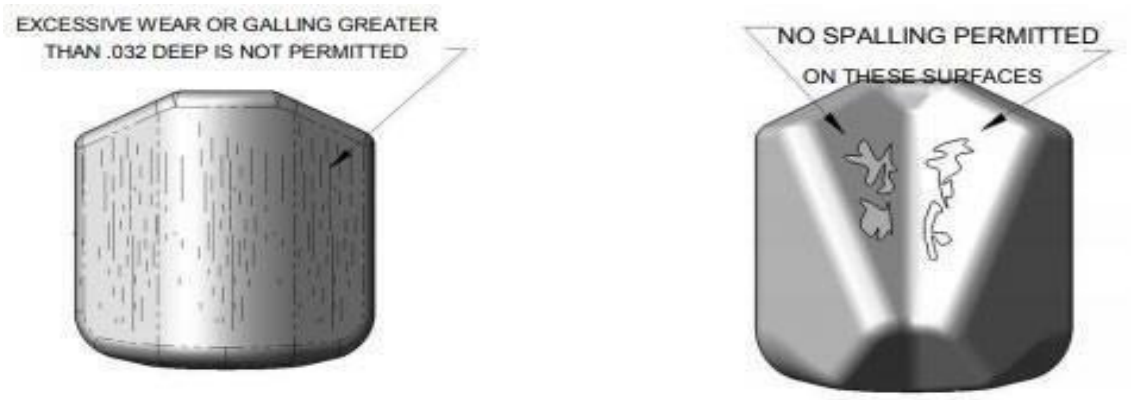


Figure No. 02

Top follower

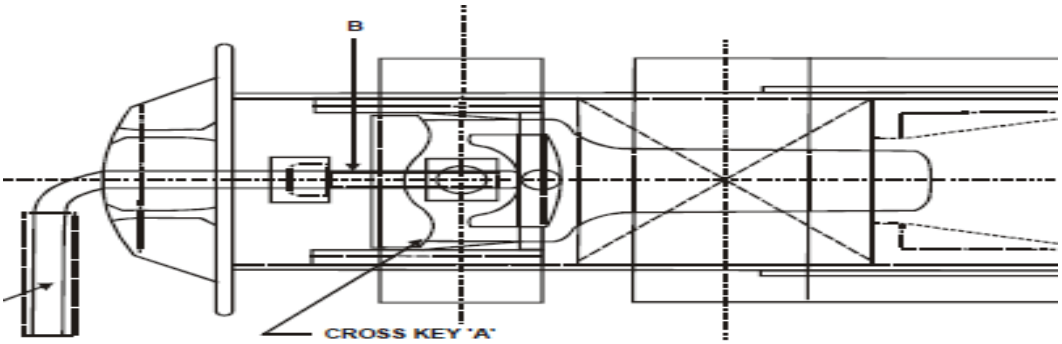
- Outside profile dimension must be at least 287mm X 179mm.
- All followers must be shot blasted prior to inspection. Sharp edge to wear must be blended with the surrounding area. Flatness shall be checked visually. Followers showing harmful distortions shall be rejected out-rightly.
- Follower overall thickness should be checked with gauge No.HEI-2080.
- Flange thickness for bottom flange must be checked with gauge No.HEI-2081.

REMOVAL OF DRAFT GEAR FROM WAGON

When a draft gear with cast follower is installed into a pocket of a wagon, it has ample initial spring load to provide a tight fit into the draft gear pocket. While removing the draft gear from the wagon pocket, it is necessary to compress the draft gear approximately 6.35 mm. In order to clear the front and rear stops, a suitable device can be used to compress the draft gear so that the draft gear and yoke assembly may be free to be lowered from the wagon.

To remove the gear and yoke assembly when the gear is tight in the wagon pocket, first apply cross key through front of yoke and position in yoke pinhole. Then apply screw B in a cross key A and turn until contact is made with front follower of draft gear. With wrench C, turn screw with the aid of a piece of 38 mm pipe until gear is loose in the wagon pocket. Remove wrench and lower the gear and yoke assembly on support from the wagon pocket.

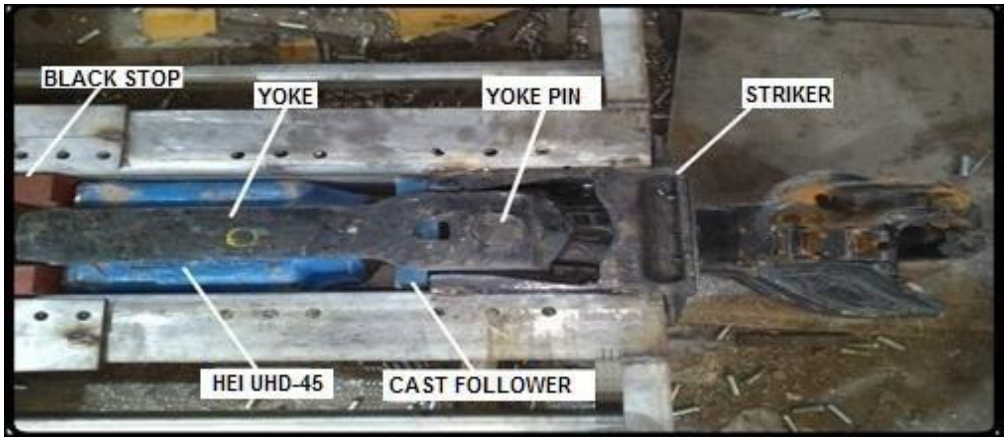
To remove the draft gear from the yoke, compress the gear by means of screw and insert two pre-shortners as done during assembly. Then release the screw and remove draft gear.



REMOVAL OF DRAFT GEAR FROM WAGONS

LOWERING OF DRAFT GEAR IN WAGON

To install a draft gear into a pocket of a wagon. It is necessary to pre-shorten the draft gear and maintain pre-shorten height to 559mm maximum and this pre-shorten draft gear is placed into a yoke opening with front cast follower. This draft gear, follower and yoke assembly is placed in a pocket of a wagon (between back stop and striker) as shown attached in snap.



RE-ASSEMBLY OF RE-CONDITIONEDUHD-45DRAFT GEAR

Tools required:

- 200t vertical press.
- Draft Gear assembly ring support fixture.

For re-assembly, the assembly ring is first placed over the housing. The three shoes are put in position in the bore and the wedge is placed over the shoes, with each wedge lugs resting on the angled shoulder of the shoes. Next, the assembly block is put over the wedge, so the legs of the assembly block contact the top of the shoes. Press down very slowly and carefully, pushing the shoes into the housings. When the top of the wedge has cleared the bottom of the housing lugs by either tapping the handle or slightly rotating it clock- wise, the wedge will take its position in place and the compression can be released.

WELDING OF REAR PLATE AFTER ASSEMBLY

- After the weld zones of the housing and rear wall plate have been suitably preheated, the
  heating gas is to be turned off, and the heating ring is to be removed from the housing.
- Place the remaining two rubber pads on the pad stack these pads will be projecting above the rear of the housing.
- Place the preheated rear wall plate on top of the rubber stack and position it as closely as possible so the edges of the plate align with the edges of the housing.
- Position on draft gear assembly so that it is centered directly under the ram of the press. This is done to ensure even loading and square closure.
- Compress the rear wall plate down until it is firmly and squarely in contact with the housing base. Check the alignment of the rear wall plate sides in relation to the housing base sides. If necessary, release the press pressure, reposition the plate and compress again until the sides of the two pieces are aligned. It may be necessary to do this a number of times, depending on the skill and experience of the operator, till the proper alignment is obtained.

ROOT RUN WELDING

- With the rear wall plate firmly held in place under the press, a root run, approximately 6.4 mm-7.9 mm (1/4"-5/16") in depth is made completely around all four sides. It is very important to obtain complete fusion and penetration into the full depth of the weld preparation.
- MIG welding with AWS /SFA 5.18 IRS M46 CLASS-I E70S-6, 1.2 mm diameter wire is used. Preferable shielding is a CO2 gas. The welding machine to be set for 250-280 amps. 20-30 volts.
- When the root run has been completed, the gear is removed from the press and moved aside. Inspect, to be sure that it is free of any visible defects.

FILLER PASS WELDING

- The accumulated root run welded gears are placed side by side on a holding table, which is either flat or slightly tilted up to permit down hand welding of the filler pass.
- Use MIG welding with the same wire as used in the root run. 100% CO2 shielding gas is used in the fill pass. The current & volts are set at 250-280 Amp and 20-30 Volts respectively.
- Weld one side of each of the accumulated gears.
- Turn each of the gears 90 degree and weld the second side of each gear. Continue this process till all 4 sides have been welded. The fill pass should leave a weld bead that protrudes just above the housing surface.
- All welds are to be ground flush. The finished gear assemblies are then box gauged for dimensional acceptability.

12.0 PRE-SHORTENING & PAINTING

- The assembled UHD-45 draft gear must be pre-shortened to facilitate installation into the yoke and draft pocket.
- Place the gear under a 200-ton open gap press, position the pre-shortening block on the shoes and apply a load. Compress the gear until there is sufficient vertical clearance between the housing and wedge lugs to insert standard pre-shortner. Attach tap to 3 inserts (cube) using taps lower inserts through openings.
- Check the pre shortened length.
- After pre-shortening the external surfaces of the draft gear is to be painted with black or blue paint.

LIST OF GAUGES.

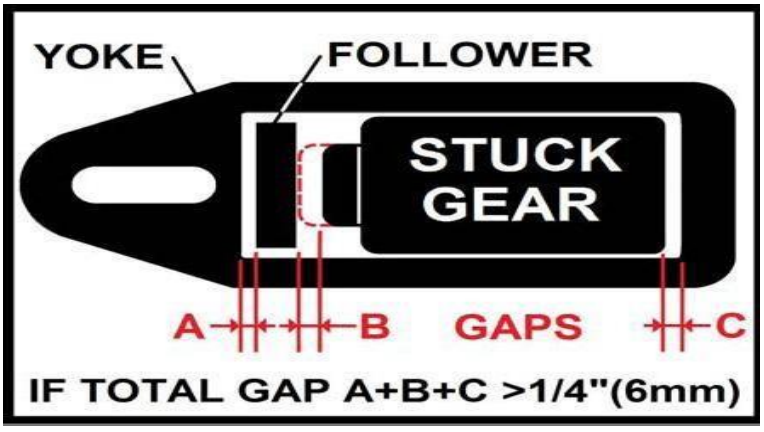
List of Gauges for Upgraded High Capacity Draft Gear As Per STR No. WD-71-BD-15(Rev.01)			
S.No.	**Description**	**Drg. No.**	**Alt.**
1	HOUSING END WALL THICKNESS GAUGE (0.50")	HEI-2058	Nil
2	HOUSING BOX GAUGE (SHEET 1 OF 2 & 2 OF 2)	HEI-2059	Nil
3	HOUSING LUG CLEARANCE GAUGE	HEI-2060	Nil
4	INSIDE HOUSING DEPTH GAUGE	HEI-2061	Nil
5	INSIDE HOUSING WIDTH GAUGE (184.15)	HEI-2062	Nil
6	INSIDE HOUSING WIDTH GAUGE (292 Min.)	HEI-2063	Nil
7	HOUSING SIDE WALL THICKNESS GAUGE (0.8125")	HEI-2064	Nil
1	WELDED REAR WALL PLATE THICKNESS GAUGE	HEI-2070	Nil
2	WELDED REAR WALL PLATE LENGTH GAUGE	HEI-2070/01	Nil
3	WELDED REAR WALL PLATE WIDTH GAUGE	HEI-2070/02	Nil
1	30° SHOE BACK ANGLE AND RADIUS GAUGE	HEI-2071	Nil
2	30° SHOE BACK SURFACE FLATNESS GAUGE	HEI-2072	Nil
3	30° SHOE FACE CROWN GAUGE	HEI-2073	Nil
4	30° SHOE FACE "NO SEAT" GAUGE	HEI-2074	Nil
5	30° SHOE FACE "SEAT" GAUGE	HEI-2075	Nil
6	30° SHOE OUTSIDE WIDTH GAUGE	HEI-2076	Nil
7	30° SHOE THICKNESS GAUGE	HEI-2077	Nil
1	TOP FOLLOWER BOTTOM FLATNESS GAUGE	HEI-2078	Nil
2	TOP FOLLOWER OUTSIDE CONTOUR GAUGE	HEI-2079	Nil
3	TOP FOLLOWER OVER ALL THICKNESS GAUGE	HEI-2080	Nil
4	TOP FOLLOWER THICKNESS GAUGE FOR BOTTOM FLANGE	HEI-2081	Nil
5	TOP FOLLOWER THICKNESS GAUGE	HEI-2082	Nil
1	WEDGE LUG DEPTH GAUGE	HEI-2083	Nil
2	WEDGE ANGLE GAUGE	HEI-2084	Nil
3	WEDGE BODY LENGTH GAUGE	HEI-2085	Nil
4	WEDGE LUG WIDTH GAUGE	HEI-2086	Nil
5	WEDGE TOP TO TOP OF LUG DEPTH GAUGE (MAX.)	HEI-2087	Nil
6	WEDGE TOP TO TOP OF LUG DEPTH GAUGE (MIN.)	HEI-2088	Nil
7	WEDGE TRIM DIAMETER GAUGE	HEI-2089	Nil
1	CAST FOLLOWER THICKNESS CHECKING GAUGE	HEI-2092	Nil
2	CAST FOLLOWER PROFILE GAUGE	HEI-2093	Nil
3	CAST FOLLOWER OUTSIDE CONTOUR GAUGE	HEI-2094	Nil
4	CAST FOLLOWER WIDTH GAUGE	HEI-2095	Nil
5	FOLLOWER LENGTH GAUGE	HEI-2096	Nil
1	PRE-SHORTENED ASSEMBLED LENGTH "GO" GAUGE	HEI-2097	Nil
1	TEST PIECE LOCATION OF DRAFT GEAR HOUSING	HEI-2098	Nil
2	TEST PIECE LOCATION OF CAST FOLLOWER	HEI-2099	Nil

14.0 Stuck Draft Gear Removal Process.

Derived from AAR Manual of Standards and Recommended Practices Book – B-II, RP-101-83, Pages 57 – 98

Never remove a stuck draft gear from a yoke and follower assembly!

IF A DRAFT GEAR IS SUSPECTED TO BE IN STUCK CONDITION, IMMEDIATELYNOTIFY THE SUPERVISOR IN CHARGE OF SAFETY.



A draft gear is stuck if the gaps add to over 1/4" (6mm) as shown.

Properly contain and label the assembly per the following guidelines.

This document does not supersede any relevant AAR instructions or guidelines. Hindusthan Engineering & Industries Limited assumes no liability for injury due to failure to adhere to recommended practices.

1.0 SCOPE

The following procedure applies to any stuck draft gear made or refurbished by HEI. This procedure outlines the handling methods recommended when cars are determined to have a stuck draft gear, by visual inspection or as noted.

IDENTIFYING A STUCK DRAFT GEAR

To avoid personal injury when performing inspection or repairs on rail cars, always make certain the car is uncoupled in a protected location, with "blue flag" protection and/or track lockouts where applicable, with the wheels chocked on all trucks in each direction, and that the proper safety equipment is worn following all applicable OSHA and/or FRA guidelines.

Stuck draft gears are extremely dangerous! Keep away from coupler and clear of draft system components. Never attempt to physically check free slack if gear is suspected of being stuck (see 2.2.2).

Recommended Inspection

- If gears are suspected of being in a stuck condition, use extreme caution and verify by visual inspection of gear system per 2.2 below before deferring to standard inspection guidelines.
- This procedure is for stuck draft gear conditions, and designed to serve as a supplement to the AAR guidelines in the *AAR Manual of Standards and Recommended Practices* for the inspection of draft gear components.

Indications of a Stuck Draft Gear:

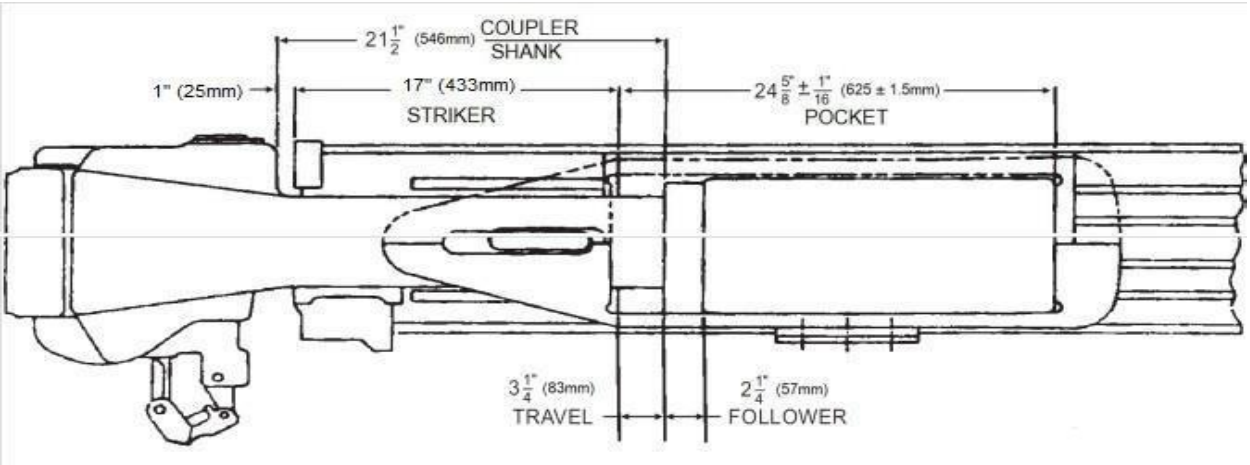


Figure 2.2.1: Side View of Coupler and Pocket

- Free slack exceeding 1 in. (25mm) is an indication of a worn or defective coupler shank, coupler yoke connection, yoke, draft gear, follower, or car pocket. Slack is defined as the difference in distance between coupler striking horn and striking casting. Excess slack may be an indication of a stuck draft gear that could cause personally injury. Never attempt to physically check free slack on the coupler without visually verifying that the draft gear is not stuck. If excess slack is suspected, perform visual inspection first as outlined in section 2.2.2 below.
- To avoid personal injury, a visual inspection should be made of the draft gear system to determine if the draft gear is in a "stuck" condition or if any other unsafe or abnormal condition is evident. If an abnormal condition is present, proceed with extreme caution.

  "Stuck" gear is a term used to describe a condition where abnormal friction or unseen broken parts prevent the components of the friction clutch, still under high force, from returning to their normal fully released position and filling out the draft gear pocket. This inspection applies only to draft gear systems that are not coupled. Certain gaps can be present as shown, if the car is coupled. See Figure 2.2.2.
  GAP A is the distance between the follower and front lugs. GAP B is the distance between the wedge of the draft gear and the follower. GAP C is the distance between the
  rear lugs and the back of the draft gear housing. Any total longitudinal gap (GAP A+GAP B + GAP C) in excess of 1/4 in. (6mm) between the gear, follower, and the car pocket should be viewed with great caution:

A stuck gear is dangerous because the slightest vibration could cause the gear to suddenly release, forcibly propelling the friction components and the follower plate and coupler outward. If a draft gear is determined to be stuck, immediately report this condition to the supervisor in charge of safety.

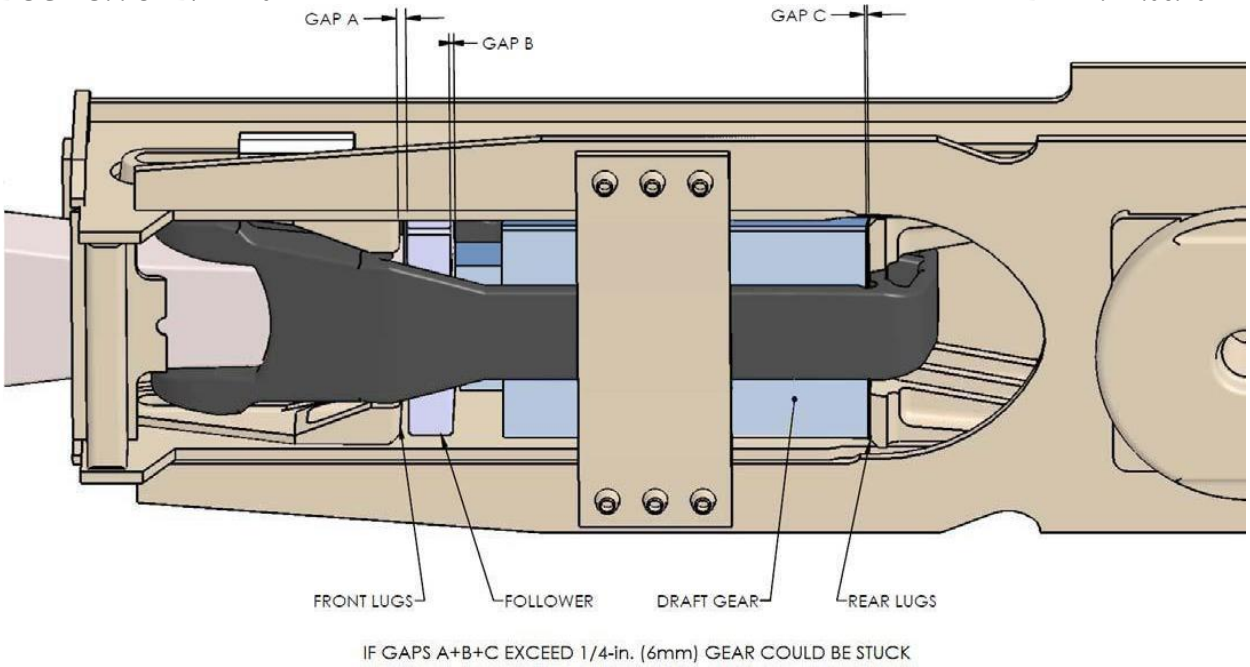


Figure 2.2.2: Bottom View of Gear-Sill-Yoke Assembly

An additional scenario where the gaps could be present as outlined in 2.2.1 or 2.2.2 is in the case of a completely worn out draft gear. If the cutch components are loose (and not wedged into a fixed position) the gear can be removed and replaced per the AAR guidelines.

STUCK DRAFT GEAR PROCEDURE

HEI recommends securing the movable parts of a stuck draft gear while still in the yoke, so that they cannot release unexpectedly, and disposing of the entire assembly properly. If the draft gear is determined to be in a "stuck" condition, follow the procedure outlined below.

Safety Precautions

- Appropriate personal protective equipment must be worn per your employer's policy, including protection for the eyes and ears, to protect from possible injury.
- Before working on draft system, make certain that the car is in a protected location, with "blue flag" protection and/or track lockouts where applicable.
- Do not stand or work directly in front of coupler.
- Chock the wheels at the end of the car not being worked on.
- Your safety is important to HEI. Please follow all safety measures provided by your employer, equipment instructions, all applicable OSHA and/or FRA guidelines, and proceed with extreme caution.

Securing and Removal Procedure

- If the car has two yoke support plates, remove the front plate only.
- Inspect the yoke and follower for soundness.
- Securely weld the follower and then draft gear housing to the lower yoke strap using strong intermittent welds (see Figure 3.2.3a). If the yoke strap is broken, suitable bar stock should be selected and welded to both the follower and draft gear housing or yoke to securely contain the draft gear (see Figure 3.2.3b).
- The coupler can now be removed.
- Disconnect the brake rigging from the truck to be rolled out. Jack the car and roll the truck clear of the working area (chock the wheels to prevent unwanted movement).
- DO NOT remove the yoke support plate until a lift table or lowering device is placed under the yoke and draft gear, and the yoke strap is supported securely. Draft gears should always be lowered, never dropped.
- Determine if the key slot is broken or if the yoke will interfere with the coupler carrier as it is lowered.
- Position lift-table or other lowering device under the yoke support plate, and use blocking as required to securely support the yoke away from the support plate.
- Remove yoke support plate rivets or bolts.
- Slowly lower the yoke and gear assembly to the ground as one unit following AAR standard removal procedures for draft gear / yoke assemblies.
- Add a steel spacer block behind draft gear housing to firmly restrict expansion of gear (Fill gap between yoke butt and draft gear rear wall). Add additional shims or filler blocks to take up any longitudinal space. Weld movable parts to the yoke and securely restrain the draft gear from expanding. See Figure 3.2.11 for suggested weld locations and restraining details.

⚠ DANGER

Weld near the clutch area of the housing last, after follower and back of gear are securely welded to yoke. Temperature change near the friction components can cause the clutch components to release suddenly.

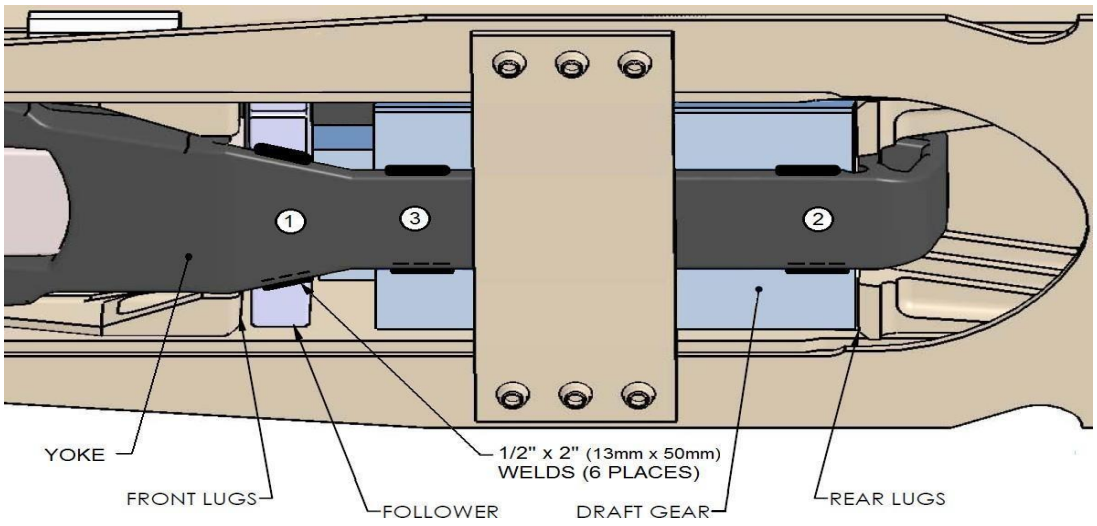


Figure 3.2.3a: Welding Yoke to Gear and Follower

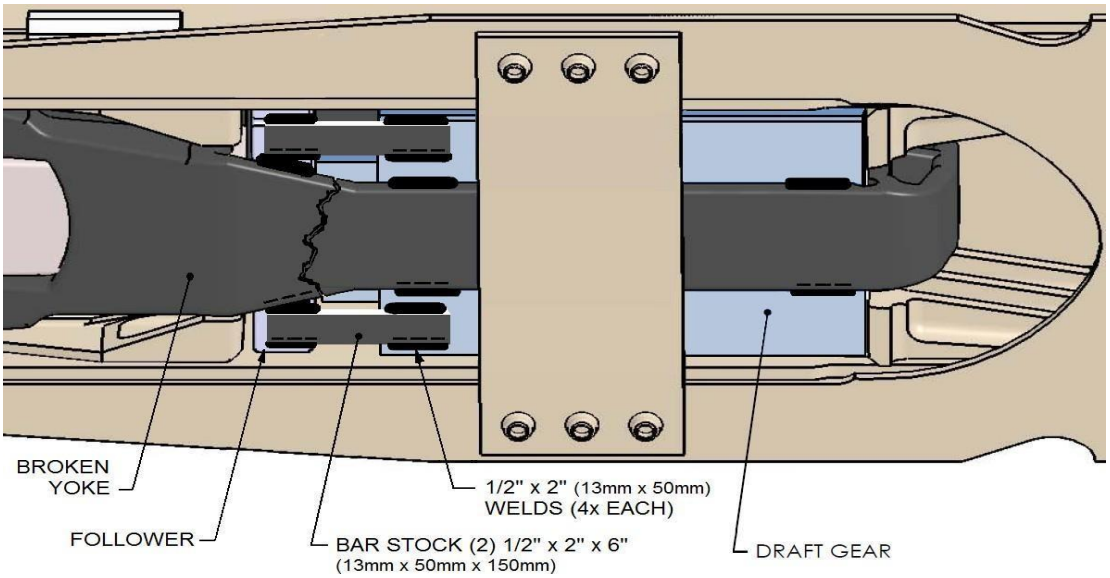


Figure 3.2.3b: Broken Yoke

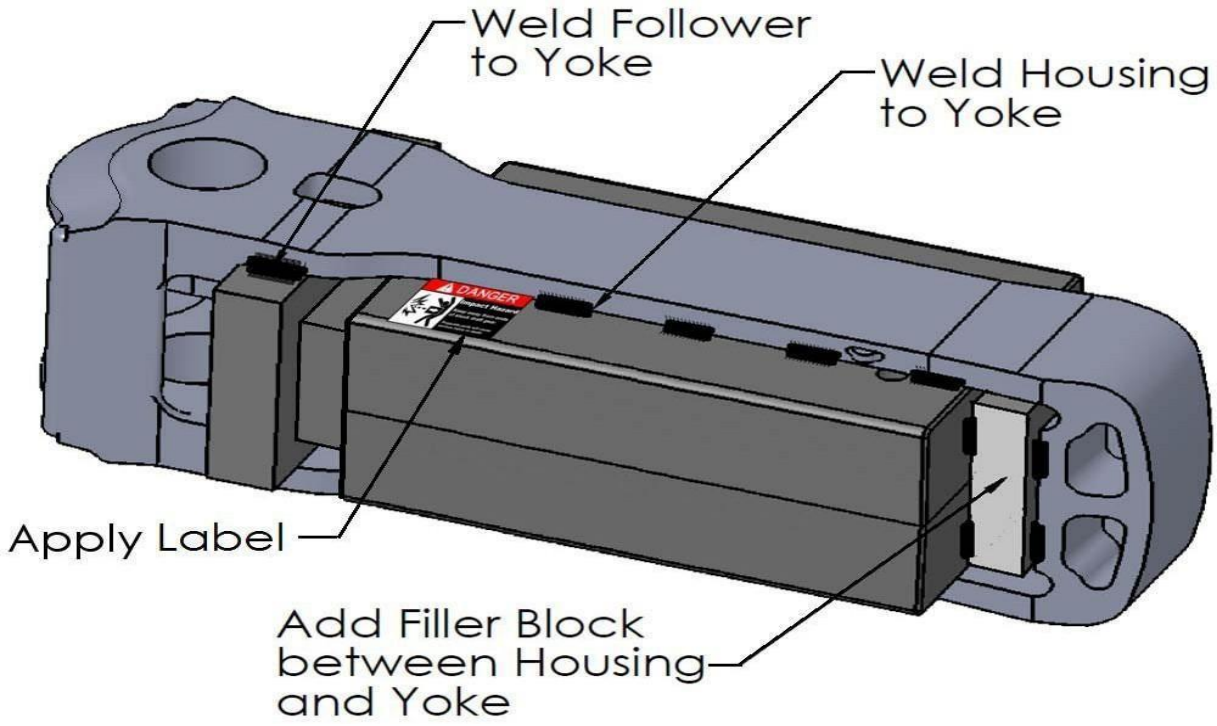


Figure 3.2.11: Weld Locations

- If any of the spring pads in an open style gear appear to be bulging out of the open side of the draft gear, a containment strap or plate at least 1/8" thick must be welded across the opening, after completing 3.2.11, to prevent the possibility of the springs suddenly bursting out of the housing.

- Any severe cracks or severe damage should also be handled cautiously. Similar containment straps or plates as designated in 3.2.12 should be employed to secure the draft gear after containing per 3.2.11.
- Print out copies of the Danger Label, figure 3.2.14, and apply as shown in figure 3.2.11 following OSHA standards. Insure that the label is readable and adequately attached.
- Only after the draft gear is firmly secured to the yoke and containment components with the front and back of the draft gear solidly supported and secure, and the gear is labeled as shown in figure 3.2.11, should the gear be considered safe for transport or proper disposal.

Stuck Gears Not Contained In a Yoke

DANGER

Stuck gears not contained in a yoke present a different situation not covered by this manual. Please be advised that the gears are dangerous in this condition, and will remain so until sufficiently restrained. HEI requires that stuck draft gears never be removed from a draft gear yoke and follower assembly. Contact your employer's chief safety representative immediately.

Contact HEI for UHD-45 draft gear issues or draft gear OEM for instructions.

Figure 3.2.14 "Danger Label" for printing per section 3.2.14