# Transmission Input Bearing Retainer

## Transmission Input Bearing Retainer

### Worn Surface

**See Figure 82.**

**Driver Notices**: The transmission is hard to shift into first and reverse gears.

**Observations:** Outer surface is worn with deep grooves and scratches. The wear is "cupped" towards the center of the retainer.

**Causes:** Normal wear. Also, the driver may be engaging the clutch brake when the vehicle is moving or trying to override drag from a seized pilot bearing.

**Correction:** Replace the transmission input bearing retainer. Inspect the clutch brake and replace if required. Inspect the pilot bearing and replace if required. Make sure the driver uses the clutch brake correctly. This condition is not covered under warranty.

***NOTE:***
***The transmission input bearing retainer can also be checked by measuring the distance from the top of the splines on the input shaft to the top of the bearing retainer as shown in Figure 82A. The TARGET distance for the input shaft is 8.657 inch (219.9 mm). The dimensions are based on SAE Standard J-1463 from the 1994 SAE Handbook, 36.120.***

Figure 82

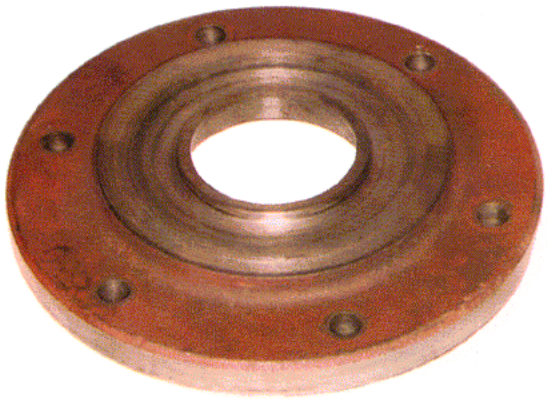
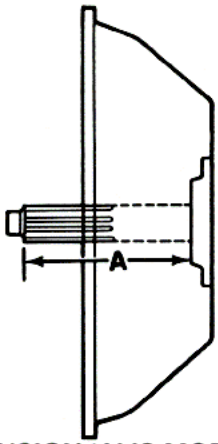


Figure 82A




IF DIMENSION 'A' IS MORE THAN 8.72 INCHES (221.48 mm), REPLACE THE INPUT BEARING RETAINER

# Clutch Cover / Intermediate Plate

Fig 11

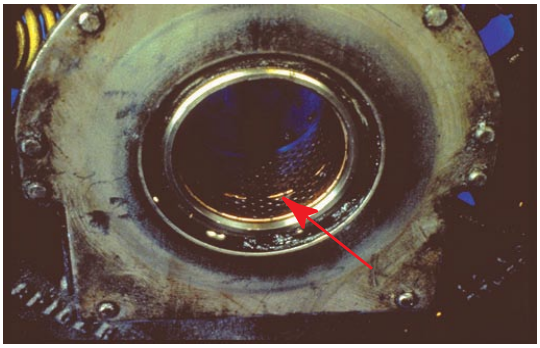
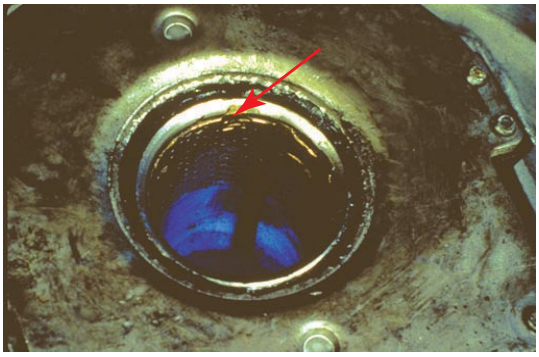


Fig 12

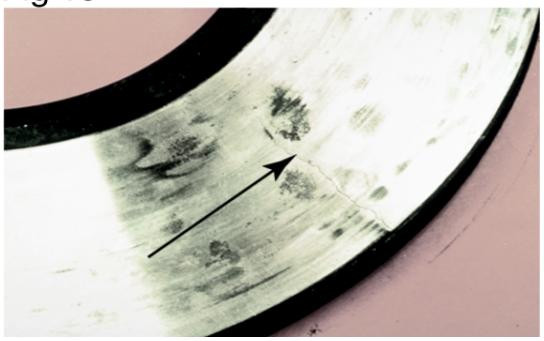


## Failure - Damaged Sleeve Bushing

**Possible Causes**

Failure to center the input shaft with the sleeve of the release bearing assembly, when installing the transmission, can cause this failure. If the transmission hangs up during installation, investigate the cause before preceding as excessive force can damage the bushing (see arrow in Figure 12). Allowing the transmission to hang unsupported in the sleeve bushing can damage the bushing. The arrow in Figure 11 shows another example of sleeve bushing damage on a heavy duty clutch.

Fig 13



## Failure - Damaged Intermediate or Pressure Plate

**Possible Causes**

Figures 13 - 16 depict damaged clutch plates which resulted from an abnormal amount of clutch slippage/heat. Some causes of this abnormal slippage/excess heat can be one or more of the following:

1. Incorrect clutch applications. In otherwords, the engine's torque rating exceeds the clutch's torque rating.

- Driver abuse. (refer to Factors that Effect Clutch Performance Sections concerning the specific driver practices that can lead to excessive heat).
- Improper/ inadequate clutch adjustments. More specifically, operating the truck without free-play for extended periods of time; adjusting the clutch via the linkage instead of the required internal adjustment.
- Overloading of the vehicle.

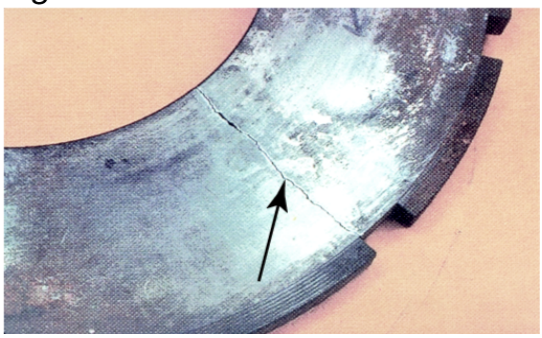
Figure 13 is an example of a cracked pressure plate. The heat flow was so great that the metal could not dissipate it quickly enough.

# Clutch Cover / Intermediate Plate

## Failure - Damaged Intermediate of Pressure Plate (Continued)

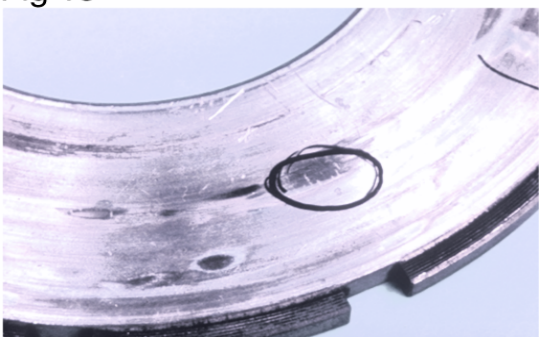
**Possible Causes (Continued)**
Figure 14 shows a broken intermediate plate. As in the previous example, the heat flow was so intense that the metal could not disperse the heat quickly enough.

Fig 14



In Figure 15, an area of the intermediate plate has been circled to reveal the damage of heat checks. These heat checks are actually small cracks with raised ridges that are capable of shaving off the facings of the driven disc.

Fig 15

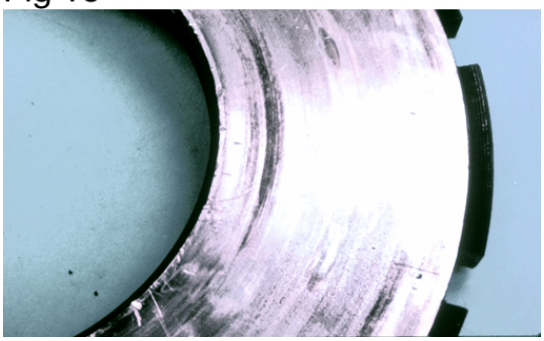


Finally, Figure 16 reveals an example of a burned or scorched intermediate plate in which the metal became so hot that it began to flow. The typical evidence of such a failure will be one or more of the following:

- High and low spots on the plate
- Partial transfer of the facing material (ceramic or organic) from the driven disc onto the plate
- A blue discoloration throughout the failed part

To view the resulting damage that can occur to the facing material of the driven discs, please refer to Figures 53-56 and 58.

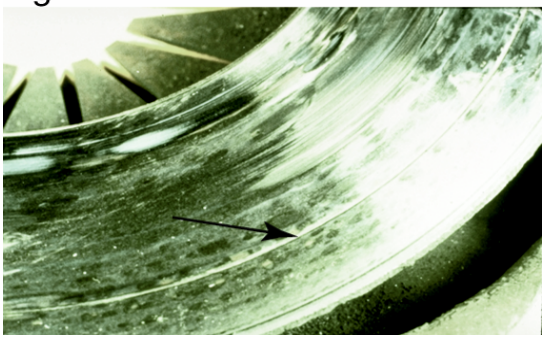
Fig 16



## Failure - Grooved Pressure Plate

**Possible Causes**
The groove (see arrow in Figure 17) worn into the face of this pressure plate was caused by the rivets of the driven disc facing. (For the related disc failure, see the description under Figure 70). The same damage can occur on both the intermediate plate and flywheel. A surface that is grooved can damage the new driven discs that are installed. As a result, a new clutch assembly should be installed. Refer to the OEM service manual concerning flywheel resurfacing.

Fig 17



# Clutch Cover / Intermediate Plate

Fig 18

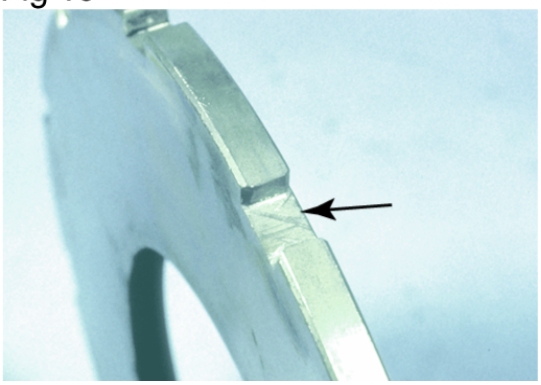
## Failure - Cocked Drive Pins (14" Pot-Style Clutches Only)

**Possible Causes**

The groove worn in the face of the drive pin slots are on the upper section of the face on one side of the slot (see arrow in Figure 18) and on the lower section on the opposite side of the slot. This indicates that the drive pins were cocked and causing the intermediate plate to hang-up. This will cause release problems and therefore hard shifting. Do not file the slots of the intermediate plate to correct the problem. Instead, you must reset the drive pin(s) until they are square to the flywheel.

**Note:** Always install new Eaton drive pins when installing a new Eaton Fuller 14" Heavy Duty Clutch. This is important because worn drive pins (against the new intermediate plate slots) can prevent the clutch from releasing cleanly. Also, ensure that the drive pins are set squarely to the flywheel's friction surface (refer to the Eaton Installation Instrutions packaged with each Eaton Fuller Clutch). Failure to set each drive pin squarely is the most prevalent reason for a "poor release complaint" on a recently installed clutch (Angle Spring and Easy-Pedal Plus 1402).

Fig 19



## Failure - Filed Drive Slots

**Possible Causes**

As indicated by the shiny areas on the drive slots, (see arrow Figure 19) the slots of this intermediate plate were hand filed. Eaton does not recommend this practice since it can cause unequal loading on the drive pins in the flywheel. Instead, Eaton recommends that the drive pins be checked for squareness to the flywheel friction surface and reset if necessary (see Eaton Installation Instructions).

# Clutch Cover / Intermediate Plate

## Failure - Broken Drive Pins and Worn/Broken Drive Slots (14" Pot-Style Clutches Only)

**Possible Causes**

Figure 20 shows a broken drive pin head that has become wedged into the intermediate plate's drive slot. Figure 21 is the same intermediate plate but with excessively worn and broken drive slots. Figure 22 shows a broken drive pin. The above failures can be caused by one or more of the following:

- Failure to use the anti-rattle springs packaged with each super-duty clutch
- Misapplication of the clutch
- Unequal loading on the drive pins as a result of filing the drive slots.

**Note:** Failure to use the anti-rattle springs can cause other problems such as a noisy or poor releasing clutch.

Fig 20

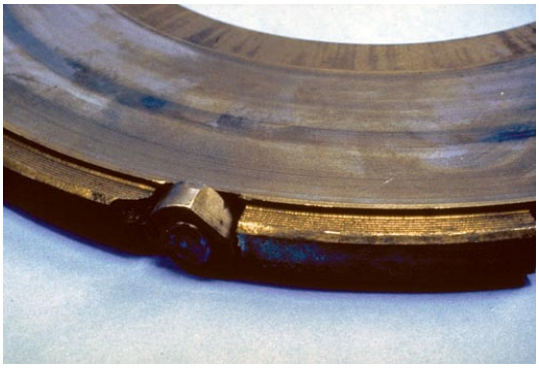


Fig 21

Fig 22

# Drive Pins

## Normal Wear

**See Figure 49.**

**Observations:** Wear pattern is in the shape of the drive pin in the slot of the center plate. Drive pin shows even wear.

**Causes:** Normal wear.

**Correction:** Move center plate to next slot over drive pin during installation. If all slots are worn, replace plate and pins. This condition is not covered under warranty.

Figure 49

## Not Correctly Installed

**See Figure 50.**

**Driver Notices**: Clutch may drag and/or slip.

**Observations:** Wear pattern is only in one area of the drive pin and slot.

**Causes:** Drive pins not correctly installed (cocked).

**Correction:** Replace drive pins. Use an installation tool to install pins. Move center plate to next slot during installation. If all slots are worn, replace center plate. This condition is not covered under warranty.

Figure 50

# Clutch Cover / Intermediate Plate

Fig 23

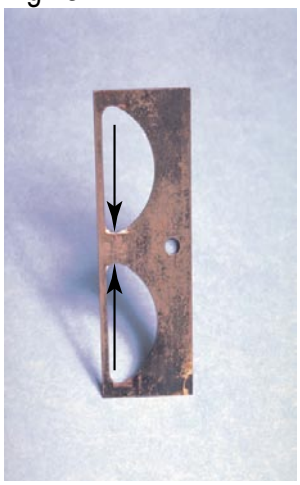
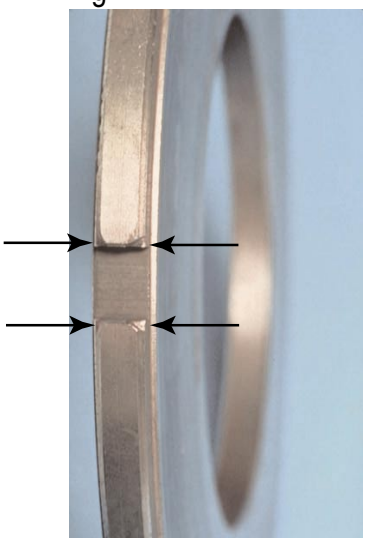


Fig 24

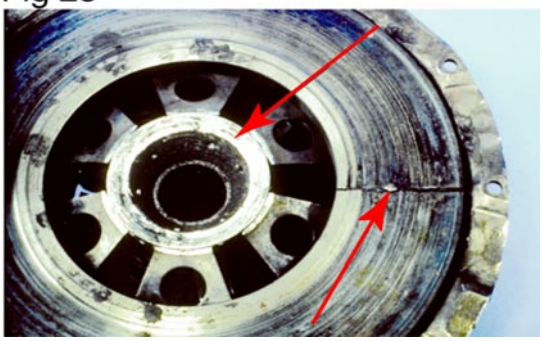


## Failure - Anti-Rattle Springs Installed Backwards

**Possible Causes**

As shown in Figures 23 and 24, the intermediate plate was "hanging up" at the corners of the open sections of the anti-rattle springs. The driver's complaint was a clutch that would not release. It is important that the rounded sections of the anti-rattle springs be installed TOWARDS the flywheel/ engine.

Fig 25



## Failure - Interference Between Retainer Assembly and Rear Disc Rivets

**Possible Causes**

Figure 25 shows the damage done to the nose of the retainer assembly (see arrow) due to contact with the disc rivets. Figure 57 shows the resulting damage done to the rear disc. Adjusting the clutch externally (with the linkage) instead of internally (rotation of adjusting ring) will cause the retainer sleeve/release bearing assembly to move too far forward as the clutch wears, leading to this failure.

An additional result from the above failure is that while the clutch is engaged, it can begin to slip due to the unloading condition created by the disc and retainer interference. This, in turn, will create excessive heat and can cause the pressure plate to break (see Figure 25, black arrow on pressure plate) and /or the ceramic buttons to separate from the disc (see Figure 58). The above failure may also be preceded by a noise complaint.

# Clutch Cover / Intermediate Plate

## Failure - Broken Leg

**Possible Causes**

- Abusing the clutch during shipping and handling.
- Dropping the clutch during installation or removal.

The photo in Figure 27 is a close-up of the broken leg shown in Figure 26. The arrow in this close-up shows where the leg contacted the concrete floor after the clutch was dropped.

The use of "guide studs" plus a "hydraulic clutch stand" will help prevent this 150 lb. clutch from being dropped during installation and removal.

**Note:** Eaton Clutch does not provide warranty coverage for this type of failure.

Fig 26

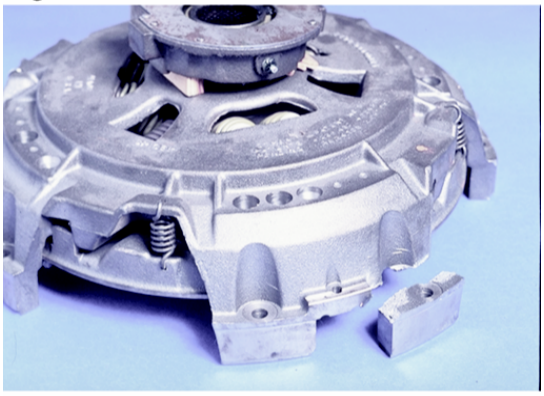
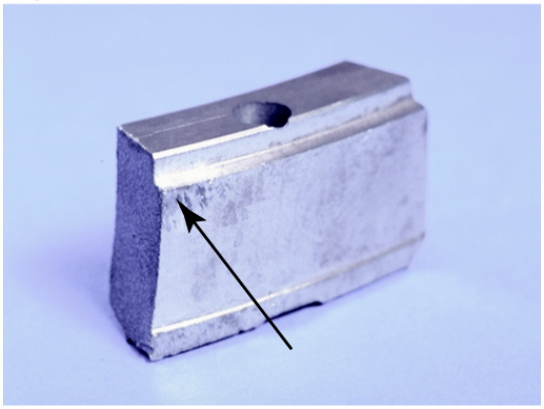


Fig 27



## Failure - Release Bearing

**Possible Causes**

A failed release bearing (see Figure 28) can usually be attributed to one or more of the following situations:

- A dry release bearing due to lack of periodic lubrication (does not apply to sealed bearings).
- Failure to fully release or riding the clutch pedal will place a constant thrust load on the bearing, (see arrows in Figure 29) leading to higher temperatures and consequential loss of lubricant. Failure to maintain free play up in the cab can also cause this condition. Not only will the bearing begin to fail, constant contact in this area will cause both the release yoke fingers (Figure 79), and the wear pads (Figure 29), to wear excessively.
- A potential result of this wear is that the release yoke will force the bearing and sleeve assembly against the input shaft. Consequently, this "side loading" condition can damage the bushing, sleeve, and input shaft (see Figure 78).
- Failure to use the recommended high temperature lubricant can also cause a loss of lubricant, even under normal operating conditions. An impending release bearing failure may be accompanied by noise.

**Note:** In order to determine the proper greasing techniques, be sure to consult the Eaton Installation Instructions packaged with each Eaton Fuller Clutch.

Fig 28

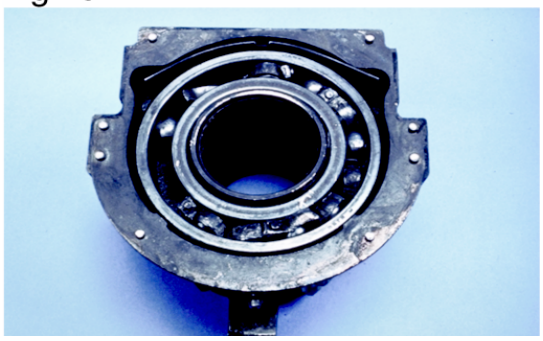


Fig 29

# Release Bearing Housing Assembly

## Severe Wear on Wear Pads

**See Figure 68.**

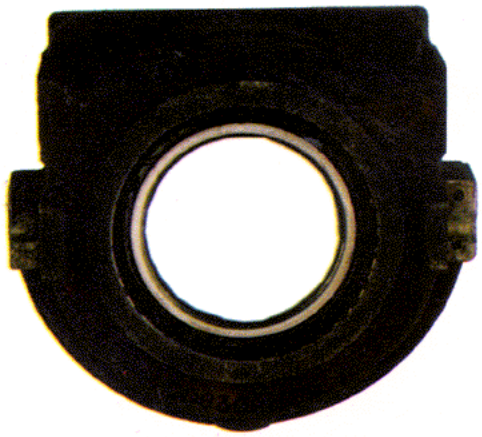
**Driver Notices**: Clutch pedal free travel does not exist. Hard shifting into first and reverse gears. Clutch does not disengage and slips. The clutch pedal is hard to push.

**Observations:** Round wear into (and possibly through) the wear pads. In more severe cases, the wear is into the body of the release bearing housing.

**Causes:** Release bearing clearance was never adjusted or the linkage was adjusted instead of the release bearing clearance. The release fork-to-pad clearance is not correct. Also, the driver may keep a foot on the clutch pedal.

**Correction:** Replace the release bearing housing or the clutch assembly. Make sure the clutch is adjusted internally. Check and adjust the release bearing clearance at regular intervals. Inspect the release fork. Make sure the driver does not keep a foot on the clutch pedal. This condition is not covered under warranty.

**Figure 68**



# Release Bearing Housing Assembly

## Wear Is Not Even on Wear Pads

**See Figure 69.**

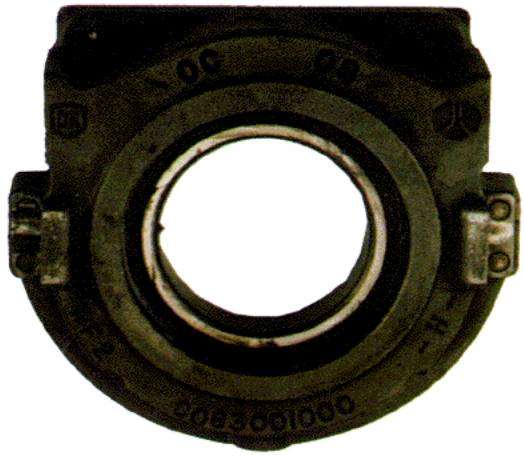
**Driver Notices**: Clutch drags or is difficult to engage and disengage.

**Observations:** Wear is different on the wear pads on each side of the release bearing housing.

**Causes:** The cross shaft is worn or damaged or the bushings for the cross shaft in the clutch shaft are worn or damaged.

**Correction:** Replace the release bearing housing or the clutch assembly. Inspect the cross shaft, the release fork and the cross shaft bushings and service as required. Lubricate the bushings at scheduled intervals. This condition is not covered under warranty.

Figure 69



## Burnt or Seized

**See Figure 70.**

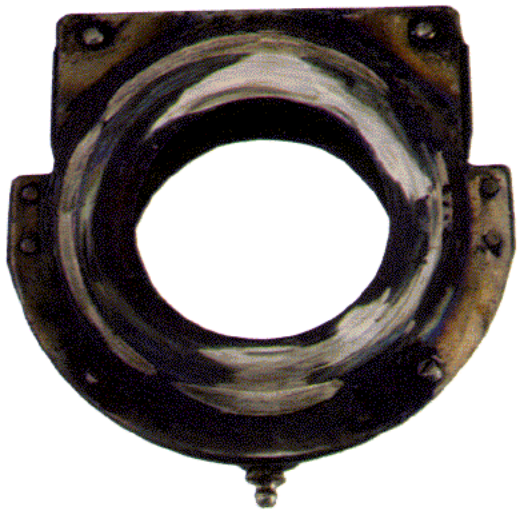
**Driver Notices**: Clutch is noisy and difficult to engage or disengage.

**Observations:** Release bearing is severely burnt and may not rotate freely on the clutch assembly.

**Causes:** The release bearing is not lubricated at the specified intervals or with the correct lubricant.

**Correction:** Replace the release bearing housing. Inspect the release fork and replace if necessary. Lubricate the release bearing at the specified intervals with the correct lubricant. This condition is not covered under warranty.

Figure 70



Section 3

# Release Bearing Housing Assembly

## Bearing Housing Cover Wear

**See Figure 71.**

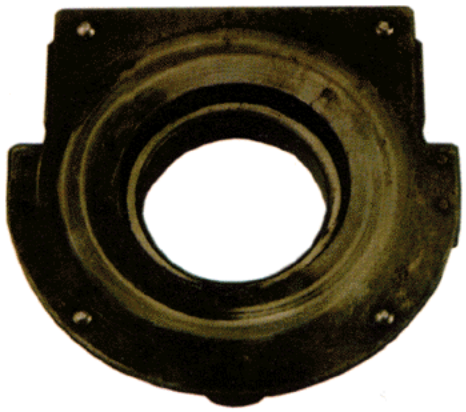
**Driver Notices**: Hard shifting and noise into first and reverse gears.

**Observations:** Heavy wear pattern is on the release bearing cover.

**Causes:** The release bearing clearance and/or the clutch linkage are out-of-adjustment or not adjusted correctly which cause the clutch brake to touch the release bearing cover. Also the driver may be engaging the clutch brake when the vehicle is moving or trying to override drag from a seized pilot bearing.

**Correction:** Replace the release bearing housing. Adjust the release bearing clearance and the clutch linkage. Inspect the clutch brake and replace if required. Inspect the pilot bearing and replace if required. This condition is not covered under warranty.

Figure 71



## Cover Separates from Bearing Housing

**See Figure 72.**

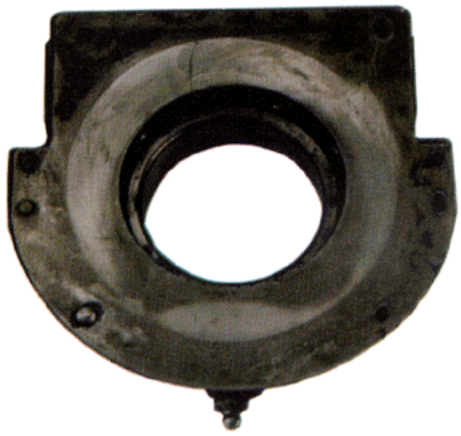
**Driver Notices**: Clutch is noisy when engaged or disengaged.

**Observations:** The cover is separated from the release bearing housing.

**Causes:** Clutch brake squeeze may not be adjusted correctly. Also the driver may apply too much pressure on the clutch pedal.

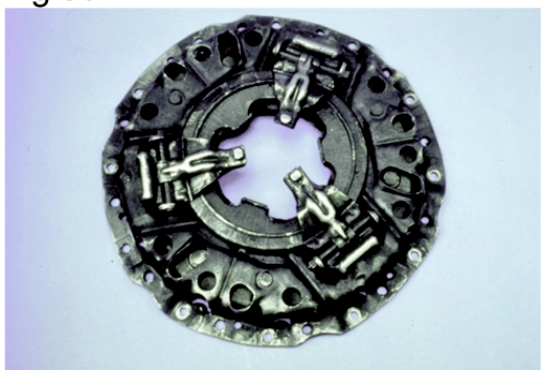
**Correction:** Replace the release bearing housing assembly. Make sure clutch brake squeeze adjustment is correct. Make sure the driver operates the vehicle correctly. This condition is not covered under warranty.

Figure 72



# Clutch Cover / Intermediate Plate

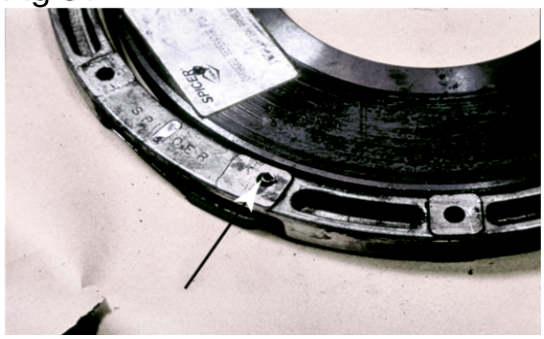
Fig 30



## Failure - Oil Soaked Cover

**Possible Causes**
A leaking transmission or a leaky rear main engine seal can coat the clutch cover with oil, as indicated in Figure 30. Figure 41 shows the disc which was run with this cover.

Fig 31



## Failure - Bent/Damaged Positive Separator Pin

**Possible Causes**
The separator pin shown in Figure 31 became damaged (bent) when it was dropped during clutch installation. To prevent this from occurring, Eaton recommends the use of two (2) guide studs when mounting the intermediate plate and clutch cover to the flywheel (refer to the Eaton Installation Instructions).

The damage done to the separator pins in Figures 32 and 33 (see arrows) is the result of using the wrong tool combined with excessive force. All four pins (on each intermediate plate) were damaged. When “setting” the four (4) roll pins, the proper tool would be a 1/4” flat nose punch used in conjunction with a small hammer (to help ensure light taps).

A damaged pin(s) can prevent the intermediate plate from retracting evenly when the clutch is disengaged, leading to a “poor release” complaint from the driver. The same complaint can also occur if the mechanic forgets to “set” the four (4) positive separator pins upon installation of the clutch. In you forgot to set the separator pins before installing the transmission, you can still set them through the inspection opening of the transmission.

Fig 32 (EPP 15.5")

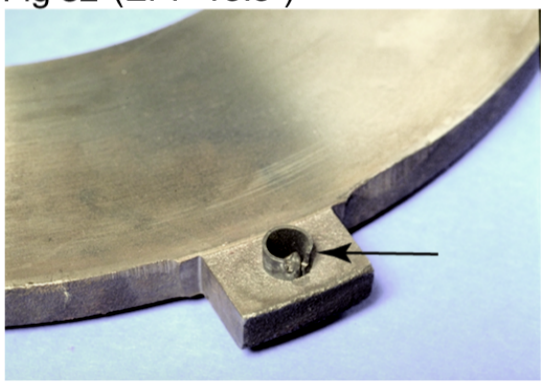


Fig 33