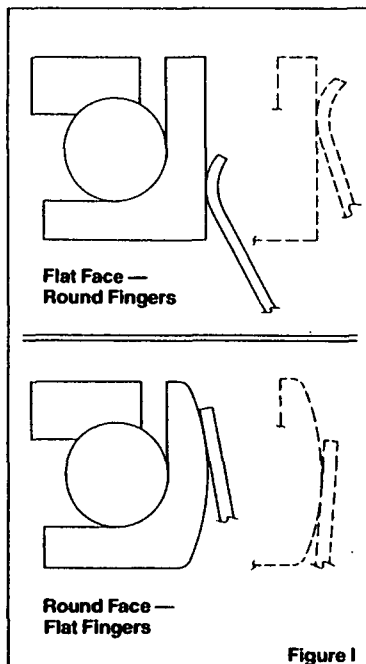


How to analyze a clutch system by inspecting the clutch release bearing

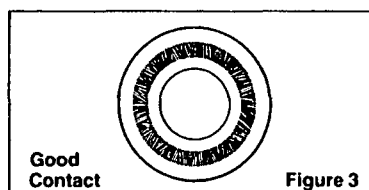
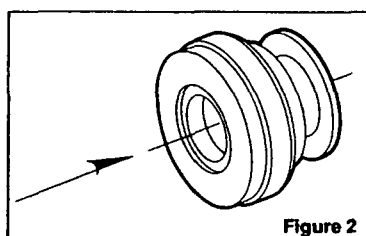
The face of a used clutch release bearing can reveal very useful information about your clutch system. We want to show you how to inspect the clutch bearing and how to interpret what you see.

In an earlier Tech Tip, we discussed how the clutch system operates. As we described it, the clutch release bearing contacts the clutch fingers (or levers) and releases the clutch as the bearing moves into the clutch fingers. This movement along the inner face of the bearing is shown in the diagrams in Figure 1 below.

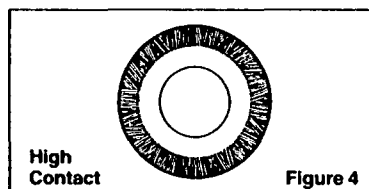


During this movement of the clutch bearing, the fingers slide radially on the face of the bearing. This sliding on the face results in a wear pattern on the face of the bearing. The resulting wear pattern can help diagnose a clutch system problem.

The proper viewing angle to inspect this wear pattern is shown in the diagram below.



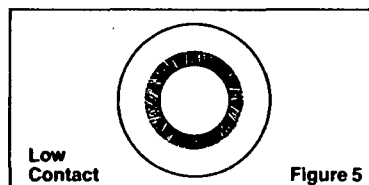
This wear pattern illustrated in Figure 3 is typical of a clutch system that is operating correctly. The worn area is sometimes shiny but is mostly a rusty color. This rusty color is caused by oxidation that occurs during fretting (sliding) wear. As you see, the wear pattern is located within the borders of the face and is concentric to the bearing bore. The following diagrams show face wear that indicates the presence of a problem in the clutch system.



The high contact pattern shown in Figure 4 is the result of the fingers contacting the bearing face on the outer edge. This can result in the bearing housing being worn off and/or the fingers being excessively worn.

Possible causes of high contact pattern:

- Misapplication
- Improper adjustment
- Worn or deformed clutch fingers
- Worn or deformed clutch fork
- Clutch disc too thin (flat face)
- Clutch disc too thick (round face)

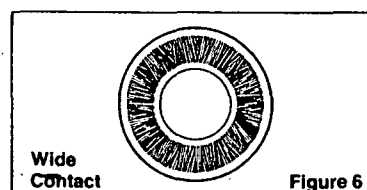


The low contact pattern shown in Figure 5 is the result of the fingers contacting the bearing face on the inner edge. This can result in the inner sleeve of the bearing being worn and/or the fingers being excessively worn.

Possible causes of low contact pattern:

- Misapplication
- Improper adjustment
- Worn or deformed clutch fingers
- Worn or deformed clutch fork
- Clutch disc too thin (round face)

The wide wear pattern illustrated in Figure 6 is typical of a long-lived bearing. This wide



pattern is caused by the contact point moving because of wear on the clutch disc. If this is noticed after a relatively short time, it could indicate a problem in the clutch system.

Possible causes of wide wear pattern:

- Misapplication
- Improper adjustment
- Worn or deformed clutch fingers
- Worn or deformed clutch fork
- Misalignment
- Excessive bearing travel
- Excessive clutch disc wear

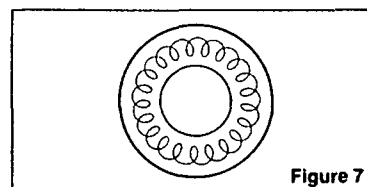


Figure 7 illustrates a wear pattern that is the result of misalignment between the bearing centerline (transmission) and the clutch axis (engine). This misalignment will cause excessive wear of the bearing face and clutch fingers. It will also result in a reduction in bearing life.

Possible cause of spiraling wear pattern:

- Misalignment

As you can see, the inspection of the clutch release bearing face can give you useful information while troubleshooting a clutch system problem. In many cases, the problem can be attributed to the use of improper components in the clutch system. In some cases, a wear pattern can indicate a specific problem—for example, misalignment.

By inspecting the NAPA clutch release bearing, we believe you can gain useful information and get the maximum service life from the components in your clutch system.

For further information on NAPA Bearings write:

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For technical, application or interchange information, call our answer line 1-800-521-0102 (in Michigan, call 1-800-572-9206) for fast assistance.