

## Cage damage

If, on examination of a failed bearing, the cage is found to be damaged, it may in many cases prove difficult to ascertain the cause. Usually other components of the bearing are damaged too and this makes it even more difficult to discover the reason for the trouble. However, there are certain main causes of cage failure, viz. vibration, excessive speed, wear and blockage.

### Vibration

When a bearing is exposed to vibration, the forces of inertia may be so great as to cause fatigue cracks to form in the cage material after a time. Sooner or later these cracks lead to cage fracture.

### Excessive speed

If the bearing is run at speeds in excess of that for which the cage is designed, the cage is subjected to heavy forces of inertia that may lead to fractures. Frequently, where very high speeds are involved, it is possible to select bearings with cages of special design.

### Wear

Cage wear may be caused by inadequate lubrication or by abrasive par-

ticles. The idea with rolling bearings is of course to avoid sliding friction. However, where the cage is concerned, sliding cannot be eliminated in the contacts with the other components of the bearing. This explains why the cage is the first component to be affected when the lubrication becomes inadequate. The cage is always made of softer material than the other components of the bearing and consequently it wears comparatively quickly. As the cage pockets increase in size, due to wear, the rolling element guidance deteriorates and this also applies to the cage in cases where the cage is centred on the rolling elements. The resultant forces may lead to cage failure within a short space of time.

### Blockage

Fragments of flaked material or other hard particles may become wedged between the cage and a rolling element, preventing the latter from rotating round its own axis. This leads to cage failure.

### Other causes of cage damage

If the rings of a deep groove ball bearing are fitted out of alignment with each other, the path of the balls has an oval configuration. If the cage is centred on the balls, it has to change shape for every revolution it performs.

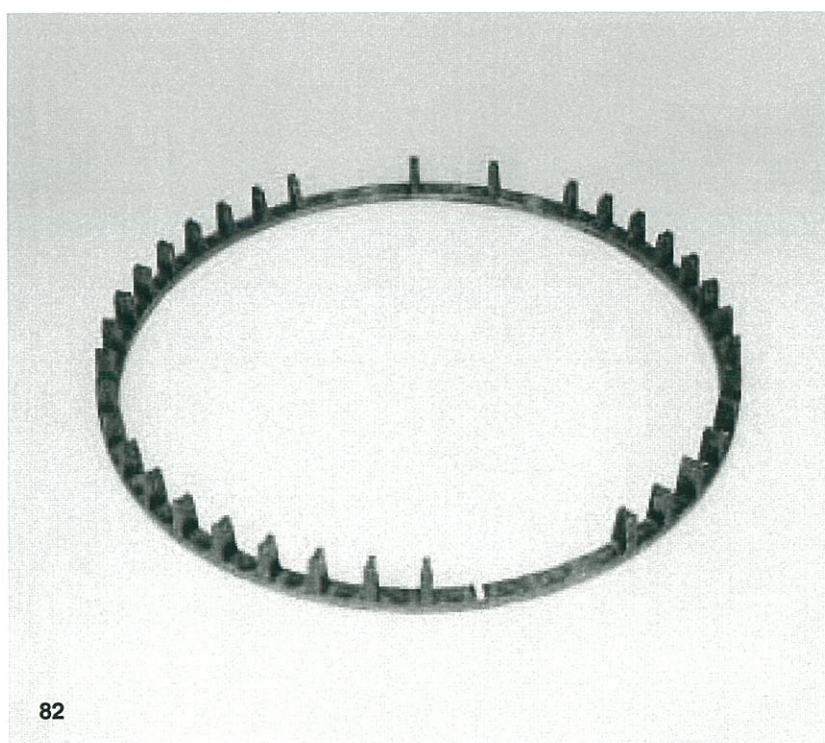
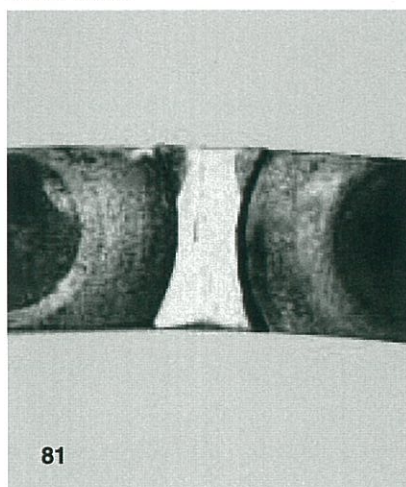
Fatigue cracks then form in the material and sooner or later they lead to fractures.

There is a similar case when a thrust ball bearing is fitted together with radial plain bearings. If clearance arises in the plain bearings, the washers of the thrust bearing become displaced in relation to each other. Then the balls do not follow their normal path and heavy stresses may arise in the cage.

Cages in bearings subject to severe acceleration and retardation, in conjunction with fluctuations in speed, are affected by forces of inertia. These give rise to considerable pressure between the contacting surfaces, with consequent heavy wear.

**Fig 82** Cage of a spherical roller bearing. Fatigue cracks have formed in the fillets

**Fig 81** Fractured surface of the cage shown in fig 82. The fatigue cracks are clearly visible





The attached document references ball bearings your bearing being a roller type here is an example of roller bearing which has suffered a cage failure due to poor lubrication, the most likely case in your case.

