

## Maintenance and Inspection Detecting and Correcting Irregularities

In order to maintain the original performance of a bearing for as long as possible, proper maintenance and inspection should be performed. If proper procedures are used, many bearing problems can be avoided and the reliability, productivity, and operating costs of the equipment containing the bearings are all improved. It is suggested that periodic maintenance be done following the procedure specified. This periodic maintenance encompasses the supervision of operating conditions, the supply or replacement of lubricants, and regular periodic inspection. Items that should be regularly checked during operation include bearing noise, vibration, temperature, and lubrication.

If an irregularity is found during operation, the cause should be determined and the proper corrective actions should be taken after referring to Table 14.2.

If necessary, the bearing should be dismantled and examined in detail. As for the procedure for dismantling and inspection, refer to Section 14.5, Inspection of Bearings.

## NSK BEARING MONITOR (Bearing Abnormality Detector)

It is important during operation to detect signs of irregularities early before damage becomes severe

The NSK Bearing Monitor (see Page C5) is an instrument that checks the condition of bearings and gives a warning of any abnormality, or it stops a machine automatically in order to prevent serious trouble. In addition, it helps to improve maintenance and reduce its cost.

## Bearing Failures and Measures

It is very important throughout operation to spot indications of abnormalities early prior to damage ends up being extreme.

In order to keep the initial efficiency of a bearing for as long as possible, appropriate upkeep and assessment need to be carried out. If correct treatments are utilized, numerous bearing issues can be prevented and the dependability, performance, and running expenses of the devices consisting of the bearings are all enhanced. It is recommended that regular upkeep be done following the treatment defined. This routine upkeep includes the guidance of operating conditions, the supply or replacement of lubes, and routine assessment. Products that must be frequently examined throughout operation consist of bearing sound, vibration, temperature level, and lubrication. If an abnormality is discovered throughout operation, the cause ought to be identified and the correct restorative actions.

If required, the bearing must be dismantled and taken a look at in information.

If rolling bearings are utilized properly they will endure to their forecasted tiredness life. Nevertheless, they frequently stop working too soon due to preventable errors.

In contrast to tiredness life, this early failure is brought on by incorrect installing, managing, or lubrication, entry of contaminant, or irregular heat generation.

For example, the reasons for rib scoring, as one example of early failure, might consist of inadequate lubrication, usage of inappropriate lube, malfunctioning lubrication system, entry of contaminant, bearing installing mistake, extreme deflection of the shaft, or any mix of these. Therefore, it is hard to identify the genuine reason for some early failures.

If all the conditions at the time of failure and previous to the time of failure are understood, consisting of the application, the operating conditions, and environment; then by studying the nature of the failure and its likely causes, the possibility of comparable future failures can be lowered. The most regular kinds of bearing failure, in addition to their causes and restorative actions as bellow.

Type of Failure	Probable Causes	Measures

Flaking Flaking of one-side of the raceway of radial bearing.	Abnomal axial load.	A loose fit should be used when mounting the outer ring of free-end bearings to allow axial expansion of the shaft.
Flaking of the raceway in symmetrical pattern.	Out-of-roundness of the housing bore.	Correct the faulty housing.
Flaking pattern inclined relative to the raceway in radial ball bearings. Flaking near the edge of the raceway and rolling surfaces in roller bearings.	Improper mounting, deflection of shaft, inadequate tolerances for shaft and housing.	Use care in mounting and centering, select a bearing with a large clearance, and correct the shaft and housing shoulder.
Flaking of raceway with same spacing as rolling elements.	Large shock load during mounting, rusting while bearing is out of operation for prolonged period.	Use care in mounting and apply a rust preventive when machine operation is suspended for a long time.
Premature flaking of raceway and rolling elements.	Insufficient clearance, excessive load, improper lubrication, rust, etc.	Select proper fit, bearing clearance, and lubricant.
Premature flaking of duplex bearings.	Excessive preload.	Adjust the preload.
Scoring Scoring or smearing between raceway and rolling surfaces.	Inadequate initial lubrication, excessively hard grease and high acceleration when starting.	Use a softer grease and avoid rapid acceleration.
Spiral scoring or smearing of raceway surface of thrust ball bearing.	Raceway rings are not parallel and excessive speed.	Correct the mounting, apply a preload, or select another bearing type.
Scoring or smearing between the end face of the rollers and guide rib.	Inadequate lubrication, incorrect mounting and large axial load.	Select proper lubricant and modify the mounting.
Cracks Crack in outer or inner ring.	Excessive shock load, excessive interference in fitting, poor surface cylindricality, improper sleeve taper, large fillet radius, development of thermal cracks and advancement of flaking.	Examine the loading conditions, modify the fit of bearing and sleeve. The fillet radius must be smaller than the bearing chamfer.
Crack in rolling element. Broken rib.	Advancement of flaking, shock applied to the rib during mounting or dropped during handling.	Be careful in handling and mounting.
Fractured cage.	Abnormal loading of cage due to incorrect mounting and improper lubrication.	Reduce the mounting error and review the lubricating method and lubricant.
Indentations Indentations in raceway in same pattern as rolling elements.	Shock load during mounting or excessive load when not rotating.	Use care in handling.
Indentations in raceway and rolling elements.	Foreign matter such as metallic chips or sand.	Clean the housing, improve the seals, and use a clean lubricant.
Abnormal Wear False brinelling (phenomenon similar to brinelling)	Vibration of the bearing without rotation during shipment or rocking motion of small amplitude.	Secure the shaft and housing, use oil as a lubricant and reduce vibration by applying a preload.
Fretting	Slight wear of the fitting surface.	Increase interference and apply oil.
Wearing of raceway, rolling elements, rib, and cage.	Penetration by foreign matter, incorrect lubrication, and rust.	Improve the seals, clean the housing, and use a clean lubricant.
Creep	Insufficient interference or insufficient tightening of sleeve.	Modify the fit or tighten the sleeve
Seizure Discoloration and melting of raceway, rolling elements, and ribs.	Insufficient clearance, incorrect lubrication, or improper mounting.	Review the internal clearance and bearing fit, supply an adequate amount of the proper lubricant and improve the mounting method and related parts.
Electric Burn Fluting or corrugations.	Melting due to electric arcing.	Install a ground wire to stop the flow of electricity or insulate the bearing.

Corrosion & Rust

Rust and corrosion of fitting surfaces and bearing interior.

Condensation of water from the air, or fretting. Penetration by corrosive substance (especially varnish-gas, etc).

Use care in storing and avoid high temperature and high humidity, treatment for rust prevention is necessary when operation is stopped for long time. Selection of varnish and grease.