Vibration	Contact Vibration of Rotor due to Growth of Carbide in Bearing	Rotating machinery
Forced Vibration		

Object Machine

Power generation turbine for industrial use (general arrangement shown in Fig.1), 42MW, 3,600rpm

Observed Phenomena

Vibration component synchronized with the rotational speed increases for some reason, but after a short time, returns to the former condition and again increases. This phenomenon occurred repetitively. Fig.2 shows the shaft vibrations of this machine.

Cause Estimation

Judging from the fact that the vibration component corresponds to the rotational speed and that the growth of vibration is not so sharp, it was determined that the shaft was in slight contact with the casing.

Analysis and Data Processing

No special analysis was not carried out. When the vibrations became large, a listening rod was used to go around to check sounds of the casing at many locations, and it was estimated that there was a high possibility of a rotor contact near the turbine free end side, but the exact position was not identified.

Countermeasures and Results

After shutting down the turbine, the contact position was checked. Then, on the mating face of the bearing, the growth of carbide that was assumedly due to lubrication oil was found. And then the carbide was removed. As a result the contact vibrations were eliminated.

Lesson

There are pretty many examples that, inside the bearings, carbide grow, leading to contact with a rotor. In these cases, next points are needed to care.
(1) Design shall be made so as to avoid becoming a high bearing temperature.
(2) Arrangement shall be made to prevent the entry of a dust inclusion in the lubrication oil. In particular, control shall not be neglected at the time of flushing.

References

Nothing in particular.

Keywords

Contact vibration, growth of carbide in the bearings

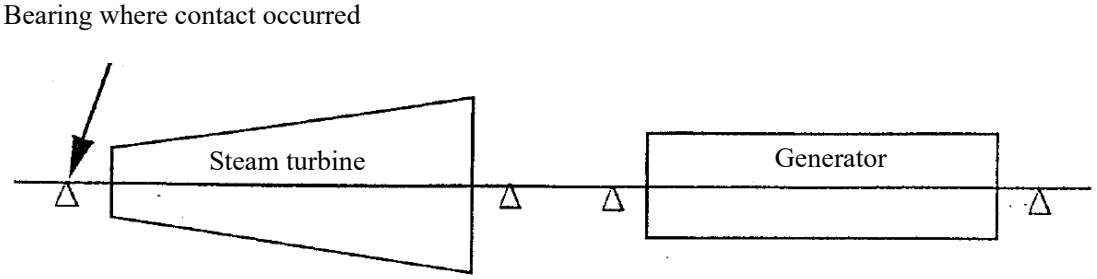

Fig.1 General arrangement of shaft system

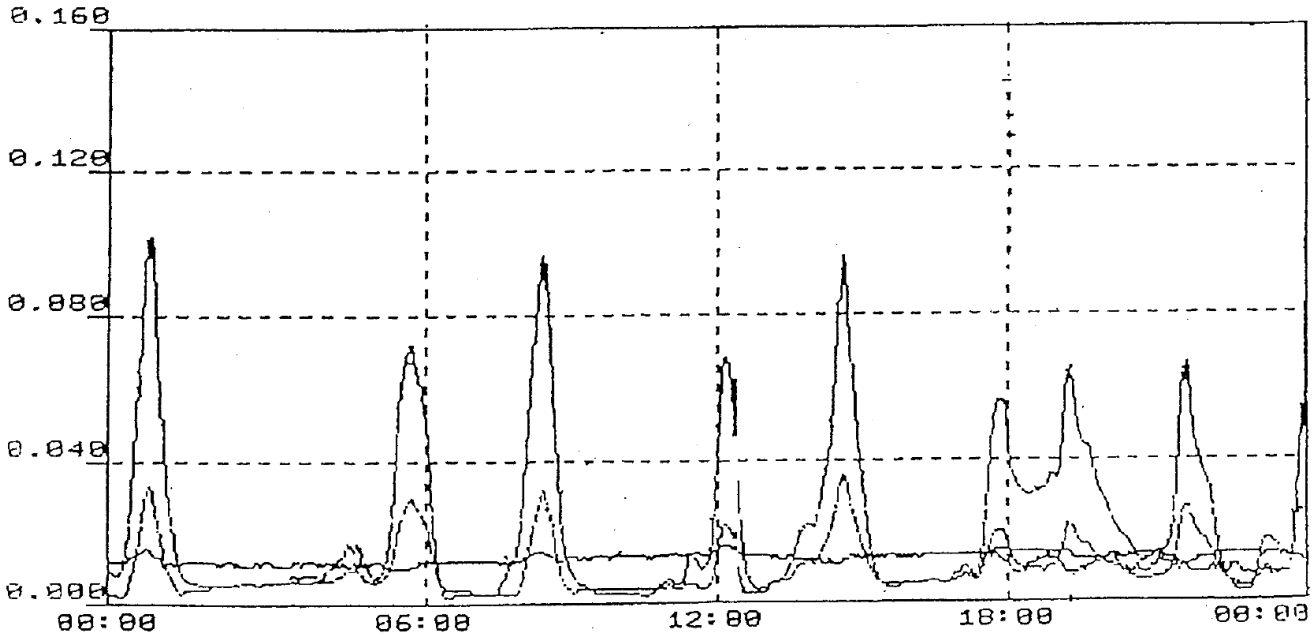

Fig.2 Temporal changes in shaft vibration