FM602 Mechanical Noise (Bearing / Gear)

Chapter 6: Comprehensive Technology — Fault model & typical case

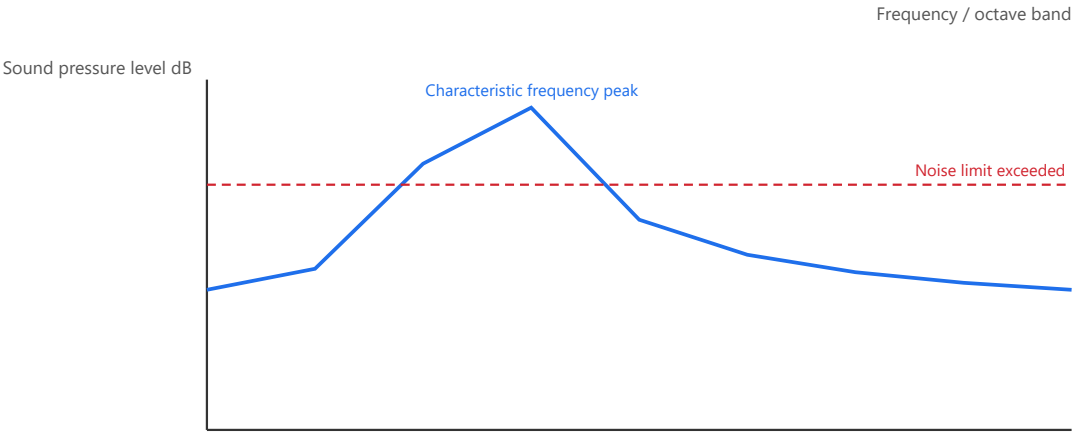
DOCUMENT
FM602

CHAPTER
Comprehensive Technology

RELATED Q&A
6-30

PUBLISHER
Kunshan Best Machinery Equipment Co., Ltd.

Fault model + typical case. Mechanism, causes, symptoms, diagnosis, corrective actions and prevention are all anchored to the relevant entries of the Fan Engineering Q&A (see front matter for question references).



FM602 Mechanical Noise (Bearing / Gear): bearing spalling and poor gear meshing give a low-frequency peak at the characteristic frequency; combine acoustic spectrum and vibration diagnosis and follow the noise trend.

Failure Mechanism

Bearing spalling, poor gear meshing and similar defects generate mechanical noise (6-30), which is an early acoustic signal of wear and damage.

Common Causes

- Bearing damage
- Gear fault

Failure Symptoms

- Low-frequency rumbling / meshing noise

Diagnosis & Evaluation

- Combined acoustic spectrum and vibration diagnosis

Corrective Actions

- Replace the bearing / repair the gear

Preventive Measures

- Noise trend monitoring

Typical Failure Case (Summary)

- Case 1 (rolling-bearing race damage on a cantilever centrifugal fan at a plant, 2017-08): the motor had a rated speed of 2900r/min (48.33Hz), power 15kW and airflow 100m^3/min, with 6310 bearings at both ends of the fan. The abnormality appeared as periodic vibration impact noise at the two bearing housings of the cantilever support, with axial vibration at the non-drive-end bearing reaching 11.55mm/s, far above the ISO10816-3 Group 2 limit for a rigid foundation. The demodulated spectrum showed the bearing outer-race fault frequency of 151.6Hz and its harmonics, indicating that the outer-race wear had developed to a medium-to-late stage. Root cause: outer-race spalling of the bearing, with the mechanical noise appearing before other symptoms. Corrective action: immediate shutdown and bearing replacement, with disassembly showing obvious severe pitting on the outer race.
- Case 2 (centrifugal fan at the west air shaft No.2 of the Xinglongzhuang Coal Mine, Yankuang): power 630kW, speed 590r/min. Monitoring in 2008-03 showed a high vibration value and abnormal noise from the fan. Spectrum analysis found a 95Hz frequency (corresponding to the modulated bearing roller rotation frequency) and sidebands, indicating a bearing fault. Corrective action: the operating unit was required to disassemble and inspect and prepare for bearing replacement so that the fault would not escalate.

This document is reference material prepared for engineering review, distilled from BEST's fan engineering Q&A archive. It does not constitute a certified performance curve or a project commitment; final selection, performance and warranty remain subject to a project-specific technical review and written confirmation.