FM503 Shaft Bending Missed in Inspection / Improper Straightening

Chapter 5: Maintenance & Repair — Fault model & typical case

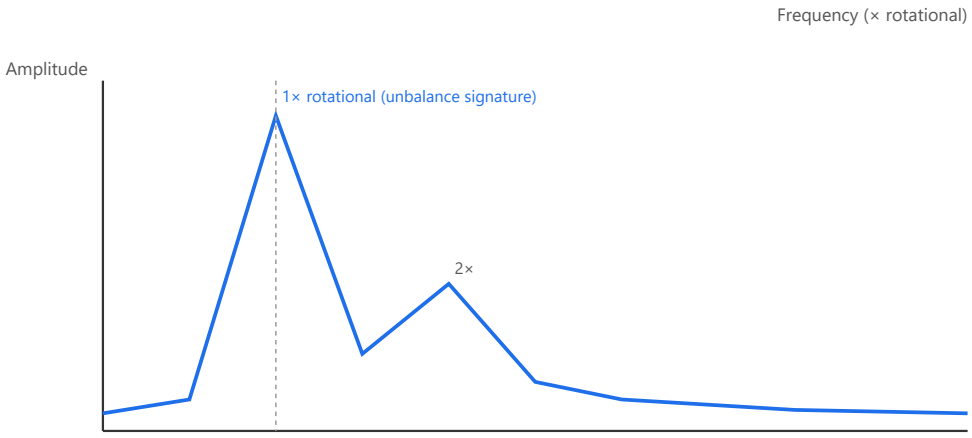
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FM503

CHAPTER
Maintenance & Repair

RELATED Q&A
5-02

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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).



FM503 Shaft Bending Missed in Inspection / Improper Straightening: if the shaft runout is not checked, bending gives a 1× peak with harmonics, severe vibration and rubbing on start-up. Always measure runout with a dial indicator during overhaul.

Failure Mechanism

Overhaul does not check the shaft runout (5-02 whether the shaft is bent), or the bending is straightened by an improper method, so vibration and rubbing occur as soon as the unit is put into service.

Common Causes

- Runout check omitted
- Over-straightening

Failure Symptoms

- Severe vibration on start-up

Diagnosis & Evaluation

- Measure the shaft runout with a dial indicator

Corrective Actions

- Straighten or replace the shaft

Preventive Measures

- Shaft runout must be measured during every overhaul

Typical Failure Case (Summary)

- During the overhaul of the main exhaust fan (SJ8500 type, 1500 r/min) of the 75 m^2 sinter machine at a steel works, the old rotor assembly was put back into service; when the shaft straightness was checked on the lathe, bending was found from the coupling side to the thrust bearing segment with runout up to 0.6 mm, and the shaft was scrapped. This shows that putting a shaft with undetected bending back into service causes repeated vibration.
- After returning to the works for overhaul, the primary air fan of a 600 MW unit had high vibration; a dial indicator showed shaft bending of 1 mm (far above 0.05 mm) and ultrasonic testing found a shaft crack. After fitting the spare shaft, the re-assembly trial run was normal.
- The drive-end bearing of a high-temperature kiln-end fan at a cement plant burned out and bent the shaft head (Φ160 mm, radial runout ≤1.4 mm); it was repaired on site by turning without dismantling, reducing the radial runout from 1.4 mm to 0.2 mm, after which the trial-run vibration was clearly reduced and the bearing temperature was about 30 °C.

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