FM401 Coupling Misalignment → Vibration & Bearing Damage

Chapter 4: Installation & Operation — Fault model & typical case

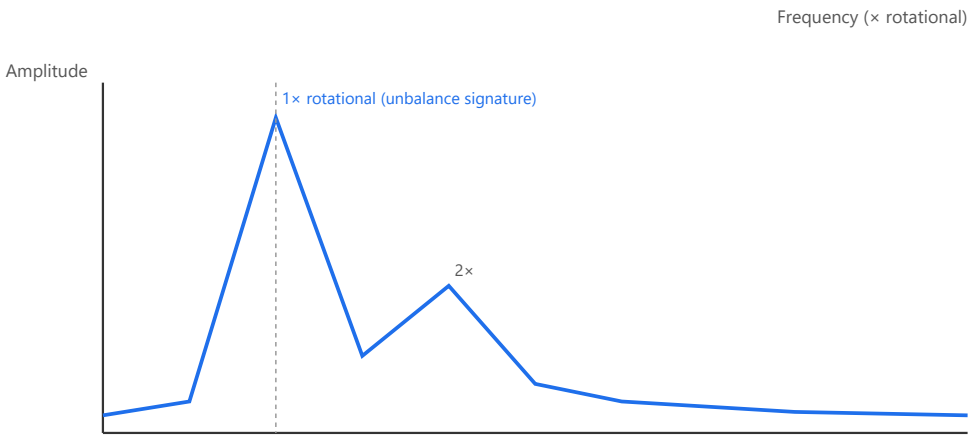
DOCUMENT
FM401

CHAPTER
Installation & Operation

RELATED Q&A
4-47, 4-54

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).



FM401 Coupling Misalignment → Vibration & Bearing Damage: a clear peak at 1× rotational frequency is the typical signature of rotor unbalance; a marked rise at 2× points instead to misalignment or loosening.

Failure Mechanism

Excessive coaxiality error in a coupling drive (4-47 inspection and adjustment, 4-54 coaxiality requirement) generates 2× rotational vibration and additional bending moment, accelerating bearing and diaphragm damage.

Common Causes

- No thermal compensation allowed in the cold state
- Wrong alignment method
- Foundation settlement

Failure Symptoms

- Large 2× rotational vibration
- High temperature on the coupling side

Diagnosis & Evaluation

- Re-measure with laser alignment

Corrective Actions

- Re-align and allow for hot-state compensation

Preventive Measures

- Laser alignment is mandatory during installation

Typical Failure Case (Summary)

- The clinker grate cooler fan of a cement group (motor Y315S-2, 110kW, fan PCF0732, speed 2980r/min) triggered an online monitoring alarm in September 2020: the horizontal velocity vibration at the fan end rose from 5.437mm/s to 11.727mm/s, and the envelope vibration rose from 133mm/s^2 to 477mm/s^2. The diagnosis was coupling misalignment and a defective bearing at the fan end; dismantling confirmed extensive spalling of the bearing inner race and wear of the nylon dowel pin. After replacing the bearing and pin and performing laser alignment, vibration returned to normal.
- One week after replacing the bearing on a dry-bed centrifugal fan, abnormal friction noise was heard from the motor-end bearing and the bearing temperature rose to 73 °C (normally a little over 50 °C); the cause was that the previous maintenance had only roughly adjusted alignment with a straightedge and feeler gauge, and the motor-end hold-down bolts were loose. After re-aligning by the two-dial method and tightening the hold-downs, vibration decreased markedly and the temperature returned to normal.

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.