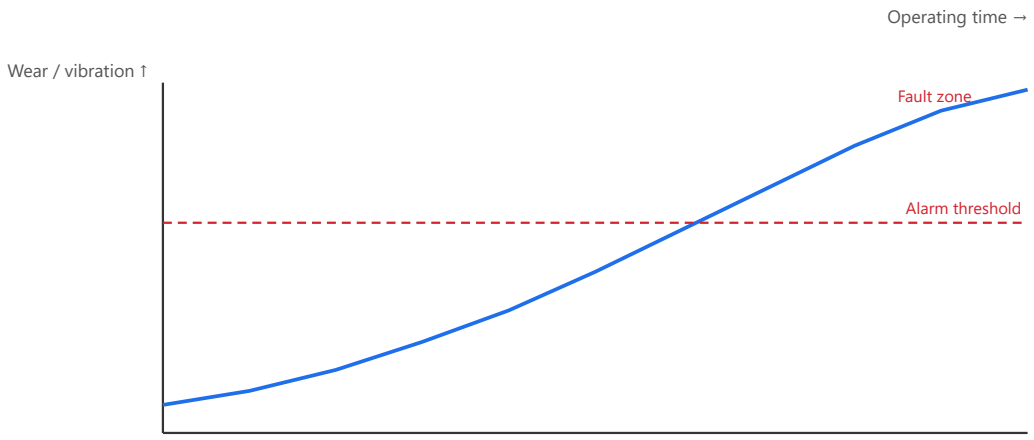
FM201 Asymmetric Blade Wear of the Impeller → Rotor Unbalance

Chapter 2: Structural Features — Fault model & typical case

DOCUMENT	CHAPTER	RELATED Q&A	PUBLISHER
FM201	**Structural Features**	**2-28, 2-31**	**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).



FM201: asymmetric blade wear grows with operating time, so vibration rises continuously; once it crosses the alarm threshold the machine is in the fault zone. Plan balancing and overhaul before that point.

Failure Mechanism

The windward faces of the blades wear in a dusty medium, and the wear is unevenly distributed around the circumference (2-28 impeller structure, 2-31 blade number), which destroys the rotor mass distribution, induces mainly 1× running-speed vibration and accelerates bearing fatigue.

Common Causes

- Dust erosion (see FM104)
- Poor symmetry of the wear
- Balancing not done during overhaul (see FM501)

Failure Symptoms

- 1× running-speed vibration gradually increases
- Abnormal noise, bearing temperature somewhat high

Diagnosis & Evaluation

- Carry out on-site dynamic balancing tests
- Strip down and measure the blade thickness difference

Corrective Actions

- Re-weld the wear-resistant layer and dynamically balance the complete machine to G2.5
- Replace the impeller

Preventive Measures

- Dynamic balancing is mandatory after repair; monitor the vibration trend online

Typical Failure Case (Summary)

The 2070DIBB24 high-temperature fan (a Zhejiang plant, 1250 kW, 1200 r/min, double inlet) on the 2000 t/d production line of Nanjing Zhonlian Cement wore on the windward faces of the blades because of the high temperature and heavy dust (normal 280~300 °C), so the mass distribution became uneven and the vibration kept worsening, eventually damaging the coupling and then the fluid coupling; re-measurement gave the vibration values at the two bearing pedestals as A vertical 18.6 mm/s, A horizontal 24.9 mm/s, B vertical 24.4 mm/s, B horizontal 19.8 mm/s (ISO 2372—1974 limit 0.28~4.5 mm/s), a serious exceedance. The root cause was dust erosion producing asymmetric impeller wear and rotor unbalance; to avoid an accident shutdown and disassembly, the rotor was sent to the works for repair and dynamically balanced on both planes on site; this failure caused a shutdown lasting 15 days.

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