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| Nota di contenuto | CASE HISTORIES INVIBRATION ANALYSIS AND METAL FATIGUE FOR THE PRACTICING ENGINEER; CONTENTS; Preface; 1 Introduction; Reference; 2 Basics of Vibration; 2.1 Spring-Mass Systems and Resonance; 2.2 Case History: Combining Springs and Masses in a Steam Turbine Problem; 2.3 Useful Questions to Ask Before Beginning a Vibration Analysis; 2.4 Linear Spring Constants and Area Moments of Inertia; 2.5 Vibrating Flat Plates; 2.6 Two-Degree Tuned Vibration Absorber; 2.7 Natural Frequencies of Pipes and Beams; 2.8 Effect of Clearance on the Natural Frequency<br>2.9 Static Deflection and Pendulum Natural Frequency 2.10 Coupled Single-Mass Systems; References; 3 Vibration-Measuring Methods and Limits; 3.1 Important Frequencies; 3.2 Campbell Diagrams; 3.3 Case History: Systematic Procedure to Identify a Vibration Source; 3.4 Vibration-Measuring Terms; 3.5 Cascade Diagram; 3.6 Shock Pulse Method; 3.7 Measuring Transducers; 3.8 Measurements: Time-Based, Bode, and Orbit Plots; 4 Simple Analytical Examples; 4.1 Determining Vibration Amplitude; 4.2 Resonant and Off-Resonant Amplitudes; 4.3 |

Case History: Transmitted Force and Isolation of a Roof Fan
4.4 Case History: Seal Failure Due to Misalignment of an Agitator Shaft
4.5 Case History: Structural Vibration; 4.6 Case History: Production-Line Grinding Problem; 4.7 Case History: Vehicle on Springs; 4.8 Case History: Vibrating Cantilevered Components; 4.9 Bump Test; 4.10 Case History: Vibrating Pump Mounted on a Plate Deck; 4.11 Case History: Misalignment Force; 4.12 Case History: Vertical Pump Vibrations and Bearing Survival; 4.13 Case History: Cause of Mysterious Movement on a Centrifuge Deck; 4.14 Case History: Engine Vibration Monitoring Device
4.15 Case History: Natural Frequency of A Midsupport Vertical Mixer
4.16 Case History: Valve Float Analysis; References; 5 Vibration-Based Problems and Their Sources; 5.1 Fatigue Cracking; 5.2 Fretting and Wear; 5.3 Ball and Roller Bearing Failures; 5.4 Bolt Loosening; 5.5 Flow-Induced Vibration; 5.5.1 Case History: Stack Vibration Induced by Wind; 5.6 Excessive Noise; 5.7 Pressure Pulsations; 5.8 Mechanical Seal Chipping and Damage; 5.9 Surging of Fans and Other Causes of Vibration; 5.10 Vibration Due to Beats; 5.11 The Slip-Stick Problem; 5.12 Drive Belt Vibration; References
6 Causes of Vibrations and Solutions in Machinery 6.1 Rotating Imbalance; 6.1.1 Case History: Motor Imbalance; 6.2 Causes of Shaft Misalignment; 6.2.1 Types of Misalignment; 6.2.2 Thermal Offset; 6.2.3 Acceptable Coupling Offset and Angular Misalignment; 6.3 A Problem in Measuring Vibration on Large Machines; 6.4 Causes of Pump Vibration; 6.4.1 NPSH Problems and Cavitation; 6.4.2 Suction Vortex; 6.4.3 Off Best Efficiency Point; 6.4.4 Vertical Pump Vibration; 6.4.5 Pump Vibration Level Guidelines; 6.5 Other Causes of Motor Vibration; 6.5.1 Electrical Causes; 6.5.2 Mechanical Cause
6.5.3 Motor Vibration-Level Guidelines

Sommario/riassunto

This highly accessible book provides analytical methods and guidelines for solving vibration problems in industrial plants and demonstrates their practical use through case histories from the author's personal experience in the mechanical engineering industry. It takes a simple, analytical approach to the subject, placing emphasis on practical applicability over theory, and covers both fixed and rotating equipment, as well as pressure vessels. It is an ideal guide for readers with diverse experience, ranging from undergraduate students to mechanics and professional engineers.