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Nota di contenuto	front cover; copyright; table of contents; front matter; About the author; Preface; body; 1 Introduction; The first machines a brief history; The need for balancing; The industrial revolution; The history of balancing; Why do we balance?; Balancing is not an additional expense!; Vibration, causes and effects; Simple vibration; Complex vibration; Damping; Why is vibration so bad?; What is the cause of vibration?; Misalignment; Damaged bearings; Bent shaft; Turbulence; Hydraulic (or aerodynamic) unbalance; Cavitation; Oil whirl; Looseness; Bearing lubrication; Worn or damaged gear; Unbalance 2 Eliminate unwanted motion!Introduction; How do we do that?; Balancing is Science, Technology and Art; What is the cost of balancing a rotor?; What are alternatives to balancing?; What is the benefit of proper balancing?; Unbalance is not good for my product!; How do we implement the program?; Mission possible; Sir Isaac Newton; Newton's first law; Newton's second law; Newton's third law; Energy balance; Baseball; Golf; Rotary motion; Know your forces; Inward or outward?; Flying free; Which direction?; Bearing load; Acceleration; Moment of a force; Moment is a vector quantity

Relation of force to balancing  
The cost of increased performance;  
Balance tolerances and performance; Unbalance and speed; Centrifugal force; Unbalance and speed; Unbalance defined; Everything together; Correcting unbalance. How do we do that?; 3 The balancing process; Overview of real balancing tolerances; Summary; Rotor unbalance defined; Specific unbalance; Sources of unbalance; Force, unbalance and speed; How to balance?; What is balancing?; Rotor balancing; Rotor axes; Review definitions; Mass axis; What is a micron?; Balancing defined; Force/vibration; Rotor rigidity characteristics  
Static unbalance  
Couple unbalance; Dynamic unbalance; Measurement and correction; Single unbalance - 1; Single unbalance - 2; Single unbalance - 1a; Single unbalance - 2a; Two unbalances; Vector addition; Unbalance in two planes; Unbalance outside the bearings; Getting to be too much?; Plane separation; Machine setup; Balancing machine basics; Measure, then correct unbalance; Correction; Correction, 3 ways; What are the limits?; Noise is the limit; Noise signature; The right tolerance; Standards again; ISO 1940; Example grades; Getting at the numbers; API 610; Fundamentals of balancing  
The importance of ANGLE  
Phase error; Phase shift; Correction efficiency; Unbalance vector; Angle error chart; Correction ratio; Why not 'zero'; Measuring errors; Correction error; Plane separation; Is the process in control?; Process parameters; Gage R&R; Cpk; Balancing efficiency; Balancing machine testing; How to be sure your machine does what you need; Balancer specifications; Test requirements and specifications; Balancing machine types; 1. Horizontal or vertical orientation of the rotor axis; 2. Soft bearing or hard bearing; 3. Single or two plane; 4. Single plane balancers  
Unbalance correction

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## Sommario/riassunto

Rotating machinery (eg pumps, motors, compressors) is normally manufactured to precise measurements but there comes a point when the costs of manufacture mean that further precision is not cost-effective and thus any slight imbalance inherent in the machine will need to be attended to after manufacture. When such machinery is in operation, often at very high speeds of thousands of revs per minute, any imbalance will set up vibration and often noise. In addition, such imbalance will cause extra wear and loss of efficiency in the machine. The answer is to balance the affected parts of the machi

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