Dynamics of Machinery

Chapter 1: Force Analysis

- 1.1 Dynamic Force Analysis
- 1.2 Inertia Force and Inertia Torque
- 1.3 D' Alembert's Principle
- 1.4 Dynamic Analysis in Reciprocating Engines
- 1.5 Gas Force
- 1.6 Inertia Effect of Connecting Rod
- 1.7 Bearing Load Calculation
- 1.8 Crank Shaft Torque
- 1.9 Turning Moment Diagrams
- 1.10 Flywheel
- 1.11 Flywheels of Punching Presses
- 1.12 Dynamics of Cam Follower Mechanism

Chapter 2: Balancing 2.1 Introduction of Balancing

- 2.2 Static and Dynamic Balancing
- 2.3 Balancing of Rotating Masses
- 2.4 Balancing a Single Cylinder Engine
- 2.5 Balancing of Multi-cylinder Inline Engines

- 2.6 Balancing of V-Engines
- 2.7 Partial Balancing of Locomotives
- 2.8 Balancing Linkages
- 2.9 Balancing Machines
- 2.10 Field Balancing

Chapter 3: Free Vibration

- 3.1 Introduction of Free Vibration
- 3.2 Basic Features of Vibratory Systems
- 3.3 Degree of Freedom
- 3.4 Free Vibrations
- 3.5 Equation of Motion for Free Undamped System
- 3.6 Equation of Motions of Free Damped Vibrations
- 3.7 Damping
- 3.8 Torsionally Equivalent Shaft
- 3.9 Free Torsional Vibrations of Single Rotor System
- 3.10 Free Torsional Vibrations of Two Rotor System
- 3.11 Free Torsional Vibrations of Three Rotor System

Chapter 4: Forced Vibration

- 4.1 Response of One Degree Freedom Systems to Periodic Forcing
- 4.2 Harmonic Disturbances

- 4.3 Disturbance Caused by Unbalance
- 4.4 Forced Vibration Due to Excitation of Support
- 4.5 Force Transmissibility
- 4.6 Vibration Isolation
- 4.7 Vibration Measurement
- 4.8 Classification of Vibration Measuring Instruments
- 4.9 Parameters and Instruments in the Vibration Measurement

Chapter 5: Mechanism for Control

- 5.1 Governors
- 5.2 Types of Governor
- 5.3 Dead Weight Type (or) Gravity Controlled Governor
- 5.4 Spring Control Type
- 5.5 Characteristics of Centrifugal Governor
- 5.6 Effect of F<mark>rictio</mark>n
- 5.7 Controlling Force Curves
- 5.8 Introduction to Gyroscope
- 5.9 Precessional Angular Motion (Angular Acceleration)
- 5.10 Steps to Find the Direction of Gyroscopic Couple
- 5.11 Gyroscopic Stabilization
- 5.12 Gyroscopic Effect in Naval Ships
- 5.13 Gyroscopic Effect in Aeroplanes