<<振动机械理论、技术及其应用>>

图书基本信息

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前言

Vibrating machines are a new type of machines quickly developed in the late 20thcentury. They utilize vibration principle to perform various processing tasks and havebeen widely used in various fields in industries, such as agriculture, national defence,mining, metallurgy, coal, petro-ehemical industry, mechanical engineering, electricpower, hydroelectricity, irrigation, construction, architecture, construction materials,railway, highway, light industry, food and grain processing industry, crop cultivation,crop harvest, etc.Vibrating machines can perform various processing tasks efficiently, such asmaterial feeding, loading, conveying, screening, distributing, drying, cooling, dehydrating,extracting, crashing, grinding, polishing, core sand shaking out, compacting, tampering,road rolling, material leveling, spreading, excavating, loading, plowing, pile driving,pile drawing, cleaning, tying, oil extracting, stress relieving, material cutting, pileinspecting, measuring, prospecting, diagnosing, etc. With the further development ineconomy and technology, new types of vibrating machines have been designed andmanufactured. At present, vibrating machines have be widely used in various industrialfields, and play an important role in industries.In order to design new types of high-performance vibrating machines, it isnecessary to study their working principles and design calculation methods systematically.With the development of computer science and technology, applying the new techniques,such as non-linear dynamics theory, and modem design theory to systematic analysisand dynamic design of machines has become an important measure to ensure reliabilityand efficiency of mechanical systems. In this book, the authors summarize thetheoretical and experimental investigations on vibrating machines as well asexperiences of designing various new types of vibrating machines in more than 30years, which includes the newest research achievements and design methods of otherdomestic and foreign scientists.

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内容概要

The working theory and techniques of vibrating machinery are described in this book. The applications, kinds, working principles and typical constructions of vibrating machines are introduced in the book briefly. This book describes the theories of several technical processes, the design and calculation methods of technical parameters, calculation and selection methods of the parameters of vibrating systems, the theories of vibratory synchronization and controlled synchronization of vibrating machines with dual- or multi-motor drives, the dynamic theories of linear and nonlinear vibrating machinery (including inertia vibrating machinery,flexible linkage vibrating machines and electromagnetic vibrating machines).Besides these some examples are introduced in this book. This book can be used by the students and graduate-students of the universities to be as the study and reference reader. And this book also can be used by the researchers and designers of the research institute and design enterprises.

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书籍目录

Introduction to the First AuthorPrefaceChapter 1 Applications, Classifications, Principles and Structures of Vibrating Machines 1.1 Applications and classifications of vibrating machines 1.2 Principle and structure of inertial vibrating machines 1.3 Principle and structure of flexible linkage vibrating machines 1.4 Principle and structure of electromagnetic vibrating machines 1.5 Principle and structure of hydraulic vibrating machinesChapter 2 Principles and Design Calculation of Vibrating Machines 2.1 Principles and processing parameters of linear vibrating machines 2.2 Analysis of material motion and computation of parameters for circular and elliptical vibrating machines 2.3 Characteristics of material motion in non-harmonic vibrating machines 2.4 Dynamic characteristics of working process of vibrating machinesChapter 3 Design and Calculation of Mass, Damping, and Spring Stiffness of Vibrating Machines 3.1 Calculations of the mass of vibration and equivalent damping for material during the sliding process 3.2 High order harmonic vibration caused by non-linear material force 3.3 Calculation of elastic component combining mass of vibrating machines 3.4 Calculation of equivalent damping and power of vibrating machines 3.5 Isolation theory and isolation spring stiffness calculation 3.6 Selection of the frequency ratio and calculation of the spring stiffness for the primary vibrating system in a near-resonant vibrating machine 3.7 Vibration isolation mode, primary vibration mode and responseChapter 4 Vibratory Synchronization for Vibrating Machines with Dual Motors 4.1 Introduction 4.2 Synchronization theory of plane motion self-synchronous vibrating machines with single mass 4.3 Vibratory synchronization of spatial motion self-synchronous vibrating machines 4.4 Electromechanical coupling self-synchronous characteristics of elastic link vibrating machines 4.5 Electromechanical coupling analysis of synchronization of electric vibrating machines with two exciting headersChapter 5 Design and Computation of Dynamic Parameters for Inertia Vibrating Machines 5.1 Dynamic parameters of non-resonant single-shaft inertial vibrating machines 5.2 Dynamic parameters of non-resonant dual-shaft inertial vibrating machines 5.3 Dynamic parameters of non-resonant multi-shaft vibrating machines 5.4 Dynamic parameters of linear near-resonant inertial vibrating machines 5.5 Dynamic parameters of non-linear near-resonant inertial vibrating machines 5.6 Dynamic parameters of impacting inertial vibrating machines 5.7 Dynamic parameters of inertial vibrating machines 5.8 Adjustment of inertial vibrating machinesChapter 6 Design and Computation of Dynamic Parameters for Flexible Linkage Vibrating Machines 6.1 Dynamic parameters of linear single-mass flexible linkage vibrating machines 6.2 Dynamic parameters of linear dual-mass flexible linkage vibrating machines. 6.3 Dynamic parameters of multi-mass flexible linkage vibrating machines 6.4 Dynamic parameters of nonlinear flexible linkage vibrating machines 6.5 Calculation procedure of dynamic parameters for flexible linkage vibrating machines and examples 6.6 Adjustment of flexible linkage vibrating machinesChapter 7 Computation of Dynamic Parameters for Electromagnetic Vibrating Machines 7.1 Types of electromagnetic forces of electromagnetic vibrating machines 7.2 Dynamic parameters of linear harmonic force electromagnetic vibrating machines 7.3 Dynamic parameters of non-harmonic force EMVMs 7.4 Dynamic parameters of nonlinear spring force EMVMs 7.5 Computational procedure of dynamic parameters for EMVMs and examples 7.6 Transition process analysis of electromagnetic vibrating machines 7.7 Adjustment of electromagnetic vibrating machinesChapter 8 Electromagnetic Parameters and Control Systems of Electromagnetic Vibrating Machines 8.1 Excitation methods of electromagnetic vibrating machines 8.2 Electromagnetic force of EMVMs 8.3 Voltage and current of electromagnetic vibrating machines 8.4 Power and power factor of EMVMs 8.5 Computation of electromagnetic parameters for EMVMs 8.6 Control of EMVMsReferences

章节摘录

插图：2. Material screening, separating, dehydrating, cooling and dryingVibration can make material discrete and distribute uniformly on the working surface.At the same time, under the action of gravity, impacting force, friction and inertia forces,vibrating machines can perform screening, separating, dehydrating, cooling, etc.3. Material grinding, work piece cleaning and polishingVibration can make materials crack and crackles spread rapidly inside thematerials. It can also intensify the friction and impact among grinding （polishing,cleaning） medium and particles of processed material or work pieces to performmaterial work piece） grinding, cleaning, casting component shaking, workpiecepolishing, etc.4. Discrete material shaping and compactingVibration reduces the coefficient of friction inside material remarkably so that"flowability" is increased, and makes material shaping easily and more compact.5. Soil, sand and gravel compacting, concrete vibrating, pile driving anddrawingVibration can reduce internal friction force that soils, gravels and other mixedmaterials exert on penetrating objects （such as piles and pipes） so that soil and gravelcompacting process, concrete vibrating process, and pile driving and drawing processescan be performed effectively. Hence, the human labor intensity can be reducedremarkably.6. Instrument, machine and their components testingVibration can also be used to perform vibration test of machine components. Vibratingtesting machines and vibrating measuring insmanents are widely used to measureparameters of measuring insmunents, machines and their components. Vibration principleis also used to perform dynamic balance of rotating components.

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