

<<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 20th century. They utilize vibration principle to perform various processing tasks and have been widely used in various fields in industries, such as agriculture, national defence, mining, metallurgy, coal, petro-chemical industry, mechanical engineering, electric power, 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 as material feeding, loading, conveying, screening, distributing, drying, cooling, dehydrating, extracting, crushing, 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, pile inspecting, measuring, prospecting, diagnosing, etc. With the further development in economy and technology, new types of vibrating machines have been designed and manufactured. At present, vibrating machines have been widely used in various industrial fields, and play an important role in industries. In order to design new types of high-performance vibrating machines, it is necessary 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 modern design theory to systematic analysis and dynamic design of machines has become an important measure to ensure reliability and efficiency of mechanical systems. In this book, the authors summarize the theoretical and experimental investigations on vibrating machines as well as experiences of designing various new types of vibrating machines in more than 30 years, which includes the newest research achievements and design methods of other domestic 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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插图：2. Material screening, separating, dehydrating, cooling and drying Vibration 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 polishing Vibration can make materials crack and crackles spread rapidly inside the materials. It can also intensify the friction and impact among grinding ( polishing, cleaning ) medium and particles of processed material or work pieces to perform material work piece ) grinding, cleaning, casting component shaking, work piece polishing, etc. 4. Discrete material shaping and compacting Vibration 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 and drawing Vibration can reduce internal friction force that soils, gravels and other mixed materials exert on penetrating objects ( such as piles and pipes ) so that soil and gravel compacting process, concrete vibrating process, and pile driving and drawing processes can be performed effectively. Hence, the human labor intensity can be reduced remarkably. 6. Instrument, machine and their components testing Vibration can also be used to perform vibration test of machine components. Vibrating testing machines and vibrating measuring instruments are widely used to measure parameters of measuring instruments, machines and their components. Vibration principle is also used to perform dynamic balance of rotating components.

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