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Autore	Xu Qian
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Transportation Pipeline under the Action of Oblique Reverse aults -- Assessment of the effect of blood pressure on aortic rupture risk based on two-way fluid-structure coupling -- Quantifying the risk of aortic stenosis complications based on bi-directional thermo-fluid-solid coupling.

Sommario/riassunto

This book is a summary of the author's pioneering work on the theory of heating pipelines and its application expansion over the years, trying to establish a complete logical system from the basic theory of pipelines to the application of heating pipelines to the innovation and expansion of large-diameter energy transmission pipelines. These esoteric fundamental theories are linked to practical applications, and numerical simulations are used to help readers understand the problems faced by pipelines in engineering practice. The book consists of four chapters, the first chapter describes the basic concepts of district heating system, related standards, development history, facing problems and future prospects, while for the basic characteristics of district heating pipe network installation and laying methods made an introduction; followed by the second chapter summarizes and organizes the pipeline safety research of fluid-solid heat, elastic-plasticity and other basic theories, as well as heating pipeline thermal insulation system heat loss and the economic evaluation of theory and so on. Based on the basic theory of pipeline, the third and fourth chapters introduce several typical pipeline application cases in detail, and each case includes modelling, solving, and result analysis, which can provide readers with technical references and idea guidelines in the field of pipeline research. The third chapter of the different structures of the heating pipeline from the safety and economic aspects of a detailed numerical study; the fourth chapter in the heating pipeline on the basis of energy transportation pipeline, transportation medium from the original hot water, hot steam to the oil and gas, specifically introduced various types of large-diameter energy transportation pipeline under the action of different loads of the dynamic response characteristics. It has important theoretical significance for enriching and developing the basic theory of pipeline and the expansion of all kinds of pipeline applications, and at the same time, it provides technical guidance for the safe, stable, economic and efficient operation of all kinds of long-distance pipelines, such as heating pipelines and energy transmission and transportation pipelines. It helps readers to systematically and comprehensively understand the basic theories of elasticity and plasticity, fluid-solid-thermal coupling, and economic evaluation of pipelines, and at the same time provides readers with new research ideas and technical means from the perspective of scientific research.