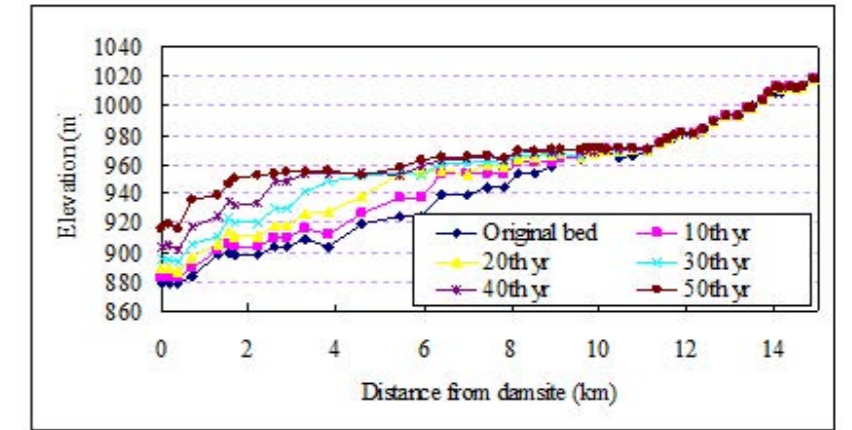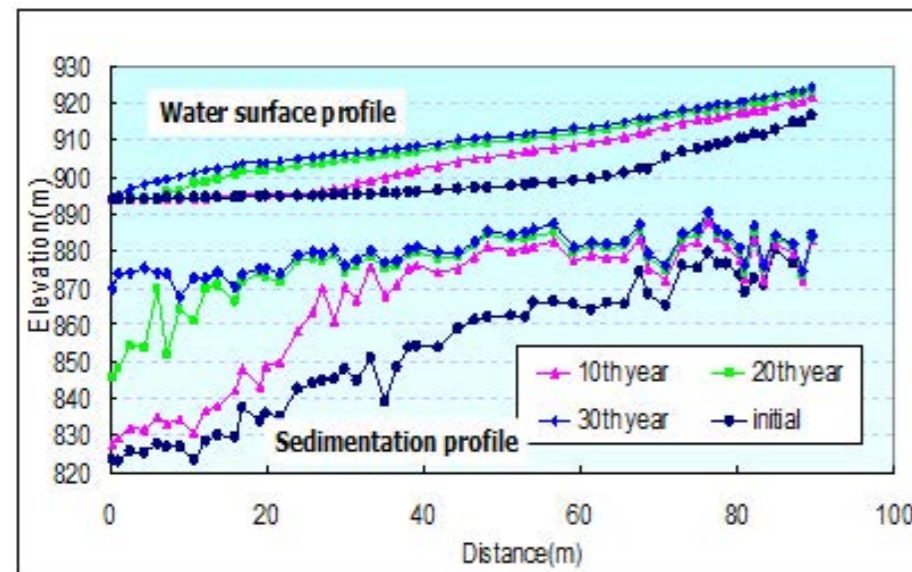# RESERVOIR SEDIMENTATION

著作类成果

水库淤积

【创新性】

《水库淤积》是水库淤积方面的专著，共分三篇、十五章。第一篇为水库淤积的基本现象和规律，包括非均匀悬移质不平衡输沙、水库异重流和高含沙量水流、水库淤积形态、推移质淤积、水库排沙与冲刷、淤积与回水的相互作用、变动回水区冲淤、水库淤积的平衡以及糙率及水库干容重确定等。第二篇为水库淤积控制，其中有库容淤积控制、洪水位抬高控制、变动回水区航道控制、坝前泥沙和水流控制及下游河道冲淤控制等。第三篇为水库下游河床冲淤与变形，包括冲淤的一般现象、来水来沙过程改变的作用、含沙量恢复以及河床变形等。《水库淤积》体系科学，资料丰富，机理阐述清晰，特别强调理论上的概括，很多内容涉及水库淤积前沿和相关进展，不少内容属于首创。它将水库淤积由定性描述，完成了定量过渡，且建立了水库淤积理论体系。

【影响力】

该书建立了水库淤积理论体系，已成为水库泥沙淤积、淤积控制和下游河道冲淤演变数值模拟技术的理论基石，将水库淤积由定性描述升华到定量计算。谢鉴衡院士评价：《水库淤积》自成体系，内容新颖、全面，资料丰富，机理阐述清晰，理论概括水平高，很多内容涉及水库淤积前沿和相关进展，不少内容属于首创，实用价值和科学价值皆高。基于该书理论发展的水沙数学模型，在三峡、小浪底等上百座水库淤积和优化调度中得到应用，明确回答了三峡水库 80% 以上有效库容可永久保留的关切问题，理论的正确性和模型的可靠性被实践所证实。在国内外得到广泛赞誉，影响很高，不少国外同行纷纷表示用不同语言翻译此书。

主要完成人：韩其为
受奖单位：泥沙所

【Innovation】

Reservoir Sedimentation is a monograph regarding sediment deposition in reservoirs, which consists of three sections and fifteen chapters. Section I elaborates the fundamental phenomena and laws of reservoir sedimentation, including non-equilibrium transport of non-uniform suspended sediment, density currents and hyper-concentrated flows in reservoirs, longitudinal sedimentation profiles, deposition of bed load, sediment releasing and flushing, mutual effect of deposition and backwater, erosion and deposition in fluctuating backwater areas, the equilibrium state of sedimentation, and determinations of roughness coefficient and dry density of sediments in reservoirs. Section II focuses on the sedimentation control mechanism, including the control of sedimentation in the effective storage capacity, control of rising of flood level, control of navigation channels in fluctuating backwater areas, control of sediment and flows in front of dam area, and control of erosion downstream the dam. Section III elaborates the erosion-deposition and the fluvial process downstream the reservoir, including general phenomena of erosion and deposition, effect of the variations of flow and sediment process, recovery of suspended sediment concentration and riverbed variation. This book is structured scientifically with abundant data and explicit elaboration. It stresses the summarization of theories, and involves frontier and relevant progress of reservoirs sedimentation in many aspects. A lot of its contents are original. This book accomplishes a transition from qualitative description to quantitative simulation for reservoir sedimentation, and establishes a theoretical system.

【Influence】

This book establishes a theoretical system for reservoirs sedimentation, and has become a theoretical foundation for numerical modeling of reservoir sedimentation, sedimentation control, and fluvial process downstream the dam. It has accomplished a transition from qualitative description to quantitative simulation for reservoir sedimentation. According to Academician Xie Jianheng's comments, the monograph Reservoir Sedimentation establishes a complete system with novel and comprehensive content, abundant data, explicit elaboration of mechanism and high-level summarization of theories; it involves frontier and relevant progress of reservoir sedimentation in many aspects, and a lot of its contents are original, with both high practical and scientific values. Numerical models based on theories in this book have been applied to the simulation of sedimentation and optimal dispatching of hundreds of reservoirs like Three Gorges and Xiaolangdi, and the concern that more than 80% of the effective storage capacity of the Three Gorges reservoir can be retained permanently has been clearly answered. Validity of the theory and reliability of the models have been proved in practice. This book has won extensive praise at home and abroad, with significant influence. Quite a few foreign peers say they will translate this book into various languages.

Main Contributor : Han Qiwei
Award-winning Unit : Department of Sediment Research