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STRUCTURAL HEALTH MONITORING

— USING —

IOT

SMARTER STRUCTURES.
REAL-TIME INSIGHTS.
STRONGER TOMORROW.



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Structural Health Monitoring Using IOT

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PREFACE

Dear Reader,

Urban flooding has become a serious and recurring challenge in rapidly developing cities. Rapid urbanization, increasing impervious surfaces, inadequate drainage infrastructure, encroachment of natural drainage systems, poor maintenance, and changing rainfall patterns have considerably increased urban flood risk. The impacts extend beyond temporary waterlogging, affecting human life, infrastructure, transportation, public health, economic activities, and the overall sustainability of cities. This book, *Urban Flood Mitigation*, has been prepared to provide a systematic understanding of the causes, assessment, management, and mitigation of urban flooding. It presents urban flooding as a multidisciplinary challenge requiring the integration of engineering, hydrology, urban planning, environmental management, geospatial technologies, disaster management, institutional coordination, and community participation.

The book discusses the fundamentals of urban flooding and storm water management, followed by urban drainage systems, sustainable storm water management, flood-risk assessment, Sustainable Urban Drainage Systems (SUDS), urban storm water planning, and structural and non-structural mitigation measures. Particular emphasis is placed on sustainable and nature-based approaches that promote infiltration, storage, controlled release, and reuse of storm water rather than relying solely on rapid conveyance. The book also examines the growing influence of climate change on urban flooding, including intense rainfall events, changing precipitation patterns, sea-level rise, and associated challenges to existing drainage systems. It highlights the importance of integrated, catchment-based, sustainable, and climate-resilient planning approaches for developing cities.

An important feature of this work is its coverage of GIS, Remote Sensing, flood modelling, monitoring, forecasting, early warning systems, disaster preparedness, governance, and community participation. These tools and approaches can support better flood-risk assessment, planning, decision-making, and emergency response. The book also recognizes that effective mitigation requires a balanced combination of structural, non-structural, sustainable, and institutional measures. The book is intended for undergraduate and postgraduate students, researchers, civil and environmental engineers, urban

planners, water-resources professionals, municipal authorities, disaster-management practitioners, and policymakers. The presentation is designed to support both academic learning and practical understanding, with appropriate review questions and objective-type questions included for educational use.

The central philosophy of this book is that urban flooding should not be addressed merely by attempting to remove storm water as quickly as possible. Instead, cities must learn to manage storm water sustainably, work with natural hydrological processes, reduce vulnerability, protect natural drainage systems, and build long-term resilience.

It is hoped that this book will serve as a useful academic and professional reference and contribute to the development of safer, sustainable, climate-resilient, and flood-resilient cities.

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