Preface

The transition towards a more sustainable and resilient future requires engineering materials and technologies that address environmental challenges while responding to the evolving needs of society. Green Engineering Materials and Technologies brings together a collection of research contributions that explore innovative materials, sustainable technologies, environmental management, and engineering practices from diverse perspectives.

This book presents ten research papers covering a broad range of topics related to green engineering and sustainable development. The contributions demonstrate how natural and renewable resources can be transformed into useful engineering materials, how innovative technologies can improve the performance and durability of infrastructure, and how engineering solutions can contribute to environmental protection and community well-being.

Several chapters focus on the development and application of sustainable materials, including durian peel for the removal of methylene blue, Leucaena leucocephala cement-bonded particleboard, glulam manufactured from Melunak and Mengkulang, and the use of lignin as a bio-binder for sustainable asphalt pavement. Other contributions investigate innovative approaches to infrastructure materials, including the self-healing performance of steel fibre asphalt mixtures, the mechanical behaviour of steel fibre reinforced concrete, and the application of experimental and finite element techniques in timber engineering.

The scope of the book also extends beyond material development to wider environmental and sustainability challenges. Studies on rainfall interception, food losses in cabbage production, and the experiences of communities in un-electrified remote areas highlight the importance of understanding the interaction between engineering, natural systems, resources, and society. In addition, the discussion of health and safety practices at construction sites demonstrates that sustainability must encompass not only materials and technologies, but also safe and responsible practices throughout the construction process.

Collectively, these contributions reflect the multidisciplinary nature of green engineering. They demonstrate that sustainable engineering requires an integrated approach in which material innovation, environmental stewardship, technological advancement, structural performance, resource efficiency, and human well-being are considered together. The research presented in this book also illustrates the importance of combining experimental investigation, numerical modelling, field

studies, statistical analysis, and review of existing knowledge to develop practical and scientifically grounded solutions.

We hope that Green Engineering Materials and Technologies will serve as a useful reference for researchers, academics, engineers, postgraduate students, practitioners, and other professionals interested in sustainable materials, green construction, environmental engineering, and emerging engineering technologies. More importantly, we hope the collection will encourage further research, collaboration, and innovation towards a more sustainable built environment and a greener future.

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