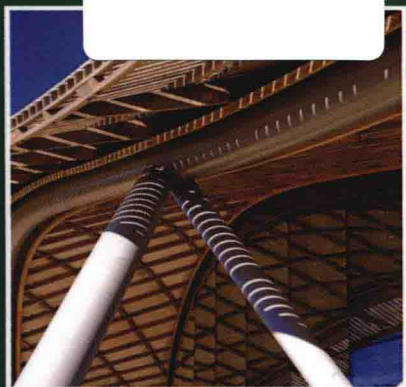


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# Wood Composites

Edited by Martin P. Ansell

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# Wood Composites

*Edited by*

***Martin P. Ansell***



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# Preface

According to the Food and Agricultural Organization of the United Nations in 2013, global sawn wood production amounted to 421 million cubic metres, a 4.6% increase on the previous year. In the same period, global wood-based panel production reached a record high of 358 million cubic metres, an increase of 7.8% on 2012. In the face of competition from other materials, markets for wood composites are expanding and products such as glue-laminated timber, wood-based panel products, wood fibre composites and cross-laminated timber are finding new and exciting applications based on their unique properties, sustainable sources and excellent environmental credentials. It has therefore been timely to bring international experts together to produce this volume on wood composites.

The book is divided into three parts: materials for wood composites, wood composites and their applications, and advances in wood composites. The first part looks at the structure of softwoods and hardwoods, and considers the wood cell wall as a natural composite in its own right (Chapter 1). The first stage in the processing of wood for wood composites involves the production of nano-cellulose, fibres, chips, flakes, strands and veneer, and these processes are described together with sawing and planing operations (Chapter 2). A key ingredient of the majority of wood composites is the adhesive bonding agent, which ranges from natural adhesives to advanced epoxies and isocyanates (Chapter 3).

In Part two, the major classes of commercial wood products are explained, including plywood (Chapter 4), fibreboards, covering hardboard and medium density fibreboard (Chapter 5), and chipboard, oriented strand board and parallel strand products (Chapter 6). Larger structural components include glue-laminated timber (Chapter 7), cross-laminated timber (Chapter 8) and I-beams (Chapter 9). Wood-polymer composites are a huge class of engineering materials, and are reviewed in Chapter 10.

Part three is concerned with advances in wood composites, including their preservation and modification (Chapter 11), and the key issues of environmental impact and legislation associated with wood composites (Chapter 12). A state-of-the-art description of nano-composite coatings and plasma treatments for wood-based composites (Chapter 13) is followed by a thought-provoking review of biomimetic composites inspired by the structure of wood (Chapter 14). Chapter 15 considers recent research on using wood as a scaffold following carbonization or mineralization, and Chapter 16 goes on to give examples of how wood composites are so often combined with other materials to form hybrid structures.

The combination of chapters has brought together authors from Canada, England, Finland, Germany, Japan, Malaysia, New Zealand, Scotland, Slovenia and Wales. I am grateful to them for delivering all of the commissioned chapters

despite their many other commitments, and I appreciate the support provided by Woodhead-Elsevier throughout all stages of production. Overall, I hope that the extraordinary range of wood composites, tailored to a multiplicity of applications, excites and stimulates the reader and confirms wood composites as truly twenty-first century materials.

Martin P. Ansell

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