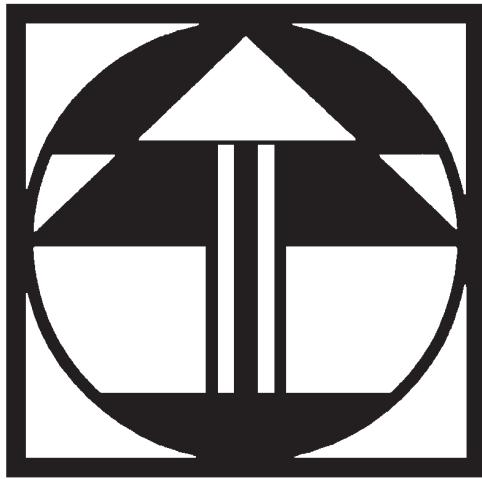


*Forest Products Society*



*Publications*

*2005 - 2006*



*The Forest Products Society publishes and distributes proceedings, manuals, and other technical publications covering a broad range of topics related to wood and wood fiber properties, products, and markets.*

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## ***What's New***

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## General Interest



### A Guide for Developing A Wood Collection

by Samuel H. Lamb and  
Alan B. Curtis

We are fortunate to have available to us many different woods from all over the

world. Fascination with the beautiful colors of wood, its interesting grain and figure, and the pleasure and challenge of working with wood has inspired many people to begin a personal wood collection. This booklet, published in a cooperative effort between the Forest Products Society and the International Wood Collectors Society, explains how to get started collecting wood. Discussion topics include field collecting, trading, and how to protect, maintain, store, and dispose of your collection. The importance of correctly identifying wood and the proper labeling of wood specimens is also discussed. An extensive list of references and color photographs are included.

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### A Guide to Useful Woods of the World

edited by James H. Flynn, Jr.  
and Charles D. Holder

Published in a cooperative effort between the Forest Products Society and the International Wood Collectors Society, this book is an

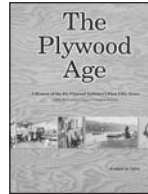
invaluable reference for woodworkers, wood collectors, and other interested in wood. For each of the 279 species, information is presented on the scientific name, family name, common name, distribution, the tree, the timber, seasoning, durability, workability, uses, and supplies. In addition there is a line drawing of a key botanical feature, a photomicrograph of the wood end grain, and a color photograph of a sample of the wood. Also included are a common name index with approximately 2,000 entries, a family name index with the names of the 73 families represented, a scientific name index that in-

cludes synonyms, and three useful appendices: a discussion of biology and taxonomy for woodworkers, insights on the toxicity of various wood species, and a list of selected references.

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### The Plywood Age

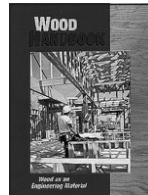
*The Plywood Age* was published in 1955 to mark and record the first 50 years of the softwood plywood industry. One of the most innovative and versatile building materials ever developed, plywood –

now 100 years since its introduction – remains a workhorse material in countless construction and industrial applications around the world. This 100th anniversary commemorative edition, republished by APA – The Engineered Wood Association includes a new foreword by William T. Robinson, retired president of APA and acting secretary of the Plywood Pioneers Association. This book has been published to help preserve the fascinating chronicle of the plywood industry's founders, early companies, technology innovations, marketing programs, and other milestone events and development during the plywood industry's first half century.

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### Wood Handbook: Wood as an Engineering Material

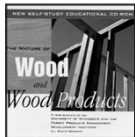
This classic reference from the USDA Forest Products Laboratory has been updated and expanded to provide

over 400 pages of current information on a wide range of subjects including: basic wood and wood product characteristics and properties, various wood product manufacturing processes, processes to enhance the performance of wood, product structural design information, specifications and rules for the proper use of wood products, and numerous other areas

of interest to manufacturers, specifiers, and users of wood products. The book is designed to be easily laid open for ready access to tables and charts without breaking the spine. Each chapter contains an updated list of references for those users who wish to go into greater depth and detail in the subject covered. An expanded and updated glossary and detailed index are also included.

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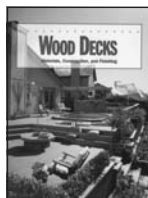
### The Nature of Wood and Wood Products CD-ROM

by Jim L. Bowyer and Ruth L. Smith

This CD-ROM, authored by Dr. Jim L. Bowyer, Dept. of Wood and Paper Science, Univ. of Minnesota, and Ruth L. Smith, President, WebSmith, Inc., presents a series of modules to provide a basic understanding of wood as a material and of the principal products made of wood. The fifteen study modules cover: properties of softwoods; properties of hardwoods; the formation and chemistry of wood; juvenile wood and reaction wood; the influence of forestry practices on wood quality; wood drying; specific gravity of wood; strength of wood; wood preservation; lumber; plywood; wood composite products; pulp and fiber products; measurement of wood products; and raw materials and the environment. Each module includes a review that tests understanding of key concepts. Instant feedback is provided, along with links to review material that is relevant to any question that may have been answered incorrectly. Also included are over 700 photographs and graphics, animations, and self-test scroll bars – all designed to promote an understanding of the subject matter in a visual, interactive environment. A demo version is available at [www.forest-prod.org](http://www.forest-prod.org).

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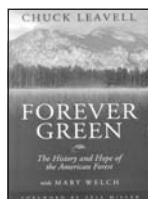
### Wood Decks: Materials, Construction, and Finishing

This invaluable resource for do-it-yourselfers, designers, home builders, and remodelers contains important information on the design, construction, and maintenance of wood decks that is not available in other deck construction publications, including: span tables for deck design; unbiased technical information that outlines the *dos* and especially the *don'ts* of deck design and construction; information on the properties of wood species used in deck construction and how these properties impact deck quality and longevity; a detailed discussion of materials and procedures for finishing wood decks; and a step-by-step examination of the procedures involved in inspecting and maintaining various deck components and deck finishes. This manual contains over 40 color photos, numerous tables, and more than 50 scale drawings of various construction details.

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### Forever Green: The History and Hope of the American Forest

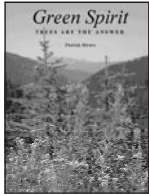
by Chuck Leavell

Chuck Leavell, an acclaimed rock/blues pianist, has become one of our most respected

conservationists and tree farmers. A nationally recognized spokesman on behalf of America's forest, Leavell and his wife Rose Lane transformed Charlane Plantation into an award-winning southern pine forest plantation and conservation educational facility. In *Forever Green*, Leavell steers a well-reasoned course for the future of America's forests by pointing out that wood is one of our most critical resources, one that must be wisely used and conscientiously renewed. Leavell's message is frank but encouraging. Thanks to pressure applied by environmental and conservation groups, sound forest management practices by timber-owning companies and individuals

demonstrating good stewardship practices, responsible government policies, and an ever-rising social consciousness on behalf of all our natural resources, we are making progress in forest management. The American forest does have hope.

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**Green Spirit —  
Trees are the Answer**

by Patrick Moore

Delivering a powerful message about forests that runs contrary to much of the environmental movement's current thinking, this personal essay, in words and photographs, gives us new eyes with which to see the land and explore the beauty, biodiversity, and spirit of forests growing back after logging. With a logical argument based on facts and science, Dr. Patrick Moore demonstrates

that rather than reducing our consumption of wood, we should be planting more trees and using more renewable wood in order to reduce our reliance on non-renewable fuels and materials. By linking forests, biodiversity conservation, and climate change into a unified understanding of the global environment, he shows that the apparent logic of saving the forests by cutting fewer trees and using less wood is actually an anti-environmental proposition. Written in non-technical prose, *Green Spirit* provides a new insight into how forests work and how they can play a powerful role in solving many of our current environmental problems.

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**Composite Products**



**Modern Particleboard & Dry-Process Fiberboard Manufacturing**

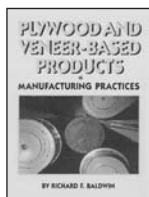
by Thomas M. Maloney

This updated edition presents comprehensive, practical information on particleboard

and a wide array of other composite wood products. It is designed to provide accessible information to the novice and valuable insight to the manufacturing professional. The book covers manufacturing practices, processing systems, product standards and material properties, and presents material ranging from an overview of the industry and definitions of terms to technical factors governing production. This edition also includes an all-new chapter which focuses on the range of composite panels and lumber products, including plywood, MDF, fiberboard, OSB/waferboard, and lumber or timber composites. The development of new composite products and materials has created new problems and greater opportunities, and the author takes a hard look at ongoing developments, current standards, and research in all aspects of composite production. Chapters include: introduction; production and markets; modern processing systems; composition board materials: properties and testing; parameters affecting board properties; raw materials and particle geometry: effects on board properties; particle generation, conveying, and storage; drying principles and practices; moisture measurement and control; particle separation: principles and equipments; fire and explosions: prevention and detection; resins and other additives; resin/wax applications and blenders; caul and caulless systems; mat forming and formers; prepressing; hot pressing and presses; finishing board; and new developments.

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## **Plywood & Veneer-Based Products: Manufacturing Practices**

by *Richard F. Baldwin*

Focusing on the efficient manufacture of softwood plywood while highlighting new opportunities and challenges created by today's growing, diverse veneer-based industry, this book explains every phase of the manufacturing process and covers recent developments in LVL and other veneer-based products, as well as changes in plywood manufacturing methods, standards, and market demands. Fully illustrated, the information is divided into eight sections. Section I provides a summary and profile of the veneer-based industry; defines the manufacturing task; and describes how industry activities relate to current environmental thinking. Section II provides an historical perspective of the business, with an emphasis on understanding the past and applying its lessons to the future. Section III refines the guidelines for raw material selection and processing of the peeler. Section IV introduces various peeling and green end systems in chronological order and discusses innovations and trends that will extend into the immediate future. Section V describes various veneer drying and product assembly machinery and methods, including the latest adhesive use – especially helpful material as the industry produces a wider variety of engineered wood products. Section VI illustrates secondary manufacturing of the basic glued assembly and gives ideas for selling the resulting products. Sections VII and VIII provide tools for managing the business and insights for the future, as the softwood plywood industry moves into its next 100 years.

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## **Proceedings from the 8th International Woodfiber-Plastic Composites Conference**

*Scheduled to be available at the end of 2005, this proceedings will contain the papers and technical forum abstracts presented at the conference.*



## **Proceedings from the 7th International Woodfiber-Plastic Composites Conference**

This proceedings contains papers presented at the 7th International Conference on

Woodfiber-Plastic Composites held in 2003. Subjects covered in the fundamentals session include fiber-matrix adhesion, composite microstructure, natural fibers, bio-composites, nano-composites, and foaming. Papers from the applied sessions cover durability, standards development, performance considerations, and automotive applications. Keynote presentations present an overview of the use of natural and woodfiber-plastic composites in North America and Europe, the use of natural fiber-plastic composites in the automotive industry, and experience gained during the product development of engineered wood-plastic composites. In addition to the full papers from the main sessions, abstracts from the technical forum are included.

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## **Proceedings from the 6th International Woodfiber-Plastic Composites Conference**

This proceedings contains papers presented at the 6th International Woodfiber-

Plastic Composites Conference held in 2001. The materials sessions covered natural fiber materials, matrix effects, and fiber-polymer interactions and interphases. Concurrent sessions covered durability and processing issues. Keynote presentations covered natural fiber composites in the U.S. automotive industry, the driving factors behind natural fiber use in the European automotive industry, and the U.S. woodfiber-plastic composites decking market. In addition to the full papers from the main sessions, abstracts from the technical forum are included.

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## Proceedings from the 5th International Woodfiber- Plastic Composites Conference

This proceedings contains papers presented at the 5th International Woodfiber-

Plastic Composites Conference held in 1999. Fundamentals session topics include fiber and composites, processing and properties, and structure and performance; applications session topics include worldwide perspectives, processing, and markets and applications. There are also keynote presentations on the fundamental principles of polymer composites design and manufacturing, functional fillers for plastics: outlook to the year 2005, and the changing nature of window materials in North America. In addition to the full papers from the main sessions, abstracts from the technical forum are included.

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## Woodfiber-Plastic Composites: Virgin and Recycled Wood Fiber and Polymers for Composites

This proceedings contains papers from the 3rd International Conference held in 1995 to explore the potential of wood fiber for the plastic composites industry. Fundamental sessions include: characterizing woodfiber-plastic composites: fiber analysis; characterizing woodfiber-plastic composites: matrix alternatives; surface interactions: interface, interphase, and compatibilization; relationship between structure and properties; and property improvements. Application sessions include: processing equipment; effects of processing on composite properties; aspects of recycled resources: research, recovery, availability, costs, and markets; applications of wood-fiber-plastic composites; and life cycle assessment.

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## Use of Agricultural Fibers in the Manufacture of Composite Panels

This proceedings is from a two-day conference sponsored by the Eastern Canadian Section of the Forest Products Society in Winnipeg, Manitoba in 1999. Topics covered include the use of "hybrid" resin systems for strawboard manufacture; practical experiences in the production of panels using agricultural-based fibers; factors to consider when producing particleboard from straw; utilization of industrial hemp stalks in composite panels; an overview of key issues in the utilization of wheat straw in MDF; a study of five different agro-based particleboards bonded with urea-formaldehyde resin; soybean-based adhesives for wood and agricultural fiber composite products; the relationship between moisture content and pMDI in the manufacture of strawboard; market trends for particleboard and MDF; and structural board manufactured from split straw.

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## Fiberboard Manufacturing Practices in the United States

by Otto Suchsland and George E. Woodson

This book provides a thorough review of the manufacture, properties, and application of fiberboard. First printed in a limited edition in 1987 by the USDA Forest Service (now out of print), this book has been updated with industry statistics and standards information reflecting data as of 1989 or, if available, 1990. The book includes a brief history of the industry and discussions of important technological and chemical aspects of fiberboard manufacture; raw material characteristics and availability; manufacturing equipment and processes, including insulation board, wet and dry process boards, and MDF; finishing processes; water use and treatment; and product properties and applications, including a discussion of commercial standards.

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PROCEEDINGS  
39TH WOOD COMPOSITE  
MATERIALS SYMPOSIUM  
W.S.U. 2005  
CD-ROM

### **39th International Wood Composite Materials Symposium Proceedings on CD-ROM**

The 39th annual Wood Composite Materials Symposium, formerly the Particleboard/Composite Materials Symposium, featured information on current topics in the manufacture of particleboard and other composite materials. The papers presented at the 2005 meeting at Washington State University are included on this CD-ROM, which has a searchable PDF file of the complete symposium. The symposium was organized into four sessions: symposium opening and general session; process innovation; product innovation;

and introduction to natural fiber thermoplastic composites. The papers presented during the technical workshop (panel surfacing technology) and abstracts of papers presented during the technical forum are also included.

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### **Also Available: Past Editions of the International Particleboard/Composite Materials Symposium Proceedings**

All previous Particleboard/Composite Materials Symposium proceedings may be purchased from the Forest Products Society. Call for pricing information.

## ***Durability, Drying, and Moisture Relations***



### **Woodframe Housing Durability and Disaster Issues**

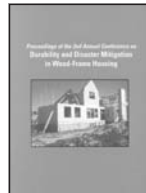
The proceedings from the Woodframe Housing Durability and Disaster Issues conference, held in 2004,

provides the latest information on problems and solutions related to woodframe housing and disaster issues. Opening with overviews of research and demonstration field test structures and facilities throughout North America that are designed to address the effects and mitigation of various environmental stresses (moisture, wind, earthquakes, fire, decay and insect attack) on woodframe structures, session topics included the influence of construction and design practices; disaster mitigation; assessment and durability treatments; and biological degradation and moisture control.

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### **Durability and Disaster Mitigation in Wood-Frame Housing**

This proceedings contains over 50 papers and abstracts of presentations made at the 2nd Annual Conference on

Durability and Disaster Mitigation in Wood-Frame Housing held in 2000. The information in this proceedings provides design professionals, builders, code officials, government officials, researchers, and educators with information on issues related to housing durability and disaster mitigation. Subjects covered include case studies of product and systems durability performance; national durability programs; wind, fire, flood, seismic, pests, mold, and rot issues; new products and technologies; construction quality assurance and implementation; and builder perspectives on durability and disaster mitigation.

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## Swelling and Shrinking of Wood: A Practical Technology Primer

by Otto Suchsland

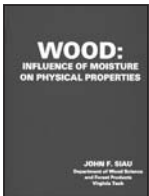
Swelling and shrinking of wood and wood-based products presents perhaps the most vexing technological problems and design/utilization challenges for users and manufacturers of wood and wood products and for the ultimate consumers of these products. This book addresses in detail the fundamental concepts of the swelling and shrinking of solid wood and wood-based products and serves as an invaluable guide in the design, manufacture, and use of these products. Chapters cover the basics of air, water, and relative humidity; wood and its reaction to moist air; dimensional changes in solid wood; warping of solid wood; swelling, shrinking, and warping of laminated wood products; swelling, shrinking and warping of wood-based composite boards; and the dimensional stabilization of wood and wood products. This is a reference manual that should be on the shelves of every business that utilizes wood as a raw material and in every classroom where the fundamentals of wood technology are taught.

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\$35 full-time student



## Wood: Influence of Moisture on Physical Properties

by John F. Siau

Nearly all physical properties of wood are influenced by its moisture content. Written by John F. Siau, this book discusses the interactions between moisture, heat, and wood – the principle source of problems encountered in applications with wood. This book can be used as a text and reference for students and faculty and will also be helpful to engineers, architects, and designers. Chapters include: basic wood – moisture relationships; elementary wood structure; permeability; capillarity, osmotic phenomena, and water potential; thermal con-

ductivity and electrical properties; steady-state moisture diffusion; thermodynamics and sorption theories; and unsteady-state transport, mass convection, and nonisothermal diffusion. Also included are laboratory exercises, problems and answers, and an index.

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## Dry Kiln Operator's Manual

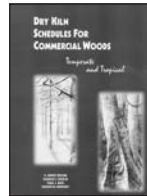
This manual, reprinted from USDA Agricultural Handbook No. 188 with the consent of the USDA Forest Products Laboratory, offers a

guide to all aspects of both hardwood and softwood lumber kiln drying. The manual is designed as a text, either for a short course on lumber drying or for use in universities and technical colleges. The manual is divided into 11 chapters, plus a glossary and index, covering: the properties of wood that affect the drying process; dry kiln types and features; auxiliary equipment for dry kilns; inspection and maintenance of dry kilns and auxiliary equipment; stacking and loading lumber for kiln drying; preparation and use of kiln samples; developing and using kiln schedules; types of drying defects and their control; basic techniques in dry kiln operation; proper methods of log and lumber storage; and energy consumption in drying systems.

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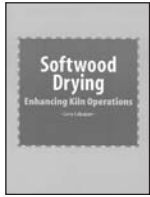


## Dry Kiln Schedules for Commercial Woods – Temperate and Tropical

This report, originally published by the USDA Forest Products Laboratory, contains suggested dry kiln schedules for over 500 commercial woods, both temperate and tropical. The schedules are written out for easy reference and use. The majority of the schedules are from the world literature with emphasis on U.S., Canadian, and British publications. Revised schedules are sug-

gested for western U.S. and Canadian softwoods and U.S. southern pines. Included are conventional and elevated temperatures for U.S. and Canadian species, Latin American woods, Asian and Oceanian woods, African woods, and European woods. Also included are high temperature schedules for U.S. and Canadian species and tables of assembled dry kiln schedules.

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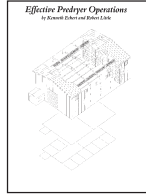
**Softwood Drying:  
 Enhancing Kiln  
 Operations**

by Larry Culpepper

In this book Larry Culpepper explains why and how the entire manufacturing and

drying process affects the final quality of lumber from any dry kiln. From log cutting to kiln maintenance, discover how the proper equipment and practices can increase quality and profitability (by producing narrowed moisture distribution, improved grade recovery, reduced drying time, easier operation, and lower costs). Use this comprehensive resource to: understand the latest kiln technologies and techniques; identify potential problem areas in your operations; learn more efficient use of natural resources; stimulate new ideas for kiln improvement; and contribute to your operation's overall success. Chapters include: lumber manufacture and its impact on drying; sorting and green lumber handling; lumber stacking and stick laying; kiln setups and loading practices; final loading considerations; dry lumber handling; fan systems and air flow; humidity control; steam-heated kilns; direct-fired dry kilns; computerized lumber drying control; the drying process; quality control; and kiln maintenance and design. Exploring the full scope of processes and challenges involved, this book helps you develop outstanding kiln operations for drying softwood of all kinds.

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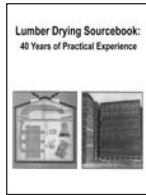
**Effective Predryer  
 Operations**

by Kenneth Eckert and  
 Robert Little

This manual presents a common sense approach to predrying. The manual reviews

common problems experienced by predryer operators in an easy-to-understand manner. Simple, practical solutions to the problems of mixed species, varying lumber thickness, and stain development are presented. Solutions to the problems of slow drying rates and moisture variation are also discussed. Chapters include: introduction to predryers; stacking, loading, and start-up; air flow; temperature and humidity control; management decisions; sample boards; special problems; considerations when building a predryer; troubleshooting; and references.

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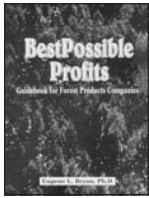
**Lumber Drying  
 Sourcebook: 40 Years of  
 Practical Experience**

The more than 130 articles contained in the *Sourcebook* resulted from a careful selection of the most practical and

pertinent articles on lumber drying that were published in the Forest Products Society's *Wood Drying News Digest* over the past 40-plus years. From understanding the basics of shrinkage, stresses, and moisture movement in wood to troubleshooting and maintaining drying equipment, the articles are brief and clearly written by the world's leading authorities on lumber drying. Articles are grouped by subject matter for easy access, and a comprehensive index is also provided. This essential manual should be kept on a bookshelf within easy reach of every drying operator and manager in the wood products industry.

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# Marketing and Management



## **BestPossible Profits: Guidebook for Forest Products Companies**

by Eugene L. Bryan

Dr. Eugene L. Bryan has nearly 40 years of experience in computer-based systems and management services that help company managers coordinate the use of raw materials, production capabilities, and market opportunities to achieve optimum (BestPossible) profits. Part One of this guidebook presents insights and concepts, management tools, and the guidance systems companies need to understand in order to meet challenges and capture opportunities on the way to achieving BestPossible profits. Part Two outlines opportunity-based management principles and describes how companies can use optimization technology to produce departmental "roadmaps" to ensure that management efforts culminate in BestPossible profits. Included is a discussion on how to use internal benchmarking to track progress, minimize slippage, and document accomplishments. Part Three looks to the future and describes what a company must do to continually improve its BestPossible profit picture and thus have uninterrupted access to fresh opportunities. Managers who are learning to use high-tech management tools to identify and manage complexity are leading the journey into the future. This guidebook was written for such managers and others who wish to follow their lead.

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## **Operations Management in the Forest Products Industry**

by Richard F. Baldwin

With the manufacturing of forest products becoming ever more management- and capital-intensive, this book provides answers to questions such as how do successful firms grow and prosper? How does the industry

at-large cope with the cyclic business environment? The answers lie more in attitudes and thought processes than in ready resources and markets. With time-tested management concepts in action, not just outlined in theory, this book presents 24 chapters organized into six sections: forest products enterprise: a study in change (overview); management heritage; management planning; production process; management and cost control techniques; and managing change. Topics examined within these sections cover everything from industry roots to financial planning and budgeting, mill scheduling and inventory control, energy management, and new technology and innovation. Addressing both technical as well as management concerns, this is a "must-have" reference for supervisors, operations managers, and executives involved in manufacturing softwood lumber, plywood, and reconstituted products.

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## **Marketing Forest Products: Gaining the Competitive Edge**

by Dr. Jean Mater with

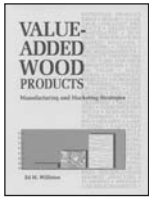
M. Scott Mater and

Catherine M. Mater

To stay profitable in today's economy, wood products must be marketed to specific markets, such as home center store sales, repairing, remodeling, the do-it-yourself market, factory-built homes, components, or export markets. Providing examples from the field and descriptions of marketing tactics and preparation checklists, this guide shows you how to: find your market niche; identify potential customers and target markets; develop the appropriate wood products; compete by using product differentiation; develop the most profitable distribution system; improve sales with packaging and point of purchase tags; promote the unique characteristics of each wood species; and hedge the risks of a new product venture. In addition, there are ideas for low-cost promotions; pricing and merchandizing strate-

gies; a marketing glossary; and lists of trade journals, associations, and other references and resources. For marketing newcomers as well as experienced strategists, this book offers innovative ideas for increasing market share and capturing market segments throughout the wood products industry.

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### **Value-Added Wood Products: Manufacturing and Marketing Strategies**

by Ed M. Williston

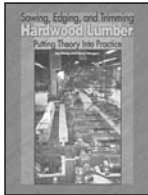
Value-added manufacturing requires a shift from standardized, high-volume com-

modity products such as framing lumber and sheathing plywood toward the development of new products tailored to the needs of specific market segments. Drawing on his 40-plus years of experience in developing, manufacturing, and marketing wood products, Williston demonstrates how to uncover opportunities for in-

creased return in every phase of the business. This book shows you how to boost product value to appeal directly to those niche markets – where there's less competition and more profit opportunity. In addition, the book demonstrates how to remain profitable in the face of rising threats from foreign and domestic competitors by adding direct value to the product line. Topics include: analyzing the market for new products; tailoring product specifications to use requirements; low, medium, and high-capital cost business opportunities for value-added products; readily available, low cost products; and training and motivating employees for value-added manufacturing. This book explains how to enhance the value of your product line and remain profitable.

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## **Processing and Process Control**



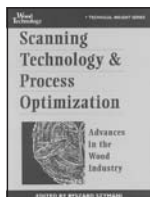
### **Sawing, Edging, and Trimming Hardwood Lumber: Putting Theory Into Practice**

by Joe Denig and Gene Wengert

This manual, published in cooperation with the National Hardwood Lumber Association, contains five chapters covering all aspects of sawing, resawing, edging, trimming, and grading hardwood lumber. Chapter 1 – Sawing at the Headrig covers basic sawing techniques, log loading and orientation, opening faces and log yield, taper settings, opening face size, lumber thickness, log turning, sawing rules, special sawing procedures, and the use of carriage scanners. Chapter 2 – Resawing Hardwood Cants includes general guidelines for resaw operations, basic grading concepts, cant sawing options, resawing cants,

and producing cants from sweepy logs. Chapter 3 – Edging Hardwood Lumber discusses edging objectives, edging performance, the basics of edging, guidelines for edging hardwood lumber, and edger evaluation. Chapter 4 – Trimming Hardwood Lumber covers suggestions for profitable trimming of lumber. Chapter 5 – Grading Hardwood Lumber includes the basics of grading hardwood lumber, designed especially for novice sawyers, edgermen, and trimmermen, and includes several lumber grading exercises. This manual will be an essential resource for hardwood producers and educators and extension personnel involved with the hardwood industry.

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## Scanning Technology & Process Optimization: Advances in the Wood Industry

*edited by Ryszard Szymani*

Scanning technology and process optimization are indispensable in today's competitive forest products industry, particularly considering the high cost of logs which accounts for almost 80% of the cost of lumber. To operate profitably, mills must utilize logs to their maximum potential. Optimization of any operation requires machine vision technology that can accurately determine log geometry and external and internal features considered defects, as well as computer technology that provides a solution at production speed. Electronic scanning is one of the most rapidly changing technologies in the wood industry mostly due to tremendous advances in data processing. This book provides an overview of various scanning methods and their application to the wood industry in order to maximize processing efficiency and value recovery. Topics include: enterprise optimization using scanning and process control as management tools; optimizing log bucking and sorting; three-dimensional log scanning for automation of log breakdown; lumber scanning for optimized edging, ripping, and cross-cutting; and automated defect detection for lumber grading. This book contains a selection of papers which were presented at International Conferences on Scanning Technology in the Wood Products Industry and provides mill managers with practical guidance on the selection of scanning and process optimization systems for primary and secondary wood processing.

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## Managing Mill Maintenance: The Emerging Realities

*by Richard F. Baldwin*

Mill maintenance today is no longer a simple series of "break it/fix it" tasks. Instead, it's a complex system of procedures and techniques aimed at capturing the competitive edge in productivity, quality, yield . . . and profits. But how do you use it? This book is a guide to maintenance management techniques for winning the competitive edge. Supervisors, machine operators, owners, and senior managers alike can put the system described to use immediately. Emphasizing increased mill efficiency in the forest products industry, the book cites examples of competitive mills throughout North America, Europe, and Japan. Key topics include: creating and sustaining an effective maintenance program; managing for results; predictive maintenance: tools and techniques; budgets and cost controls; maintenance support systems; obtaining more from the mill; innovation, involvement, and quality circles; and designing away from maintenance. This book is a hands-on guide to devising a new system for mill maintenance that is based on lower costs, optimum equipment performance, maximum effectiveness of each function, less downtime, and simpler maintenance efforts.

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## Quality Control in Lumber Manufacturing

*edited by Terence D. Brown*

Along with 15 other industry experts responsible for successful quality control programs in North America, lumber authority Terry Brown has compiled the first how-to guide for starting and improving lumber quality control programs. With an emphasis on maximizing a company's value and profits, this book discusses the entire manufacturing process step by step, with emphasis on efficient, standardized procedures and useful tools for controlling lumber size, monitor-

ing machinery, and evaluating personnel. In addition, this guide fully explains how to: establish the best quality control program for your mill; improve your existing quality control program; sell the importance of quality control to management; and keep your quality control program simple.

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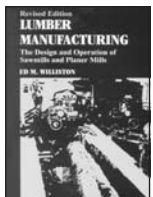


### Small Sawmill Handbook: Doing It Right and Making Money

by Joseph Denig

This results-oriented book explains the profitable philosophies behind sawing and describes high-yield equipment, simple and efficient mill layouts, quality lumber drying processes, and value-added techniques. Developed as a hands-on guide for the small mill operator who wants more than the status quo and needs to prepare the mill for the future, this book is also an excellent introduction for novices who need a good understanding of the theory and practical aspects of sawmill operations. With dozens of photos and illustrations showing how sawmilling principles are put into practice, the book's contents cover: the raw material; sawing patterns (the key to yield and productivity); sawmill equipment for primary breakdown; secondary breakdown; edging, trimming, and sorting; mill layouts; lumber drying; and value-added manufacturing. If your sawmill produces 3 to 20 million board feet annually, this book shows you how to survive, prosper, and ensure future profitability.

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### Lumber Manufacturing: Design & Operation of Sawmills & Planer Mills

by Ed M. Williston

This updated edition of the definitive book on lumber manufacturing techniques looks at the modern, efficient mill as a total system – from the handling of raw materials

through the finished product. It includes coverage of developments in scanner-computer systems, automatic grading, sorting and packaging systems, and automatic data collection. Each unit of the mill is examined and described in detail. Every method, operation, and technique is illustrated and documented with easy-to-read graphs and tables. More than 30 chapters examine five central topics: supplying and preparing the raw material; rough lumber manufacturing; manufacturing dry lumber, chips, and fuel; measuring performance, controlling quality, and maintaining equipment; and principal sawmill types. This book is indispensable for management, technical, and operations people who must keep up with the best methods and techniques for producing profitable yield from available raw materials.

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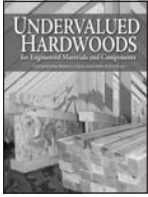
### Computer Control Systems for Log Processing and Lumber Manufacturing

by Ed M. Williston

A computerized lumber mill with a series of automated subsystems can save 25%, or more, on raw material costs. Since raw material can be as much as 90% of the total cost of sales, the savings potential is enormous. This guide shows you how to evaluate your needs and implement process controls which measure and control raw material and machine variables. The three main sections are: process control equipment; applications in the yard and mill; and process management and quality control. In addition there are detailed tables of performance standards, log yields, and conversion factors; a glossary of terms; and a check list of programmable logic controller capabilities. This book is an essential reference for anyone who plans, designs, operates, and maintains facilities for processing logs, lumber, and other wood products.

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# Timber Resource and Its Utilization



## Undervalued Hardwoods for Engineered Materials and Components

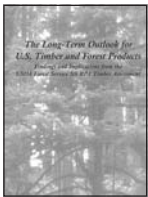
compiled by Robert J. Ross and John R. Erickson

Engineered wood components represent one of the fastest growing segments of the forest products industry. Most engineered components are manufactured from softwoods such as Douglas-fir, the southern pines, or spruce-pine-fir lumber. During the past decade, significant research and development efforts have been devoted toward investigating the use of lower grade hardwood resource in engineered materials and components. This publication is a compilation of those results. Widely respected technical authorities were asked to prepare sections dealing with their area of expertise. Part One focuses on basic information about this resource: availability, mechanical properties, log grading techniques, and appropriate drying methods. Part Two summarizes studies that examine use of this resource in trusses, laminated veneer lumber, I-joists, glulam timber, and bridges. This publication is designed to serve as a primary reference on the use of the undervalued hardwood resource in engineered components.

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## The Long-Term Outlook for U.S. Timber and Forest Products: Findings and Implications from the USDA Forest Service 5th RPA Timber Assessment

Edited by Kenneth Skog, these papers indicate how U.S. demands for forest products will likely interact with U.S. timber and product supplies and product imports to affect U.S. forests and public benefits of forest products over the next 50 years. The results are from the 5th RPA Timber Assessment of the USDA Forest

Service and additional special studies that evaluate forest management issues in the U.S. West. The purpose of this *Timber Assessment* is to: analyze and project trends and determinants of trends in demands and supplies of timber; estimate prospective changes in the land and timber resource base; examine the implications of these trends in use and the resource base, and survey the opportunities to manage and use the forest resource base to meet private and public sector goals. These papers were originally presented at the 2001 Forest Products Society annual meeting and used data from the 2001 Draft RPA Timber Assessment. After that meeting the Assessment projections were revised and the papers in this report, including the review papers, were revised to reflect the final projections for the 5th RPA Timber Assessment. The Assessment findings provide a basis for informed discussion on policies that will influence forest management and timber removal practices and determine their subsequent effect on ecosystems.

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## Maximizing Forest Products Resources for the 21st Century

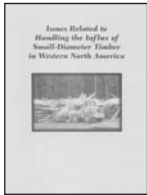
by Richard F. Baldwin

The forest industry is an essential global industry – yet it is an enigma. Some believe the Paul Bunyan heritage still lives: a heritage of big men, huge mills, and ancient trees. Others are not so sure: they know trees are the mainstay raw material for lumber, papers, and other products, but they don't know if the forest reemerges after harvest, and if it does will the land ever return to its preharvest condition. Somehow the industry has not escaped its cut-and-move-on reputation of the 19th century. The consumer and the industry have somehow each failed to recognize the change in each other. This book is a progress report to the industry participant, the consumer, the investor,

and others who depend in some way on the forest and its products. Hands-on business activities, interviews, observations, and detailed research in the United States and 20 other countries covering five continents over the decades have provided material for the text. The 19 chapters are divided into five sections: an overview; the raw material base: globalization and re-engineering; the mills: adapting to change; marketing and sales: meeting global demand; and moving ahead to the 21st century.

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### Issues Related to Handling the Influx of Small-Diameter Timber in Western North America

Selective logging of a number of western species (e.g., ponderosa pine) and effective fire suppression methods have had a major impact on the health and composition of millions of acres of forests in the western United States. Many forest stands in the west are densely stocked, and the implementation of ecological restoration treatments in these stands will result in significant volumes of small diameter (20 to 38 cm dbh) being available for processing. The papers in this proceedings were presented at the 1999 Forest Products Society Annual Meeting. The papers were selected for their focus on the management,

characteristics, and quality of small-diameter softwood timber, and the challenges and opportunities involved in the processing and use of this timber in value-added products.

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### Life Cycle Environmental Impact Analysis for Forest Products

The impact that a product can have on the environment during its manufacture and throughout its useful life is beginning to play a role in the selection process for building materials. Life cycle assessment or analysis (LCA) is emerging as the preferred measurement tool for evaluating “cradle-to-grave” environmental impacts of alternative processes and products. This proceedings contains a number of papers on LCA methodologies and applications related to forest products. Six of the papers were presented at the Forest Products Society’s 1995 Annual Meeting; two were presented at the 1995 Fall Meeting of the Forest Products Society’s Midwest Section; and one was presented at an LCA Workshop convened by the European Forestry Institute and the University of Hamburg in 1995.

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## Wood Adhesives and Adhesion

### Wood Adhesives 2005

Available mid-2006, this proceeding will contain the papers presented at the November 2005 conference.

### Wood Adhesives 2000

The peer-reviewed papers in this proceedings were presented at the Wood Adhesives 2000 symposium, the seventh in a series of symposia. The symposium was organized into sessions: green chemistry for wood adhesives, plenary,

industrial applications of isocyanates and polyurethanes, composite panel resin systems, advances in wood adhesive formulations, post production concerns, characterization and test methods, and a general session. Papers based on both the oral and poster presentations have been included. Also included are relevant papers presented at the Forest Products Society 1999 Annual Meeting.

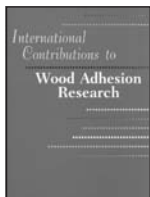
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## Wood Adhesives 2000 Extended Abstracts

Prepared to be available during the Wood Adhesives 2000 Symposium, these brief abstracts provide concise versions of the peer-reviewed full papers.

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### International Contributions to Wood Adhesion Research

These papers are based on presentations from the Gluing Technical Interest Group's session from the

1998 Forest Products Society Annual Meeting. The session provided a forum for the exchange of information about research, product development, and other global developments influ-

encing wood adhesives, bonded wood products, and concepts about the wood bonding process. Several papers are overviews of developments in various world regions affecting adhesively bonded products. New product developments cover the progress in adhesives from tannins, liquefied wood, and carbonate-accelerated phenolic resins. Kinetic related papers include an elucidation of the complicated phenolic resin synthesis process and a proposed quantum mechanical-based modeling of phenolic monomer reactivity. A paper on the role of different types of bonding mechanisms for pMDI resins is also included. In addition to a paper on aminoplastic resins, a means of measuring the heat stability of urea-formaldehyde resins is included along with papers from the three poster presentations given in technical forum sessions.

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## Wood Engineering and Testing



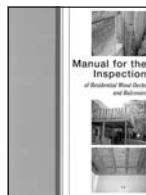
### Wood and Timber Condition Assessment Manual

by Robert Ross, Brian Brashaw, Xiping Wang, Robert White, and Roy Pellerin

The deterioration of an in-service wood member may result from a variety of causes during the life of a structure. It is important, therefore, to periodically examine wood used in structures to determine the extent of deterioration so that degraded members may be replaced or repaired to avoid structural failure. This manual stems from numerous research studies, inspections, and lectures dealing with assessing the condition of in-service wood and timber. This manual is organized into six chapters: Chapters One through Three present background information on techniques currently used by inspectors, which include information on visual inspection techniques, mechanical coring or probing techniques, and stress wave or ultrasound-based techniques. Included in

each chapter is a detailed description of the technique, a list of currently available tools and where they can be obtained, and guidelines for their use. Each chapter concludes with a list of references that serve as the technical base for the technique. Chapter Four is devoted to inspection of fire-damaged wood. Chapter Five includes a sample report. Summaries of several inspections are included in Chapter Six.

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### Manual for the Inspection of Residential Wood Decks and Balconies

by Cheryl Anderson, Frank Woeste, and Joseph Loferski

This manual, published in cooperation with the International Code Council (ICC), is intended for use by home inspectors, renovation contractors, consulting engineers, homebuilders, and building code officials interested in the

inspection of residential wood decks built with conventional framing lumber. Homeowners who own wood deck structures will also find parts of the manual helpful in the proper maintenance of wood decks. Information includes: Preparation for Inspection – information that should be gathered, the inspection plan, and recommended equipment for an inspection. What to Look For – general points useful in all aspects of the inspection including proper installation of lumber and connections, *National Design Specification® (NDS)* requirements, the quality of the elements, decay hazard based on location, and the use of details that provide protection against decay and insects. Inspection – a systematic inspection approach including the preparation of plans and elevations and recommended inspection procedures for all structural elements and the connection system at the house. Analysis – descriptions of structural calculations that may be needed and resources available for the calculations. Report – Recommendations for the content of a complete deck inspection report prepared for a homeowner with a suggested format. The appendix contains additional information on the “pick test” for detecting early surface decay, information on deck attachment issues, a sample report of a comprehensive deck inspection, and lists of accredited grading and lumber treating agencies. The sample report includes sample calculations with details on where to find the necessary information.

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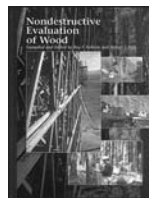
### Structural Behaviour of Timber

by Borg Madsen

This book provides a descriptive presentation of the structural behavior of timber. The book describes the importance of in-grade testing and recounts experiences with a large in-grade testing program. The structural behavior of timber when subjected to different forces (tension, bending, shear, etc.) is examined and the effects of load duration, moisture content, and size are studied. The book then presents specific sugges-

tions as to how an understanding of these effects can be incorporated into the design procedure of timber members. The book is directed at anyone who is associated with the structural use of timber, including producers, designers, regulators, or users. It is recommended reading for serious students of timber engineering. It is presented in an easy to read format with an abundance of illustrations.

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### Nondestructive Evaluation of Wood

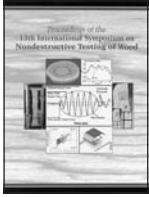
compiled by Roy F. Pellerin and Robert J. Ross

This book answers the request of our colleagues throughout the world who

expressed the desire for a synthesized source of information on nondestructive evaluation of wood. Widely respected technical authorities were asked to prepare chapters dealing with their areas of expertise. Contents include: characteristics of wood, fundamental hypothesis, static bending nondestructive evaluation methods; transverse vibration and longitudinal stress wave nondestructive evaluation methods; acoustic emission and acousto-ultrasonics; proof loading; probing, drilling, and coring – nondestructive evaluation methods; visual grading of softwood dimension lumber; mechanical grading of lumber; ultrasonic veneer grading; inspection of timber structures using stress wave timing nondestructive evaluation tools; and nondestructive evaluation of green materials – recent research and development activities. Sections of the book originally appeared in technical journals, research reports, and various symposia proceedings. In addition more than 400 technical articles are cited in the chapters or listed in the Appendix.

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## 13th International Symposium on Nondestructive Testing of Wood

*edited by Frank C. Beall*

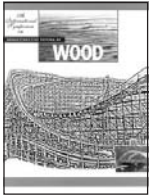
This proceedings contains over 50 papers from presentations made at the 13th International

Symposium on the Nondestructive Testing of Wood sponsored by the University of California Forest Products Laboratory. Topics included cover a broad range of subjects related to nondestructive evaluation and measurement of the characteristics and properties of a wide range of wood materials from standing trees to composite products. Techniques discussed include: electrical impedance spectroscopy, dielectrics, ultrasonics, NIR spectroscopy, infrared imaging, acousto-ultrasonics, stress-wave evaluation, high-resolution imaging, radiation transmission image analysis, digital speckle photography, x-ray computerized tomography, acoustic tomography, radio frequency, and gamma radiation.

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## 11th International Symposium on Nondestructive Testing of Wood

As engineered products assume a major role in the wood industry, testing and measurement are becoming

the keys to maximizing profit from every available component of a wood resource. The economic viability of the wood industry depends on the constant upgrading of techniques that allow the fullest use of the wood resource. This proceedings from the 11th NDT Symposium, held in 1998, presents research on: nondestructive testing of wood and wood-based composite products, nondestructive evaluation of lumber, nondestructive evaluation techniques for logs and standing timber, and *in-situ* nondestructive inspection of timber structures.

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## Wind Safety and Performance of Wood Buildings

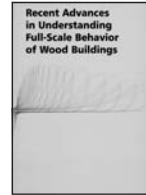
Of natural disasters, damage and losses caused by high winds are likely the costliest.

Over 95% of low-rise residential buildings are framed with wood, many with little or no engineering design, and many industrial buildings and special purpose low-rise buildings are of light-frame or engineered wood construction, or sometimes of mixed wood construction. While substantial progress has been made in the last three to four decades in our understanding of wind loading and the response of buildings, only a small percentage of research on wind damage mitigation is directly relevant to low-rise buildings. The purpose of this publication is to provide a snapshot of developments in wind loading, response prediction, and design of low-rise wood buildings. The papers included, with their references, can be used for further investigation and study.

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## Recent Advances in Understanding Full-Scale Behavior of Wood Buildings

Triggered by seismic and wind events that resulted in widespread damage and loss

of life, design requirements for all types of structures are being subjected to significant revisions. The Wood Engineering Division of the Forest Products Society held a session during the 1997 Forest Products Society Annual Meeting which covered some of the recent advances in understanding the full-scale behavior of wood buildings. With the theme "response of the lateral force resisting elements in timber buildings subjected to wind and seismic loading," papers in this proceedings include information on nailed and bolted connections, braced timber frames, the effect of various anchorage conditions and panel sizes on the response of timber shear walls, the response of multi-story platform wood construction, basic principles of seismic

design, and the performance of fiber-reinforced plastic glulam beams.

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## Earthquake Performance and Safety of Timber Structures

Earthquakes have revealed inadequacies in engineering analysis, detailing, and construction practices related to light-frame timber structures. In the general area of earthquake engineering and structural dynamics, there has been a marked lack of investigation into the seismic performance and dynamic response of timber structures. The little that is known about seismic performance has been derived, at an enormous material and social cost, from investigations of earthquakes in California and Japan. The objectives of this proceedings from the 1995 Forest Products Society Annual Meeting are: to offer a general overview of the state-of-the-art and state-of-the-practice in earthquake performance and safety of timber structures; to present a series of articles on current research into the seismic performance of timber structures; and to identify research needs related to improving the performance and safety of timber structures in seismic regions.

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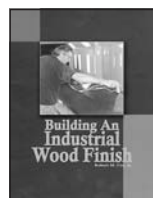
## Proceedings of the International Wood Engineering Conference (4 volume set)

This four volume set of the complete proceedings of the 4th International Wood Engineering Conference contains more than 300 technical papers covering a broad range of wood engineering subjects. Subjects include: spatial structures; timber bridges; trusses; glulam; reinforced members; round timbers and logs; structural composite panels; shear walls and diaphragms; floors and roofs; multi-story construction; seismic, wind, and fire performance; design methodologies; nondestructive evaluation; creep and load duration effects; and numerous other subjects. The objectives of the 4th International Wood Engineering Conference, held in 1996, were to: assess the current international state-of-art of wood engineering, provide a forum for the exchange of views, assemble unreported current research, augment interdisciplinary interaction, and determine the direction for future research. This proceedings should be of interest and value to researchers, educators, and design professionals working in the field of structural wood engineering.

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## Wood Finishing



### Building An Industrial Wood Finish

by Robert M. Cox, Jr.

The information contained in this manual has been gleaned from the experiences of the author during his more

than 30 years as a supplier of wood finishes to manufacturers of finished wood products and as a consultant to the industry. The purpose of the manual is to help manufacturers gain a full understanding of all of the factors that impact

the quality, durability, cost, and environmental impact of finished wood products. Four chapters cover: Finishing Products – multiple-step wood furniture finishes, kitchen cabinet and office furniture finishes, specialty wood finishes, and waterborne/water-based finishes; Executing the Wood Finish – wood finish application hardware options, examples of wood finishing manufacturing lines, and transfer efficiency and calculation of wood finish costs; Wood Finishes and the Environment – legal and regulatory issues and pollution prevention

opportunities through hardware and finish product improvements; and Quality Control – white room wood preparation, wood finish variables and recommendations, finish incon-

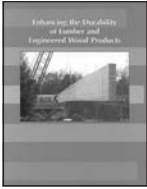
sistencies/troubleshooting, the importance of lighting, and analyzing rejected pieces.

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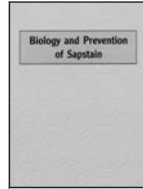
### Enhancing the Durability of Lumber and Engineered Wood Products

Changes in environmental concerns, increasing regulatory pressures, and public perceptions concerning the use of treated wood have placed increasing emphasis on the need for safe, economical treating systems that can produce durable wood products. The nearly 60 papers in this proceedings were prepared from presentations given at a 2002 conference sponsored by the Forest Products Society. Subjects covered include: emerging issues in wood protection; an overview of current research on wood protection and durability; durable engineered wood products; environmental issues; new protection technologies; and whole-house protection against termites and decay.

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Sapstain on the surface of sawn lumber poses challenges for those marketing wood on the basis of its bright, clear appearance. For decades, sapstain was controlled by dipping freshly sawn lumber into solutions of sodium pentachlorophenate. This situation changed as environmental restrictions encouraged the development of alternative sapstain control chemicals and increased the use of kiln drying. The industry remains in a state of flux and lacks a single, broadly toxic and widely used chemical. This lack has encouraged research to explore the fundamental mechanisms of fungal discoloration, identify new chemicals, and develop alternative non-chemical protection systems. This proceedings presents the papers from the 1997 Oregon State Univ. conference on sapstain and its control.

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This work is the result of 13 years (1982–1995) of research and study by Peter Koch. This five-part text in three volumes describes the several subspecies of lodgepole pine (*Pinus contorta* Loud.) that

grow in North America. Part I of the work describes the resource and the species origin, physiology and silvical aspects; a long chapter concluding this first part is concerned with agents that attack lodgepole pine. Part II is concerned with water, forage for livestock, wildlife, and recreation in lodgepole pine forests. Part III characterizes tree parts including foliage, stems, stumps, and roots. Part IV describes the processes by which lodgepole pine is converted to products, and Part V discusses the major products resulting from such conversion. Each of the 26 chapters contains extensive reference to the lodgepole pine literature. With over 200 photos and 400 illustrations, this definitive work provides an invaluable reference source. A comprehensive index is also included.

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This proceedings contains presentations from the second Resin and Blending seminar sponsored by the Composite Panel Association or its predecessor, the National Particleboard Association. Held in 1998 in Portland, Oregon, and Charlotte, North Carolina, these seminars are a project of

the Composite Panel Association's Production Management Committee. Their purpose was to discuss new technology and operating techniques with operational personnel. The speakers focused on practical information that can be applied at the mill level and issues that affect plant personnel every day. This 176-page proceedings was published by the Forest Products Society for the Composite Panel Association as a cooperative effort. Topic areas in this proceedings include: urea-formaldehyde resin technology; furnish characterization and blending; outlook – developments on the horizon; and a particleboard blender suppliers forum.

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**Added Marketing for Value Added Products**

The theme, Value Added Marketing for Value Added Wood Products, was chosen for both the Forest Products Society's marketing plenary session at the 1997 Annual Meeting and as a Special Meeting of Working Group 5.10.00 (Forest Products Marketing) of IUFRO. The globalization of wood supply, processes, products, and markets is now a reality for the wood products industry worldwide. Yet this global focus is balanced by the recognition that sales are made at the neighborhood level. The wood products industry is being confronted by trends which cross international borders and product categories. These trends include: a renewed focus on customer satisfaction; management and marketing working together for successful business operations; and efforts at the firm, regional, and national level for industries to move up the value chain closer to the end user. Presentations in this 182-page, peer-reviewed proceedings include both theoretical models for strategic planning and applied market research. Also included are overviews of forest products marketing education and research efforts at numerous organizations and educational institutions.

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Continuing advances in electronic and mechanical process control technologies have produced systems that offer producers of forest products much greater control over the manufacturing process and the resulting quality of their products. This 130-page proceedings consists of abstracts,

outlines, and full papers from presentations given at the 1996 conference sponsored by the Forest Products Society. The purpose was to provide state-of-the-art information on current and pending technologies for improving control and quality of the manufacturing process and business decisions related to that process. The papers in this proceedings relate primarily to the manufacture of softwood lumber and panel products; however, many of the technologies discussed will be of interest to a broad sector of the forest products industry on a worldwide basis.

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The North American forest products industry is in the midst of a dynamic period of change. Factors such as the changing resource quality and availability, price volatility, public resource legislation, federal court decisions, changing technologies and new product development, and emerging global markets have contributed to the dynamic nature of this change. The result of these and other factors has been a dramatic change in the nature of competition within the forest products industry. This is true not only in the North American market but also in other major foreign markets. Topics discussed in this 104-page proceedings, edited by Dr. Ivan Eastin and Dr. Eric Hansen, include: structural changes within the global forestry sector; structural changes affecting the forest products industry; structural changes in the dynamics of timber supply; and strategic responses to structural change within the forest products industry. These papers were presented during the Industry Focus Session of the 1995 Annual Meeting of the Forest Products Society.

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The Forest Products Society serves as a distribution center for American Wood Council (AWC) publications. The AWC is the wood products division of the American Forest & Paper Association (AF&PA). The AWC is a major publisher of a number of important technical publications related to wood design and construction, including the *National Design Specification® (NDS®) for Wood Construction*, which is the nationally recognized standard of practice for structural lumber, structural glued-laminated timber, timber piles, and structural connections.

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The **Forest Products Society** encourages the development and application of new technology and provides a link for technical interchange between industry and research through the collection and dissemination of the latest technical information.

The **Society's Vision** is to be the world leader in technical information transfer to further the socially beneficial use of wood and fiber resources.

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A full-time professional staff at the International Office in Madison, Wisconsin, and an extensive network of volunteers at the local level, generate the many services the Society provides.

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**Delivery charges by region (0.5 to 8 pounds total weight).**

Total Weight (lb.)	United States	Canada	Mexico	Europe	Australia, New Zealand, Japan	All other countries
0.5	\$2.00	\$2.00	\$4.00	\$4.00	\$ 4.00	\$ 4.00
1	7.00	7.00	8.00	10.00	11.50	12.00
2	7.50	8.00	12.00	15.00	17.00	18.00
3	8.00	11.00	17.00	20.00	22.50	25.00
4	8.50	13.00	22.00	24.00	28.00	32.00
5	9.00	18.00	25.00	25.00	35.00	35.00
6	9.50	20.00	27.00	28.00	39.00	39.00
7	10.00	21.00	29.00	30.00	42.50	42.50
8	10.50	23.00	31.00	33.00	47.00	46.00

**Delivery charges by region (9 to 15+ pounds total weight).**

Total Weight (lb.)	United States	Canada	Mexico	Europe	Australia, New Zealand, Japan	All other countries
9	\$11.00	\$24.00	\$33.00	\$36.00	\$51.00	\$50.00
10	11.50	25.00	35.00	40.00	55.00	53.00
11	12.00	26.00	37.00	43.00	59.00	57.00
12	12.50	27.00	39.00	46.00	62.00	61.00
13	13.00	28.00	41.00	49.00	66.00	65.00
14	13.50	29.00	43.00	52.00	70.00	69.00
15	14.00	30.00	45.00	55.00	75.00	73.00
15+	call for rates: 608-231-1361, ext. 202					

*If the total includes a half pound, round up to the next pound.*