

Structural Testing of Wood and Wood-Based Products

Maine's economy has always drawn upon its forests. Our wood composites research not only follows this tradition, it allows future generations to do so, as well. International timber competition has forced Maine to become smarter about the lumber goods it produces, which is why the UMaine Advanced Structures and Composites Center has been working with industry to produce value added wood products since its inception in 1996. Focus areas have included FRP-reinforced glulam, structural composite lumber, wood-plastic composites, wood and bio-based panels, nanocellulose, and mass timber construction.

Sample of Wood Products Testing Capabilities



- ASTM D143** Testing Small Clear Specimens of Timber
- ASTM D198** Static Tests of Lumber in Structural Sizes
- ASTM D245** Structural Grades and Related Allowable Properties for Visually Graded Lumber
- ASTM D905** Strength Properties of Adhesive Bonds in Shear by Compression Loading
- ASTM D1037** Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
- ASTM D1101** Integrity of Adhesive Joints in Laminated Wood Products for Exterior Use
- ASTM D1990** Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens
- ASTM D2395** Specific Gravity of Wood and Wood-Based Materials
- ASTM D2339** Strength Properties of Adhesives in Two-Ply Wood Construction in Shear
- ASTM D2555** Establishing Clear Wood Strength Values
- ASTM D2559** Standard Specification for Adhesives for Structural Laminated Wood Products
- ASTM D3165** Lap Shear Strength Properties of Adhesives
- ASTM D3737** Establishing Allowable Properties for Structural Glued Laminated Timber
- ASTM D4442** Direct Moisture Content Measurement of Wood and Wood-Base Material
- ASTM D4761** Mechanical Properties of Lumber and Wood-Base Structural Material
- ASTM D4933** Moisture Conditioning of Wood and Wood-Base Materials
- ASTM D5456** Evaluation of Structural Composite Lumber Products
- ASTM D6815** Duration of Load and Creep Effects of Wood and Wood-Based Products
- ASTM E72** Conducting Strength Tests of Panels for Building Construction
- ASTM E564** Static Load Test for Shear Resistance of Framed Walls for Buildings
- ASTM E2126** Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings
- ANSI A190.1** Standard for Wood Products- Structural Glued Laminated Timber
- ANSI/APA PRG 320** Standard for Performance-Rated Cross-Laminated Timber (Except Section 6.3)
- AITC Test T107** Shear Test
- AITC Test T110** Cyclic Delamination Test
- AITC Test T119** Full Size End Joint Tension Test
- BS EN 408** Timber structures-structural timber and glued laminated timber - determination of some physical and mechanical properties

About the UMaine Composites Center

The UMaine Composites Center has a diverse list of industrial clients on state, national, and international levels – ranging from small, start-up companies to large, Fortune 500 corporations. Our capacity for industrial cooperation has led to more than 500 product development and testing projects as well as leading awards for innovation in the composite materials and civil engineering fields.

Case Study: Norway spruce tested at UMaine approved for construction-grade lumber

Project Overview

On Oct. 20, 2016, the American Lumber Standards Committee (ALSC) approved the inclusion of Norway spruce in the Spruce-Pine-Fir South grouping of wood species for home construction and industrial applications. This announcement was the result of structural testing and analysis conducted at the UMaine Advanced Structures and Composites Center.

Introducing Norway spruce into the market marks a nearly once-in-a-lifetime occasion, says Jeff Easterling, president of the Northeastern Lumber Manufacturers Association (NELMA).

“This is a momentous occasion for the building industry,” he says. “The addition of a new species hasn’t happened in almost a century, and it’s been a very exciting year as we’ve worked to shepherd it through testing and bring it into the mainstream.”

Landowners, loggers, lumber mills, retailers and builders all are expected to benefit from being able to utilize lumber from some of the millions of Norway spruce trees, many of which the Civilian Conservation Corps planted in the United States during the Great Depression.

From October 2015 to February 2016, a team of staff and students at the UMaine Composites Center, led by Russell Edgar, wood composites manager, tested 1,320 pieces of lumber milled from Norway spruce grown in Maine, Vermont, four regions of New York and Wisconsin.

The team then derived allowable design values (including bending, tension, shear and compression) for the species and wrote the final report that NELMA submitted to ALSC.

“It is exciting to be involved in this type of research, which has immediate and direct economic impacts for the state and region. This is exactly why our center exists,” says Edgar.

For complete information on the impact of Norway spruce on the building products and design industry, as well as additional details on history, grading and the mill perspective, visit nelma.org/norwayspruce.

For more information about this project, visit: <https://umaine.me/2hAGmNv>

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