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**Jerrold Everett Winandy, Principal Partner & CTO**

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**Education**

BSF, 1976. Wood Utilization, Dept. of Forestry, Purdue University, West Lafayette, IN.  
 MS, 1978. Wood Science, Dept. of Forestry, Purdue University, West Lafayette, IN.  
 Ph.D., 1993. Wood Science & Engineering, Dept. of Wood Science & Engineering,  
 Oregon State University, Corvallis, OR.

**Experience**

2008-present Principal Partner, Winandy & Associates LLC, Ham Lake, MN 55304  
 2008-2009 Interim Executive Vice-president, Forest Products Society, Madison WI  
 2005-2015 Adjunct Professor, College of Forest Resources, Mississippi State University.  
 2001-2008 Project Leader & Principal Wood Scientist, Performance Engineered Composites--  
 RWU 4706, USDA, Forest Products Laboratory, Madison, WI  
 1998-present Adjunct Professor, Department of Bioproducts and Biosystems Engineering,  
 University of Minnesota.  
 1994-2001 Principal Wood Scientist, Engineering Properties of  
 Wood--RWU 4714, USDA, Forest Products Laboratory  
 1989-1994 Research Wood Scientist, Engineering Properties of  
 Wood--RWU 4714, USDA, Forest Products Laboratory  
 1988-1989 Visiting Scientist, Forest Products Research Laboratory,  
 Oregon State University, Corvallis, OR 97331  
 1979-1988 Research Forest Products Technologist, Engineering  
 Properties of Wood--RWU 4714, USDA Forest Products Laboratory  
 1978-1979 Forest Products Technologist, National Furniture Engineering Center,  
 General Services Administration, Washington, DC

## **Society and Committee Participation**

### **1. Membership in professional societies**

American Society for Testing and Materials, ASTM  
American Wood Protection Association, AWP  
Forest Products Society, FPS  
International Academy of Wood Science, IAWS (Fellow, elected 2004)  
International Research Group for Wood Preservation, IRG/WP  
International Union of Forest Research Organizations (IUFRO)  
Society of Wood Science and Technology, SWST

### **2. Committee assignments**

ASTM D7.06--Chairman, Subcommittee on preservative treatment of wood (1999-2003).  
ASTM D7.07--Vice-Chairman, Subcommittee on fire-performance of wood (1996-1999).  
ASTM D7.06.04--Chairman, Section on fire-retardant treatments of wood (1992-1996).  
ASTM D7.06.04.02 Task group (Chairman) developing Standard Test Methods (D-5516 and D-5664) to assess effects of elevated temperatures on FR-treated plywood and lumber (1990-1995) and develop Standard Practice (D6305) to estimate adjustments to allowable design properties of FR-treated plywood (1995-1998).  
ASTM D7.02--Committee on lumber.  
ASTM D7.03--Committee on engineered wood composites.

AWPA General Treatments--Chairman, oversee activities of nine AWP T-subcommittees for writing and maintaining standards on preservative and fire retardant treatments for lumber, poles, pilings, posts, ties, structural composites, and plywood (1999-2003).

AWPA T1--Chairman, Committee on committees for establishing standards on preservative treatment of lumber, timbers, poles, and piling (1999-2003).

AWPA T9--Chairman, Subcommittee on fire-retardant treatments for wood products (1996-1999).

AWPA T2--Committee for identifying requirements and establishing standards on preservative treatment of lumber and timbers (1986-1999).

AWPA T8--Committee for identifying requirements and establishing standards on preservative treatment of composite materials (1988-1999, 2008).

AWPA P6--Chairman, Committee on evaluation and test methods (2006-2011).

FPS Wood Engineering Division--Division Coordinator (1992-1995).

FPS Treated Wood Products Section--Vice-chairman (1989-1992).

FPS Treated Wood Products Section--Secretary (1986-1989).

FPS Treated Wood Products Tech. Newsletter--Contrib. Editor (1986-1996).

IUFRO, Member of Organizing Committee for October/November

IUFRO Division 5 Forest Products conference in Taipei, Taiwan

IUFRO, Vice-chair of the Division 5.05 Composites Research Group for enhancing performance, durability & long-term sustainability of bio-based composites.

SWST President (2008-2009).

SWST Member of Executive Board (2004-2006).

## **Research Leadership and Accomplishments**

Dr Winandy started his own consulting firm specializing in forensic wood science, wood durability and bioresource sustainability in 2008.

He served as Project Leader from 2001 to 2008, of the Engineered Composites Science Research Work Unit (RWU4706) at FPL. He had primary responsibility for the processing and serviceability of wood-based and wood-plastic composite products. This research group is recognized by the building codes, the wood industry, and standard organizations as having a leadership role in providing unbiased technical information on manufacturing of and serviceability requirements of wood-based and wood-plastic composite products.

He is internationally recognized for his research and technological development of the concepts of using engineered biocomposites as a value-added tool to promote and to fund sustainable forest management. He formerly led this emerging approach through his long-work with the International Union of Forest Research Organizations (IUFRO) Division 5 Forest Products. From 2003-2012, he was the vice-chair of the Division 5.05 Composites Research Group of IUFRO in which he focused on enhancing the performance and durability of engineered biocomposites and the long-term sustainability of bio-based composites.

He is internationally recognized for his research on the effects of chemicals and chemical processing on the structural performance of wood and wood-composites. This research has resulted in over two dozen peer-reviewed publications on the effects of preservatives and preservative treatment on the physical and mechanical properties of wood. This research has been resulted in several new design adjustments or process limitations in National Codes and Standards in the US and Canada.

The multidisciplinary FRT-Serviceability Team received national recognition by the building codes, the wood industry, and standard organizations for having taken a leadership role in providing unbiased technical information on serviceability assessment of fire-retardant treated plywood roof sheathing. The team also pioneered mechanical- and chemical-based techniques for residual serviceability assessment and predictive models to estimate residual serviceability of wood products in-service. This research resulted in over another two dozen peer-reviewed publications. It has also resulted in four National Standards (ASTM D5516-94, D-5664-95, D-6305-98, and D-6841-02) and major revisions to FR-Treating Standards (AWPA C20 & C27, now AWPA U-1 & T-1).

His work on the very early stages of biological decay showed that changes in the chemical composition of the wood cause significant reductions in wood strength before measurable weight loss occurs. From an engineering perspective, estimating strength loss and residual strength is the critical element in assessing wood serviceability/durability for structures in-service as affected by wood decay. Collaborative studies have shown close a relationship between the degradation of hemicellulose and wood strength losses. Residual strength of degraded wood can be predicted using models developed by this collaborative team. The changes in chemical composition appear to be similar in both the biological and chemical systems. Understanding the relationship between chemical composition and strength loss is critical in developing models to estimate strength loss caused by biological, chemical or thermal agents.

## **Awards/Honors**

Elected as a Fellow, International Academy of Wood Science, July 2004

Elected as a Fellow, Society of Wood Science and Technology, June 2014

President of the Society of Wood Science and Technology (2008-2009)

Interim Executive Vice President of the Forest Products Society (2008-2009)

Distinguished Service Award, Society of Wood Science and Technology, June 2015

Forest Products Society (FPS). 2002 L. J. Markwardt Engineering Research Award for distinguished contribution to knowledge of wood as an engineering material and to the enhancement of the efficient utilization of this renewable resource for:

*Winandy, J. E., Lebow, P. K., 2001. Modeling strength loss in wood by chemical composition. Part I. An individual component model for Southern pine. Wood and Fiber Science 33(2):239-254.*

Forest Products Society (FPS). 2000 L. J. Markwardt Engineering Research Award for distinguished contribution to knowledge of wood as an engineering material and to the enhancement of the efficient utilization of this renewable resource for:

*Lebow, P. K., J. E. Winandy. 1999. Verification of a kinetic model for the effects of FR on bending strength at elevated temperatures. Wood and Fiber Science 31(1):49-61.*

Society of Wood Science and Technology (SWST). 2018 George C. Marra Award for excellence in research and writing as exhibited in:

*Winandy, J. E. 2017. Relating wood chemistry and strength. Part II. Fundamental relationships between changes in wood chemistry and strength of wood. Wood and Fibers Science 49(1):2-11.*

American Wood Preservers' Association "Award of Merit" for lifetime service to Association for strategic and technical advancements in National Standards for durable engineered wood materials, April 2006.

Named Adjunct Professor of Wood Science (February 1998-present), Department of Bioproducts and Biosystems Engineering, University of Minnesota, St. Paul, MN.

Named Adjunct Professor of Wood Science (2004-2013), College of Forest Resources, Mississippi State University, Starkville, MS.

USDA Superior Service Award (June 92) for fundamental research defining the interaction between mechanical properties and fire-retardant treated wood exposed at elevated temperatures.

Society of Wood Science and Technology (SWST). 1994 George C. Marra Award (2nd Place). For excellence in research and writing as exhibited in:

*Winandy, J. E., J. J. Morrell. 1993. Relationship between incipient decay, chemical composition, and properties of Douglas-fir. Wood and Fiber Science 25(3):278-288.*

## **Reporting of Research Results**

1. Publications: (J. Winandy has authored or co-authored over 185 Technical Publications)

2. Patents:

- Apparatus to nondestructively estimate the density of contiguous segments of lumber (U.S. Patent No. 4747308) May 31, 1988.
- Method of making medium density fiberboard (U.S. Patent No. 8123904) Feb 28, 2012.

## List of Publications:

### Wood & Wood Science

- W1. Winandy, Jerrold E. 2017. Relating wood chemistry and strength. Part II. Fundamental relationships between changes in wood chemistry and strength of wood. *Wood and Fibers Science* 49(1):2-11.
- W2. Winandy, Jerrold E. 2016. Relating wood chemistry and strength. Part I. Wood structure and chemistry. *Proc. Soc. of Wood Science and Technology*. Levan SM (ed). Pg.92-102. (*swst.org*) Monona WI. 277pg.
- W3. Winandy, Jerrold E.; Rowell, Roger M. 2013. Chemistry of wood strength. In: Rowell, Roger M. ed. *Handbook of wood chemistry and wood composites*, 2<sup>nd</sup> Ed.. Boca Raton FL: CRC Press LLC: 415-455, Chapter 11.
- W4. Piao, C., Winandy, J.E., Shupe.T.F. 2010. From hydrophilicity to hydrophobicity: A critical review. *Wood and Fibers Science* 42(4):490-510.
- W5. Sabo, R., Clausen, C.A., Winandy, J.E., Basta, A. 2008. Remediation and recycling of WBP-treated lumber for use as flakeboard. *Proc. American Wood Protection Association*. Vol. 104:256-266. AWWPA Birmingham, AL.  
([http://www.fpl.fs.fed.us/documnts/pdf2008/fpl\\_2008\\_sabo002.pdf](http://www.fpl.fs.fed.us/documnts/pdf2008/fpl_2008_sabo002.pdf) )
- W6. Sabo, R., Clausen, C., Winandy, J.E. 2008. Thermochemical Remediation of Preservative-Treated Wood. IRG/WP- 50524. Stockholm, Sweden.  
[http://www.fpl.fs.fed.us/documnts/pdf2008/fpl\\_2008\\_sabo001.pdf](http://www.fpl.fs.fed.us/documnts/pdf2008/fpl_2008_sabo001.pdf)
- W7. Winandy, J.E., Hatfield, C.H., 2007. Analysis of three-year Wisconsin temperature histories for roof systems using wood, wood-thermoplastic composite, and fiberglass shingles. *Forest Products Journal*. 57(9):87-96.  
[http://www.fpl.fs.fed.us/documnts/pdf2007/fpl\\_2007\\_winandy004.pdf](http://www.fpl.fs.fed.us/documnts/pdf2007/fpl_2007_winandy004.pdf)
- W8. Kretschmann, D.E., J.Winandy, C.Clausen, M.Wiemann, R.Bergmann, R.Rowell, J.Zerbe, J.Beecher, R.White, D.McKeever, J.Howard. 2007. Wood. In: Kirk-Othmer *Encyclopedia of Chemical Technology*. New York : John Wiley & Sons, pg 59 (Online posting July 13, 2007.).  
[http://www.fpl.fs.fed.us/documnts/pdf2007/fpl\\_2007\\_kretschmann001.pdf](http://www.fpl.fs.fed.us/documnts/pdf2007/fpl_2007_kretschmann001.pdf)
- W9. Winandy, Jerrold E.; Rowell, Roger M. 2005. Chemistry of wood strength. In: Rowell, Roger M. ed. *Handbook of wood chemistry and wood composites*. Boca Raton FL: CRC Press LLC: 303-347, Chapter 11.  
[http://www.fpl.fs.fed.us/documnts/pdf2005/fpl\\_2005\\_winandy004.pdf](http://www.fpl.fs.fed.us/documnts/pdf2005/fpl_2005_winandy004.pdf)
- W10. Wegner, T.H., Winandy, J.E., Ritter, M.A. 2005. Nanotechnology opportunities in residential and non-residential construction. IN: 2<sup>nd</sup> International Symposium on Nanotechnology in Construction. Held 13-16 Nov2005, Bilbao, Spain. RILEM, Bagneuz, France 9p.  
( [http://www.fpl.fs.fed.us/documnts/pdf2005/fpl\\_2005\\_wegner003.pdf](http://www.fpl.fs.fed.us/documnts/pdf2005/fpl_2005_wegner003.pdf) )
- W11. Winandy, J. E., Grambsch, M., Hatfield C. 2005. Two-year Wisconsin thermal loads for roof assemblies and wood, wood-plastic composite, and fiberglass shingles. Research Note FPL-RN-0301. Madison, WI: United States Department of Agriculture, Forest Service, Forest Products Laboratory: 13p.  
[http://www.fpl.fs.fed.us/documnts/fplrn/fpl\\_rn301.pdf](http://www.fpl.fs.fed.us/documnts/fplrn/fpl_rn301.pdf)
- W12. Winandy, Jerrold E.; Barnes, H. Michael, Falk, Robert H. 2004. Summer roof temperatures of western red cedar, wood-plastic composite, and black- and white-fiberglass shingles. *Forest Products Journal* 54(11):27-33. (refereed)  
[http://www.fpl.fs.fed.us/documnts/pdf2004/fpl\\_2004\\_winandy002.pdf](http://www.fpl.fs.fed.us/documnts/pdf2004/fpl_2004_winandy002.pdf)

- W13. Laufenberg, Theodore L.; Winandy, Jerrold E. 2004. Stabilized Engineered Wood Fiber (SEWF) Surfaces for Accessible Playground Areas: Field testing at Governor Nelson State Park in Wisconsin. In: Gen. Tech. Rep. FPL-GTR-154; U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 13p. (refereed) [http://www.fpl.fs.fed.us/documnts/fplgtr/fpl\\_gtr154.pdf](http://www.fpl.fs.fed.us/documnts/fplgtr/fpl_gtr154.pdf)
- W14. Williams, R.S., Lacher, S., Winandy, J. E., White, C. 2004. Comparison of traditional methods for testing paint service life with new methods for service life prediction. In: Proceedings of 3<sup>rd</sup> International Symposium on Surfacing and Finishing of Wood. Sponsored by IUFRO Division 5: Working Group 5.04.12 and held on November 24-26, 2004 in Kyoto, Japan. Pg. 167-190. [http://www.fpl.fs.fed.us/documnts/pdf2004/fpl\\_2004\\_williams005.pdf](http://www.fpl.fs.fed.us/documnts/pdf2004/fpl_2004_williams005.pdf)
- W15. Laufenberg, T., A.Krzysik, J.E.Winandy. 2003. Improving engineered wood fiber (EWF) surfaces for ADA-accessible playgrounds. USDA, For. Serv. Gen. Tech. Report FPL-GTR-135, Madison, WI. (refereed). <http://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr135.pdf>
- W16. Laufenberg, Theodore L.; Winandy, Jerrold E. 2003. Field Performance Testing of Improved Engineered Wood Fiber (EWF) Surfaces for Accessible Playground Areas. In: Gen. Tech. Rep. FPL-GTR-138; U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 14p. (refereed) <http://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr138.pdf>
- W17. Williams, R.S., J. E. Winandy, W. Feist. 2002. Correlation of adhesive strength with service life of paint applied to weathered wood. Proc. of 9<sup>th</sup> Durability of Building Materials Conference, held March 17-21, 2002 in Brisbane, Queensland, Australia. Vol II. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf2002/willi02a.pdf>
- W18. Winandy, J. E., TenWolde, A., Falk, R.H., Barnes, H.M. 2002. Temperature histories of plywood roof sheathing and roof rafters as used in North American light-framed. In: Proc. of the 7<sup>th</sup> World Conference on Timber Engineering, Vol. 3:114-121. August 6-10,2002, Malaysia. <http://www.fpl.fs.fed.us/documnts/pdf2002/winan02b.pdf>
- W19. Winandy, J. E., H.M. Barnes, C.Hatfield.. 2000. Temperatures of Wood Roof Materials and Attics in Mississippi and Wisconsin. USDA, For. Serv. Res. Paper FPL-RP-589, Madison, WI. 24 pgs. (refereed). <http://www.fpl.fs.fed.us/documnts/fplrp/fplrp589.pdf>
- W20. Durbak, I., Green, D. W., Highley, T. L., Howard, J. L., McKeever, D. B., Miller, R. B., Pettersen, R. C., Rowell, R. M., Simpson, W. T., Skog, K. E., White, R. H., Winandy, J. E., Zerbe, J. I. 1998. Wood. In: Kirk-Othmer Encyclopedia of chemical technology, 4<sup>th</sup> Ed. Vol. 25:627-664. J.Wiley & Sons, NY, NY.
- W21. Green, D. W., J.E. Winandy, D. E. Kretschmann. 1999. Chapter 4: Mechanical Properties of Wood, USDA Gen. Tech. Report 113, Wood Handbook: Wood as an Engineering Material, Madison, WI. (refereed).
- W22. Stoker, D.L., J. E. Winandy, E. K. Achi. 1996. Engineering properties of two underutilized Cote de Ivoire species: Adjouaba and Aniouketti. J. of Tropical Forest Science 2(1):114-124. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf1996/stoke96a.pdf>
- W23. Falk, R. H., K. A. McDonald, J. E. Winandy. 1995. Controlling Moisture in Deck Lumber. Fine Homebuilding. August/September 1995. p.70-71. <http://www.fpl.fs.fed.us/documnts/pdf1997/falk97c.pdf>
- W24. Larsen, M. J., J. E. Winandy, F. Green. 1995. A proposed model of the tracheid cell wall having an inherent radial ultrastructure in the S<sub>2</sub> layer. Materials und Organism 29(3):197-210. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf1995/larse95a.pdf>

- W25. McDonald, K. A., R. H. Falk, R. S. Williams, J. E. Winandy. 1995. Residential Wood Decks: Materials, Construction, & Finishing. Forest Products Society. Madison, WI. 93pg.
- W26. Winandy, J. E., R. Beaumont. 1995. Roof Temperatures in Simulated Attics. USDA, For. Serv. Res. Paper FPL-RP-543, Madison, WI. pg. 14. (refereed).  
<http://www.fpl.fs.fed.us/documnts/fplrp/fplrp543.pdf>
- W27. Winandy, J. E. 1994. Wood Properties. In: Encyclopedia of Agricultural Science, C.J. Arntzen, ED. Academic Press. San Diego, CA. V4:549-561.  
<http://www.fpl.fs.fed.us/documnts/pdf1994/winan94a.pdf>
- W28. Winandy, J. E., McDonald, K. A. 1993. Material Selection and Preservative Treatment for Outdoor Wooden Structures. Wood Design Focus 4(3):8-13.  
<http://www.fpl.fs.fed.us/documnts/pdf1993/winan93b.pdf>
- W29. Ritter, M. and J. E. Winandy. 1990. Chapter 3: The properties of wood and structural wood products IN: U.S. Forest Serv. Timber Bridge Manual. M. Ritter, ed., USDA, Washington, DC.
- W30. Williams, R. S., J. E. Winandy, and W. C. Feist. 1987. Adhesion of paint to weathered wood. For. Prod. J. 37(11/12):29-31. (refereed).  
<http://www.fpl.fs.fed.us/documnts/pdf1987/willi87b.pdf>
- W31. Williams, R. S., J. E. Winandy, and W. C. Feist. 1987. Paint adhesion to weathered wood. J. of Paint and Coatings Technology 59(749):43-49. (refereed).  
<http://www.fpl.fs.fed.us/documnts/pdf1987/willi87a.pdf>
- W32. Bendtsen, B.A., W.J. James, C.C. Gerhards, J.E. Winandy, D.W. Green, M. Chudnoff, P.J. Giese. 1987. Chapter 4: Mechanical Properties of Wood, USDA Ag. Hdbk. #72, Wood Handbook: Wood as an Engineering Material, Madison, WI. (refereed).
- W33. Boone, R. S., J. E. Winandy, and B. A. Bendtsen. 1985. A technique for simulating lumber drying using small clear specimens. Forest Prod. J. 35(11/12):49-51. (refereed).
- W34. Winandy, J. E. 1984. Evaluation of live oak submerged underwater for 50 years and proposed for use in rebuilding the USS Constitution. Forest Prod. J. 34(51):61-63. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf1984/winan84a.pdf>
- W35. Winandy, J. E., and R. M. Rowell. 1984. The chemistry of wood strength, Chapter 5 in The Chemistry of Solid Wood. R. M. Rowell, ed., Advances in Chemistry Series No. 207, American Chemical Society, Washington, DC.
- W36. Winandy, J. E. 1979. The feasibility of using FPL Press-Lam as upholstered furniture dimension stock, Part I. Furniture Manufacturing Management 25(3):29-32.
- W37. Winandy, J. E. 1979. The feasibility of using FPL Press-Lam as upholstered furniture dimension stock, Part II. Furniture Manufacturing Management 25(4):35-36.
- W38. Eckelman, C. A. and J. E. Winandy. 1979. Performance test for upholstered furniture frames. Furniture Manufacturing Management, 25(6):17-20.

### **Durability & Decay**

- D1. Winandy JE, Morrell JJ. 2017. Improving the utility, performance and durability of wood- and bio-based composites. Annals of Forest Science. 74(1):Article 25. 11pg. doi:10.1007/s13595-017-0625-2. <https://medcraveonline.com/FREIJ/FREIJ-02-00027.pdf>
- D2. Aro, M., Donahue, P., and Winandy, J. 2014. Thermal Modification: Current Developments in the U.S. and Canada. In: *Proceedings of the 8th European TMT Workshop*. Dresden, Germany. 147-158.
- D3. Kirker, G., Winandy, J. 2014. Chapter 6: Above ground deterioration of wood and wood-based materials. In: Schultz, T., Goodell, B., Nicholas, D. (Ed.). Deterioration and

Protection of Sustainable Biomaterials. ACS Symposium Series, Vol. 1158. American Chemical Society Press. Wash.DC. p113-129

<https://global.oup.com/academic/product/deterioration-and-protection-of-sustainable-biomaterials-9780841230040?cc=us&lang=en&#> )

- D4. Winandy, J.E., Donahue, P. 2014. Development and use of AWWA/ANSI Guidance Document N—Data requirements for listing thermally modified wood in AWWA Standards. Proc. of 7<sup>th</sup> European Conference on Wood Modification. Held March 10-12, 2014 in Lisbon, Portugal. 8pg.
- D5. Curling, S., Winandy, J.E. 2008. Comparison of the effects of gamma irradiation and steam sterilization on southern pine sapwood. Forest Products Journal 58(1/2):87-90. (refereed). ([http://www.fpl.fs.fed.us/documnts/pdf2008/fpl\\_2008\\_curling001.pdf](http://www.fpl.fs.fed.us/documnts/pdf2008/fpl_2008_curling001.pdf) )
- D6. Kamke, F.A., Winandy, J.E. 2008. Issues and concepts for making durable composites. Proc. American Wood Protection Association. Vol. 104. (In-Press). AWWA Birmingham, AL. ([http://www.fpl.fs.fed.us/documnts/pdf2008/fpl\\_2008\\_kamke001.pdf](http://www.fpl.fs.fed.us/documnts/pdf2008/fpl_2008_kamke001.pdf) )
- D7. Winandy, Jerrold E.; Curling, Simon F.; Lebow, Patricia K. 2005. Controlling the moisture content of wood samples using the modified FPL soil-pan decay method. Forest Products Journal 55(6): 80-85. [http://www.fpl.fs.fed.us/documnts/pdf2005/fpl\\_2005\\_winandy002.pdf](http://www.fpl.fs.fed.us/documnts/pdf2005/fpl_2005_winandy002.pdf)
- D8. Curling, S.F., J. E. Winandy, C. Carll, J. A. Micales, A. Tenwolde. 2003. How variability in OSB mechanical properties affects biological durability testing. Holzforschung 57 (2003): 8-12 (refereed). <http://www.fpl.fs.fed.us/documnts/pdf2003/curli03a.pdf>
- D9. Smith, W. R., A. Rapp, J. E. Winandy. 2003. Resistance of heat-treated wood to Formosan subterranean termites. International Research Group on Wood Preservation, Document No. IRG/WP 03-40264. Stockholm, SWEDEN. <http://www.fpl.fs.fed.us/documnts/pdf2003/smith03a.pdf>
- D10. Curling, S.F., C.A. Clausen, J. E. Winandy. 2002. Relationship between mechanical properties, weight loss and chemical composition of wood during incipient brown rot decay of southern pine sapwood. Forest Products Journal 52(7/8):34-39. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf2002/curli02b.pdf>
- D11. Curling, S.F., J. E. Winandy, C.A. Clausen. 2002. Experimental method to quantify progressive stages of decay of wood by basidiomycete fungi. International Biodeterioration and Biodegradation 49 (2002) 13-19. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf2002/curli02a.pdf>
- D12. Morris, P.I., Winandy, J. E. 2002. Limiting conditions for decay in wood systems. International Research Group on Wood Preservation, Document No. IRG/WP 02-10421, Stockholm, SWEDEN. <http://www.fpl.fs.fed.us/documnts/pdf2002/morri02a.pdf>
- D13. Curling, S.F., J. E. Winandy, C. A. Clausen. 2001. Effect of hemicellulose degradation on mechanical properties during brown rot decay. International Research Group on Wood Preservation, Document No. IRG/WP 01-20219, Stockholm, SWEDEN. <http://www.fpl.fs.fed.us/documnts/pdf2001/curli01a.pdf>
- D14. Winandy, J. E., C. A. Clausen, Curling, S.F. 2001. Predicting the effects of decay on wood properties and modeling residual service-life. Proc. of 2<sup>nd</sup> annual conference on Durability and Disaster Mitigation in Wood-Frame Housing. Held Nov 6-8, 2000 in Madison, WI. Published by Forest Products society October 5, 2001. p.261-263. <http://www.fpl.fs.fed.us/documnts/pdf2000/winan00b.pdf>



- D15. Curling, S.F., J. E. Winandy, C. A. Clausen. 2000. An experimental method to simulate incipient decay of wood by basidiomycete fungi. International Research Group on Wood Preservation Document No. IRG/WP 00-20200, Stockholm, SWEDEN. 12pg.  
<http://www.fpl.fs.fed.us/documnts/pdf2000/curli00a.pdf>
- D16. Winandy, J. E., J. J. Morrell. 1993. Relationship between incipient decay, chemical composition, and physical properties of Douglas-fir heartwood. *Wood and Fiber Science* 25(3):278-288. (refereed). <http://www.fpl.fs.fed.us/documnts/pdf1993/winan93a.pdf>
- D17. Green, F., M. J. Larsen, J. E. Winandy, T. L. Highley. 1991. The role of oxalic acid in brown rot decay. *Materials und Organism* 26(3):191-213. (refereed).  
<http://www.fpl.fs.fed.us/documnts/pdf1991/green91b.pdf>
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