



WCTE 2006

9th World Conference on Timber Engineering
August 6-10, 2006 Portland, OR, USA

Editors: Donald A. Bender, David S. Gromala, and David V. Rosowsky



Program and Abstracts

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WCTE 2006

9th World Conference on Timber Engineering

Welcome to WCTE 2006 in Portland, Oregon!

Dear WCTE 2006 Delegates,

Welcome to Portland! I hope this week will be both educational and enjoyable. Besides the outstanding technical and social programs, we hope you will take some time to enjoy this beautiful city. Portland is the largest city in Oregon, a state best known for its environmental programs and outdoor activities, and boasts some of the best restaurants, wineries and breweries, music, sports, shopping, and mountain views in the region.

The World Conference on Timber Engineering (WCTE), held every two years, is the leading international scientific conference on timber engineering. We hope the Portland conference will be the next in a line of successful WCTE conferences, following an excellent WCTE 2004 conference held in Lahti, Finland. WCTE 2006 welcomes more than 450 delegates from 41 different countries. The technical program includes nearly 320 papers and more than 60 posters.

On behalf of the Steering Committee, the International Advisory Committee, and the Scientific Committee, welcome to Portland and enjoy the conference. I look forward to meeting you during the week.

Sincerely,

-- David Rosowsky, Ph.D., P.E.
WCTE 2006 Conference Chair



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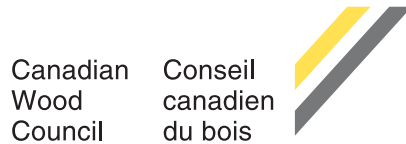
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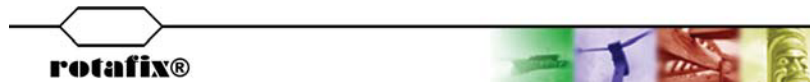


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Exhibitors

The WCTE 2006 Organizing Committee would like to thank the following exhibitors for their generous support.



TIMBERLINX

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Program Overview

Saturday, August 5, 2006

18.00 – 21.00 **Registration Check-in**
Willamette Room, Lobby level

Sunday, August 6, 2006

10.00 – 21.00 **Registration Open**
Willamette Room, Lobby Level

18.00– 21.00 **Get Together Reception**
Salons E/F

Monday, August 7, 2006

08.00 – 18.00 **Registration Check-in**

08.30 – 09.40 **Opening Session and Keynote Lecture**
Keynote Speaker: Gary Williams
Salons E/F

09.40 – 10.10 **Break**
Foyer

10.10 – 11.50 **Connections I** - Salon I
Seismic I - Salon C/D
Architecture I - Salon A/B
Composite Structures -Salon G
Fracture - Eugene Room
Grading & NDT I - Portland Room

11.50 – 13.20 **Lunch**
Salon E/F

13.20 –15.00 **Connections II** - Salon I
Shearwalls I - Salon C/D
Glulam I - Salon A/B
Fire I - Salon G
Portal Frames - Salon H
Wood – Concrete I - Eugene Room
Grading & NDT II - Portland Room

- 15.00 – 15.30 **Break**
Foyer
- 15.30 – 17.10 **Seismic II** - Salon I
Glulam II - Salon C/D
Fire II - Salon A/B
Poles - Salon G
Timber Engineering I – Salon H
Wood – Concrete II - Eugene Room
Design Properties - Portland Room
- 17.30 – 19.00 **Simpson Strong-Tie Welcome Reception**
World Trade Center

Tuesday, August, 8, 2006

- 08.00 – 18.00 **Registration Check-in**
- 08.00 – 09.40 **Connections III** - Salon I
Shearwalls II - Salon C/D
Architecture II - Salon A/B
Bridges I - Salon G
FRP Reinforcement - Salon H
Vibration I - Eugene Room
Wood – Concrete Connection - Portland Room
- 09.40 – 10.10 **Break**
Foyer
- 10.10 – 11.50 **Connections IV** - Salon I
Seismic III - Salon C/D
Glulam III - Salon A/B
Bridges II - Salon G
World Timber Quality - Salon H
Vibration II - Eugene Room
Wood – Concrete III - Portland Room
- 11.50 – 13.20 **APA Conference Luncheon**
Salon E/F

- 13.20 – 15.00 **Connections V** - Salon I
Shearwalls III - Salon C/D
Experiments, Loads, Dynamics I - Salon A/B
Adhesives I - Salon G
Finite Element - Salon H
Next Generation Thinking in Education & Quality Assurance - Eugene Room
Timber Engineering II - Portland Room
- 15.00 – 15.30 **Break**
Foyer
- 15.30 – 17.10 **Shearwalls IV** - Salon I
Experiments, Loads, Dynamics II - Salon C/D
Bridges III - Salon A/B
Adhesives II - Salon G
Material Properties - Salon H

Wednesday, August 9, 2006

- 08.00 – 18.00 **Registration Check-in**
- 08.00 – 09.40 **Connections VI** - Salon I
Seismic IV - Salon C/D
Durability & Restoration I - Salon A/B
Bridges IV - Salon G
Creep I - Eugene Room
Reliability - Portland Room
- 09.40 – 10.10 **Break**
Foyer
- 10.10 – 11.50 **Connections VII** - Salon I
Seismic V - Salon C/D
Performance Based Design - Salon G
Traditional/Historic Structures I - Salon H
Creep II - Eugene Room
Shear Properties - Portland Room
- 11.50 – 13.20 **Lunch**
Salon E/F

- 13.20 – 15.00 **Connections VIII** - Salon I
Shearwalls V - Salon C/D
Durability & Restoration II - Salon A/B
Engineered Wood Products I - Salon G
Composite Materials - Salon H
Timber Engineering III - Eugene Room
- 15.00 – 15.30 **Break**
Foyer
- 15.30 – 17.10 **Connections IX** - Salon I
Shearwalls VI - Salon C/D
Durability & Restoration III - Salon A/B
Engineered Wood Products II - Salon G
Traditional/Historic Structures II - Salon H
Sustainable Design & Construction I - Eugene Room
Design Methods & Standards I - Portland Room
- 18.00 – 21.00 **Weyerhaeuser Conference Banquet**
Portland Art Museum

Thursday, August 10, 2006

- 08.00 – 13.30 **Registration Check-in**
- 08.00 – 09.40 **Design Methods & Standards II** - Salon I
Timber Building Systems I - Salon D-C
Architecture III - Salon A-B
Truss Bracing - Salon G
Moisture - Salon H
Sustainable Design & Construction II - Eugene
Structural Properties of Wood Species - Portland Room
- 09.40 – 10.10 **Break**
Foyer
- 10.10 – 11.50 **Design Methods & Standards III** - Salon I
Timber Building Systems II - Salon C/D
Architecture IV - Salon A/B
Truss Systems - Salon G
Mechanical Properties - Salon H
Timber Engineering IV - Eugene Room
- 11.50 – 13.20 **Closing Session / Lunch**
Salon E/F

Oral Presentations by Session

Monday, August 7, 2006

Connections I: Monday 10.10-11.50 (Salon I)

Moderated by: Dan Wheat

Echavarria, C. & Salenikovich, A. Canada
Influence of the variability of the elastic properties of wood and wood-based composites on the stresses of mechanical connections

Tanahashi, H., Shimizu, H. & Suzuki, Y. Japan
Formulation of elasto-plastic moment-resisting performance of timber connections using Pasternak model

Rammer, D., Zelinka, S. & Line, P. USA
Fastener corrosion: testing, research and design considerations

Zelinka, S. & Rammer, D. USA
Electrochemical method for measuring corrosion of metals in wood

Seismic I: Monday 10.10-11.50 (Salon C/D)

Moderated by: Rakesh Gupta

Isoda, H., Okada, H. & Kawai, N. Japan
Seismic dampers for rehabilitating vulnerable Japanese wood houses

Kawai, N., Araki, Y., Koshihara, M. & Isoda, H. Japan
Influence of insufficient joints on the shear capacity of frames

Line, P., Rosowsky, D. & Gromala, D. USA
Benchmarking seismic base shear to historical practice for woodframe shear wall structures

Liu, Y., Ni, C., Rainer, H. & Wensheng, L. P.R. China
Effect of upper story / floor on the performance of wood shear walls

Architecture I: Monday 10.10-11.50 (Salon A/B)

Moderated by: Geoff Boughton

Iimura, Y., Kurita, S. & Ohtsuka, T. Japan
Reticulated timber dome structural system using glulam with a low specific gravity and its scalability

Pirazzi, C. & Weinard, Y. Switzerland
Geodesic lines on free-form surfaces – optimized grids for timber rib shells

Tseng, Y-J, Chen, T-H, Wu, T-C, Hsu, M-F & Chang, W-S Taiwan
Space information of traditional dei-dou timber frames in Taiwan and their applications

Composite Structures: Monday 10.10-11.50 (Salon G)

Moderated by: Ned Waltz

Heiduschke, A., Kasal, B. & Haller, P. Germany
Analysis of small-scale timber frames under earthquake loads

- Clouston, P. & Liu, S. USA
Predicting the Influence of macro-void distribution in parallelwood strand composites
- Hummer, T., Dolan, J., & Wolcott, M. USA
Tension perpendicular-to-grain strength of wood, laminated veneer lumber, and a wood plastic composite
- Hairstans, R., Kermani, A. & Lawson, R. Scotland
Timberstrand LSL nailed flitch beams
- Fracture: Monday, 10.00-11.50 (Eugene Room)**
Moderated by: Ian Smith
- Moutou-Pitti, R., Dubois, F., Petit, C. & Sauvat, N. France
Long term fracture of wood under mixed mode loading: numerical approach by the Mtheta-v-Integral
- Nairn, J. USA
Numerical simulation of transverse fracture in wood
- Chaplain, M., Dethan, T. & Castera, P. France
Effects of climatic conditions changes on crack growth
- Tukiainen, P. & Koponen, S. Finland
Fracture behavior of small wood specimens in RT-direction
- Grading & NDT I: Monday 10.10-11.50 (Portland Room)**
Moderated by: Brian Walford
- Ravenshorst, G.J.P. & van de Kuilen, J.W.G. The Netherlands
An innovative species independent strength grading model
- Ziethen, R. Sweden
The reliability of proof-loading as a strength grading technique
- Ohuchi, T., Yano, K., Murase, Y., Fujimoto, Y. & Morita, H. Japan
Evaluation of sugi finger-jointed laminae having knot by acoustic emission
- Mattone, M. Italy
The state of preservation of wooden structures: resistographic and x-ray tests
- Connections II: Monday 13.20-15.00 (Salon I)**
Moderated by: Tom McLain
- de Oliveira Santana, C. & Mascia, N. Brazil
Determination of fastener stiffness and application in the structural design with semi-rigid connections
- Fernandez-Cabo, J., Avila-Nieto, M. & Lopez-Rodriguez, G. Spain
A parametric study on the bearing capacity of a dowel under static load: the definition and variables of the optimal slenderness
- Schanzlin, J., Kuhlmann, U., Bruhl, F. & Deam, B. Germany
Design of timber structures considering the plastic behavior of steel fasteners

Haller, P. & Birk, T. Germany
Tailor made textile reinforcements for timber connections

Shearwalls I: Monday 13.20-15.00 (Salon C/D)

Moderated by: Tom Skaggs

Leichti, R., Anderson, E., Sutt, E. & Rosowsky, D. USA
Sheathing nail bending yield strength-role in shear wall performances

Nakajima, S., Hamasaki, H., Ohkubo, T. & Yamaguchi, N. Japan
The effect of specification and aging on the strength properties of mortar-finished shear walls

Moosbrugger, T., Guggenberger, W. & Bogensperger, T. Austria
Cross-laminated timber wall segments under homogeneous shear – with and without openings

Waltz, N. & Douglas, B. USA
Performance of multiple-pier portal frame bracing systems

Glulam I: Monday 13.20-15.00 (Salon A/B)

Moderated by: Roland Hernandez

Mascia, N. & Vanalli, L. Brazil
Analysis of stress and strain in wood laminated beams

Williamson, T. USA
Fire performance of fiber reinforced polymer glued laminated timber

Haiman, M. & Baljkas, B. Croatia
Roof Structure over new swimming pool in St. Martin, Croatia

Aicher, S. (Paper Not Received at Time of Printing) Germany
Engineered reinforcement and retrofitting of glulam constructions with glued-in steel bars

Fire I: Monday 13.20-15.00 (Salon G)

Moderated by: Steve Cramer

Erchinger, C., Frangi, A. & Mischler, A. Switzerland
Thermal investigations on multiple shear steel-to-timber connections

Lau, P.H., Moss, P., Buchanan, A. & Chuo, T.C. New Zealand
Fire performance of connections in laminated veneer lumber (LVL)

Laplanche, K., Dhima, D. & Racher, P. France
Thermo-mechanical analysis of the timber connection under fire using 3D finite element model

Schnabl, S. & Turk, G. Slovenia
Coupled heat and moisture transfer in timber beams exposed to fire

Portal Frames: Monday 13.20-15.00 (Salon H)

Moderated by: A.J.M. Leijten

Kohara, K., Komoto, K., Imanishi, A., Nakai, N., Takahashi, A. & Misawa, F. Japan
A study on experiment and structural design for timber rigid frame

Komatsu, K., Hosokawa, K., Hattori, S., Matsuoka, H., Yanaga, K. & Mori, T. Japan
Development of ductile and high-strength semi-rigid portal frame composed of mixed-species glulams and H-shaped steel gusset joints

Noguchi, M. & Komatsu, K. Japan
Development of wooden portal frame structures with improved columns

Schmidt, R. & Lindblom, P. USA
Effects of beam pockets in timber girders

Wood-Concrete I: Monday 13.20-15.00 (Eugene Room)

Moderated by: Mohammad Mohammad

Negrao, J., Oliveira, F. & Oliveira, C. Portugal
Investigation on timber-concrete glued composites

Kuhlmann, U. & Michelfelder, B. Germany
Optimized design of grooves in timber-concrete composite slabs

Ceccotti, A., Fragiaco, M. & Giordano, S. Italy
Behaviour of a timber-concrete composite beam with glued connection at strength limit state

Grading & NDT II: Monday 13.20-15.00 (Portland Room)

Moderated by: David Kretschmann

Iniguez, G., Arriaga, F., Esteban, M. & Bobadilla, I. Spain
Nondestructive methods for the quality control of structural Tali timber

Ziethen, R. Sweden
Strength grading of Norway spruce using image analysis technique

Lee, S.-J., Kim, K.-M. & Lee, J.-J. Republic of Korea
Improvement of the ultrasonic and X-ray CT techniques for field application

Wang, X., Wachter, J. & Rammer, D. (Paper Not Received at Time of Printing) USA
Use of NIR Spectroscopy to predict weathered wood exposure times

Seismic II: Monday 15.30-17.10 (Salon I)

Moderated by: Erol Karacebeyli

Liu, H. & van de Lindt, J. USA
Shake table testing of a performance-based seismic designed woodframe structure

Judd, J. & Fonseca, F. USA
Equivalent single degree of freedom model for wood shearwalls and diaphragms

Miyake, T., Minowa, C., Isoda, H., Koshihara, M., Tsuchimoto, T. & Sakamoto, I. Japan
A collapsing response analysis of existing wood house subjected to seismic motion

Nakagawa, T. & Ohta, M. Japan
Collapsing process simulations of wooden houses under dynamic loading

Glulam II: Monday 15.30-17.10 (Salon C/D)

Moderated by: Vik Yamada

- Zangiaco, A. & Lahr, F. Brazil
Brazilian alternative tropical wood in glulam production
- Haiman, M. Croatia
3D analysis of timber structures
- Fujimoto, Y., Morita, H. & Imura, Y. Japan
Curved glulam with extremely small radius made of obi-sugi
- Kommenovic, M. Serbia & Montenegro
Analysis of stress at the girders of glued laminated wood with circular axis and variable cross section height

Fire II: Monday 15.30-17.10 (Salon A/B)

Moderated by: Bill Davids

- Douglas, B. USA
Calculating the fire resistance of exposed wood members
- Schleifer, V., Frangi, A. & Fontana, M. Switzerland
Separating function of light timber frame assemblies
- Moura Pinto, E. & Calil, Jr., C. Brazil
Behavior of Eucalyptus citriodora and Eucalyptus grandis structural members exposed to ASTM E 119 fire curve
- Takeda, H. Canada
Fire resistance of wood-framed floor / ceiling assembly: model and full-scale test

Poles: Monday 15.30-17.10 (Salon G)

Moderated by: Peter Mazikins

- Walford, B. & Reelick, J. New Zealand
Structural possibilities using poles of uniform diameter
- Carradine, D. & Gonzalez, J. USA
Evaluating Brazilian wood species for utility pole and cross arm use
- Elkins, L., Leichti, R. & Morrell, J. USA
Through-boring utility poles: Method of test & Effect
- Kretschmann, D., Faller, R., Reid, J., Hascall, J., Sicking, D. & Rohde, J. USA
Small - diameter, round-wood, strong-post with beam guardrail systems

Timber Engineering I: Monday 15:30-17.10 (Salon H)

Papers Not Received At Time of Printing

- Estevez, J. & Vazquez, J. Spain
An innovative timber structure: sport building roof structure in a Coruna, Spain.
- Wang, L., Fan, C. & Pan, J. China
The structural characteristics of Yingxian ancient wooden pagoda and its vertical compression deformation

Kan, Y. & Hong-tie, Z. China
Study on the aseismatic construction of Chinese historical wooden buildings

Galimard, P. & Cointe, A. United Kingdom
Coupling structural health monitoring and numerical techniques for the appraisal of a large timber bell tower

Wood-Concrete II: Monday 15.30-17.10 (Eugene Room)

Moderated by: Peggy Clouston

Kreher, K. Austria
Light-weight wood concrete (LWC)

Bathon, L. & Bletz, O. Denmark
Long term performance of continuous wood-concrete-composite systems

Fragiacomo, M., Gutkowski, R., Balogh, J. & Fast, R. USA
Long-term behavior of wood-concrete composite beams with notched connection

Jorge, L., Lopes, S. & Cruz, H. Portugal
Castellated surface for timber-concrete composite connections

Design Properties: Monday 15.30-17.10 (Portland Room)

Moderated by: Cathy Kaake

Nguyen, M., Foliente, G., Syme, M. & Juniper, P. Australia
Establishing engineering design properties of structural timber based on a techno-industry-participatory approach

de Vries, P. & Gard, W. & Schuch, R. The Netherlands
Development of a strength grading system of small diameter round

Katzengruber, R., Jeitler, G., Brandner, R. & Schickhofer, G. Austria
Tensile proof loading to assure quality of finger-jointed structural timber

Chen, Y., Lam, F. & Barrett, J.D. Canada
Bending strength and modulus of elasticity of BC coastal timbers

Tuesday, August 8, 2006

Connections III: Tuesday 08.00-09.40 (Salon I)

Moderated by: Bill Bulleit

Herzog, B. & Yeh, B. USA
Nail withdrawal and pull-through strength of structural-use panels

Hong, J. P & Barrett, J.D. Canada
Empirical wood material model for three-dimensional finite element analysis of a nail joint

Tomasi, R., Piazza, M., Angeli, A. & Mores, M. Italy
A new ductile approach design of joints assembled with screw connectors

Garbin, E., Valluzzi, M. & Modena, C. Italy
Characterization of a dovetail joint for timber roofs

Shearwalls II: Tuesday 08.00-09.40 (Salon C/D)

Moderated by: Jay Crandell

- Dinehart, D., Hoffman, R. & Blasetti, A. USA
Finite element modeling of wood shear walls with VE polymers
- Folz, B. Canada
Hysteretic response of wood shear walls examined via incremental dynamic analysis
- Pang, W., Rosowsky, D., Pei, S. & van de Lindt, J. USA
Evolutionary parameter hysteretic models for wood shearwalls
- Sinha, A., Gupta, R. & Muszynski, L. USA
Strain profile in wood frame shear walls – preliminary results

Architecture II: Tuesday 08.00-09.40 (Salon A/B)

Moderated by: Lori Elkins

- Epp, G. Canada
Craft at a structural scale
- Peters, J. USA
Finnish wooden towns: urban design in wood
- Lecomte de Mello, R. Brazil
Eucalyptus structural poles for medium cost houses in central Brazil
- Ganzerli, S. & Ganzerli, L. USA
The structure of Valsesia's Walser Houses

Bridges I: Tuesday 08.00-09.40 (Salon G)

Moderated by: Keith Crews

- Calil Junior, C. Brazil
Emerging timber bridge program to Sao Paulo state: a four-year report
- Gilham, P. USA
Design construction and installation of the Hopland Casino Bridge
- Glencross-Grant, R. Australia
The evolution of timber truss road bridges in New South Wales
- Honda, H., Sasaki, T. & Usuki, S. Japan
Structural performance of hybrid timber truss highway bridge

FRP Reinforcement: Tuesday 08.00-09.40 (Salon H)

Moderated by: Jeff Linville

- Raftery, G., Harte, A & Rodd, P. Ireland
Performance evaluation of adhesives and reinforcements in GFRP-Wood connections
- Kreher, K. Austria
Load introduction with timber-timber as reinforcement for glued composites

Tanaka, H., Ono, T. & Idota, H. Japan
Evaluation of bucking strength of hybrid timber columns reinforced with steel plates and carbon fiber sheets

Davids, W., Botting, J. & Peterson, M. USA
Composite-reinforced timber highway guardrail: development and structural testing

Vibration I: Tuesday 08.00-09.40 (Eugene Room)

Moderated by: Glen Robak

Sandoz, J.L. & Leistner, P. Switzerland
Research and development at CBS-CBT for acoustically high performing timber-floor-system

Toratti, T. & Talja, A. Finland
Classification of human induced floor vibrations

Salmela, K. & Olsson, A. Sweden
Vibration properties of a floor system with high transverse stiffness

Hindman, D. & Wicks, A. USA
Transverse vibration of wood composite I-joists

Wood-Concrete Connection: Tuesday 08.00-09.40 (Portland Room)

Moderated by: Phil Line

Dias, A., Van de., Kuilen, J., Cruz, H. & Lopes, S. Portugal
Densified veneer wood for notched joints in timber concrete composite structures

Lukaszewska, E., Johnsson, H. & Stehn, L. Sweden
Connections for prefabricated timber-concrete composite systems

Fernandez-Cabo, J., Fernandez-Lavandera, J. & Avila-Jalvo, J. Spain
Wood-concrete and wood-wood mixed beams: a rational basis for selecting the connections

Coronado, M., Triche, M. & Fridley, K. USA
Wood to concrete connections

Connections IV: Tuesday 10.10-11.50 (Salon I)

Moderated by: Ed Sutt

Kamachi, K., Ando, N. & Inayama, M. Japan
New method to estimate the load-slip characteristic of the double-sheared bolted timber-to-timber joints

Snow, M., Asiz, A. & Smith, I. Canada
Modelling fracture in bolted engineered wood joints

Hirai, T., Tsujino, T. & Sasaki, Y. Japan
Steel washers on timber

Abbasi, V., Dubois, F. & Sauvat, N. France
A numerical method for simulation of moisture effect at bolted timber joints in service

Seismic III: Tuesday 10.10-11.50 (Salon C/D)

Moderated by: B.J. Yeh

- Peterson, A. & Popovski, M. Canada
Seismic behavior of tall wood-frame walls
- Ceccotti, A., Lauriola, M., Pinna, M. & Sandhaas, C. Italy
SOFIE Project - cyclic tests on cross-laminated wood panels
- Shimizu, H., Iwamoto, I., Yamada, M. & Suzuki, Y. Japan
Seismic performance evaluation of penetrating tie beam with large cross-section by full-scale shaking tests
- Koshihara, M., Araki, Y., Isoda, H. & Sakamoto, I. Japan
A study of collapsing process of wood conventional houses shaking table tests of real-size models

Glulam III: Tuesday 10.10-11.50 (Salon A/B)

Moderated by: Simon Aicher

- Augustin, M., Ruli, A., Brandner, R. & Schickhofer, G. Austria
Behaviour of glulam in compression perpendicular to grain in different strength grades and load configurations
- Kessel, M. & Guenther, M. Germany
Assessment of the load bearing capacity of defectively glued laminated timber
- Nakatani, M., Mori, T. & Komatsu, K. Japan
Development of moment-resisting joint systems using lagscrewbolts
- Kiss, L., Sasaki, T., Toyota, A. & Usuki, S. Japan
Performance of glulam beam-orthotropic steel deck hybrid bridge structure

Bridges II: Tuesday 10.10-11.50 (Salon G)

Moderated by: Mike Triche

- Baltrusaitis, A. & Kasiulevicius, M. Lithuania
Pedestrian timber bridge in Klaipeda, Lithuania
- Ronnquist, A., Wollebaek, L. & Bell, K. Norway
Dynamic behavior and analysis of a slender timber footbridge
- Arriaga, F., Esteban, M. & Iniguez, G. Spain
Modular sawn timber footbridge at the coast.
- Choi, F., Crews, K., Samali, B. & Li, J. Australia
Calibration of a laboratory timber bridge finite elements model using the experimental model data

World Timber Quality: Tuesday 10.10-11.50 (Salon H)

Moderated by: Bob Leicester

- Mina, A., Dias, A. & Calil Junior, C. Brazil
Mechanical properties of timber piles in Brazil
- Ren, H., Yin, Y., Ni, C. & Lu, J. P. R. China
In-grade lumber testing of Chinese fir plantation

- Horita, Y., Hirashima, Y. & Takeuchi, M. Japan
Mechanical properties of compressed Japanese cedar
- Jumaat, M. Z., Bakar, A., Razali, F., Abdul Rahim, A. H. & Othman, J. Malaysia
The determination of the embedment strength of Malaysian hardwood
- Vibration II: Tuesday 10.10-11.50 (Eugene Room)**
Moderated by: Tomi Toratti
- Jorissen, A. The Netherlands
The design of timber floors
- Kohara, K., Misawa, F., Tsuji, M., Ishii, M. & Takahashi, A. Japan
A study on vibration characteristics of wooden structure on each construction phase based on microtremor measurements
- Hu, L., Desjardins, R. & Chui, Y. H. Canada
Nature of vibrations induced by footsteps in lightweight and heavy floors
- Wood-Concrete III: Tuesday 10.10-11.50 (Portland Room)**
Moderated by: Ulrike Kuhlmann
- Kanocz, J. & Kulikova, D. Slovak Republic
High performance timber-concrete composite slab systems with fiber reinforced concrete
- Bathon, L., Bletz, O. & Schmidt, J. Germany
Hurricane proof buildings – an innovative solution using prefabricated modular wood-concrete-composite elements.
- Brunner, M. & Schnuriger, M. Switzerland
Adhesive connection for timber-concrete composite
- Flach, M. & Schönborn, F. Austria
Prefabricated wood-concrete slabs
- Connections V: Tuesday 13.20-15.00 (Salon I)**
Moderated by: Steve Pryor
- Tanaka, K., Inoue, M., Fujihara, H., Adachi, H., Goto, Y. & Inoue, M. Japan
Development of bamboo connector strengthened by densified technique
- Shiratori, T., Jung, K. & Komatsu, K. Japan
Development of "Kusabi-Nageshi" timber joint system and the applied "Staggered colonnade shear wall"
- Fukuyama, H., Inayama, M. & Ando, N. Japan
Shear characteristics and load-slip stiffness design method of wooden dowel joint
- Habkirk, H. & Quenneville, P. Canada
Bolted wood connections loaded perpendicular-to-grain: effect of wood species

Shearwalls III: Tuesday 13.20-15.00 (Salon C/D)

Moderated by: Dan Dolan

Graham, D., Carradine, D., Bender, D. & Dolan, J. USA
Lateral loading characteristics of connections in log shear walls

Park, M. & Karacebeyli, E. Korea
Finite element analysis of wood-based hybrid wall system

Chang, W-S, Hsu, M-F, Chen, W-C Taiwan
Experimental study on traditional wood shear walls in Taiwan

Martin, Z., Skaggs, T., Keith, E. & Yeh, B. USA
Development of narrow wall bracing and effects of boundary conditions¹

Experiments, Loads & Dynamics I: Tuesday 13.20-15.00 (Salon A/B)

Moderated by: Y.H. Chui

Koch, H. & Seim, W. Germany
Load bearing capacity of traditional roof structures - modelling of joints

Brandner, R. & Schickhofer, G. Austria
System effects of structural elements- determined for bending and tension

Franke, S., Franke, B., Schober, K-U. & Rautenstrauch, K. Germany
Experimental verification of FE-simulations of wood using photogrammetry

Song, X. & Lam, F. Canada
Three dimensional stability analysis of wood beam columns

Adhesives I: Tuesday 13.20-15.00 (Salon G)

Moderated by: Ben Herzog

Yeh, B. & Brooks, R. USA
Evaluation of adhesive performance at elevated temperatures for engineered wood products

Cruz, H. & Custodio, J. Portugal
Thermal effects on the performance of epoxy adhesives in timber structural repair

Brunner, M. & Engels, I. Switzerland
Special adhesive for the production of ductile glulam beams

Pommier, R. & Morlier, P. France
Finger jointing on green maritime pine timber – improving the process and final performances

Finite Element: Tuesday 13.20-15.00 (Salon H)

Moderated by: Bo Kasal

Zhang, H., Ridley-Ellis, D.J. & Hapca, A. United Kingdom
Space with time finite element timber plate dynamics

Kessel, M. & Meyer, M. Germany
Wood panel diaphragms with free sheathing joints

Wang, B., Liu, X. & Lam, F. Canada
Computational modeling of the lateral load transfer capacity of rimboard

Doudak, G., McClure, G. & Smith, I. Canada
Modelling the structural response of wood light-frame structures

Next Generation Thinking in Education & Quality Assurance: Tuesday 13.20-15.00 (Eugene Room)
Moderated by: V.J. Gopu

Vahtikari, K., Mauno, A., Kairi, M., Absetz, I. & Heikkinen, P. Finland
Interactive development of wood construction education

Kairi, M. Finland
Interaction of the R&D and business development in wood product industry

Bittencourt, R. Brazil
The wood for the civil engineering: A proposal education of distance

Brooks, R., Stochlia, K. & Kuchar, A. USA
Modern quality systems and new enforcement solutions for engineered wood products

Timber Engineering II: Tuesday 13.20-15.00 (Portland Room)
Papers Not Received At Time of Printing

Ohandja, A., Mvogo, J. & Morlier, P. West Africa
Mechanical grouping of structural timber species of the congo basin forest

Aicher, S. & Riethmuller, S. Germany
Glued high strength frame corners with different ductility

Duju, A. & Bakar, B. Malaysia
Strength performance of full-size structural timber of dryobalanops species of Sarawak, Malaysia

Shearwalls IV: Tuesday 15.30-17.10 (Salon I)
Moderated by: Dick Schmidt

Bregulla, J., Griffiths, D. & Enjily, V. United Kingdom
Racking performance of structural insulated panel (SIP) walls

du Chateau, K., Dolan, J. & Wolcott, M. USA
Performance of bracing panel wall segments utilizing wood plastic composite sill plates

Dujic, B., Aicher, S. & Zarnic, R. Slovenia
Testing of wooden wall panels applying realistic boundary conditions

Muñoz Toro, W., Salenikovich, A., Mohammad, M. & Beauregard, R. Canada
Strength and stiffness of prefabricated wall panel assemblies with different connection systems

Experiments, Loads & Dynamics II: Tuesday 15.30-17.10 (Salon C/D)
Moderated by: Milo Clauson

Fischer, C. & Kasal, B. USA
Stochastic analysis of wind loaded light-frame low-rise buildings using simplified models

Doudak, G., McClure, G., Smith, I. & Stathopoulos, T. Canada
Field measurements of wind forces on wood buildings

Richins, W., Larson, T., Lacy, J. & Kobbe, Ryan USA
Manufactured home testing in simulated and naturally occurring high winds

Li, Y. & Ellingwood, B. USA
Mitigation of risk to wood-frame residential construction from natural hazards

Bridges III: Tuesday 15.30-17.10 (Salon A/B)

Moderated by: Paul Gilham

Doehrer, A. & Rautenstrauch, K. Germany
The construction of road bridges as timber-concrete composites

Dahl, K., Bovim, N. & Malo, K. Norway
Evaluation of stress laminated bridge decks based on full scale tests

Bathon, L., Bletz, O. & Bahmer, R. Germany
Retrofit of timber bridges - a system approach using prefabricated wood-concrete-composite elements

Lindquist, M., Friis-Hansen, P. & Calil Junior, C. (Paper Not Received at Time of Printing) Denmark
Statistical analysis of pre-stress in stress-laminated timber bridges

Adhesives II: Tuesday 15.30-17.10 (Salon G)

Moderated by: Rob Brooks

Stamm, B. & Weinand, Y. Switzerland
Joining wood by friction welding-fabrication of multi-layered components

Properzi, M., Pizzi, A., Resch, L., Bocquet, J.F., Pichelin, F. & Ganne-Chedeville, C. Switzerland
Latest development in the field of wood welding

Ahmad, Z., Ansell, M. & Smedley, D. United Kingdom
The mechanical properties and microstructure of nano and microparticle-filled epoxy adhesives for bonded-in timber connections

Material Properties: Tuesday 15.30-17.10 (Salon H)

Moderated by: Dan Hindman

Cheung, A., Lindquist, M. & Calil Junior, C. Brazil
Elastic properties calibration of orthotropic timber deck in stress-laminated truss deck using simple algorithms

Walford, B. & Gaunt, D. New Zealand
Experience with performance-based visual grading of dimension lumber

Craig, B., Green, D. & Gromala, D. USA
Flexure properties of structural lumber products after long term exposure to high temperatures

Boughton, G. & Falck, D. Australia
Confidence in statistical methods for analyzing in-mill test data

Wednesday, August 9, 2006

Connections VI: Wednesday 08.00-09.40 (Salon I)

Moderated by: Robert Emerson

- Branco, J., Cruz, P., Piazza, M. & Varum, H. Portugal
Experimental analysis of original and strengthened traditional timber connections
- Fardy, L., Chui, Y., Schneider, M. & Rogers, B. Canada
Method of enhancing load-carrying capacity of dowel-type timber joints
- Mohammad, M. & Salenikovich, A., Quenneville, P. Canada
Investigations on the effectiveness of self-tapping screws in reinforcing bolted timber connections
- Inoue, M., Shirakawa, Y., Tanaka, K. & Guan, Z. Japan
Study on reinforcement around bolt hole at fastener joint in timber structure

Seismic IV: Wednesday 08.00-09.40 (Salon C/D)

Moderated by: Ario Ceccotti

- Shirayama, A., Suzuki, Y., Sasaki, T. & Shimizu, H. Japan
Seismic performance evaluation of traditional wooden structures reinforced with horizontal member by static and dynamic tests
- Suda, T., Suzuki, Y., Shimizu, H. & Ogasawara, M. Japan
Dynamic tests of traditional wooden house in Kyoto using large-scale shaking table
- Araki, Y., Koshihara, M., Sakamoto, I., & Isoda, H. Japan
A study on dynamic performances of wooden houses considering the break of joints
- Ogasawara, M., Suzuki, Y., Shimizu, H. & Suda, T. (Paper Not Received at Time of Printing) Japan
Study of seismic design of the Japanese traditional town houses in consideration of the form

Durability & Restoration I: Wednesday 08.00-09.40 (Salon A/B)

Moderated by: Steve Zylkowski

- Ruther, N., Herlyn, J. & Schliesing, S. Germany
Characteristics of external insulation compound systems with wooden softboards-research methods and numerical simulation
- Rüther, P. Norway
Color changes in wooden boards during weathering
- Langlois, J., Vatovec, M., Westover, P. & Preston, R. USA
Remediation of Massachusetts Institute of Technology's W33 cage building
- Alam, P., Ansell, M. & Smedley, D. Finland
Repair of fractured spruce beams with bonded-in reinforcements

Bridges IV: Wednesday 08.00-09.40 (Salon G)

Moderated by: Leander Bathon

- Malo, K., Holmestad, A. & Larsen, P. Norway
Fatigue strength of dowel joints in timber structures

- Sauvat, N., Dubois, F. & Petit, C. France
Climatic effects on a bridge with hyperstatic timber structure and disconnected roadway: Chavanon highway, France.
- Nakazawa, T., Zhang, R., Imura, Y., Imai, F. & Miura, I. Japan
Time-dependent changes of mechanical properties of timber bridges
- Watanabe, H. & Imura, Y. Japan
Ultimate behavior of bolt joints for glulam bridges under cyclic load
- Creep I: Wednesday 08.00-09.40 (Eugene Room)**
Moderated by: Ken Fridley
- Dias, A.M.P.G., Cruz, H., Lopes, S. & Kuilen, J.W.G. Portugal
Creep effects in timber concrete joints with dowels and notches
- Dubois, F., Sauvat, N. & Petit, C. France
Modelling of the long term behavior of the merle timber bridge
- Okabe, M. & Yasumura, M. Japan
Long-term bending failure tests of structural insulated panel
- Reliability: Wednesday 08.00-09.40 (Portland Room)**
Moderated by: Chun Ni
- Kohler, J. & Faber, M. Switzerland
The JCSS probabilistic model code for timber structures examples and discussion
- Ozola, L., Keskkula, T. & Miljan, J. Latvia & Estonia
Assessment of timber structures
- Bulleit, W. USA
Reliability of wood connections designed using LRFD from NDS-2005
- Kohler, J., Leijten, A. & Jorissen, A. Switzerland
Uncertainties related to the strength modeling of dowel type fastener connections
- Connections VII: Wednesday 10.10-11.50 (Salon I)**
Moderated by: Alex Schreyer
- Rammer, D. & Line, P. USA
Development of failure mechanisms for fasteners in the United States
- Crews, K. & Hutchings, B. Australia
Defining appropriate limit states for design of timber connections
- Ballerini, M. & Rizzi, M. Italy
A numerical investigation on the splitting strength of beams loaded perpendicular-to-grain by multiple dowel-type connections
- Bickerdike, M. & Quenneville, P. Canada
Predicting the row shear failure mode in parallel-to-grain bolted connections

Seismic V: Wednesday 10.10-11.50 (Salon C/D)

Moderated by: Greg Foliente

- Nakaji, H., Suzuki, Y., Gotou, M. & Iwamoto, I. Japan
Seismic performance evaluation of traditional wooden house by alternate cyclic loading test
- Fujita, K., Kawai, N., Minowa, C., Koshihara, M. & Chiba, K. Japan
Shaking table test and earthquake response monitoring of traditional Japanese timber pagoda
- Ono, T., Kameyama, Y., Sato, A. & Kanno, T. Japan
Experiments on seismic safety of traditional timber temples part 1: results of horizontal loading test
- Kameyama, Y., Ono, T., Sato, A. & Kanno, T. Japan
Experiments on seismic safety of traditional timber temples part 2: results of vibration test

Performance-based design: Wednesday 10.10-11.50 (Salon G)

Moderated by: John van de Lindt

- Ellingwood, B., van de Lindt, J., Gromala, D., Rosowsky, D., Gupta, R. & Pryor, S. USA
Performance-based Engineering for light-frame wood construction in the US: status-challenges
- Buchanan, A., Gibson, T. & Morris, H. New Zealand
15 years of performance-based design in New Zealand
- Rainer, H., Ni, C., Karacabeyli, E. & Popovski, M. Canada
Canada's 2005 objective-based codes & implications for timber buildings
- Kawai, N., Isoda, H., Sakamoto, I. & Okada, H. Japan
Performance-based structural design for wood buildings in Japan

Traditional/Historic Structures I: Wednesday 10.10-11.50 (Salon H)

Moderated by: Joe Loferski

- Misawa, F., Misawa, Y & Kohara, K. Japan
A study on proposal for high performance "min-ka" type construction
- Branco, J., Cruz, P., Piazza, M. & Varum, H. Portugal
Portuguese timber roof structures
- Shim, K., Park, J., Yeo, H., Kim, Y. & Han, J. Korea
Modernization of traditional Korean building systems with engineering methods laminated timber
- Oztank, N. Turkey
Timber frame residential constructions in Turkey and design model houses

Creep II: 10.10-11.50 (Eugene Room)

Moderated by: Bruce Craig

- Hartnack, R., Doehrer, A. & Rautenstrauch, K. Germany
Long-term load bearing of wooden columns influenced by climate and stochastic material parameters
- Svensson, S., Astrup, T. & Hoffmeyer, P. Denmark
Testing long-term behavior by a duration of deformation method

Engelund, E., Astrup, T., Svensson, S. & Hoffmeyer, P. Denmark
Modelling time to failure in constant deformation experiments

Kuhlmann, U. & Teichmann, G. Germany
Influence of creep on the lateral torsional buckling of glued laminated timber beams

Shear Properties: Wednesday 10.10-11.50 (Portland Room)

Moderated by: Doug Rammer

Gotou, H., Chida, T. & Usuki, S. Japan
Estimation of shear modulus by FEM bending simulation of wood beams

Harrison, S. & Hindman, D. USA
Comparison of shear modulus test methods

Ukyo, S. & Masuda, M. Japan
A new method for measuring the true shear strength of wood

Gopu, V. & Chen, Y. USA
Influence of tension-perpendicular-to-grain stress on shear strength of southern pine glued laminated timber

Connections VIII: Wednesday 13.20-15.00 (Salon I)

Moderated by: Pierre Quenneville

Murty, B., Asiz, A., Smith, I. & Lai, S. Canada
Wood connections with small steel tube fasteners

Coste, G. & Kermani, A. Scotland
Performance of helically shaped connectors in timber

Robertson, M. Canada
Assessment of tight-fitting spring-pin connections in timber

Tannert, T. & Lam, F. Canada
Geometry parameters of rounded dovetail connections

Shearwalls V: Wednesday 13.20-15.00 (Salon C/D)

Moderated by: Alex Salenikovich

Dinehart, D., Shenton, H., Foley, D. & Johnston, A. USA
The cyclic performance of viscoelastic shearwalls

Cheng, H., Ni, C., Lu, X. & Karacabeyli, E. P.R. China
Effect of transverse walls and vertical load on the performance of shear walls without hold-downs

Gu, J., Lam, F. & Foschi, R. Canada
Comparison of seismic performance of Japanese wood shear walls

Yasumura, M., Richard, N., Davenne, L. & Uesugi, M. Japan
Estimating seismic performance of timber structures with plywood-sheathed walls by pseudo-dynamic tests and time-history earthquake response analysis

Durability & Restoration II: Wednesday 13.20-15.00 (Salon A/B)

Moderated by: Robert Taylor

Smedley, D., Alam, P. & Ansell, M. United Kingdom
George Street, St. Albans, UK - a case study in the repair of historic timber structures using bonded-in pultruded plates

Gray, G. & Gilham, P. USA
Repair and reinforcement of glulam beams for Tinora High School

Schober, K-U & Rautenstrauch, K. Germany
Upgrading and repair of timber structures with polymer concrete facing and strengthening

Lehmann, M., Properzi, M., Pichelin, F. & Triboulot, P. Switzerland
Pre-stressed FRP for the in-situ strengthening of timber structures

Engineered Wood Products I: Wednesday 13.20-15.00 (Salon G)

Moderated by: Bob Tichy

Palermo, A., Pampanin, S., Fragiacomio, M., Buchanan, A. & Deam, B. Italy
Innovative seismic solutions for multi-storey, LVL timber buildings

Grandmont, J.F., Cloutier, A., Thivierge, C. & Gendron, G. Canada
Engineering properties and modeling of wood I-joists

Talkad, P. & Gopu, V. USA
Thermal effects on the response of structural composite lumber decks

Composite Materials: Wednesday 13.20-15.00 (Salon H)

Moderated by: John Nairn

Gerber, C., Crews, K. & Sigrist, C. Australia
Simulating the serviceability stress-skin panels with changing boundary conditions - finite element approach

Gerber, C., Crews, K. & Sigrist, C. Australia
On the services responses and failure mechanisms of stressed-skin panels- experimental approach

Guggenberger, W. & Moosbrugger, T. Austria
Mechanics of cross-laminated timber plates under uniaxial bending

Sugimoto, T. & Sasaki, Y. Japan
Effect of loading waveform on the fatigue of structural plywood in shear through thickness

Timber Engineering III: Wednesday 13.20-15.00 (Eugene Room)

Papers Not Received At Time of Printing

Racher, P. & Bressolette, P. France
Experimental and numerical analysis of dovetail joints in timber structures

Estevez, J., Otero, D., Martin, E. & Muniz, S. Spain
New joint design for the improvement of the axial strength of steel threaded rods glued-in timber

Wang, L., Fan, C. & Pan, J. P.R China
Reinforcement of ancient timber structures using GFRP

Coureau, J., Morel, S. & Morlier, P. France
On the application of fracture mechanics on traditional connections

Connections IX: Wednesday 15.30-17.10 (Salon I)

Moderated by: Kelly Cobeen

Vasek, M. & Vyhnalek, R. Czech Republic
Timber semi rigid frame with glued-in-rods joints

Poertner, C. & Seim, W. Germany
Glued-in FRP-Rods with short bonding lengths

Batchelar, M. New Zealand
Timber frame moment joints with glued-in steel rods - a designer's perspective

Gattesco, N. & Gubana, A. Italy
Performance of glued-in joints of timber members

Shearwalls VI: Wednesday 15.30-17.10 (Salon C/D)

Moderated by: J-L. Sandoz

Tsuchimoto, T., Koshihara, M. Matsuda, M., Suzuki, K., Sugimoto, K., Minowa, C. & Sakamoto, I. Japan
Effect of deterioration and degradation of structural members on the static collapsing behavior and limit deformation to collapse

Kallsner, B. & Girhammar, U. Sweden
A plastic design method for incompletely anchored wood-framed wall diaphragms

Mori, T., Kitamori, A. & Komatsu, K. Japan
Effect of testing methods on the mechanical behaviors of shear walls composed of wooden plates

Gebremedhin, K. USA
Evaluation of design practices of post-frames building diaphragms

Durability & Restoration III: Wednesday 15.30-17.10 (Salon A/B)

Moderated by: Zeno Martin

Wang, C-H, Leicester, R., Nguyen, M., Foliente, G. & Sicad, N. Australia
Timber Life: Durability prediction and design of timber construction

Leicester, R., Leonard, J. & Bianchi, R. Australia
Attack by wildfire

Tsuchimoto, T., Minowa, C., Nishiyama, N., Koshihara, M., Isoda, H., Fukumoto, Y., Sato, T. & Sakamoto, I. Japan
Studies on fracture behavior of shear walls picked from old wood house and reproduced wall under shaking table tests

Vasek, M. Czech Republic
Some problems of timber structures solved by forensic control

Engineered Wood Products II: Wednesday 15.30-17.10 (Salon G)

Moderated by: Dan Cheney

- Dinehart, D. & Morrissey, G. USA
Experimental evaluation of wood I-joints with web openings
- Pirzada, G. & Chui, Y. Canada
Predicting knife-through failure in wood I-joint under bearing load
- Descamps, T., Lambion, J. & Laplume, D. Belgium
Timber structures: rotational stiffness of carpentry joints
- Gjinolli, A. & Vogt, J. USA
In Service Moisture Problems and Structural Performance of OSB Panels

Traditional/Historic Structures II: Wednesday 15.30-17.10 (Salon H)

Moderated by: Ben Brungraber

- Kawai, N., Minowa, C., Maekawa, H. & Hanazato, T. Japan
Dynamic characteristics of Japanese pre-modern five-storied pagodas
- Ma, R., He, M., Li, H. & Feng, L. China
The structural system and analysis of timber construction built in Tianning pagoda, China
- Ye, P., Ye, W. & Wang, Z. China
A study of hongshan culture the goddess temple wood construction China prehistoric age architecture aesthetics
- Han, S.R. & Lee, J. Korea
Mechanical performance of Korean traditional wooden building of the column-girder tenon-joint by joint type

Sustainable Design & Construction I: Wednesday 15.30-17.10 (Eugene Room)

Moderated by: Vladimir Kochkin

- Haapio, A. & Viitaniemi, P. Finland
Building environmental assessment tools
- Tichelmann, K-U. Germany
Refurbishment for the future with timber
- Hairstans, R., Dodyk, R. & Kermani, A. United Kingdom
Development of the optimum sustainable timber frame wall detail
- Lippke, B. & Perez-Garcia, J. USA
Environmental performance of residential construction: An assessment of processes, products & designs

Design Methods & Standards I: Wednesday 15.30-17.10 (Portland Room)

Moderated by: Michael Faber

- Hirasawa, H., Oikawa, A. & Kobayashi, A. Japan
Loading tests of glulam beams reinforced by CFRP sheets and plates
- Maksimovic, S. & Komnenovic, M. SCG
Failure analysis of curved layered timber constructions

Wheat, D. Kallivokas, L. & Garza, C. USA
Forward and inverse modeling of Piezoelectric effects in wood

Taylor, R., Line, P., Showalter, J. & Douglas, B. USA
Introducing the 2005 NDS for wood construction

Thursday, August 10, 2006

Design Methods & Standards II: Thursday 08.00-09.40 (Salon I) *Moderated by: Erik Aasheim*

Douglas, B. USA
Designing for lateral-torsional stability in wood members

Barrett, J.D., Lam, F., Rouger, F. & Wang, Y. Canada
The proposed ISO strength class system: an update

Bell, K. Norway
Stiffness properties in timber structure analysis and design

Mazikins, P. & Line, P. USA
Special design provisions for wind and seismic: a new standard is born

Timber Building Systems I: Thursday 08.00-09.40 (Salon C/D) *Moderated by: Marvin Criswell*

Raadschelders, J. The Netherlands
Prestressed timber floor slabs in timber frame houses

Hu, L., Desjardins, R. & Jones, E. Canada
Systems approach for optimizing wood-based floor construction

Valluzzi, M., Garbin, E. & Modena, C. Italy
An intrados technique for the flexural strengthening of timber floors

Lam, F., Li, M. & Gu, J. Canada
Structural performance of one-story Japanese post-and-beam building

Architecture III: Thursday 08.00-09.40 (Salon A/B) *Moderated by: Massimo Fragiaco*

Jorissen, A. The Netherlands
Roundwood structures

Smith, I., Asiz, A., Dick, K., Doudak, G. & Mohammad, M. Canada
Field-monitoring, models and design of timber buildings

Lecomte de Mello, R. & de Melo, J. Brazil
Wood structures in the new building of (CENAFLOOR) in Brazil

Lin, Y. C. & Hsu, M. Taiwan
The typical ways of assembling a traditional chuandou timber frame in Taiwan

Truss Bracing: Thursday 08.00-09.40 (Salon G)

Moderated by: Stu Lewis

Cas, B., Saje, M., Turk, G. & Planinc, I. Slovenia
Shear strain and local buckling of plane timber truss structures

Gruber, J. USA
Permanent bracing of metal plate connected wood trusses

Triche, M. & Partain, J. USA
Effect of lumber variability on truss performance

Cramer, S. & Wheat, D. USA
System stability in wood truss assemblies during construction

Moisture: Thursday 08.00-09.40 (Salon H)

Moderated by: Lech Muszynski

Haglund, M. Sweden
Varying moisture content and eiger-stressed in timber elements

Tichy, R. & Murray, C. USA
Moisture performance of wood framed wall systems in the Pacific Northwest

Ormarsson, S., Rosenkilde, A., Noren, J. & Johansson, C. Sweden
Moisture-related distortions in wood-based floor structures - numerical simulation and experimental validation

Kim, S-J, Park, C.Y. & Lee, J.J. Korea
Moisture control in light-frame wall for preventing condensation

Sustainable Design & Construction II: Thursday 08.00-09.40 (Eugene Room)

Moderated by: Naohito Kawai

Suikkari, R. & Reinikainen, K. Finland
Material, scale and density - components of the Finnish wooden towns

Leicester, R., Wang, C.-H., Nguyen, M., MacKenzie, C. & Foliente, G. Australia
Codification of durability models

Tsai, Y-H. & Hsu, M-F. Tiwan
The study on practices of conducting saving policy on timber building materials from 1937 to 1945 in Taiwan

Buchanan, A. New Zealand
Can timber buildings help reduce global CO₂ emissions?

Structural Properties of Wood Species: Thursday 08.00-09.40 (Portland Room)

Moderated by: Don DeVisser

Boughton, G., Falck, D. & Duff, G. Australia
A preliminary study to predict the strength of sawn timber in production

van de Kuilen, J.W.G. & Ceccotti, A. Italy
Analysis of statistical methods for the determination of characteristic values of Italian red spruce (Picea abies)

- Sotomayor Castellanos, J.R., Ido, H. & Onishi, Y. Mexico
Rupture behavior of discontinuous beams of cryptomeria japonica wood
- Gong, M., Nakatani, M., Yang, Y. & Afzal, M. Canada
Maximum compression ratios of softwoods produced in Eastern Canada
- Design Methods & Standards III: Thursday 10.10-11.50 (Salon I)**
Moderated by: Fernando Fonseca
- Filiatrault, A. & Folz, B. USA
Displacement-based seismic design of light-frame wood buildings
- Keith, E., Martin, Z., Skaggs, T. & Yeh, B. USA
The evolution of lateral load design in residential construction
- van de Lindt, J., Rosowsky, D., Filiatrault, A., Symans, M. & Davidson, R. USA
Development of a performance- seismic design philosophy for mid-rise woodframe construction: progress on the NEESWood project
- Dill-Langer, G. & Aicher, S. (Paper Not Received at Time of Printing) Germany
Non-destructive detection of glue-line defects in glued laminated timber
- Timber Building Systems II: Thursday 10.10-11.50 (Salon C/D)**
Moderated by: Kohei Komatsu
- Lee, I-C., Park, C-Y. & Lee, J-J. Korea
Evaluation of structural properties of multi-story wood building
- Hairstans, R., Kermani, A. & Lawson, R. Scotland
Stability of domestic dwellings
- Descamps, T., Datoussaïd, S. & Van Parys, L. Belgium
Discrete minimum weight design under static and dynamic constraints
- Esteban, M., Arriaga, F. & Iniguez, G. Spain
Modelling of structural pathologies in king trusses
- Architecture IV: Thursday 10.10-11.50 (Salon A/B)**
Moderated by: Julie Bregulla
- Heiekkila, J. Finland
Finnish experiences with the technical qualities of log structures
- de Vries, P. & Gard, W. The Netherlands
Small diameter round wood observation tower
- Vessby, J. & Olsson, A. Sweden
Stability strategies for multi-story timber frame structures
- Metsala, H. Finland
Between tradition and trends – Aspen in contemporary Finnish architecture

Truss Systems: Thursday 10.10-11.50 (Salon G)

Moderated by: Jeff Langlois

- Ozola, L. Latvia
Design models and rational solutions of timber trusses
- He, M., Wu, S. & Hu, J. China
The tests and analysis of load bearing capacity for light wood trusses
- Taazount, M., Racher, P., Faugeras, J-C. France
Finite element analysis of timber trusses with punched plate connections with semi rigidity and contact
- Lewis, S., Mason, N., Cramer, S., Wert, D., O'Regan, P., Petrov, G. & Goclano, D. USA
Design of metal plate connected wood truss joints for moment

Mechanical Properties: Thursday 10.10-11.50 (Salon H)

Moderated by: Vihak Enjily

- Brunner, M. & Jung, P. Switzerland
On the increasing importance of tensile loading perpendicular to the grain in some new timber structural products
- Loferski, J. & Woeste, F. USA
Residential deck and balcony safety: design and testing of residential deck guard railings
- Ballerini, M. Italy
A new prediction formula for the splitting strength of beams loaded perpendicular-to-grain by dowel-type and nail-plates connections
- Vasic, S. & Ceccotti, A. Italy
Rate effects and crack dynamics in mode I fracture of spruce

Timber Engineering IV: Thursday 10.10-11.50 (Eugene Room)

Papers Not Received At Time of Printing

- Dill-Langer, G., Schrank, M., Klock, W. & Aicher, S. Germany
Size effect in tension perpendicular to grain design of large curved and pitched cambered beams - serial vs. semi-parallel design models
- Rajcic, V. & Plavec, I. Croatia
Modern prefabricated system for wooden family house

Poster Presentations by Author

- Aratake, S., Arima, T. & Tanaka, H. Japan
Creep of sugi structural members processed by various drying methods
- Asiz, A., Smith, I., Hu, C. & Afzal, M. Canada
Lifting and transportation forces in prefabricated units
- Ballerini, M., Mares, F. & Somnavilla, D. Italy
Dowel timber connections with two shear planes loaded parallel-to-the-grain: reliability of the new European design code by means experimental tests
- Bathon, L., Bletz, O. & Bahmer, R. Germany
Concrete bearings - a new design approach in wood-concrete-composite applications
- Benabou, L., Duchanois, G. & Mougel, E. France
Multi-scale approach for obtaining the mechanical properties of oriented strand board
- Bittencourt, R. Brazil
Actual Brazilian habitations in wood: a technology in development or a question of fashion?
- Bolmsvik, A., Alsmarker, T. & Petersson, H. (not confirmed) Sweden
Sound transmission to different types of walls in a wooden house - results from accelerometer measurements
- Corinaldesi, V. & Moriconi, G. Italy
Local reinforcement of wooden elements by means of composite materials
- Correa Stamato, G., Calil Jr., C., Espinosa Martinez, M. & Fernandes de Fonte, T. Brazil
Reliability of timber bridges using nailed plywood box beams
- Datye, K.R., Gore, V.N. & Joshi, J.M. India
Development of joinery for wood bamboo composites
- Datye, K.R. & Gore, V.N. India
Engineered wood bamboo composites
- Delahunty, S. & Chui, Y. Canada
Use of dense hardwood in engineered wood product manufacturing
- Doehrer, A., Lehmann, S. & Rautenstrauch, K. Germany
The natural adhesive bond between board stacks and mineral surface layers
- dos Anjos Azambuja, M., Alves Dias, A. & Calil Jr., C. Brazil
Resistance of finger joints glued with polyurethane adhesive based on castor oil
- Eskolin, J. Finland
Large wood constructions and architectural form
- Fabio Cesar, S., Reis de Teive e Argollo, D. & Dione Araujo Cunha, R.D. Brazil
Building project for house embryo with eucalyptus structure and pine sealing boards
- Fiorelli, J. & Alves Dias, A. Brazil
Theoretical model and experimental analysis of glulam beam reinforced with FRP

Freedman, G. & Kermani, A. <i>Laboratory and Field Tests on Stress Laminated Timber Arches in the UK</i>	Scotland
Glaso, G. & Clements, C. (not confirmed) <i>Solid wood elements- Design criteria due to human induced vibration</i>	Norway
Goia Rosa de Oliveira, F. & Sales, A. <i>Density effect on ultrasonic velocity in Brazilian wood</i>	Brazil
Gopu, V. & Reed, K. <i>Service and ultimate load behavior of full-scale three-hinged glued laminated tudor arch</i>	USA
Guan, Z.W. & Pope, D.J. <i>Modelling of the shear behaviour of punched metal plate timber fasteners</i>	UK
Hairstans, R., Dodyk, R., Kermani, A., Lawson, R. & MacKenzie, R. <i>Knowledge transfer in timber engineering</i>	Scotland
Hong, J.-P. & Barrett, J. D. <i>Three-dimensional finite element analysis of nailed connections</i>	Canada
Horsting, P. & Kessel, M. (not confirmed) <i>Cross section and system capacity of wooden components</i>	Germany
Idota, H. & Mineoka, S. <i>Moment- resisting joints using serrated surface</i>	Japan
Inoue, M., Tanaka, K., Inoue, M., Ukyo, S., Tsunoue, Y. & Harada, K. <i>Wood or bamboo made shear plate and bolt for timber structure</i>	Japan
Jing, J. (not confirmed) <i>Static and dynamic analysis of ancient timber building - Fei Yun Lou</i>	China
Judd, J. & Fonseca, F. <i>Dynamic finite element analysis of wood shearwalls</i>	USA
Jumaat, M. Z., Abdul Rahim, A.H., Othman, J. & Razali, F. <i>Timber engineering research and education in Malaysia</i>	Malaysia
Jung, K. & Komatsu, K. <i>Improvement of Japanese traditional joint by using recovery-property of compressed wood</i>	Japan
Kobayashi, K. & Ando, N. <i>The lateral resistance of wood screw joints with wood-based panels</i>	Japan
Kocetov Misulic, T. & Gramatikov, K. (not confirmed) <i>Sheathing to framing joints response under the different loading protocols</i>	Serbia & Montenegro
Laplume, D. & Descamps, T. (not confirmed) <i>Discrete optimization of timber portal frames including constraints on the strength of joints</i>	Belgium
Lecomte de Mello, R. & Eustaquio de Melo, J. <i>Technical and economical viability study of low cost wooden house in Brazil</i>	Brazil

- Lee, W. & Ando, N. Japan
3-Dimensional numerical analysis about shear strength of bolted joint-double shear strength of bolted joint with timber side members
- Limam, A., Mathon, C., Vincensini, M.P. & Deperraz, G. France
Wood-concrete composite beams: A new concept for short span bridge construction
- Lopes, D. & Neves, L. (not confirmed) Portugal
Instability of columns, Portugal UE
- Luis Nunes de Goes, J., & Alves Dias, A. Brazil
Experimental analysis of built-up timber beams
- Luis Nunes de Goes, J., & Alves Dias, A. Brazil
Experimental behavior of multicellular prestressed timber deck
- Luis Nunes de Goes, J. & Calil Jr., C. Brazil
Field load test behavior of composite timber and concrete bridge
- Machado, J. Portugal
Impact of juvenile wood on visual strength grading of pine timber
- Magalhaes, M.D.C., Bamberg, P. & Chahud, E. (not confirmed) Brazil
Vibration transmission across junctions of connected wood panels in timber frame constructions
- Mauno, A., Vahtikari, K., Lahti, P. & Kairi, M. Finland
The new approach to teaching wood products technology
- Metsala, H. Finland
Between tradition and trends - Aspen in contemporary Finnish architecture
- Minowa, C., Sakamoto, I., Suzuki, Y., Kamiya, F., Kawai, N., Miyake, T., Isoda, H.,
Tsuchimoto, T., Koshihara, M., Nakamura, I. & Nakamura, H. Japan
Earthquake hazard mitigation of existing wood houses - outline of research project
- Misztal, B. Poland
Forecasting in time of rheological deflections of truss girders, consolidated from wood, wood-based materials and steel
- Natalino, G. & Fabio, U. Italy
Mechanical Coupling system for timber joints made with glued-in bars
- Nguyen, M., Leicester, R., Cookson, L. & Foliente, G. Australia
An engineering model of marine borer attack on timber piles
- Nolte, S. & Ridley-Ellis, D. UK
Timber Engineering Online
- Otero, D. (not confirmed) Spain
Strength of epoxied threaded steel rods in chestnut timber
- Otero, D., Estevez, J., Martin, E. & Vazquez, J.A. (not confirmed) Spain
Strength of epoxied threaded steel rods in chestnut timber
- Pope, D.J., & Guan, Z.W. UK
The effect of openings on LVL beams

Reichert, T. & Ridley-Ellis, D. <i>Modelling geometric non-linear behaviour of single shear bolted joints</i>	UK
Ridley-Ellis, D. & Wise, S. <i>Women in education and training for the wood chain in the UK</i>	UK
Rodd, P., Zhou, T. & Pope, D.J. <i>Punched metal plate fasteners and the Johansen equations</i>	Ireland
Sales, A., Rosa de Oliveira, F., Candian, M. & Miller, K.P. <i>Determination of mechanical properties of structural wooden pieces using nondestructive techniques of ultrasound waves and transversal vibration</i>	Brazil
Sandoz, J-L. & Benoit, Y <i>Timber grading machine using ultrasonic and density measures: TRIOMATIC</i>	France
Sato, H., Matsuda, M., Fujita, K., Koshihara, M. & Sakamoto, I. <i>Study on the structural performance of traditional timber house based on a static lateral loading test of a farmhouse in Japan</i>	Japan
Schanzlin, J. <i>Comparison of different models describing the time-dependent behavior of timber</i>	Germany
Schoenmakers, D., Jorissen, A. & Leijten, A. <i>Failure of load-carrying timber beams caused by connections</i>	The Netherlands
Sekularac, N. & Adzic, C. <i>Folded plate structures formed of metal plate connected wood trusses</i>	Serbia and Montenegro
Sjodin, J. <i>Moisture induced stresses in multiple dowel-type joints loaded parallel to grain</i>	Sweden
Sugimoto, K., Aoi, H., Tsuchimoto, T., Ido, H. & Fukumoto, Y. <i>Deterioration and structural behavior of existing wooden houses</i>	Japan
Takac, S. & Lozancic, S. <i>Wood-concrete composite structures joined by special type dowels</i>	Croatia
Takahashi, A., Kohara, K. & Komoto, K. <i>A study on experiment of bearing wall with glass fiber reinforced plastics grating</i>	Japan
Tanaka, K., Inoue, M., Nakahara, M., Goto, Y., Imabayashi, M. & Uchiyama, Y. <i>Introduction to Japan pavilion nagakute in expo 2005 Aichi, Japan-bamboo connector and various eco-friendly technologies</i>	Japan
Virtanen, J. (not confirmed) <i>Important properties for structural lumber in future</i>	Finland
Wang, X, Wacker, J. & Rammer, D. <i>Use of NIR Spectroscopy to predict weathered wood exposure times</i>	USA
Weckendorf, J., Zhang, B., Kermani, A., Dodyk, R. & Reid, D. <i>Assessment of vibrational performance of timber floors.</i>	Scotland
Yamasaki, M., Mizutani, A. & Sasaki, Y. <i>Enforcement condition of the construction material recycling law in Nagoya City, Japan</i>	Japan

Yin, Y., Lu, J., Ren, H. & Ni, C.

China

Assessment of bending, tensile and compressive strength of structural lumber with transverse vibration method

Zelinka, S., & Rammer, D.

USA

Exposure test of fasteners in preservative treated wood

Zhang, R., Nakazawa, T., Imura, Y. & Kanemaru, K.

Japan

Collision test of log - concrete composite bridge guardrail systems