Proceedings of the
13th International
Wood Machining Seminar

University of British Columbia
Vancouver, Canada
June 17-20, 1997

hosted by
The IWMS-13 Organizing Committee
Table of Contents

Volume I

Keynote Address

Preparing for growth: New challenges and opportunities for the world’s forest industry
   Jean Mater ........................................................................................................................................... 3

Band Saws and Frame Saws: Part 1
Moderator: Ryszard Szymani

Wood machining—Research and education, where are we going?
   Rolf Birkeland .................................................................................................................................... 17

Minimizing cutting bias in bandsaws
   J. Taylor, J. White ............................................................................................................................ 23

Effect of wheel profile on bandsaw tracking stability
   D. C. Wong, G. S. Schajer .................................................................................................................. 41

Bandsaw performance improvement II—Some experimental aspects of parametric excitation and
bandsaw blade behavior during no-load running
   J.-M. Rivat, P. Martin, P. Chabrier, C. Sales, M. Ginot .................................................................. 53

Band Saws and Frame Saws: Part 2
Moderator: Helmut Huber

Experimental active vibration control of moving bands
   C. A. Tan, D. Huang, Q. Fan .............................................................................................................. 67

Surface roughness on sawing frozen wood and non-frozen wood using band saw
   Jianguo Yu, Chiaki Tanaka, Ting Ling Kai, Guoxi Zhu, Ma Yan ....................................................... 77

The effectiveness of the band saw equipped with strain guides
   V. Goglia ................................................................................................................................................ 81

Band Saws and Frame Saws: Posters

The proper static frequencies of saw blades of frame sawing machines
   Stefan Barcik, Alena Ockarová, Slavomir Ukropec ........................................................................ 93

Circular Saws
Moderator: Shiro Kimura

Means of testing and designing circular saw blades
   U. V. Minz ............................................................................................................................................ 105

Non-classical critical speed behaviour of guided circular saws
   G. S. Schajer, K. J. Kishimoto ........................................................................................................ 117

Experimental sawing performance results for industrial supercritical speed circular saws
   Peter F. Lister, Stanley G. Hutton, K. John Kishimoto ................................................................ 129
### Circular Saws: Posters

Cutting accuracy and lumber yield improvement of timbers: Circular saw case  
**P. Chabrier, J.-M. Rivat, Pr P. Martin** .......................................................... 151

Air flow around the rotating circular saw blade  
**H. Ikegiwa, T. Matsui, Y. Fujii, S. Okumura** .................................................. 161

Free programmable machine for straightening and tensioning circular saw blades  
**U. V. Müinz** ................................................................................................. 173

### Sawing Vibrational Stability

**Moderator: Stan Hutton**

Elastic stability and vibration of circular saws in a unitary approach based on a semi-analytical finite element  
**G. Gogii** ........................................................................................................ 181

Effects of workpiece thickness and its position from the ground on self-excited vibration and washboarding during sawing  
**R. Okai, S. Kimura, H. Yokochi** ................................................................. 193

The kinematics of washboarding of bandsaws and circular saws  
**Bruce F. Lehmann, Stanley G. Hutton** ..................................................... 205

Analysis of instabilities in wood cutting  
**Jifang Tian, Stanley G. Hutton** ................................................................. 217

### Sawing Vibrational Stabilty: Posters

Universal speed of rotation of heating circular saw  
**S. V. Ershov** ................................................................................................ 233

The dynamics of circular saw blades with big diameter  
**Y. M. Stakhiev** .......................................................................................... 241

### Monitoring and Controlling the Cutting Process

**Moderator: Rolf Birkeland**

Application of the surface method for vibration analysis to CNC-routers  
**Uwe Heisel, Harald Krondorfer** ...................................................................... 253

A methodology to experimentally design low noise saws  
**John Rhemrev, Tomas Cano, Jim Turner, Luigi Trinchera** ......................... 265

Presentation of a fully automatic working equipment for hardening circular saws and knives—a new technology  
**H. Huber, H.-G. Bittner** .............................................................................. 277

Opportunities of sensor techniques for inspection of wood materials and its impediments  
**S. Fuchs** ...................................................................................................... 289
Scanning-based intelligent routing strategies for solid wood
Hsi-Yung (Steve) Feng, Ridha Ben Mrad ................................................................. 299

Prediction of distribution of airborne dust in a woodworking chamber—an approach using
eperimental and numerical analyses
Yoshihisa Fujii, Yutaka Sawada, Shogo Okumura, Hiroyuki Ikegiwa, Shigeru Kitayama .................. 311

Monitoring and Controlling the Cutting Process: Posters

The effects of grain orientation on routing surface finish, cutting forces and acoustic emission
Grzegorz Cyra, Chiaki Tanaka ................................................................. 323

Determining grain orientation: An iterative scanning method
A. Jerbi, R. Ben Mrad ................................................................. 333

Forintek's video tooth inspector
Peter Lister, Kam Lau, David Sykes ................................................................. 345

Acoustic emission characteristics in wood sanding: Acoustic emission measurement in disc sanding
Hiroshi Matsumoto, Yasuhide Murase ................................................................. 353

Investigation on influence of tool jointing on cutting force and moulded surface
Stanislaw Miklaszewski, Marcin Zbiec ................................................................. 363

Economical estimation of band saw maintenance
K. Murata, K. Fujiwara, Y. Ikami, K. Nishimura, M. Ebihara ................................................................. 365

Pattern recognition of the cutting sound of circular saws and its application to the in-situ diagnosis
of cutting conditions: Optimization of pattern vectors using the FE-method
Yutaka Sawada, Yoshihisa Fujii, Shogo Okumura ................................................................. 377

On the evaluation of reliability of wood-cutting saws
Vladimir Soloviev ................................................................. 387

The mathematical simulate research of small log ripped by slasher saw
Ma Yan, Jianguo Yu, Guoxi Zhu, Chiaki Tanaka ................................................................. 393

Wood Cutting Mechanics: Part 1
Moderator: Norman Franz

Milling with small cutting angles: A new principle of operation for wood working
Uwe Heisel ................................................................. 399

Rotary cutting simulation of heterogeneous wood: Application to Douglas fir peeling
Frédéric Mothe, Bernard Thibaut, Rémy Marchal, Martino Negri ................................................................. 411

Tooth action leading to excessive sawing deviations
W. M. McKenzie ................................................................. 429

The stability of periodic orthogonal cutting process as the consequence of the manner of excitation
B. Bucar, D. Gornik Bucar ................................................................. 445