

ISAAT 2003
6th International Symposium
on
Advances in Abrasive Technology

18 - 20 November 2003

Wills Hall Conference Centre

University of Bristol

Bristol, UK

CONFERENCE PROGRAMME



View of the University of Bristol, situated in the heart of the City of Bristol

Organized and Sponsored by



International Committee for Abrasive Technology



Japan Society for Abrasive Technology



Institute of Grinding Technology, University of Bristol



Cranfield University



Liverpool John Moores University

ISAAT 2003

6th International Symposium on Advances in Abrasive Technology

The International Symposium on Advances in Abrasive Technology is an annual event open to researchers across the world from both Universities and industry. The series originated in Japan in the 1990's. The 2003 event is the 6th in the series and is the first to be held in Europe. 97 presentations across two and a half days are planned, plus 2 keynote papers.

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ISAAT2003 programme

17. Nov

17. Nov		
17:00	Early Registration	Will's Memorial Building
18:00	Reception	Will's Memorial Building
21:30	Registration & Reception end	

18. Nov

18. Nov			Will's Hall	Will's Hall
			Room A	Room B
08:00	Late registration			
09:00	Opening Ceremony			
09:20	Keynote Speech		High Speed Grinding with CBN Dr. M. Ota, Nissan	
09:40			Grinding Mechanics 1	Cooling and Coolant 1
10:00	Sessions 1,2		Energy Limitations in HEDG and Conventional Grinding M.N. Morgan, W.B. Rowe and A. Batako	Effects of the Megasonic Floating Nozzle on Grinding Performance for Hard Materials K. Suzuki, Y. Tanaka, M. Iwai, T. Uematsu and K. Tanaka
10:20			Performance of the Speed-Stroke and Creep-Feed Grinding under Constant Removal Rate A. Yui, S. Okuyama and T. Kitajima	Analysis of Mist Flow in MQL Cutting Y. Kamata, T. Obikawa and J. Shinozuka
10:40			A Study of the Crankshaft Pin Grinding Forces A. Walsh, B. Baliga and P. Hodgson	Effect of the Floating Nozzle in Grinding of Mild Steels with Vitrified CBN Wheel S. Ninomiya, M. Iwai, T. Uematsu, K. Suzuki and R. Mukai
11:00	Coffee Break			
			Precision and Surface Quality 1	Novel Abrasive Techniques 1
11:20	Sessions 3,4		Theoretical Study on the Effect of Form Error of Grinding Wheel Surfaces under Free Form Grinding S. Okuyama, T. Kitajima and A. Yui	Improvement of Corrosion Resistance and Mechanical Properties of the Biomaterial Ti-6Al-4V Alloy by ELID Grinding M. Mizutani, J. Komotori, K. Katahira, Y. Watanabe and H. Ohmori
11:40			Reduction of Lobing in Centreless Grinding via Variation of Set-up Angles A.J.L. Harrison and T.R.A. Pearce	Micro-Polishing of Complex and Flat Parts using a Chemical Oil Based ER Fluid J.J. Lee, E.S. Lee, S.K. Min, Y.H. Kim and K.H. Hwang
12:00			Ultraprecision Abrasive Machining of Fibre Optic Connectors H. Huang, L. Yin, W.K. Chen and Z. Xiong	Development of the Electricity Rust Preventive Machining Method in Surface Grinding S. Tsukamoto, N. Nishikawa, K. Okamoto and K. Ohashi
12:20			Influence of Different Grinding Processes on Surface and Subsurface Characteristics of Carbide Tools B. Denkena and C. Spengler	A Study on the Helical Scan Groove Grinding M. Iwai, T. Uematsu, L. Lin, A. Sharma and K. Suzuki
12:40			High Efficiency Deep Grinding and the Effect on Surface Integrity P. Comley, D.J. Stephenson and J. Corbett	Smoothing CVD Diamond Films by Wire EDM with High Traveling Speed Z.N. Guo, Z.G. Huang and C.Y. Wang
13:00	Lunch			

		Grinding Wheels 1	Novel Abrasive Techniques 2
14:00	Sessions 5,6	Evaluation of Factors Controlling CBN Abrasive Selection for Vitrified Bonded Wheels M. Hitchiner and S. McSpadden	A Study on the Magnetic Field Assisted Machining Process for Internal Finishing using a Magnetic Machining Jig Y. Zou and T. Shinmura
14:20		Ultra-High Speed Cylindrical Grinding Using CBN Wheel for High Efficiency T. Nakayama, M. Wakuda and M. Ota	Determination of an Optimum Geometrical Arrangement of Workpiece in the Ultrasonic Elliptic-Vibration Shoe Centerless Grinding Y. Wu, Y. Fan, M. Kato, T. Tachibana, K. Syoji and T. Kuriyagawa
14:40		A Study on the CBN Grit Damage of a Newly Developed CBN Cup Quill in Face Grinding Q.S. Yan and Z.Q. Zhang	Magnetorheological Finishing of Glass Ceramic F.H. Zhang, G.W. Kang, Z.J. Qiu and S. Dong
15:00		A Standard Grinding Wheel Assessment Method to Support a Sophisticated Grinding Knowledge Based System P. Shore, O. Billing and V. Puhasmagi	Magnetic Field Characteristics of the Flat Type Electro-Magnetic Barrel Finishing Machine O. Sugiura
15:20		A Study on the Contact Stiffness of Grinding Wheels T. Yamada, H.S. Lee and H. Matsushita	Techniques for Enhancing the Cutting Performance of Abrasive Waterjets J. Wang
15:40		Characterization of Vitreous Bonded Grinding Wheels for CNC Crushing B. Denkena, J.C. Becker and F. Catoni	A Study on the Abrasive Water Jet Cutting for Granite Y. Liu and X. Chen
16:00	Tea		
		Grinding Mechanics 2	Polishing 1
16:20	Sessions 7,8	A Novel FEA Model for the Integral Analysis of a Machine Tool and Machining Processes D. Huo, K. Cheng, D. Webb and F. Wardle	Pad Surface Characterization and its Effect on the Tribological State in Chemical Mechanical Polishing H. Kim, H. Jeong, E. Lee and Y. Shin
16:40		Influence of the Static Stiffness of Grinding System on the Generation of Affected Layers S. Yokoyama, H.S. Lee and T. Yamada	Chemical and Mechanical Characterizations of the Passivation Layer of Copper in Organic Acid Based Slurries and its CMP Performance D.H. Eom, J.S. Ryu, J.G. Park, J.J. Myung and K.S. Kim
17:00		Geometric Models of the Ultra-Precision Grinding for Large Non-Axisymmetric Optical Aspheric Surfaces C.S. Han, S. Dong and Y.Y. Tang	Effect of Pre-Thin-Surface Grinding on Copper Chemical Mechanical Polishing J. Watanabe, T. Hisamatsu and M. Hirano
17:20		Analysis of the Cam Grinding Mechanism with a CNC Cam Grinder T. Fujiwara and S. Tsukamoto	Improvement of Simulation Accuracy in Precision CMP with Oscillation Speed Control K. Yoshitomi, A. Une and M. Mochida
17:40		Chip Formation Behaviour in Ultra-Precision Cutting of Electroless Nickel Plated Mold Substrates J. Yan, T. Sasaki, J. Tamaki, A. Kubo and T. Sugino	A 3D Numerical Study of the Polishing Behavior during an Oxide Chemical Mechanical Planarization Process D.H. Lee, D.J. Kwon, Y.K. Hong and J.G. Park
19:30	Banquet	S.S.Great Britain	

19. Nov

19. Nov		Will's Hall	Will's Hall
		Room A	Room B
09:00	ICAT assembly		
09:20	Keynote Speech	Polishing Processes on High Precision Optical Surfaces Dr. D. Walker, UCL	
09:40		Brittle Materials 1	Novel Machining Techniques 1
10:00	Sessions 9,10	Effect of Cutting-Edge Shape on Ductile Regime Grinding of Optical Glass in Single-Grit Diamond Grinding J. Tamaki, T. Mahmoud, J. Yan, G. Sato and T. Iyama	A Study to Use the Electrically Conductive CVD Diamond as Electrodes in Electrical Discharge Machining K. Suzuki, M. Iwai, A. Sharma, T. Uematsu and M. Kunieda
10:20		Single Grit Diamond Grinding of Spectrosil 2000 Glass on Tetraform Q.L. Zhao, D. Stephenson, J. Corbett, J. Hedge, J.H. Wang and Y.C. Liang	Plastic Bending of the Magnesium Alloy Plate by a Laser Forming Process K. Okuda, S. Shimoyama and M. Nunobiki
10:40		Axisymmetric Aspherical Form Generation for Large Diameter Optical Components L. Zhou, J. Shimizu and H. Eda	Characteristics of the Fine Grained CVD Diamond Film and its Industrial Applications K. Kazahaya, A. Yamakawa and T. Fukunisi
11:00	Coffee Break		
		Precision and Surface Quality 2	Truing and Dressing
11:20	Sessions 11,12	Fabrication of Off-Axis Aspherical Mirrors with Loose Abrasive Point-Contact Machining H. Cheng, Z. Feng and Y. Wu	Potential of the Electro Contact Discharge Dressing Method in Truing and Sharpening Super Abrasive Grinding Wheels B. Denkena, J.C. Becker and M. van der Meer
11:40		A Precision Grinding Technique for Radome Inner Surfaces Z.Y. Jia, T. Ji, D.M. Guo and G.H. Bian	A Study on Laser Cleaning of Al₂O₃ Grinding Wheels X. Chen, Z. Feng and I. Pashby
12:00		Factors Influencing the Surface Quality during Ultra-Precision Grinding of Brittle Materials in Ductile Mode M.J. Chen, D. Li, S. Dong and F.H. Zhang	A Study of the Characteristics of the Diamond Dresser in the CMP Process Y.S. Liao, P.W. Hong and C.T. Yang
12:20		A Novel Profilometer for Nanometric Form Assessment for Large Machined Surfaces H. Yang, S. Kim and D. Walker	A Study on the Dressing Rate in CMP Pad Conditioning P.L. Tso and S.Y. Ho
12:40		A Novel Form Error Compensation Technique for Tungsten Carbide Mould Insert Machining Utilizing Parallel Grinding Technology W.K. Chen, T. Kuriyagawa, H. Huang, H. Ono, M. Saeki and K. Syoji	Comparison of Laser Cleaning of Al₂O₃ and CBN Grinding Wheels X. Chen, Z. Feng and I. Pashby
13:00	Lunch		

		Brittle Materials 2	Grinding Mechanics 3
14:00	Sessions 13,14	Ductile Regime Machining of Single-Crystal CaF₂ for Aspherical Lenses J. Yan, J. Tamaki, K. Syoji and T. Kuriyagawa	A Study of the Molecular Dynamics Simulation in Nanometric Grinding R.K. Kang, X.G. Guo, D.M. Guo and Z.J. Jin
14:20		Fundamental Characteristics of a Freezing Chuck System for Brittle Material Machining K. Kitajima, T. Fuji, N. Kawashima, M. Kumazawa and I. Ishihara	Abrasive Nanometric Machining: Modelling, Simulation and its Application Promise X. Luo and K. Cheng
14:40		A Study of the ELID Grinding for Nano Ceramics F.H. Zhang, Y.Z. Liu, J.C. Gui and H.J. Wang	Molecular Dynamics Analysis of Ultra High-Acceleration and Vibration Cutting J. Shimizu, H. Tanaka, L. Zhou and H. Eda
15:00		Development of Ultra Thin Quartz by Abrasive Machining M. Touge, J. Watanabe, Y. Ohbuchi, H. Sakamoto and N. Ueda	A Controlled Atmosphere Cutting Apparatus for Understanding Tribological Behavior of Lubricants in Near-Dry Machining K. Hayashi, I. Inasaki, T. Wakabayashi, S. Suda, S. Suzuki, H. Yokota, T. Aoyama and M. Nakamura
15:20		Platen Belt Grinding of Brittle Materials C.Y. Wang, Y.H. Sun, Z. Qin and L. Zhou	Measurement and Analysis of AFM-Based Nano-Indentation on Micro-Machined Silicon Surface Q.L. Zhao, M.J. Chen, Y.C. Liang, S. Dong and K. Cheng
15:40		A Study on Constant-Pressure Grinding with EPD Pellets Y. Yamamoto, H. Maeda, H. Shibutani, H. Suzuki and O. Horiuchi	Brittle-Ductile Transition in Nano Bending of Monocrystalline Silicon Carbide Analyzed by Molecular Dynamics Simulation H. Tanaka, M. Sano and S. Shimada
16:00	Tea		
		Micro Machining	Polishing 2
16:20	Sessions 15,16	Fabrication of High-Quality Surfaces on Micro Tools by the ELID Grinding Technique K. Katahira, H. Ohmori, Y. Uehara, Y. Watanabe, W. Lin, J. Komotori and M. Mizutani	A Study of an Ultra-Precision CNC Polishing System S.J. Han, J.K. Choi, S.W. Lee and H.Z. Choi
16:40		Abrasive Micromachining with a Multi-Axes Vibration Tool N. Moronuki, F. Yoshida, Y. Sato and A. Kaneko	Pressure-Based Grinding and Polishing of Free-Form Lenses with Spherical Tools Y. Zhang, Z.J. Feng, H.Y. Tam and Y.B. Wu
17:00		A Study of the Micro Pole Structure Fabrication and Application Technology by Micro End-Milling Process T. Je, J. Lee, D. Choi, E. Lee, B. Shin and K. Whang	A Study on the Manufacture of the Next Generation CMP Pad with a Uniform Shape using the Micro-Molding Method J. Choi, H. Kim, J. Park, S. Chung, H. Jeong and M. Kinoshita
17:20		A Study on the Micro Machining of Si Wafer using Surface Chemical Reaction J.M. Park and H.D. Jeong	A New Process for Internal Polishing of Cemented Carbide Using a Vibrating Tool with Two-Dimensional Small Motions C. Yamamoto, I. Nakada, T. Kuboi and T. Shinmura
17:40		An Investigation on the 3D Micromachining Techniques based on a SPM Y.D. Yan, T. Sun, S. Dong, Y.C. Liang and K. Cheng	Prediction of Material Removal in Polishing Free-Form Surfaces with Fixed Abrasives L. Zhang and H.Y. Tam

20. Nov

20. Nov		Will's Hall	
		Room A	Room B
		Precision and Surface Quality 3	Grinding Wheels 2
09:00	Sessions 17,18	A Displacement-Frequency Modulator Based System for Composite Grinding Control Y. Gao, S. Tse and K. Chiu	Development of a Grinding Wheel with Electrically Conductive Diamond Cutting Edges K. Suzuki, M. Iwai, T. Uematsu and A. Sharma
09:20		A Practical Method for Improving the Pointing Accuracy of the Antenna-Radome System D.M. Guo, M.J. Liu and R.K. Kang	Performance and Wear Behaviour of Diamond Fibre Grinding Wheels when Grinding Glass P. Comley, N.P. Smith, T.R.A. Pearce, D.J. Smith and M.N.R. Ashfold
09:40		Finishing Characteristics and Residual Stress on Workpiece Surface in Dry Barrel Finishing K. Kitajima, A. Yamamoto and M. Sasai	Development and Application of Porous Vitrified-Bonded Wheel with Ultra-Fine Diamond Abrasives T. Tanaka, S. Esaki, K. Nishida, T. Nakajima and K. Ueno
10:00		Experimental Investigation of the Machined Surface Waviness, Vibrations and Cutting Forces in Peripheral Milling X.W. Liu, K. Cheng, D. Webb, X.Q. Jiang, S.J. Xiao, A.P. Longstaff, M.H. Widiyanto, L. Blunt and D. Ford	Estimation of Tribological Characteristics of Electrolyzed Oxide Layers on ELID-Grinding Wheel Surfaces T. Kato, N. Itoh, H. Ohmori, K. Katahira, W. Lin and K. Hokkirigawa
10:20		Analysis of a Surface Encoder in Wave Optics Y. Watanabe, W. Gao, H. Shimizu and S. Kiyono	High-Efficiency Cutting of Granite Blocks with Multi-Blade Diamond Saws X.P. Xu and H. Huang
10:40		An Ultra-Low Frequency Parallel Connection Nonlinear Isolator for Precision Instruments J.Z. Zhang, D. Li, M.J. Chen and S. Dong	Hard Fine Machining of Gears through Continuous Generating Grinding B. Denkena, J.C. Becker and F. Catoni
11:00		Coffee Break	
		Novel Machining Techniques 2	Cooling and Coolant 2
11:20	Sessions 19,20	Development of Cutting Tools with Built-in Thin Film Thermocouples J. Shinozuka and T. Obikawa	Effect of a Small Gap Nozzle Facing to Grinding Wheel in Slit Grinding S. Ninomiya, K. Suzuki, T. Uematsu, M. Iwai and K. Tanaka
11:40		High Speed Drilling and Tapping using the Technique of Spindle through MQL Supply Y. Saikawa, T. Ichikawa, T. Aoyama and T. Takada	Modelling of the Useful Flowrate in Grinding Based on Spindle Power V.K. Gviniashvili, M.N. Morgan, N.H. Woolley and W.B. Rowe
12:00		Cutting Accuracy of the Small Radius Ball Endmill in Deep Precision Machining T. Akamatsu, K. Kitajima and A. Ueda	Application of Air Cooling Technology and Minimum Quantity Lubrication to Relief Grinding of Cutting Tools S. Inoue and T. Aoyama
12:20		Tap Cutting Performance Improvement by Granular Abrasive Grain Polishing Y. Fukui and K. Yamakawa	Performance of a Floating Nozzle for Grinding of Glass Edges for Flat Panel Display M. Iwai, S. Ninomiya, T. Uematsu and K. Suzuki
12:40		A Study of the Chip Formation and Chip Removal in Dry Drilling of Aluminum Cast Alloy M. Liu, J. Takagi and K. Yanagida	
13:00	Lunch		
14:00	Excursion 1	Saint-Gobain Abrasives	
18:00			

21. Nov

21. Nov			
	08:00	Excursion 2,3	Cotswolds
	18:00		Cranfield Univ.