

# Vol. 10, Special Issue August 2010

# Journal of JSEM

The Japanese Society for Experimental Mechanics

Preface

M. SAKAMOTO, G. MATSUI, T. YOKOYAMA, M. IGUCHI and K. MORI

## — Contents —

**Selected Papers of the 4th ISEM'09-Niigata, 2009**

*Fluid and Thermal Engineering*

Occurrence Process of Jet-Induced Rotary Sloshing in a Cylindrical Container	1
Yoshiaki UEDA, Daisuke IGUCHI, Toshio ISHII and Manabu IGUCHI	
Relationship between Internal Flow and Fan Noise of Cross Flow Fan	7
Kazuyoshi NISHIHARA, Yusuke NAKAHATA, Charles W. KNISELY and Manabu IGUCHI	
Effects of Inner Nozzle Diameter and Hole Diameter on the Frequency of Bubble Formation from a Multi-hole Nozzle	13
Hiroyuki OYABU, Akira HIRATSUKA, Ryoji TSUJINO and Manabu IGUCHI	
Effect of Initial Acceleration History on Transition to Turbulence in Pipe Flow	20
Kazuyoshi NISHIHARA, Yusuke NAKAHATA, Yoshiaki UEDA, Charles W. KNISELY, Yasushi SASAKI and Manabu IGUCHI	
Behavior of a Droplet on an Inclined Plate under Various Wettability Conditions	26
Yusuke SAKAI, Yoshiaki UEDA, Toshio ISHII and Manabu IGUCHI	
Flow Patterns of Gas-Liquid Two-phase Flow through an Abrupt Expansion in Millimeter-Scale Rectangular Channel	32
Takashi OKE, Takehiko KUMAGAI and Manabu IGUCHI	
The Dynamic Behavior of Liquid Droplets on Vibrating Plate	38
Seiichi SUDO, Ayaka GOTO, Hiroki KUWANO, Yuichiro HAMATE, Tetsuya YANO and Kyohei HOSHIKA	
Water Model Experiments on Mechanical Agitation for Hot Metal Pretreatment Process	46
Shingo SATO, Tatsuya OHMI and Manabu IGUCHI	
Wettability Effect on a Single Bubble Passing through a Plate Orifice Placed in a Vertical Pipe	52
Sho YOKOYAMA and Manabu IGUCHI	
Effect of Operating Pressure on Freeboard Temperature Distribution in a Pressurized Fluidized Bed Incinerator of Sewage Sludge	58
Takahiro MURAKAMI, Akio KITAJIMA, Yoshizo SUZUKI, Hidekazu NAGASAWA, Takafumi YAMAMOTO, Takami KOSEKI, Hitoshi HIROSE and Seiichiro OKAMOTO	
A Study on Capillary Flow under the Effect of Dynamic Wetting	62
Kenji KATO, Tatsuro WAKIMOTO and Sinichiro NITTA	

Characteristics of Liquid Film Flowing around a Horizontal Circular Cylinder (Film Thickness and Wave Length of Standing Wave).....	67
Kenji KATOH and Tatsuro WAKIMOTO	
Conditional Sampling Stereoscopic PIV Measurement around the Blade of the Vertical Axis Wind Turbine.....	73
Masaaki HONDA, Tsuneo NOGUCHI, Deog-Hee DOH, Masahiro TAKEI and Susumu ISHII	
Measurement of Dielectrophoretic Velocities of Microparticles in a Minichannel.....	79
Kazuki OSHII, Je-Eun CHOI, Hiromichi OBARA and Masahiro TAKEI	
High-speed Visualization of Total Radiation and CARS Measurement of Vibrational/Rotational Temperatures behind Hypervelocity Shock Waves of 5 km/s.....	85
Kotaro SAKURAI, Takashi OSADA, Shota NIINOMI, Masanori OTA and Kazuo MAENO	
Model Experiments on Water Entrainment and Oxygen Transfer of Air Lifting Tower Placed in Bottom of Reservoir.....	90
Akinori NAKATA, Takaya YANOBU, Masataka YAMAGISHI and Yusaku HOSOKI	
Flow and Heat Transfer Control to Improve the Performance of Fin-Tube Type Heat Exchanger by Vortex Generator.....	96
Toshihiko SHAKOUCHI, Keiji HORI, Ichiro SUZAKI, Koichi TSUJIMOTO and Toshitake ANDO	
The Motion of Microbeads in Shear Flow through a Conical Tube.....	102
Takeshi AKINAGA, Masako SUGIHARA-SEKI, Tomoaki ITANO and Junichiro YAMAMOTO	
Bouncing Behavior of Rotating Cylinder on Wall in Water.....	107
Hideaki MONJI and Masato SATO	

## Solid Mechanics

Computing Strain Distributions from Measured Displacements on a Three-dimensional Surface.....	113
Satoru YONEYAMA	
Observation of Cylindrical Surfaces by Laser Microscopy with a Wide Field of View.....	119
Isami NITTA, Rintaro EBUCHI and Hai HUAN	
Stress Analysis Method for a Residual Stress Model.....	125
Toshiki KIHARA	
Nondestructive Inspection of Local Thinning by Infrared Thermography with Stainless Steel Film Heater.....	129
Nagahisa OGASAWARA, Masanori ITO and Norimasa CHIBA	
Cyclic Compressive Load Measurement using Electrodeposited Copper Foil.....	135
Yuichi ONO, Cheng LI and Toru MARUHISA	
Measurement of Delamination Energy of Sputtered SiC Film Coated on Tool Steel Substrate with Conical Precipitates by Micro Edge-indent Method.....	141
Masahiko KATO, Koumei FUJIOKA, Hiroyuki AKEBONO and Atsushi SUGETA	
Orientation Dependence of In-Plane Tensile Properties of Paperboard and Cardboard : Experiments and Theories.....	146
Takashi YOKOYAMA and Kenji NAKAI	
Visualization of Internal Defect of a Pipe using Mechanoluminescent Sensor.....	152
Daisuke ONO, Chao-Nan XU, Chengzhou LI and Nan BU	

Full-Field Unwrapping of Isochromatic Fringe Orders from Photoelastic Fringes Obtained using Plane Polariscop.....	157
Wataru MURATA, Yudai NOMURA and Eisaku UMEZAKI	
Three-dimensional Stress Analysis of a Simply Supported Beam using Digital Holography and Refractive Index Matching.....	163
Yohsuke TANAKA and Shigeru MURATA	
High Strain-rate Compressive Response of Friction Stir Welded AA6061-T6 Joints : Effect of Welding Parameter.....	168
Takashi YOKOYAMA, Kenji NAKAI and Kazuyoshi KATOH	
Determination of Viscoelastic Models for 2-Piece Golf Ball using Polymeric Split Hopkinson Pressure Bar.....	174
Takayuki TAMAOGI and Yuji SOGABE	
Impact Behavior of CFRP Tubes for Full-lap Collision of Automobiles.....	180
Hyoung-Soo KIM, Yoshio AOKI and Goichi BEN	
Application to Bin-picking of Shape Measurement using Whole-space Tabulation Method with MEMS Scanner Grating Projector.....	186
Daisuke ASAI, Teiji MIYAGI, Motoharu FUJIGAKI and Yoshiharu MORIMOTO	

## *Materials Engineering*

Study on Durability of Fiber-mixed Planting Soils with Wood Chips for Rainfall.....	193
Hiroshi TAKAHASHI, Masato MORI, Satoshi SHIBATA and Takashi NAGANUMA	
Microchanneling and Lining Layer Formation by Spontaneous Infiltration in Fe-Cu System.....	199
Takuhiko KODAMA, Tatsuya OHMI and Manabu IGUCHI	
Fabrication of Porous Transpiration-Cooling Device by Powder-Metallurgical Microchanneling Process.....	205
Masataka OMURA, Tatsuya OHMI, Takehiko KUMAGAI and Manabu IGUCHI	
Formation of Nanoporous Anodic Oxide Films on Ti-Al Microchannel Walls.....	210
Masashi ISHIDA, Tatsuya OHMI, Masatoshi SAKAIRI and Manabu IGUCHI	
Electrochemical Formation and Phase Control of La-Ni Alloy Films in LiCl-KCl Eutectic Melts.....	215
Hirokazu KONISHI, Yukihide YOSHIHARA, Hideki ONO, Tateo USUI, Tetsuo OISHI and Toshiyuki NOHIRA	
Enrichment of Iron and Copper by the Use of Two Liquid Phases Separation.....	221
Katsuhiro YAMAGUCHI, Hideki ONO and Tateo USUI	
Transport of Nitrogen from Molten Iron to the Gas Phase through a CaO-Al <sub>2</sub> O <sub>3</sub> Melt.....	225
Hideki ONO, Takanori SATOH and Tateo USUI	

## *Bioengineering*

Shrinkage Analysis of a Light-Cured Composite Resin in Cavities by X-ray CT Images.....	229
Kazuo ARAKAWA, Taichi FURUKAWA, Yasuyuki MORITA, Masakazu UCHINO and Hirohide KAIDA	
In Vivo Contact Areas of Tibiotalar Joint Measured with Magnetic Resonance Imaging.....	234
Makoto SAKAMOTO, Yosei NODAGUCHI, Yuji TANABE, Keisuke SASAGAWA, Yosuke KUBOTA, Hidenori YOSHIDA and Koichi KOBAYASHI	

A Novel Estimating Method of the Gait State and Velocity Control in the Initial Stance Phase for the Intelligent Ankle Foot Orthosis with Compact MR Fluid Brake (i-AFO).....	240
Takehito KIKUCHI, Sosuke TANIDA, Kikuko OTSUKI, Takashi YASUDA and Junji FURUSHO	
Accuracy Verification of Image-matching in a Setting Method for the Stem during Total Hip Arthroplasty.....	247
Yosuke KUBOTA, Makoto SAKAMOTO, Koichi KOBAYASHI, Yoshio KOGA and Yuji TANABE	
Numerical Analysis of Pressure on Cup Surface after THA.....	251
Shin KAI, Makoto SAKAMOTO, Koichi KOBAYASHI, Izumi MINATO, Yoshio KOGA and Yuji TANABE	
Biomechanical Analysis of Acetabular Defects Reconstruction with Impaction Bone Grafting in Revision Total Hip Arthroplasty.....	256
Yuji TANABE, Tomoyuki YAMAZAWA, Satoshi IIDA, Shunji KISHIDA and Hirotugu OHASHI	
Three-dimensional <i>In Vivo</i> Contact Analysis of the Wrist Joint during Wrist Motion.....	261
Keisuke SASAGAWA, Makoto SAKAMOTO, Hidenori YOSHIDA, Koichi KOBAYASHI and Yuji TANABE	