

# Advanced Experimental Mechanics

Volume 5, August 2020

## — Contents —

### **Editorial**

Editorial·····	1
	Takashi YOKOYAMA

### **Review Paper**

Advanced Impact and Vibration Insulation Based on High Pressure Technology·····	3
	Marko BEK, Alexandra AULOVA, Alen OSELI, Bernd von BERNSTORFF and Igor EMRI

### **Fluid and Thermal Engineering**

PIV Measurement of Turbulent Separated Flow Using Microbubbles as Tracer·····	25
	Shuya YOSHIOKA
Optimization of Orifice Shape and Oscillatory Displacement of an Ultrasonic Microbubble Generator to Increase Microbubble Yield·····	31
	Hokuto KATAOKA, Ryo KAMEDA and Toshinori MAKUTA
Experimental Study on the Influence of Frequency Ratio on Thrust and Vortex Structure of a Pitching Wing in a Periodic Flow·····	38
	Yoshitaka ISODA, Yohsuke TANAKA and Shigeru MURATA
Investigation of Wind-induced Behavior and Aerodynamic Stability of a Long-span Flat Roof Based on Wind Tunnel Experiment and FSI Simulation with Free-vibration Technique·····	44
	Yuki TAKADATE and Yasushi UEMATSU
Estimation of Pressure Field around a Circular Cylinder Rotating on the Ground·····	51
	Katsuyuki YOKOYAMA, Shigeru MURATA, Yohsuke TANAKA and Hayato YOGOU
Removal of Micrometer-sized Particles on a Solid Wall by High-speed Impinging Air Jet·····	57
	Tatsuro WAKIMOTO, Akihiro TAKAHASHI, Kazuhiko SOEMOTO and Kenji KATOH
Droplet Evaporation of an Azeotropic Mixture on a Superheated Surface·····	63
	Takashi SUZUKI, Akihiko MITSUIISHI and Kenzo KITAMURA
Experimental Investigation of Blade Configuration Developed for Vertical Axis Wind Turbine by Genetic Algorithm·····	69
	Hiroki NINOMIYA and Shuya YOSHIOKA
Effect of an Airfoil Profile on Dynamic Lift Generation with Impulsive Incidence Variation·····	75
	Naoto KATO, Hiroki TAKAYANAGI and Hiroaki HASEGAWA
Sonoluminescence Elemental Analysis using External Transducer in Aqueous Solution·····	80
	Sardini Sayidatun NISA SAILELLAH, Hideharu TAKAHASHI and Hiroshige KIKURA
Bioactive Effects by Air Microbubble Bathing·····	86
	Hiroto NARITA, Hiroaki HASEGAWA and Yutaka MASUDA

Study on Drag Force Acting on Tandem Car Models·····	91
Yuta KUROSAWA, Hideaki MONJI, Syouta SONOKI, Takeshi ASAI and Sungchan HONG	

### ***Solid Mechanics and Materials Engineering***

Fatigue Properties of Quenching and Tempering Steel Using Super Rapid Induction Heating·····	97
Tadao FUKUTA, Yoshihito KUROSHIMA, Manato KANESAKI and Koichi OZAKI	
Evaluation of Torsional Characteristics of 6061-T6 Aluminum Alloy Friction-welded Butt Joints using Digital Image Correlation·····	103
Yuichi ONO, Sho OGAWA and Yuta TACHI	
Development of Joining Method by Cylindrical Pin Using Thermal Expansion of CFRTP·····	110
Yuya KODAIRA, Nobuhiko KOBAYASHI, Naofumi KODAIRA, Atsuko TAKEI and Noboru NAKAYAMA	
Effect of Ultrasonic Needle Punching on Interlaminar Tensile Strength and Mode I Interlaminar Fracture Toughness of Unidirectional CFRTP Laminate·····	116
Iori NISHIHARA, Kiyotaka OBUNAI, Manato KANESAKI, Tadao FUKUTA and Kouichi OZAKI	
Damage Evaluation of Heavily Cracked Concrete by Initial AE Energy Parameter·····	122
Yuma SHIMAMOTO and Tetsuya SUZUKI	
Finite Element Study on Influence of Stent Deployment upon Mechanical Response of Coronary Artery·····	128
Haruna KITAGAWA, Ichiro SHIMIZU, Akira WADA, Tatsuyuki NAKATANI, Xinming ZHAO and Takashi TAMURA	
Computing Stresses from Measured In-plane Strains in Viscoelastic Body under Plane Stress Condition·····	135
Shotaro TAGUCHI, Kyohei TAKEO and Satoru YONEYAMA	
Measurement of Photoelastic Constant of Diamond-like Carbon Film·····	141
Ryosuke SAITO, Keita TANUMA, Kenji GOMI and Yasushi NIITSU	

### ***Materials Science and Processing***

Preparation of Hollow Silica Nanoparticles Using Ultrasonically Generated Microbubbles as a Template·····	147
Takaya KAJIHARA, Shunpei TAZAKI, Tatsuya MAKINO and Toshinori MAKUTA	
Observing the Delamination Interface in Multi Layered Thin Films with a MgAg Alloy Top Layer and Organic Semiconductor under Layers on a Flexible Substrate·····	151
Toshiro KOBAYASHI, Hideaki FURUMOTO, Akinobu YAMAGUCHI, Hideyuki KANEMATSU and Ion Cosmin GRUESCU	
Effects of Mechanical Milling of Raw Powders on Reaction Sequence of Thermite Combustion Synthesis of Tri-Nickel Aluminide·····	157
Tatsuya OHMI and Motohiro IBUKI	

### ***Sound and Vibration***

Theoretical Analysis for Tire Cavity Resonance inside Deformed Stationary Tire·····	163
Hiroshi SUGIYAMA, Yohsuke TANAKA and Shigeru MURATA	

Development of the Broad Band Frequency-tunable Dynamic Absorber Using Magneto-rheological Elastomer for the Noise and Vibration Reduction in Mechanical Systems·····	169
Takumi NAITO and Osamu TERASHIMA	
On the Active Vibration Control of the Vibrating Objective by Means of a PVDF Actuator·····	178
Takumi NAITO and Osamu TERASHIMA	

### ***Technical Note***

Fundamental Study of Sensing Technique Utilizing Magnetic Compound Fluid Rubber Sensor under Radiation Environment·····	185
Ryo IKEDA, Kunio SHIMADA, Hideharu TAKAHASHI and Hiroshige KIKURA	

### ***ISEM News***

Report on the 14th ISEM '19-Tsukuba, Japan·····	191
Hideaki MONJI	

### ***Acknowledgements to Reviewers***