

Abstracts of Papers (2006)

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Tips on Using Vacuum Techniques, Yasuyuki SUZUKI, Seimitsukougakkaishi, Vol.72 No.2 pp.191-194, 2006.

Evaluation of Fracture Surface of 11/4Cr-1/2Mo Steel by Residual Magnetization Induced from Inverse-Magnetostrictive Effect, Hiroichi HASE, Shigeo KOTAKE, Mitsuhiko OHOTA, Hiroshi KAWAKAMI and Yasuyuki SUZUKI; Key Engineering Materials (Engineering Plasticity and its Application from Nanoscale to Microscale), 340-341, pp.549-554, 2006.

A Fingertip Guiding Manipulator for Mental Image Creation of Multi-Stroke Drawings, Yoshihiko Nomura, Yuki Yagi, Tokuhiko Sugiura, Hirokazu Matsui, Norihiko Kato, Microsystem Technologies, Vol. 13, No. 8-10, pp. 905-910, (Apr. 2007), ISSN 0946-7076 (Published Online: Nov. 2006)

Relationships between the Camera Calibration Accuracy and the Imaging Condition, FUJIMOTO Takashi 1 NOMURA Yoshihiko 2 ZHANG Dili, Trans. of JSME PartC,72(706), pp. 1695-1700, 2006

A Fingertip Guiding Manipulator for Mental Image Creation of Multi-Stroke Drawings, Yoshihiko Nomura, Yuki Yagi, Tokuhiko Sugiura, Hirokazu Matsui, Norihiko Kato, CD-ROM Proc. of ASME/JSME Joint Conference on Micromechatronics for Information and Precision Equipment (MIPE 2006), 2006

Fingertip Guiding Manipulator: Haptic Graphic Display for Mental Image Creation, Yoshihiko Nomura, Yuki Yagi, Tokuhiko Sugiura, Hirokazu Matsui, and Norihiko Kato, Proc. of 9th Annual International Conference ICCHP 2006 (Computers Helping People with Special Needs) 2006

High-quality and small-capacity e-learning video featuring lecturer-superimposing PC screen images, Yoshihiko Nomura, Michinobu Murakamia, Ryota Sakamoto, Tokuhiko Sugiura, Hirokazu Matsui, and Norihiko Kato, Proc. of SPIE Conference on Intelligent Robots and Computer Vision XXIV: Algorithms, Techniques, and Active Vision 2006 "High-Quality and Small-Capacity Lecture-Video-File Creating System for Chalk-and-Talk Based Lecture," Ryota Sakamoto, Yoshihiko Nomura, Norihiko Kato, Proc. of E-Learn 2006

A formulation of camera parameter calibration error due to reference point setup error, Takashi Fujimoto, Yoshihiko Nomura, Proc. of Asia International Symposium on Mechatronics (AISM) 2006

Automatic control of a monitoring camera for remote manipulator operation”, Masahiko Niwa, Naoaki Tsuda, Norihiko Kato, Yoshihiko Nomura and Hirokazu Matsui, Proc. of the 15th IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN06), pp.151-156, 2006

An ergonomic study on multi screen type VDT work, Shin SAITO*, Norikazu OHNISHI*, Zojiro KATOH*, Masaru MIYAO*, Kaoru ITO*, Ryojun IKEURA and Kazuki MIZUTANI, Journal of Society for Occupational Safety, Health and Ergonomics, 7, 1, pp.17-22, 2006.

The aim of this study was to evaluate the characteristics of multi screen type visual display terminals (VDT) work by the analyses of work performance and subjective assessment. The comparative study, multi screen and single screen type VDT workstation, was carried out to get some ergonomic data which would be applicable to the guidelines and recommendation for VDT operations using multi screens. Seventy healthy persons, 32 males and 38 females, whose ages ranged from 18 to 47 years (average age: 23.4) were selected as subjects. They performed data search and entry task for 5 minutes using both word processing and spread sheet software in each workstation. The work efficiency and the subjective assessment of multi screens were significantly superior in comparison with a single screen. The reason why a multi screen type workstation was evaluated highly is that visibility and operability are better than with a single screen. The characteristic of multi screen type VDT work is operation method and increased efficiency by dividing software into two screens. It is necessary to examine workload, sense of incongruity and skill of operation, and other possible problems before spreading widely to many work places.

Impedance control for an industrial power assist device considering contact operations, Hiroyuki KATO, Ryojun IKEURA, Shinpei NOGUCHI, Kazuki MIZUTANI, Hisashi NAKAMURA* and Tomohiro HONDA*, Transactions of the Japan Society of Mechanical Engineers, 72, 714, pp.214-221, 2006.

This paper describes a control method for a power assist device used in factories. An adaptive control scheme is employed to control the power assist device and to estimate its dynamic parameters. Using the adaptive control, the maneuverability of the system is good in free space but it is very dangerous in the task of which an object supported by system contacts on a floor or a wall. Therefore, we propose an improved system controlled by an adaptive control in which the local control method changes to a feedback or a feed forward control in the contact condition. The improved system detects collisions based on the difference between the actual input torque to the power assist device and reference input torque, which is calculated based on the estimated parameters of the manipulator dynamics. Then, the effectiveness of the system is shown.

Ergonomic evaluation of multi display type VDT, Shin Saito, Takahiro NAKATSUKASA, Ryojun IKEURA and Kazuki MIZUTANI, The 9th Korea-Japan Joint Symposium on Ergonomics Osaka, pp.524-525, 2006.

The aim of this study was to evaluate working conditions using multi display VDTs in terms of work performance, head movement and EMG activities of the neck. A comparative study using single, multi and large display type VDT workstations, was undertaken to obtain ergonomic data applicable to the guidelines and recommendation for VDT operations using multi displays. Subjects comprised 10 healthy volunteers

who performed data search and entry tasks for 5 min on each workstation. Work efficiency of the single display was inferior compared to multi and large displays. Head movement was greater with multi and large displays than with a single display. EMG activities did not differ significantly between multi and large displays. The characteristics of a multi display type VDT work is increased efficiency by dividing software into 2 displays. Workload, sense of incongruity, skills required for operation and other possible problems must be examined before spreading this approach becomes widespread in workplaces.

A rating method for the vehicle steering based on the impedance of human arms , Ryojun IKEURA, Hiroyuki HOSHINO, Daisuke YOKOI, Yoji KANEHARA*, Mitsuhiro HOSHINO* and Kazuki MIZUTANI, Transactions of Society of Automotive Engineers of Japan, 37, 4, pp.33-38, 2006.

The relationship between the stiffness of human arms and the subjective evaluation in the operation of a steering wheel is investigated. First, the estimation and its normalization method of the arm stiffness is proposed for avoiding the difference among individuals. Next, the experiments using the steering control device are conducted to obtain the arm stiffness and the subjective rating under the several conditions. Finally, it is verified that the value of the normalized arm stiffness correlates strongly to the subjective evaluation.

Allocation of Three Control Forces to Four Actuators for 3-DOF Hybrid Vibration Isolation System, Kazuki MIZUTANI, Keisuke ITO and Ryojun IKEURA, Proceedings of the 13th International Congress on Sound and Vibration, pp.CDROM, RS-03_509, 1-8, 2006.

This paper treats a hybrid type vibration isolation system for 3-DOF vibrations, that is, bouncing, pitching and rolling vibrations. The hybrid type system is composed of passive spring-damper system and active system with electromagnetic actuators. The controller for the vibration isolation system derives one control force for bounce and two control moments for pitch and roll in regard to the center of gravity. Usually, an actuator to supply vibration control force is set in each supporting part at the four corners of the loading platform. The allocation of three control outputs to four actuators is not unique because of redundancy. In this paper, the allocation of the control output is discussed in detail.

Optimal Vibration Control for Overhung Rotor System Using Actively Flexible Pedestal, Kazuki MIZUTANI, Yukinobu NISHIYAMA*, Kazuhiro IIDA* and Ryojun IKEURA, Proceedings of the ACTIVE 2006, pp.CDROM, No.26, 1-11, 2006.

This paper describes an active vibration control to effectively reduce the unbalanced vibration of an overhung rotor system. A flexible bearing pedestal supporting the overhung rotor is installed in four pairs of U-shaped electromagnets as a control device. The electromagnets give a flexible pedestal the control force to effectively reduce unbalanced vibrations of the overhung rotor indirectly. The optimal regulator theory is applied to decide the control gain suppressing the vibrations of the overhung rotor. Frequency response curves are simulated numerically, and the optimal feedback gains to give the effective vibration suppression performance are provided. For practical use, the simplification of the rotor model for controller design and the application of the Kalman filter are also examined. The numerical results are compared with experimental ones for the overhung rotor system with the vibration control device, and both results show

the similar tendency in our study.

Characteristic of 2 DOF cooperation task by two humans, Shahrman Bin Abu Bakar, Yuichiro HANDA, Ryojun IKEURA and Kazuki MIZUTANI, Proceedings of SICE-ICASE Internation Joint Conference 2006, pp.296-301, 2006.

In this research, we propose to analyze the characteristic of human-to-human cooperation in vertical motion. The experiment subject is divided into master and slave category where the slave is required to close their eyes during the experiment. Experiment devices are equipped with 3D position sensors and Force sensors to measure the position, angle and force value. By differentiating those values, speed, angular velocity and torque value are known. This research is concentrating the special characteristic that occurs to the slave side during human-to-human cooperative work where the weight, distance and speed are varied.

Development of 6-Axis Material Tester for Measuring Mechanical Spine Properties, M. Fujiwara*, T. Masuda*, T. Inaba, T. Katoh, Y. Kasai, S. Ito*: Journal of Robotics and Mechatronics, Vol.18, No.2, pp.160-165, 2006.

Because mechanical spine properties having multiple degrees of freedom (DOF) are generally difficult to measure, we developed a parallel 6-axis material tester with hybrid position/force control. We give examples of 6-axis testing and results of material tests using polyurethane rubber and animal spines.

Quantitative Evaluation of Left Ventricular Wall Motion in Patient with Coronary Artery Bypass Grafting Using Magnetic Resonance Tagging Technique, T. Inaba, T. Nakano, M. Tsutsumi, S. Kawasaki*, Y. Kinoshita*, M. Tokuda: JSME International Journal, Series A, Vol.49, No.4, pp.597-603, 2006.

Left ventricular wall motions during systole were investigated from a mechanical perspective by using a magnetic resonance tagging technique. Subjects were 7 patients with coronary artery bypass grafting (CABG). First, by analyzing strain in the left ventricular wall, cardiac contractility was evaluated in the patients with CABG. Next, by calculating displacement in the myocardial wall, paradoxical movements following CABG were quantitatively evaluated. Strain analysis showed local decreases in circumferential strain in 4 of 7 subjects. The results of displacement analysis clarified that following CABG, the degree of radial displacement was small in the septal wall and large in the lateral wall, and circumferential displacement towards the septal wall occurred in the anterior and posterior walls. Since this behavior was seen in both reduced and normal cardiac contractility groups, paradoxical movements in the present patients were not caused by reduced cardiac contractility, but rather by rigid-body motion of the entire heart.

Shape Memory Characteristics of TiNi Casting Alloys Made by Using Self-propagating High-temperature Synthesis, K. Kitamura*, T. Kuchida, T. Inaba, M. Tokuda, Y. Yoshimi*: Materials Science and Engineering A, Vols.438-440, pp.675-678, 2006.

Self-propagating high-temperature synthesis (SHS) is a new method of making an ingot of TiNi. This method shows little gravity segregation. The purpose of this study is to investigate the difference of the shape memory characteristics of the TiNi casting alloys made from a SHS ingot and from a conventional melt cast ingot. The samples used in this study were rods made by centrifugal casting. Differential scanning calorimetry (DSC), X-ray diffraction, and tensile test were used to examine the shape memory characteristics on the samples. The heat treatment conditions were 773 K–1.8 ks and 1073 K–3.6 ks, respectively. The DSC samples were both ends (the top and bottom area) of the rod samples. The results

of the XRD measurements showed that TiNi phase was obtained in all the samples. In contrast, the result of the DSC test showed that more gravity segregation effect happened in the melt cast sample than in the SHS sample. As the conclusion of this study, gravity segregation had little effect in the SHS ingot sample.

Superelastic Property of Ti-Ni Alloy Produced by Casting After SHS, K. Kitamura*, T. Kuchida, T. Inaba, M. Tokuda, Y. Yoshimi*: *Materials Transactions*, Vol.47, No.11, pp.2867-2870, 2006.

The superelastic properties of cast Ti-Ni shape memory alloy (SMA) were studied. Base materials were prepared as a melting method ingot and as a self-propagating high-temperature synthesis (SHS) ingot. The composition of these ingots was Ti-50.8 at%Ni. Each ingot was cast into a rod shape by centrifugal casting. The heat-treatment conditions were 773 K for-1.8 ks and 773 K-1.8 ks → 873 K-3.6 ks. Shape memory characteristics were measured by differential scanning calorimetry (DSC), X-ray diffraction (XRD) and a tensile test. All casting specimens have good shape memory characteristics. According to DSC measurements, the melt method specimens show gravity segregation.

Mechanical Evaluation of Cardiac Function in Heart with Disease by Numerical Simulation, M. Tsutsumi, K. Yanagisawa, T. Inaba, M. Tokuda: *Proceedings of 5th World Congress of Biomechanics*, pp.563-566, 2006.

A numerical simulation system using the three-dimensional finite element method (3D-FEM) is established to reproduce the performance of the left ventricle during one cardiac cycle, which may ultimately provide useful information for medical diagnosis. In this study, the diseased human heart is analyzed by using the proposed numerical simulation system and the numerical results are composed with measurements results.

Bonding Process of Al/Cu bonding with liquefaction after solid state diffusion in air,
Hiroshi Kawakami, Junya Nakajima, Jippe Suzuki
Proc. of 2nd JWS-KWS Joint Symposium of Young Researchers, Preprints of the National Meeting of J. W. S., Vol.79,
pp.140-141(2006)

Effect of Bonding Conditions on Al/Cu Diffusion Liquefaction Bonding, Hiroshi Kawakami, Junya Nakajima, Toshiharu Kawabe, Jippe Suzuki, *Proc. of Sino-Japanese Young Researchers Forum*, pp.1-4(2006)

Fundamental Studies on Remote Laser Cutting for an ALIMS Robot, Muneharu KUTSUNA*, Jippe SUZUKI, Hiroshi KAWAKAMI, *Documents of International Institute of Welding*, No.IE-413-06, pp.1-8, (2006)

Behavior of Mg in Al/Cu Diffusion Liquefaction Bond, Hiroshi Kawakami, Masanori Fujiwara, Junya Nakajima, Toshiharu Kawabe, Jippe Suzuk, *Proc. of The First South-East Asia International Institute of Welding Congress*, pp.232-243(2006)

Bonding for Aluminum in Air using Some Insert Metals, Hiroshi Kawakami, Keiko Kimura, Jippe Suzuki, *Proc. Advance Technology in Welding Work(CD-ROM)*, pp.1-7(2006)

Application of Resistance Heating Technique to Hot Stamping of High-Strength Steel Sheet, Seijiro MAKI, Yuuki TANAKA*, Ken-ichiro MORI*: Journal of the Japan Society for Technology of Plasticity, 47(544), pp.394-398, 2006 (in Japanese)

Improvement of Product Strength and Press Formability of Al-Mg-Si Alloy Sheets by Resistance Heat Treatment and Artificial Aging, Minoru ISHIGURO*, Seijiro MAKI, Ken-ichiro MORI*: Journal of Japan Institute of Light Metals, 56(6), pp.313-316, 2006 (in Japanese)

Thermo-Mechanical Treatment Using Resistance Heating for Production of Fine Grained Heat-Treatable Aluminum Alloy Sheets, S. Maki, M. Ishiguro*, K. Mori*, H. Makino*: J. Mater. Process. Technol., 177, pp.444-447, 2006

Mechanism of Improvement of Formability in Pulsating Bulging Hydroforming of Tubes, Ken-ichiro MORI*, Tomoyoshi MAENO*, Seijiro MAKI: Journal of the Japan Society for Technology of Plasticity, 47(548), pp.835-839, 2006 (in Japanese)

Mushy-State Forging of Aluminum Alloy Using On-Site Resistance Heating, S. Maki, T. Shibata*, H. Shibata*, K. Mori*: Proceedings of the International Conference on Advances in Materials and Processing Technologies, AMPT 2006, Las Vegas, NV, July 30-Aug. 3, CD-ROM, 2006

Improvement of Formability and Shape Accuracy in Pulsating T-Shape Hydroforming of Tube, Ken-ichiro Mori*, Loh-mousavi Mohsen*, Kentaro Hayashi*, Seijiro Maki: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.5-6, 2006 (in Japanese)

Press Quenching Using Resistance Heating of Ultra High Strength Steel Sheet, Seijiro Maki, Atsushi Hamamoto*, Shouichi Saitou*, Ken-ichiro Mori*: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.45-46, 2006 (in Japanese)

Oxidation Preventing in Hot Press Forming of Ultra High Strength Steel Sheet, Makoto Kishimoto*, Syouichi Saitou*, Seijiro Maki, Ken-ichiro Mori*, Tatsushi Hayashi*, Toshihiko Okamura*: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.47-48, 2006 (in Japanese)

Hot Blanking of Ultra High Strength Steel Sheets, Syouichi Saitou*, Makoto Kishimoto*, Seijiro Maki, Ken-ichiro Mori*, Tatsushi Hayashi*, Toshihiko Okamura*: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.49-50, 2006 (in Japanese)

Resistance Heating Characteristics of Tubular Blank for Hot Press Forming of Ultra High Strength Steel Sheets, Seijiro Maki, Makoto Kishimoto*, Naotaka Arisawa*, Ken-ichiro Mori*: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.137-138, 2006 (in Japanese)

Decrease of Surface Cracks in Hot Shear Spinning of Cast Aluminum Alloy Castings, Minoru Ishiguro*, Yuuta Isomura*, Ken-ichiro Mori*, Osamu Ebihara*, Daigo Sugiyama*, Takayuki Nonaka*, Seijiro Maki: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.211-212, 2006 (in Japanese)

Mashy-State Forging of Cast Iron Using Resistance Heating, Kazuhito Suzuki*, Seijiro Maki, Ken-ichiro Mori*: Proceedings of the 2006 Japanese Spring Conference for the Technology of Plasticity, pp.345-346, 2006 (in Japanese)

Semi-Solid Forming of Titanium Alloy Using Resistance Heating, Seijiro Maki, Kazuhito Suzuki*, Ken-ichiro Mori*: Proceedings of the 57th Japanese Joint Conference for the Technology of Plasticity, pp.135-136, 2006 (in Japanese)

Resistance Heating Characteristics in Local Heating Blanking of Ultra High Strength Steel Sheets, Shoichi Saito*, Seijiro Maki, Ken-ichiro Mori*, Kanji Ueno*, Yasuji Hokazono*, Takuya Yamazaki*: Proceedings of the 57th Japanese Joint Conference for the Technology of Plasticity, pp.139-140, 2006 (in Japanese)

Blowing of Aluminum Compact in Dies by Resistance Heating, Minoru Ishiguro*, Seijiro Maki, Ken-ichiro Mori*, Hikaru Nisikawa*: Proceedings of the 57th Japanese Joint Conference for the Technology of Plasticity, pp.241-242, 2006 (in Japanese)

Modelings of Fiber Deformation During Machining Aramid-FRP, Eitoku Nakanishi, Masao Fukumori*, Yutaka SAWAKI*, Kiyoshi Isogimi*: Proceedings of 16th European Conference of Fracture, CD-ROM, 2006

“Wind tunnel study on the velocity profile over roughness hill” Takao MAEDA, Yasunari KAMADA, Nobutoshi NISIO, Keita NAKANO: WIND ENERGY, Vol. 30, No3, pp. 113, pp. 113-1163, 2006.

In this paper, the experimental results of velocity measurements around hill are described for various slopes. Three types of hill model are tested. The model hill has the equivalent roughness of the actual hill's surface. As the results, the flow pattern around hill shape is described. Also, it is shown that the separating point to the hill surface depends on the upstream shape.

“Study on aerodynamic forces of HAWT” Takao MAEDA, Yasunari KAMADA, Hideyasu FUJIOKA, Jun SUZUKI, Masami KAMIBAYASHI: Proceedings of JSME Fluids Engineering Division 84th Annual meeting, No.06-21, CD-ROM, 2006.

The horizontal axis wind turbines are operated under skew inflow condition and it has tilt angle to keep the

distance between tower and blade tip. Therefore, it is important to analyze the forces and moment of rotor with yawed and tilted inflow condition. In this study, the wind turbine was placed with yaw miss alignment or changing the distance between tower and rotor in a wind tunnel. Through measuring the forces and moments of HAWT with six-component detector, the characteristics of rotor performance with yaw and tilt angle condition and influence of tower position are considered.

“Study on Performance Improvement of Micro Wind Turbine with a Combination of Nosecone and Diffuser Casing” Takao MAEDA, Yasunari KAMADA, Kenta ADACHI: Proceedings of RENEWABLE ENERGY 2006, P-W-29, pp. 909-912, CD-ROM, 2006.

This study is related to use wind turbines that installed in urban area. Such area has low annual wind speed with strong turbulence. The purpose of this study is to enlarge the wind turbines output power and to improve the power curve shape with a combination of nosecone and diffuser. In this study, the utilization of diffuser for wind turbines is considered for increasing the avail ability of wind turbine. Otherwise, the nosecone with aerodynamic form was introduced. The nosecone has effect of improving the flow inside diffuser and performance of wind turbine when operating in low tip speed ratio.

“Field Measurement of Unsteady Aerodynamics Load on the Blade of Field Horizontal Axis Wind Turbine” Takao MAEDA, Yasunari KAMADA, Keita NAITO: Proceedings of RENEWABLE ENERGY 2006, P-W-17, pp. 865-868, CD-ROM, 2006.

This paper describes the experimental results of field wind turbine rotor. The experiments are carried out with 10mdiameter of HAWT. The pressure distributions on the rotating blade are measured by the pressure transducers. The blade root moment are measured simultaneously by the strain gauges. The mean wind speed are measured by a sonic anemometer, the local velocity of the test section is measured by 7 holes Pitot tubes. The relation between the aerodynamic forces from pressure distribution and the blade root moment from strain gauges are discussed. The measured moment from strain gauges show the similar fluctuation.

“Wind Tunnel Study on Velocity Profile over Hill” Takao MAEDA, Yasunari KAMADA, Nobutoshi NISHIO: Proceedings of RENEWABLE ENERGY 2006, P-W-17, pp. 861-864, CD-ROM, 2006.

This paper shows the experimental results of the velocity profile over hill in wind tunnel. The experiments are carried out with various two-dimensional hill models that contains of various slope shapes. 3 types of slopes are tested as hill model, and they are divided for model upstream and downstream slopes at the top. In the measurements, the equivalent roughness to the ground is set on the hill surface. The velocity profiles are measured by two-dimensional PIV. As the result, the velocity distribution around hill is shown for various hill shapes and the energy density in the wind is discussed from the viewpoint.

“Experimental studies on the wind turbine airfoils with dynamic state” Takao MAEDA, Yasunari KAMADA, Masayoshi SAITO: Proceedings of JSME Annual meeting 2006 (2) No.06-1, pp. 255-256, 2006.

In generally, the two-dimensional airfoil characteristics in the static state are used for the wind turbine blade

design. However, the wind turbines are operated in the natural wind with continuously changing in both speed and direction. So, the attack angle of the blade element is fluctuating. Specially, in the inboard section attack angle have big amplitude of fluctuation caused by the yaw misalignment. The airfoil characteristics in the dynamic state are important for the inboard section. In this paper, the airfoil characteristics are investigated experimentally by the surface pressure measurement. Also the dynamic characteristics with sinusoidal pitching motion are measured. As the results, it is found that the dynamic characteristics depend on the amplitude of stall angle. Furthermore, at low Reynolds number the stall angle for wind turbine airfoils is depend in both leading edge radius and suction side curvature.

“Experimental Study on unsteady aerodynamics effect on the blade root Load of HAWT field rotor”

Takao MAEDA, Yasunari KAMADA, Kei TANAKA, Keita NAITO, Yuu OUCHI: Proceedings of IEEE ISEM 2006, CD-ROM, 2006.

This paper describes the experimental results of field wind turbine rotor. The experiments are carried out with 10m diameter of HAWT. The pressure distributions on the rotating blade are measured by the pressure transducers. The blade root moment are measured simultaneously by the strain gauges. The mean wind speed are measured by a sonic anemometer, the local velocity of the test section is measured by 7 holes Pitot tubes. The relation between the aerodynamic forces from pressure distribution and the blade root moment from strain gauges are discussed. The aerodynamic force shows the fluctuation by the local wind speed and direction change. The measured moment from strain gauges show the similar fluctuation. That includes the short period vibration of the blade natural frequency.

“Studies on small scale generation plant by woody biomass gasification (Operation by upper type)”

Yasunari KAMADA, Takao MAEDA, Norio WATANABE: The 11th National Symposium on Power and Energy Systems, No, 06-8, pp. 81-82, 2006.

The experimental results of the up-draft type gasification system are described. In the experiments, the small reactor is operated in up-draft configuration. The operational condition of the reactor is described in detail.

“Studies on unsteady characteristic of field horizontal-axis wind turbine blade” Takao MAEDA, Yasunari KAMADA, Kei TANAKA, Yuu OUCHI, Keita NAITO: The 11th National Symposium on Power and Energy Systems, No, 06-8, pp. 47-48, 2006.

This report describes a experimental study related to the pressure distributions on a field horizontal axis wind turbine. It was known that a dynamic stall was occurred on a wind turbine blade. A cross-correlation function is used for the data reduction to analyze the occurrence condition of the dynamic stall. As a result, when local angle of attack is kept at the high angle, it turned out that dynamic stall occurs. The parameter of judgment for occurrence condition of dynamic stall is also suggested.

“Japanese Wind Energy Prospect and Recent Technology” Takao MAEDA (invited lecture), Proceedings of 2006 Spring Conference of KWEA General Meeting & International Symposium, pp. 83-98, 2006.

There are many barriers to development of wind energy. Japan’s climate condition is different from EU countries. It often experiences typhoons and lightning strikes due to its meteorological

characteristics. Wind has a stronger turbulence level due to complex terrain. There are many endeavors being undertaken to find the best solution for these problems. This paper reviews the wind energy activities in Japan. This includes wind resources, market, trends, environment, prospects and R&D.

“WIND TUNNEL STUDY ON SURFACE PRESSURE MEASUREMENT ON ROTATING BLADE OF HAWT” Takao MAEDA, Yasunari KAMADA, Hideyasu FUJIOKA: Proceedings of the European Wind Energy Conference & Exhibition, BL3-138 CD-ROM, 2006.

Experimental results of the surface pressure distribution on a blade of a horizontal axis model rotor for the rotating and non-rotating status are shown. The experiments were carried out in a wind tunnel with a 2.4m diameter three-bladed rotor. The pressure distribution at $r/R > 0.7$ showed good agreement between the rotating and the non-rotating situations. The pressure distribution for the inboard section of $r/R < 0.5$ showed a stall delay. The method of determining the effective angle of attack for a rotating blade from LDV measurements is also discussed.

“The wind tunnel experiments for wind turbines” Takao MAEDA, Yasunari KAMADA: JSME Fluids Engineering Division, News Letter, http://www.jsme-fed.org/newsletters/2006_9/no3.html#ctop, 2006.

The wind tunnel experiments for wind turbines are described. The wind turbines are aerodynamic device which extracts the kinematical energy from wind. The performance of turbines strongly depends on the aerodynamics of the rotor. To investigate the aerodynamics of the rotor, many experiments are carried out in wind tunnel. The velocity measurements and pressure measurements techniques are explained in detail.

A Study on Machining Characteristics of Two-Dimensional Rectangular Abrasive Jet Machining Nozzle, Masaki SUGIMOTO, Toshihiko SHAKOUCHI, Kohei HAYAKAWA and moriyasu IZAWA, *Journal of the Japan Society for Precision Engineering*, 72-1, pp.121-126, 2006.

Control of Flow Separation and Drag Reduction of Abrupt Expansion Pipe, Toshitake ANDO, Toshihiko SHAKOUCHI, Hiroyuki YAMAMOTO and Koichi TSUJIMOTO, *Transaction of the Japan Society of Mechanical Engineers*, 72-717 B, pp.1125-1130, 2006.

Gas-Liquid Two-Phase Oscillating Flow, Fluctuating Flow through Vertical Sudden Contraction Pipe, Alexandros VOUTSINAS, Toshihiko SHAKOUCHI, Koichi TSUJIMOTO, and Toshitake ANDO, *Transaction of the Japan Society of Mechanical Engineers*, 72-717 B, pp.1131-1136, 2006.

Flow Characteristics and Drag Reduction of Vertical Upward Gas-Liquid Two-Phase Flow through Sudden Contraction Pipe, Alexandros VOUTSINAS, Toshihiko SHAKOUCHI, Koichi TSUJIMOTO and Toshitake ANDO, *Transaction of the Japan Society of Mechanical Engineers*, 72-720 B, pp.1888-1894, 2006.

Effect of Throat Surface Roughness on Jet Pump, Yukitaka YAMAZAKI, Tomonori NAKAYAMA, Tadashi NARABAYASHI, Hidetoshi KOBAYASHI and Toshihiko SHAKOUCHI, *Transaction of the Japan Society of Mechanical Engineers*, 72-720 B, pp.1895-1900, 2006.

Flow Control of Turbulent Round Jet using a Resonance Nozzle, Toshihiko SHAKOUCHI, *Journal of Aeronautics, Astronautics and Aviation*, Ser. A, 38-1, pp.1-9, 2006.

Behaviors of Particle Laden Jet Flow and Machining Characteristics of Micro-Blasting Process, Masaki SUGIMOTO, Toshihiko SHAKOUCHI and Moriyasu IZAWA, *Journal of the Japan Society for Abrasive Technology*, 51-1, pp.46-51, 2005.

Effect of Surface Roughness on Jet Pump Performance, Yukitaka YAMAZAKI, Tomonori NAKAYAMA, Tadashi NARABAYASHI, Hidetoshi KOBAYASHI and Toshihiko SHAKOUCHI, *JSME International Journal*, Ser. B, 49-4, pp.928-932, 2006.

Flow Characteristics and Control of Vertical Upward Gas-Liquid Two-Phase Flow through a Sudden Contraction Pipe, Alexandros VOUTSINAS, Toshihiko SHAKOUCHI, Junichi TAKAMURA, Koichi TSUJIMOTO and Toshitake ANDO, *JSME International Journal*, Ser. B, 49-4, pp.1000-1007, 2006.

Flow Analysis for Single and Multi-Nozzle Jet Pump, Tadashi NARABAYASHI, Yukitaka YAMAZAKI, Hidetoshi KOBAYASHI and Toshihiko SHAKOUCHI, *JSME International Journal*, Ser. B, 49-4, pp.933-940, 2006.

Globular Formation of Fine Particle using a New High Temperature Air-Jet-Flow System, Hirokazu NAKAMURA and Toshihiko SHAKOUCHI, *Journal of Powder Technology*, 166, pp.14-23, 2006.

Gas-Particle Two-Phase Jet Flow from Slot Nozzle and Micro-Blasting Process, Masaki SUGIMOTO, Toshihiko SHAKOUCHI, Kohei HAYAKAWA and Moriyasu IZAWA, *JSME International Journal*, Ser. B, 49-3, pp.705-713, 2006.

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