2013 BOSI EDU JEJU ISLAND CONFERENCE SCHEDULE

2nd International Conference on

Machine Design and Manufacturing Engineering

(ICMDME 2013)

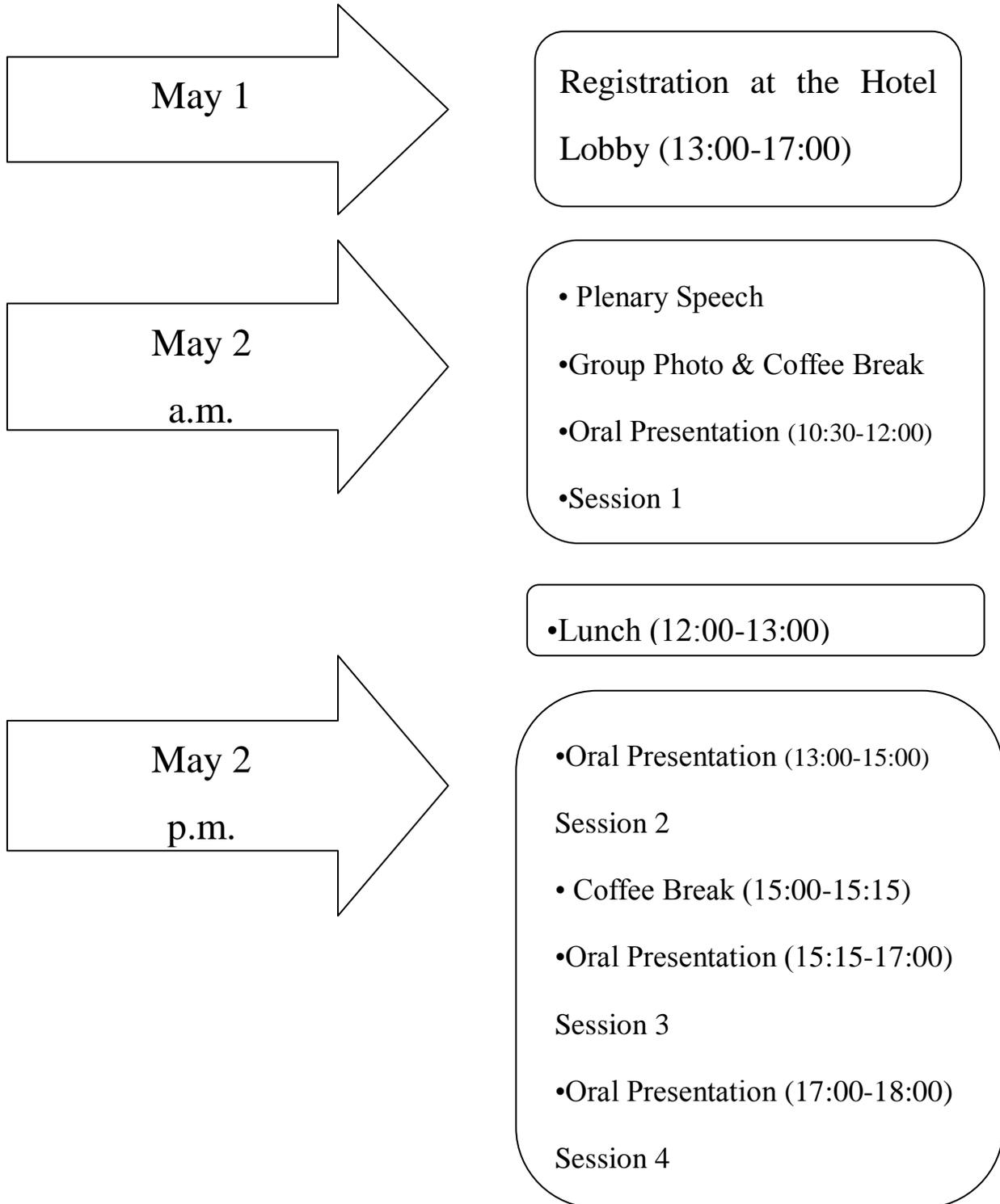**Jeju Island, South Korea**

May 1 - 2, 2013

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Simple Version of the Schedule

May 1 → Registration at the Hotel Lobby (13:00-17:00)

May 2 a.m. →
- Plenary Speech
- Group Photo & Coffee Break
- Oral Presentation (10:30-12:00)
- Session 1

- Lunch (12:00-13:00)

May 2 p.m. →
- Oral Presentation (13:00-15:00)

Session 2

- Coffee Break (15:00-15:15)
- Oral Presentation (15:15-17:00)

Session 3

- Oral Presentation (17:00-18:00)

Session 4

Venue

Conference venue: The Hyatt Regency Jeju,Jeju Island

大会会场：济州岛凯悦酒店

114, Jungmungwangwang-ro 72 beon-gil, Seogwipo-si,

Jeju Special Self-Governing Province, South Korea 697-130

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Map and Route to The Hyatt Regency Jeju,Jeju Island

From Jeju International Airport, take Jungmun express road south and follow signs leading to Jungmun. When coming to the intersection with Korea Power Station on the right hand side, turn right and continue on main road until the Jeju island hotel sign is visible. Follow the sign and it will lead you to the Hyatt Regency Jeju hotel.

乘坐机场巴士

走出机场就可乘坐机场巴士(600 号)。行车时间为从早上 6:20 到晚上 10:10。每隔 15 分钟发车，到酒店大门需要约 50 分钟。费用为韩币 3,900 元。

Conference Schedule

May 1, 2013(Wednesday)	
13:00-17:00	**Registration at the Hotel Lobby**

Note: You can also register at any time during the conference.

May 2, 2013(Thursday)	
09:00－09:45	**Plenary Speech 1**
09:45－10:15	**Plenary Speech 2**
10:15－10:30	**Coffee Break**
10:30－12:00	**Session 1**
12:00－13:00	**Lunch**
13:00－15:00	**Session 2**
15:00－15:15	**Coffee Break**
15:15－17:00	**Session 3**
17:00－18:00	**Session 4**

Note:

(1) Certificate of Participation can be collected at the registration counter.

(2) Please copy PPT files of your presentation to the secretary when registration.

(3) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(4) If you want to deliver oral presentation but your paper is not in the session list, please contact us by Email:cfp@icmdme.org (for ICMDME 2013).

Instruction for Oral Presentation

Devices Provided by the Conference Organizer:

Laptops

Projectors & Screen

Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF files

Duration of each Presentation:

Regular Oral Session: about 10 Minutes of Presentation 5 Minutes of Q&A

Session List

Session: 1

May 2, 2013, 10:30—12:00

Paper ID: D418

Title: Design Planning and Top-layer Design of Products

Author: Bangchun Wen,Xiaopeng Li,Shuying Liu,Weizhou Wang,Zongyan Wang

Abstract: The A new design method of the products named "Top-layer Design" has been proposed in this paper. From the view of the point of the system engineering, the planning of product design makes the product design qualities improve to a great extent. Besides the understanding of the client requirements, the design planning of products, the so-called 7D's: Design ideas, Design environments, Design objective, Design process, Design contents, Design methods and the Design quality evaluation, should be considered completely and planned systematically.

Paper ID: 67

Title: An Experimental Study on the Effect of Die Chamfer Shape and V-ring Position on Die Roll Height in the Fine Blanking of a Special Part with Various Corner Shapes

Author: Jong-Deok Kim

Abstract: In this paper, a change of die roll height according to the die chamfer shape and V-ring distance of a fine blanking tool was studied by experiments on a special part with various corner shapes. Three guide plate inserts with different V-ring positions and three die inserts with different die chamfers were machined, and then a fine blanking tool was manufactured for the fine blanking experiments. Nine experiments were conducted on a 650-ton fine blanking press. Each die roll height was measured and analyzed. It would be noticed that the die roll heights on the corner shapes of the fine blanked parts increased with increasing V-ring distance and die chamfer angle, but it decreased with increasing corner radius and angle. The results in this study can be used to minimize the die roll height of fine blanked parts with corner shapes when designing the V-ring and die chamfer of a fine blanking tool.

Paper ID: D598

Title: Growth Retardation of Fatigue Crack by Cold Expanded with Ring Indented Method for AISI 304 Stainless Steel

Author: Guan Chyun Shiah,Guo Zhang Huang ,Cheng-Yung Tseng

Abstract: Drilled, cold expanded with ring indented method was employed for crack-tip on the both sides and front side of the specimens, thus build up the residual compressive stresses, strain hardening and plasticity induced closure, and lead toward crack growth retardation. The compact tension specimens of AISI 304 stainless steel were used drilled, cold expanded with ring indented in the fatigue test. The experimental methods were drilled (Φ=2mm) and cold expanded (Φ=2.074mm) and both sides at 2mm and 1mm position of the crack-tip in the specimen, then apply 0, 6, and 9kN test loads, respectively. The experimental results showed that, for the same test position, the number of delay cycles result from cold expanded than that of drilled and the number of delay cycles are 220798. For the same position, the stronger test load is, the greater crack growth retardation effect is. And, This study proposed some useful information on utilizing cold expanded with ring indented method for AISI 304 Stainless Steel crack growth retardation.

Paper ID: D459

Title: Constrained Ruled Surface Reconstruction for 5-axis NC Machining of Aero-Structure

Author: Qingzhen Bi,Yaoan Lu,Zhoulong Li,Limin Zhu,Han Ding,Gang Liu

Abstract: We proposed a constrained ruled surface approximation algorithm for 5-axis machining of aero structure. Ruled surface is widely used in the design of aero structure. In practical model process, the regular ruled surface is usually split into some small fragmentary surfaces. The segmentation of the original surface mainly comes from some iterative boolean operations on the ruled surface. The segmentation destroys original parameter lines and leads into complex curved boundaries. Furthermore, the obtained fragmentary surfaces deviate from the original ruled surface because of the accuracy loss in the boolean operations of 3D CAD software. Some gaps between the small surfaces often appear. In manufacturing process, it is difficult to generating high-quality tool path for the surface with disordered parameter lines, curved boundaries and gaps. The proposed ruled surface approximation algorithm provides an effective way to reconstruct the smooth ruled surface. The constraints of boundary and smoothness are both considered. The ruled surface for simultaneous 5-axis machining is finally obtained. This algorithm have been integrated into CATIA V5 system and applied in practical manufacturing planning of aero-structures.

Paper ID: 100

Title: Design of the Flexible Container for Control of Sloshing

Author: Marija Gradinscak

Abstract: The inherent flexibility of a liquid container is usually treated as a problem since achieving a perfectly rigid container is practical impossibility. On the other hand container flexibility may be used as design parameter in control of free surface oscillations. Intentional container flexibility has been employed in this research to suppress excessive levels of liquid sloshing. This paper outlines numerical predictions for simulation of liquid sloshing in a flexible container and its design alternatives while maintaining effective control.

Paper ID: D426

Title: Residual Stress Analysis on Electrical Discharge Lapping (EDL) of Polcrystalline Diamond

Author: M. Zulafif Rahim,Songlin Ding,John Mo

Abstract: PCD is the combination of diamond particles that are sintered together under high temperature and high pressure conditions in the presence of catalytic metal. Due to its superior properties, this material has been widely used for cutting tool. However, magnitude and direction of residual stress obtained from the fabrication process believe to affect the tool performance during application. Furthermore, high temperature generated by the process might also contribute to the structure alteration that finally reduces the strength of PCD. This paper revealed that the residual stress due to EDL is more dominant in tensile direction which is vice versa to the conventional process. Analysis on the spectrum indicated that there is a relationship between the tensile stress value and the composition of graphite on the Raman laser spot location.

Paper ID: D342

Title: Effect of Twist Coefficient and Thermal Treatment Temperature on the Properties of PET Yarn

Author: Jia-Horng Lin, Po-Ching Lu, Jin-Jia Hu, Yueh-Sheng Chen, Ching-Wen Lou

Abstract: Twisting has an influence on not only the strength, luster, softness, and elasticity of the yarns, but also the properties of the resulting fabrics. This study aims to evaluate how the rotor twister speed and the thermal treatment temperature influence the properties of the polyethylene terephthalate (PET) plied yarns and wrap yarns. Both yarn types are made with a twist coefficient of 1, 1.5, or 2, and then thermally treated in an oven at 70, 110, and 150 ℃. The resulting plied yarns are wrap yarns are tested for tensile strength and elongation, and their surface is also observed by a stereomicroscope to determine the influences of the two parameters. The results of the experiment show that twist coefficient does not influence the tensile strength nor the elongation. The tensile strength of various plied yarns and wrap yarns is approximately 4.4cN/dtex; the variation in the twist coefficients is too small and thus hardly causes any significant differences in the yarn's properties.

Paper ID: D417

Title: Contact Mechanics in Cylindrical Clearance Revolute Joints

Author: Cândida Pereira,Jorge Ambrósio,Amílcar Ramalho

Abstract: A comparative study concerning the dynamics of chain drives mechanisms is presented in this article. The study compares the dynamic response using the spherical contact model proposed by Lankarani and Nikravesh with a new enhanced cylindrical model developed by the authors to describe the contact phenomenon in cylindrical clearance revolute joints. In the process, the influence of contact parameters and the numerical efficiency of using different contact modeling approaches are evaluated. It is demonstrated that cylindrical contact is stiffer than spherical contact. The spherical model represents a rough approximation to evaluate the contact between cylindrical bodies since contact forces are underestimated.

Session:2

May 2, 2013, 13:00—15:00

Paper ID: 82

Title: The Research of Sliding Boot Design Based on Compliance Characteristic

Author: Jie Liu,Feng Gao,Guoyan Xu

Abstract: With the purpose of improving vehicle trafficability on invertebrate terrains, an new kind of walking device "sliding boot" is designed. The sliding boot clamped on the front wheel as a plier, when vehicle is running on invertebrate terrains. The vehicle is in the morphology of the front wheel sliding and the rear wheel driving, as "floating-submerging" platform. With the relation between the tire rubber and sliding boot as the breakthrough point, the synthesis and analysis of sliding boot design is researched. Firstly, the mechanics equilibriums are analyzed. Secondly, the deformation between the sliding boot and the front wheel is analyzed based on compliance. Finally, the he research method of sliding boot is verified by test, the sliding boot could clamp tire moderately, and meet the vehicle driving requirements. The research method is reasonable and practicable.

Paper ID: D384

Title: NGV. Using to be Alternative Energy in Metal Melting

Author: S.Prasertsook,P.Saranan,N.Udomsree,N.Sukachart

Abstract: This research used 20 kilograms crucible furnace to be experiment furnace. The furnace used NGV. to be fuel for aluminum melting while melting process melting time, melting temperature, pouring time and fuel consumption were recorded. The fuel consumption comparison between NGV. With LPG are one kilogram of aluminum used 0.35 kilogram of NGV or 3.92 Thai bath/kilogram (NGV .price 11 bath/kilogram) and one kilogram of aluminum used 0.25 kilogram of LPG or 4.53 Thai bath/kilograms (LPG.price 17.93Thai baht/kilogram)

Paper ID: 109

Title: Computational Modelling of Liquid Sloshing in Rectangular Tank

Author: Marija Gradinscak,Farial Jafar

Abstract: Liquid sloshing inside a partially filled rectangular tank has been investigated. The fluid is assumed to be water and the tank is forced to move along x axis to simulate the actual tank excitation. The volume of fluid technique is used to track the free surface and the model solves Navier_Stokes equations by the use of the finite difference estimation. At each time step, a donar-acceptor method is used to transport the volume of fluid function and locations of the free surface. In this paper the location and transport of the free surface in the tank have been investigated using a CFD code (FLUENT) for 3D configuration. The use of a numerical tool has resulted in a detailed investigation of these characteristics, which have not been available in the literature previously.

Paper ID: D343

Title: Impact-Resistant Polypropylene/Short Glass Fiber Composites with Far-Infrared Emission：Manufacturing Technique and Property Evaluation

Author: Jia-Horng Lin, Zheng-Yan Lin, Jin-Mao Chen, Chen-Hung Huang,Ching-Wen Lou

Abstract: This study produces the far-infrared emitting composites by using impact-resistant polypropylene, short glass fibers, and far-infrared masterbatches. The addition of short glass fiber

and far-infrared masterbatches is then evaluated to determine their influence on the mechanical properties and far-infrared emissivity of the resulting composites. The experimental results show that with an increase in the content of short glass fibers, the tensile strength increases from 34 MPa to 56 MPa, the far-infrared emissivity increases from 0.85 to 0.93, but the impact strength decreases from 1037 J/m to 197 J/m, proving that the resulting composites have desired mechanical properties and far-infrared emission.

Paper ID: D419

Title: Harmonious Design Method of Product and Its Applications

Author: Bangchun Wen,Xiaopeng Li,Shuying Liu,Weizhou Wang,Zongyan Wang

Abstract: There are much more disharmonious problems in the process of product design because the environment factory of the product design could not be considered fully and systematically. For example, the disharmonious problems between the product design and natural environment or society environment and among internal elements of product design. The purpose of harmonious design is to make the harmony between product and external environments and among internal elements of products. In order to satisfy the requirement mentioned above in complete design tasks process the reasonable methods should be adopted and the relationship degree analysis and harmonious degree assessment should be done. After that the products can satisfy users and country requirement and have the excellent quality, higher performance-value ratio, the short manufacturing period, good environment protection, convenient service and so on. Due to these the enterprise will get greater market portion.

Paper ID: D349

Title: Manufacturing Technique and Property Evaluation of Resilient Nonwoven Fabrics

Author: Ching-Wen Lou, Shih-Yu Huang, Ching-Hui Lin, Yi-Chang Yang,Jia-Horng Lin

Abstract: This study creates the high resilience nonwoven fabrics by using modified polyester fiber. In order to have resilience, the nonwoven fabrics are thermally bonded with various temperatures and the air permeability and mechanical properties of the nonwoven fabrics are then evaluated. The optimum tensile strength of 481 N and resiliency of 26 cm occur when the nonwoven fabrics are thermally bonded at 180 ℃, and the optimum tear strength of 276 N occurs when the nonwoven fabrics are thermally bonded at 160 ℃.

Paper ID: D394

Title: Defect Classification Using Machine Learning Techniques for Flat Display Panels

Author: Du-Hyung Cho,Seok-Lyong Lee

Abstract: Defect classification for a flat display panel (FDP) is the crucial process that identifies and classifies defects automatically during the final step of its manufacturing process. It plays an important role since it prevents possible malfunction by inspecting defects timely and reduces time for identifying inferior products. In this paper, we propose the defect classification methods for FDP using various machine learning techniques and provide the comparison among them for practical use in production environment. First, we identify defects through Gaussian filter and threshold technique. Then, those defects are classified into different types based on geometric characteristics of them using four machine learning techniques that are widely used. The experimental results using training and test sets of FDP images show considerable effectiveness in classifying defect types. We also believe that the comparison result might be quite useful when engineers determine methods for defect classification during FDP manufacturing.

Paper ID: D344

Title: Application of Porous Chitosan/Gelatin Bone Scaffolds Used in Bone Tissue Engineering

Author: Ching-Wen Lou, Shih-Peng Wen, Hsiu-Ying Chung, Chao-Tsang Lu, Jia-Horng Lin

Abstract: Chitosan (CS) and gelatin (G) both have good biocompatibility and biodegradation, qualifying them for use in tissue engineering. In this study, CS and G are blended with different ratios to make the mixture solution, and then freeze-dried to form three-dimensional porous CS/G bone scaffolds. The surface, cross-section, porosity, and pore size of the resulting bone scaffolds are observed and analyzed. According to the experimental results, the addition of gelatin gives the CS/G bone scaffolds morphology with few pores. As can be seen from SEM observation, there are linear pores in the cross-section. In addition, with a larger quantity of gelatin, the CS/G bone scaffolds have a lower porosity.

Paper ID: D574

Title: Analysis of Dynamical Characteristics for The Feed System Considering Nonlinear Friction Force

Author: Yang Jianjun ,Wu Qin,Rui Zhiyuan,Lei Chunli

Abstract: The model that describes the friction between contact surfaces of motion pair of the feed system has been established use of Stribeck friction theory, it fully reflected the various lubrication conditions. The bifurcation and stability analysis of the model has been done. The experimental methods were used to research the nonlinear dynamics characteristics of the feed system under the external excitation. The influences that friction force to the nonlinear characteristics of the system at the certain parameters condition were analyzed. Utilize the research findings of the dynamical characteristics that caused by friction in the feed system can effectively provide a theoretical basis for designing optimization of complex systems in engineering, fault diagnosis and vibration control.

Paper ID: D416

Title: Effect of Pretension on the Dynamics of Chain Drives

Author: Cândida Pereira,Jorge Ambrósio,Amílcar Ramalho

Abstract: Suitable methodologies for the dynamic analysis of chain drive mechanisms, based on a multibody systems formulation in which clearance revolute joint formulation is extensively used, have been developed and implemented in a simulation code. The use of tightener systems has been recognized as the most effective way to improve the performance of chain drive mechanisms, since the occurrence of instabilities and vibration patterns of the free chain strands between sprockets can be largely reduced. As a result, these components have been extensively used in car and marine engines. Their influence on the dynamics of the system is analyzed in this article.

Session: 3

May 2, 2013, 15:15—17:00

Paper ID: D464
Title: Property Evaluation of PET Fiber and Metal Fiber Composite Woven Fabric
Author: Yuan-Jen Chang, Bing-Chiuan Shiu, Jia-Horng Lin, Ching-Wen Lou
Abstract: This study aims to fabricate strong mechanical properties and electrical conduction woven fabric, which provides flexible and strength for application. Polyethylene Terephthalate fiber (PET fiber) having fine mechanical properties are widely used in industry, as well as metal fiber are often used on electromagnetic shielding and static electricity protection. This study took both advantages of PET fiber and metal fiber for water sensitive functional textile. The result showed that warp yarns has a tensile strength of 1363.3N/mm and weft yarns has a tensile strength of 1483.3N/mm. In addition, both textiles with 20 wt% water absorption can be electrical conduction. Various metal yarns have different electrical resistivity and conductivity with various water absorption percentage.

Paper ID: D303
Title: Modeling and simulation of continuous flexible roll forming process
Author: Zhou Sui,Zhongyi Cai,Mingzhe Li
Abstract: The continuous flexible roll forming process is a novel sheet metal forming technique for effectively manufacture of three-dimensional surface parts. In this study, two types of finite element (FE) models were developed under the ABAQUS/Explicit environment. The difference of the two models is that the rolls are defined as discrete rigid bodies in model No.1 and are deformable in model No.2. An experiment was carried out using the continuous sheet metal forming setup. The comparison of the numerical computation results with the experimental results shows that the model No.2 can be used for the shape prediction of continuous flexible roll forming process well.

Paper ID: D357
Title: Manufacturing Technique and Antimicrobial Activity of Silver Nanoparticles
Author: An-Pang Chen, Ching-Wen Lou, Ya-Yuan Chuang, Mei-Chen Lin, Jia-Horng Lin
Abstract: Recently, the biomaterial is in rapid development stage, which could be widely applying in medical application, due to its biodegradability, nontoxic and biocompatibility. Chitosan is naturally abundant polymers have the biodegradability, nontoxic and biocompatibility. In this research, the chitosan and silver nitrate were used to develop the antibacterial agent via nano technique. In the reaction system, the reaction time and stirring speed were discussed, which will affect the surface plasmon resonance. The particle sizes were measured using transmission electron microscopy (TEM) and UV visible spectrophotometry. The silver nanoparticles size was below 100 nm via TEM. In addition, the results of antimicrobial activity indicated that the antibacterial agent has well antimicrobial activity on staphylococcus aureus. Due to the silver nanoparticle provides relatively higher surface area to contact with bacteria affect DNA molecules by losing their replication abilities.

Paper ID: D436

Title: Energy-based Approach for Controller Design of Overhead Cranes: a Comparative Study

Author: Nguyen Quang Hoang,Soon-Geul Lee

Abstract: In this paper, five controllers including linear and nonlinear ones for an underactuated overhead crane are derived based on the passivity of the system. The total energy of the system and its square are used in Lyapunov candidate function to design controllers. The equilibrium point of the closed loop is proven to be asymptotically stable by the Lyapunov technique and LaSalle invariance theorem. In addition, the optimal linear controller is also combined to force the swing angle to converge fast to zero by reaching destination of the trolley. Numerical simulations are carried out to evaluate the controllers.

Paper ID: D381

Title: Optimize the Multi-dimensional Test Coverage Based on Multiple Attribute Decision Making and Cross Entropy Method

Author: Yi Zhang,Gang Wang,Pingrong Lin

Abstract: With the scale and complexity of software increasing, people's awareness of software quality assurance has gradually strengthened. How to carry out the test, test scheme optimization selection and how to improve the testing efficiency become the reality problems in software engineering. Using the test coverage of the multidimensional metric, the effectiveness of comprehensive test coverage, test coverage rate of satisfaction and test efficiency as the optimization test scheme selection, use of multiple attribute decision making lifting scheme selection algorithm to measure the optimal test program, ameliorate the severity of the past subjective experience dependent, so as to provide guidance for reasonable, effective and scientific test. The optimization of comprehensive test coverage scheme is applied to the Markov model of software testing; software testing with the average cost minimization as objective, using the cross entropy method the optimal coverage testing section to optimize the test process.

Paper ID: D356

Title: Manufacturing Technique and Property Evaluation of RFPET/TPET Hybrid Nonwoven Fabric

Author: Jia-Horng Lin, Ya-Lan Hsing, Wen-Hao Hsing, Jin-Mao Chen, Ching-Wen Lou

Abstract: Heat energy plays a significant role in resources and industries, which makes the development of energy-saving and thermal-retention materials important to environment protection. This study combines three-dimensional hollow Polyethylene Terephthalate (TPET) fibers, recycled far-infrared polyethylene terephthalate (RFPET) fibers, and low melting temperature polyethylene terephthalate (LPET) fibers at various ratios to make the RFPET/TPET hybrid nonwoven fabric. The tensile strength, tearing strength, air permeability, and far infrared emissivity of the fabrics are evaluated. With a blending ratio of 8:0:2, the hybrid nonwoven fabrics have the optimum tensile strength of 145 N, tear strength of 184 N, and air permeability of 205 $cm^3/cm^2/s$.

Paper ID: D547

Title: Predictive modeling of minimum quantity lubrication: cutting force, temperature and residual stress

Author: Xia Ji,Xueping Zhang,Beizhi Li,Steven Y. Liang

Abstract: This paper presents an analytical approach to predict the machining force, temperature and residual stress under minimum quantity lubrication (MQL) condition. Both the lubrication and

cooling effects are considered to change the tribological and thermal properties in the modified Oxley's model, which is capable to predict the cutting force and temperature in MQL machining directly from cutting conditions. The machining-induced residual stress is predicted by modified McDowell hybrid algorithm. The predicted cutting forces and residual stresses are verified by orthogonal cutting tests for C45 steel and TC4 alloy steel.

Paper ID: D348

Title: Effects of Warp-Knit Structure on the Properties of the Elastic Bamboo Charcoal/Stainless Steel Warp-Knitted Fabrics

Author: Jia-Horng Lin, Yu-Tien Huang, Ching-Hui Lin, Chin-Mei Lin,Ching-Wen Lou

Abstract: In recent years, the improvement of scientific techniques has significantly promoted the quality of people's lives as well as concepts of health care. This study manufactures bamboo charcoal (BC)/stainless steel (SS) covered yarns, which are then made into four types of elastic BC/SS warp-knitted fabrics. The far infrared emissivity, anion amount, and air permeability of the resulting fabrics are then evaluated to determine the influence of the warp-knit structure and amount of layers. The experimental results show that the far infrared emissivity of BC/SS warp-knitted fabrics decreases when the lamination layer number increases. Single-layer BC/SS warp-knitted fabrics all have a far infrared emissivity beyond 0.8.

Paper ID: D396

Title: Heat and Mass Transfer Measurements for Bio-substrate Drying Processes

Author: Rong-Yuan Jou

Abstract: The complex process of heat and mass transfer in bio-substrates during convection, vacuum, and thermohygrostat drying was studied. Changes in temperature and moisture content at the center of the wet material were measured before and after the experiment in order to calculate the drying rate (%/h). In the case of convection drying, the inverter frequency within the wind tunnel was set at 10, 20, and 30 Hz (velocities of 2.2, 4, and 6 m/s, respectively). Measurements were then made at 10 and 20 Hz, with temperatures at 50 and 60 ℃. In the case of vacuum drying, the chamber pressure was set at 0.4, 4.2, and 92 Torr. The thermohygrostat was set at 50 ℃ with humidity levels at 30, 40, and 50%. In conclusion, thermohygrostat is more effective because of the controlled environment, and that drying rate is increased with lower wind velocities and chamber pressures for convection and vacuum drying respectively.

Paper ID: D574

Title: Analysis of Dynamical Characteristics for The Feed System Considering Nonlinear Friction Force

Author: Yang Jianjun ,Wu Qin,Rui Zhiyuan,Lei Chunli

Abstract: The model that describes the friction between contact surfaces of motion pair of the feed system has been established use of Stribeck friction theory, it fully reflected the various lubrication conditions. The bifurcation and stability analysis of the model has been done. The experimental methods were used to research the nonlinear dynamics characteristics of the feed system under the external excitation.The influences that friction force to the nonlinear characteristics of the system at the certain parameters condition were analyzed. Utilize the research findings of the dynamical characteristics that caused by friction in the feed system can effectively provide a theoretical basis for designing optimization of complex systems in engineering, fault diagnosis and vibration control.

Session: 4

May 2, 2013, 17:00─18:00

Paper ID: D346

Title: Effects of Sodium Hydroxide Treatment Duration on the Physical Properties of IRM®/Polylactic Acid Composite Filling Materials

Author: Ching-Wen Lou, Tzu Hsuan Chao, Chao-Tsang Lu, Po-Ching Lu, Jia-Horng Lin

Abstract: The purpose of this study is to explore the influence of the sodium hydroxide (NaOH) treatment duration on the physical properties of the composite filling material. This study uses Intermediate Restorative Material (IRM®) as matrix and 2 % of polylactic acid (PLA) fiber as reinforcing material to make the IRM/PLA composite filling material. Before being infused into the IRM matrix, the 2-mm long PLA fiber is treated by NaOH solution for 5, 10, 15, 20, 30, 60, or 90 minutes. The setting time and compressive strength of resulting composite filling materials are evaluated, determining the optimum treatment duration is 60 minutes. The compressive strength is increased by 41 %.

Paper ID: D520

Title: Study on the propagation characteristics of Acoustic Emission in Point Contact Bearing Ball

Author: Yanyan Xiao, Wenxiu Lu, Fulei Chu

Abstract: Acoustic Emission (AE) signal has been used pervasively in the extraction of fault feature and the location of damage. The precision of the extraction and location is determined by the propagation characteristics of AE signal in different structures. In this paper, the propagation characteristics of AE wave in the point contact sphere under continuous and transient AE signal is analyzed; a series of experiments under different condition are conducted; based on wave propagation theory, a simulation model is built using the software of ANSYS LS-DYNA. The results of experiments and simulation models reveal that the propagation characteristics-attenuation, frequency features- of AE signal can be manifested clearly in the experiments and are simulated correctly by the simulation model.

Paper ID: D347

Title: A Study of the Effect of Forcipomyia Taiwana Repellents Made of Plant Extracts

Author: Ching-Wen Lou, Ming-Chun Sie, Chao-Tsang Lu, Huey-Liang Kuo, Jia-Horng Lin

Abstract: The bite of *Forcipomyia taiwana (F. taiwana)* causes intense pruritus and swelling in sensitive skin. Most commercially available *F. taiwana* repellents are made of N, N-diethyl-3-methylbenzamide synthetic repellents [1]; however, using them for a long time influences skins, and the nervous and immune system. This study uses the water extracted *Cinnamomum osmophloeum* Kaneh and *Cymbopogon excavates* for the Y-tube test, determining the repellent effect of these two extracts and the influence of water extract time on the difference in their repellent effect.

Paper ID: D457

Title: Towards Knowledge-oriented Smart Vehicle Adaptive Traffic Service

Author: Jeong-Sig Kim, Jin-Hong Kim

Abstract: The most of very large traffic system by growing the variety of services, the relationships between the vehicle network and the infrastructure are more complex. Moreover, intelligent transportation systems are getting more and more to develop a better combination of

travel safety and efficiency since long time ago. Vehicle is being evolved and traffic environment is especially also organized well-defined schedules priorities, which is real time based wireless network traffic condition, variable traffic condition, and traffic pattern from the vehicle navigation system. Accordingly, we propose to Knowledge-oriented Smart Vehicle Adaptive Traffic Service using genetic algorithm in this paper.

Paper ID: 68

Title: Implicit Parameterization Modeling and Validationfor Body-in-white of a Car

Author: Wang Dengfeng,Ji Feng,Chen Shuming,Li Yusheng,Chen Haibo,Zhao Xuemei

Abstract: The implicit parametric method was briefly discussed in this paper. An implicit parametric 3D solid model and a finite element (FE) model of a body-in-white (BIW) were built up by this method. Low order natural vibration frequencies and modes, bending and torsional stiffness of the BIW were analyzed by FE calculation. A good agreement was acquired by comparing the prediction results with the test values. Results indicated that the implicit parametric model of the BIW established could be used for design and development of the BIW in concept design stage of the BIW.

Paper ID:D603

Title: Study of Permanent Magnet Synchronous Motor Current Robust Control Based on Adaptive Fast Terminal Sliding Mode Control

Author: Liang Qi,YanzhuYang,Xu Bai ,Hongbo Shi,Weiliang Liu

Abstract: In this paper, the main factors which influence the current control performance of the Permanent Magnet Synchronous Motor are studied and analyzed. A method, which combines the fast terminal sliding mode control and the current feed forward control methods, is proposed to solve the problems of the cross-coupling of d-q current in field oriented control. Meanwhile, an adaptive control law is designed for the system uncertainties of system parameters perturbation and external disturbances and so on. The convergence of the proposed method is proved by Lyapunov theory. The proposed control method is testified by computer simulation and improves the robustness of the Permanent Magnet Synchronous Motor control system.

Paper ID: D393

Title: Processing Technology and Characteristic Evaluation of Absorbent Cotton

Author: Jia-Horng Lin, Zong-Han Wu, Chao-Tsang Lu, Ting-Ting Li, Ching-Wen Lou

Abstract: Hemostasis is the critical steps for trauma and emergency. When injured person is under circumstance of hemorrhage, the important step is immediate hemostasis because mild hemorrhage makes patient feeling pain and dizziness while abundant hemorrhage would lead to coma, shock even death. Therefore, hemostasis becomes an important rescue issue to bleeding patient. This study uses Polylactic acid (PLA) and Polyacrylate (HPA) to prepare PLA/HPA nonwoven fabric with different weight ratios of 100/0,95/5,90/10, 85/15, 80/20 wt%/wt%, following with discussions of tensile strength, tearing strength, softness, air permeability, water vapor transmittance, water absorption, water retention. The results show that, 80 wt%/20 wt% of PLA fiber and HPA fiber was the optimal blending ratio, and its water absorption, water retention and softness were respectively improved by 323 %, 245 % and 22.3 % by contrast with 100 wt%/0 wt% of PLA and HPA; but its tensile strength was decreased by 63 % even that still reaches the strength of absorbent cotton.

Paper ID: D432

Title:Phase transformation of MgAlON-SiAlON powders synthesized by carbothermal reduction-nitridation from ludwigite tailings

Author: Jiang Tao,Zhang Lu,Tang Yi,Xia Yi,Xue Xiangxin

Abstract: This paper focuses on the influence of temperature and holding time on synthesizing MgAlON-SiAlON powders applying CRN method. The results were analyzed by chemical and XRD analysis technology. The experimental results revealed that β-SiAlON, as an intermediate phase, appeared in the synthesized products at 1200℃. With the increase of synthesis temperature, β-SiAlON was translated into Mg-SiAlON polytypoid (Mg1.25Si1.25Al2.5O3N3) and reached the maximum at 1450℃. Increasing synthesis temperature was beneficial to generate MgAlON, and the optimal condition of temperature for powders synthesis was 1500℃. β-SiAlON disappeared with the increase of holding time. MgAlON and Mg-SiAlON polytypoid became the main crystalline phases with a holding time of 4h. What's more, the phase compositions had no evident change with longer holding time. Flaky MgAlON grains and elongated Mg-SiAlON grains were observed in synthesized powders.

Paper ID: 120

Title: Optimization of Thermoplastic Pre-pregs Overmoulding

Author: Pedro Carreira,Nuno Alves,Carina Ramos,Paulo J. Bártolo

Abstract: The search for new technological concepts in the field of injection of thermoplastic polymers, in order to optimize the process and reduce cycle time, faced us with a new concept in moulding, where two different technologies are proposed to be unified. The fabric impregnated with thermoplastic is an example of a quite new product that combines the potential of polymers with long reinforcing fibres. In order to process this new product, injection of polymers and thermoforming will be applied in only one operation. To allow cycle time prediction for this new technique, changes will be made in the formulation of conventional injection cycle time, in order to comprise the new necessary stages. In this work a new approach is proposed to obtain moulded parts of thermoplastic polymers with functional fabric only in a single processing cycle. The description of the new stages and its mathematical formulation is made, in function of the time needed to complete each one. The results presented come from processing parameters optimization using the Particle Swarm Optimization (PSO) algorithm.

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