



SIMTech

for Industry

SPRING
 singapore
 Enabling Enterprise

Dear Friends from Industry,

Our next PE COI Annual conference will be held on 16 May 2012. The event is a platform for local companies to explore business opportunities with MNCs in some of the fastest growing industry sectors. We look forward to your company participating in this event as well as involvement in some of the upcoming collaborative industry projects (CIPs) listed in this newsletter.

Dr John Yong
 Director, PE COI

Meet-the-Consultants Sessions (2012)

(9.00am – 12.00pm)

- | | | |
|---------------|---------------|---------------|
| • 16 Jan 2012 | • 15 Feb 2012 | • 15 Mar 2012 |
| • 16 Apr 2012 | • 15 May 2012 | • 15 Jun 2012 |

UPCOMING

PE COI Annual Conference:

Opportunities for the Local Precision Engineering Companies in the Growing Aerospace, Oil & Gas, MedTech and Complex Equipment Sectors

Date: 16 May 2012
Time: 9.00am - 5.00pm
Venue: SIMTech Auditorium

The upcoming PE COI Annual Conference provides an invaluable opportunity for SMEs in Singapore to explore business partnerships with leading manufacturers in the oil & gas, aerospace, medtech and complex

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equipment sectors - particularly with the rapid localisation of the manufacturing activities in this high growth region. Local companies will benefit from a deeper insight of the trends, gaps and strategies to enable them to form cost-effective consortia for capabilities development, with the support from A*STAR, SIMTech, SPRING Singapore, EDB, IE Singapore, SPETA, SIAA, SSEA, SBF and PE COI. At the conference, MNCs will share some of the key localisation requirements and provide case studies.

The PE COI initiatives will also be shared to generate awareness of some of the key capabilities required to enable local companies to confidently undertake higher precision and higher value manufacturing activities to meet stringent performance requirements.

Look out for more details about this conference at PECOI.SIMTech.a-star.edu.sg.

Seminar on Thermal/Flow Simulation for Product and Equipment Design and Analysis

Date: 17 April 2012

This seminar is to introduce the simulation and measurement tool to participants for Thermal/flow solution.

Seminar on EMI/ESD for Product and Equipment Design and Analysis

Date: 14 June 2012

This seminar is to bring the international EMI/EMC specification knowledge to local industry and also introduce the simulation and measurement tool to participants for EMI/ESD solution.

Seminar on Vibration Design and Analysis for Product and Equipment Design and Analysis

Date: 15 Aug 2012

This seminar is to bring the simulation and measurement tool to participants for vibration reduction solution.

Collaborative Industry Projects (CIPs)

Seven CIPs are going to be launched soon:

Protective, Decorative Easy-Clean Coating CIP

New types of protective, decorative easy-clean coatings are required to enhance performance and durability compared to existing organic paints and lacquers in applications ranging from electronics enclosures to construction materials, automotive trim and medical instruments. A collaborative industry project is initiated, which will enable companies to evaluate the benefits of novel sol-gel coatings in selected applications, through materials testing and benchmarking, process studies and establishing guidelines for use. New formulations of sol-gel coatings will be demonstrated for different functional applications and after feasibility assessment, companies may prepare coatings on samples of product parts for validation. The goal of the project is to enable the transfer of new capabilities in speciality coatings to companies, and to provide cost sharing in developments of manufacturing readiness level towards targeted end applications.

For more information, please contact **Peter Collier**

Tel: 6793 8531 | E-mail: peterc@SIMTech.a-star.edu.sg

Chromium Replacements CIP

The surface finishing industry has been addressing alternatives to chromium (Cr) and hexavalent chromium compositions due to restrictions on hazardous materials, and while much progress has been made there remain issues, such as (i) matching replacements for hard chromium plating; (ii) lower lifetime, electrical conductivity and limited self-healing properties of Cr(III) / Cr-free surface conversion coatings as substitutes for Cr(VI) treatments; (iii) selection of Cr-free anti-corrosion pigments for water-based primers; (iv) lesser known performance of Cr-free bond primers for adhesive joints; (v) alternatives to chromium compounds for metal colouring for protective, decorative treatments of steels and for blackening of metals for high optical absorptivity and low emissivity coatings.

This collaborative industry project aims to support adoption of best practices in hexavalent chromium-free surface finishes in alignment with international standards and approvals, through shared evaluation and manufacturing readiness level developments of improved surface treatments in elected applications.

For more information, please contact **Peter Collier**

Tel: 6793 8531 | E-mail: peterc@SIMTech.a-star.edu.sg

Hydrophilic Coating CIP

Hydrophilic polymers are in medical applications in the form of lubricious coatings for catheters and guidewires, as anti-coagulation coatings for tubing, in filters and membranes for chemical separation and as anti-fouling, low friction surfaces for ophthalmic components and surgical instruments.

Copolymer hydrogels may be applied to combine functional performance with stability and durability, and to enable coatings systems to be applied to articles and cured with consistency and high productivity.

This collaborative industry project aims to establish protocols for selection, testing and benchmarking of hydrophilic coatings to support the development of new medical products. Application case studies selected by the participants will be used to assess the performance of new hydrogel compositions and the feasibility to tailor porosity and swelling characteristics for end applications.

For more information, please contact **Peter Collier**
Tel: 6793 8531 | E-mail: peterc@SIMTech.a-star.edu.sg

Thermal/Flow Simulation and Analysis CIP

This CIP will be launched in April 2012 and be completed in Sep 2012. The main objectives are

- Transfer SIMTech's expertise and know-how in the thermal/flow analysis by using Computational Fluid Dynamics (CFD) and Finite Element Analysis (FEA)
- Transfer SIMTech's expertise and know-how in heat transfer and flow measurements techniques

Members are from the precision engineering, and semiconductor equipment sectors.

For more information, please contact **Dr Lin Wen-Jong**
Tel: 6793 8988 | Email: wjlin@SIMTech.a-star.edu.sg

Electrostatic discharge (ESD) and Electrical magnetic interface (EMI) CIP

This CIP will be launched in Jul 2012 and be completed in Dec 2012. The main objectives are

- Understand the International Standards for ESD/EMI Specification
- Transfer SIMTech's expertise and know-how in the structural and equipment design for the ESD/EMI

shielding Method by using Finite Element Analysis (FEA)

- Transfer SIMTech's expertise and know-how in ESD/EMI testing and measurements techniques

Members are from the precision engineering, and semiconductor equipment sectors.

For more information, please contact **Dr Lin Wen-Jong**
Tel: 6793 8988 | Email: wjlin@SIMTech.a-star.edu.sg

Structure Vibration CIP

This CIP will be launched in Oct 2012 and be completed in Jan 2013. The main objectives are

- Understand the International Standards for Vibration Specification
- Transfer SIMTech's expertise and know-how in the structural and equipment design for the vibration reduction by using Finite Element Analysis (FEA)
- Transfer SIMTech's expertise and know-how in vibration testing and measurements techniques

Members are from the precision engineering, and semiconductor equipment sectors.

For more information, please contact **Dr Lin Wen-Jong**
Tel: 6793 8988 | Email: wjlin@SIMTech.a-star.edu.sg

X-ray sterilisation of medical devices CIP

In Singapore, the scarcity of sterilisation facilities is a long-existing and increasingly serious problem. The current facilities can barely address the growing demands from both medical devices and food industries. In-line sterilisation can be an alternative solution to the high cost and risk of sending the accumulated products to overseas sterilisation facilities. Using X-ray for in-line sterilisation is attracting more interests from industry since X-ray can provide deep penetration and fast sterilisation capability which is comparable with Gamma γ -ray. Unlike γ -ray, X-ray has no radioactive issue and does not leave toxic residues after sterilisation. The goal of the CIP is to develop an X-ray source which can provide stable high energy and high flux X-ray to meet the needs for fast and efficient in-line sterilisation of products.

For more information, please contact **Robert Lee**
Tel: 6793 8436 | Email: cmllee@SIMTech.a-star.edu.sg

INDUSTRY INITIATIVES

Below are the various PE COI initiatives for the precision engineering industry to venture into high growth industries.

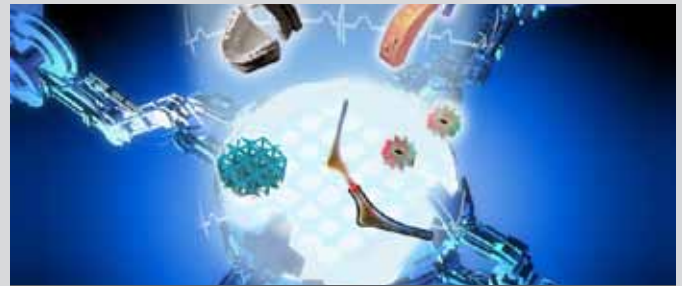


Oil & Gas Initiative

This initiative aims to develop indigenous deep-hole gun drilling, boring, trepanning and Fibre-laser cladding capabilities on exotic materials to attract a new range of high performance and corrosion resistant oilfield equipment to Singapore. An Oil & Gas team will promote, develop and transfer know-how and capabilities relating to laser cladding of Inconel 625; gun drilling, boring and trepanning of Inconel 718; drill heads designs through a series of workshops, seminars, consultancies, collaborative industry projects and consortia.

Contact: Dr Lim Beng Siong

Tel: 6793 8370 | Email: bslim@SIMTech.a-star.edu.sg

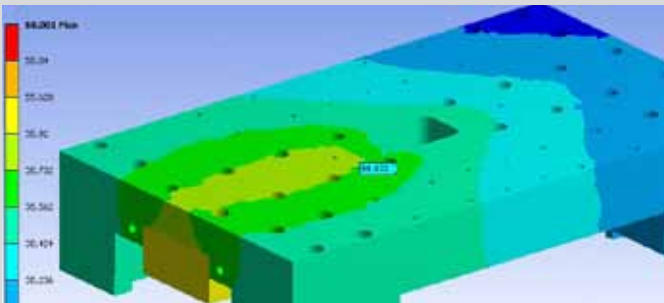


MedTech Initiative

The MedTech Initiative intends to help local companies venture into the MedTech industry through a mix of value chain, technology and capability development consortia. Manufacturing consortia-based projects will be implemented to enhance the technical capabilities of the medtech companies. Workshops and seminars will be organised to promote and impart the advanced technologies. The initiative will also address the needs and challenges faced by the Singapore industry as it diversifies and migrates to medtech products manufacturing.

Contact: Mr Robert Lee

Tel: 6793 8436 | Email: cmlee@SIMTech.a-star.edu.sg



Engineering Design & Simulation Initiative

The Engineering Design & Simulation Initiative is a cross-functional initiative set up to exploit the use of simulation to enhance design in various engineering fields so as to improve productivity across design, engineering and manufacturing activities.

Contact: Dr Lin Wen-Jong

Tel: 6793 8988 | Email: wjlin@SIMTech.a-star.edu.sg



Aerospace Initiative

Based on industry needs, an industry collaborative model involves a queen bee approach with an MNC and the local supply chain in Singapore creates niche capabilities in engine safety and component life span. These areas are of value to the aerospace industry. Critical to this is process reproducibility and part quality consistency. The objective of the industry collaboration is to develop automated surface finishing and to transfer this to an existing company or to deploy it in a joint venture or spin-off. In this manner, a unique technological competitive edge and jobs will be created for Singapore.

Contact: Dr Sun Zheng

Tel: 6793 8594 | Email: zsun@SIMTech.a-star.edu.sg



Operations Innovation Initiative

The objectives are to upgrade the local SME's capability and productivity in High Value Manufacturing through the Operations Innovation Programmes including: High-Mix Low-Volume (HMLV) consortium for Integrated Production Planning and Shopfloor Tracking; Lean Manufacturing Initiative for Leadtime and Productivity Improvement; Manufacturing Operations Management Graduate Diploma Course for Workforce Skills Upgrading; Productivity Development Programme for Companies and Trainers; Cellular Manufacturing System Development for HMLV Production.

Contact: Ms Laura Xu

Tel: 6793 8395 | Email: xxxu@SIMTech.a-star.edu.sg



Complex Equipment Initiative

The objective of the complex equipment initiative is to help enhance the business competitiveness and opportunities of the local SMEs in the manufacture of high value complex components, complex electromechanical modules and complex equipment through technological capability development. The initiative meets this objective through collaborative industry projects and technological capability upgrading programmes through the precision engineering industry value chain.

Contact: Ms Wan Siew Ping

Tel: 6793 8298 | Email: spwan@SIMTech.a-star.edu.sg



Heat Treatment Initiative

This initiative develops the process routes and transfers technology to improve the competitiveness of the local heat treatment companies. This is achieved through company upgrading and investment analysis; and gas quenching, stepped quenching and advanced heat treatment targeting low pressure carburising and case depth control. The goal of the Heat Treatment Initiative is to develop the core capabilities through collaborative industry project and direct industry projects.

Contact: Dr Mehrdad Zarinejad

Tel: 6793 8513 | Email: mehrdad@SIMTech.a-star.edu.sg



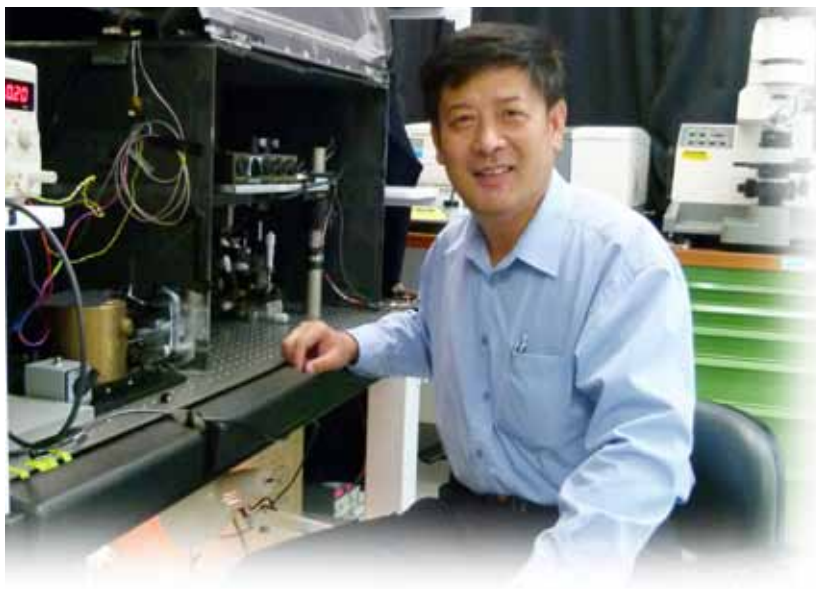
Surface Finishing Initiative

The Surface Finishing Initiative aims to launch various collaborative industry projects over the 3 years. These are the application of fluoropolymer coatings for friction control on bearing surfaces for oil & gas tooling and equipment; biocompatible coatings for medtech devices; and metals recovery and waste water treatment using novel electrochemical processing techniques.

Contact: Mr Peter Collier

Tel: 6793 8531 | Email: peterc@SIMTech.a-star.edu.sg

PE EXPERT CONSULTANT PROFILES



Biography of Dr Fang Zhongping

Dr Fang Zhongping specialises in optics, optical instruments, optics & lighting technology for machine vision inspection, precision measurements and metrology technology. He has 30 years of industrial and applied R&D experience in the field of optical system design & optical instrumentation, fibre optics & sensors, automated vision inspection, precision measurements and metrology technology for the semiconductor, electronics, precision mechanical engineering, automotive, aerospace, biomedical engineering and oil & gas industries.

Dr Fang has been working with SIMTech since 1995. Currently, he is a Senior Scientist with the Precision Measurements Group. Before taking up this position, he was the Manager of Photonic Systems Group, and Machine Vision & Sensors Group. Prior to joining SIMTech, he also held various R&D positions with the National Institute of Metrology (NIM), Beijing, China, the National Institute of Standards and Technology (NIST), USA, semiconductor equipment manufacturing and optical manufacturing companies in Hong Kong. He graduated from Tsinghua University, Beijing, China and received a PhD degree from a joint programme between Tianjin University, China and the University of North Carolina at Charlotte, USA, in Optical Instruments Engineering and Metrology Technology.

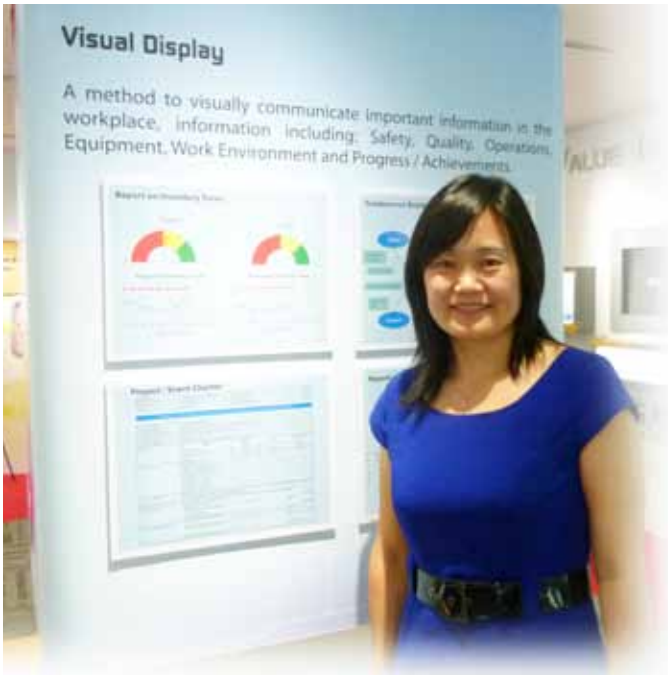
Biography of Dr Linda Wu

Dr Linda Wu is a Senior Scientist in the Surface Technology Group of SIMTech. Her research fields cover chemical formulations of sol-gel based coating materials, surface treatments and multi-functional coatings for metals, ceramics and plastics substrates by wet chemical processes and electro-chemical processes, nanoparticles syntheses and their surface modifications for biomedical applications, self-assembled nanostructures for surface energy control and optical applications, roll-to-roll coating technology for functional films, and materials characterisations.



She holds a Bachelor degree and a Master degree in Materials Science from Tsinghua University, China, an MBA from University of South Australia and PhD from Nanyang Technological University. Before joining SIMTech, she worked as a research scholar in Liverpool University, UK, and a Senior Engineer in Philips Electronics (Singapore) Pte Ltd. She joined SIMTech in 2000 and has been a Principal Researcher and project leader for several research projects and industrial projects. Her achievement on the multilayer sol-gel coating system was awarded the Singapore National Technology Award in 2002. Currently, she is working with industrial partners on sol-gel based scratch resistant easy-clean coatings, coloured anodising, surface patterning and surface energy control chemical treatment, chemical synthesis of special functional nanoparticles of metals and semiconductor, and transparent conductive coatings on flexible substrates.

Biography of Ms Laura Xu

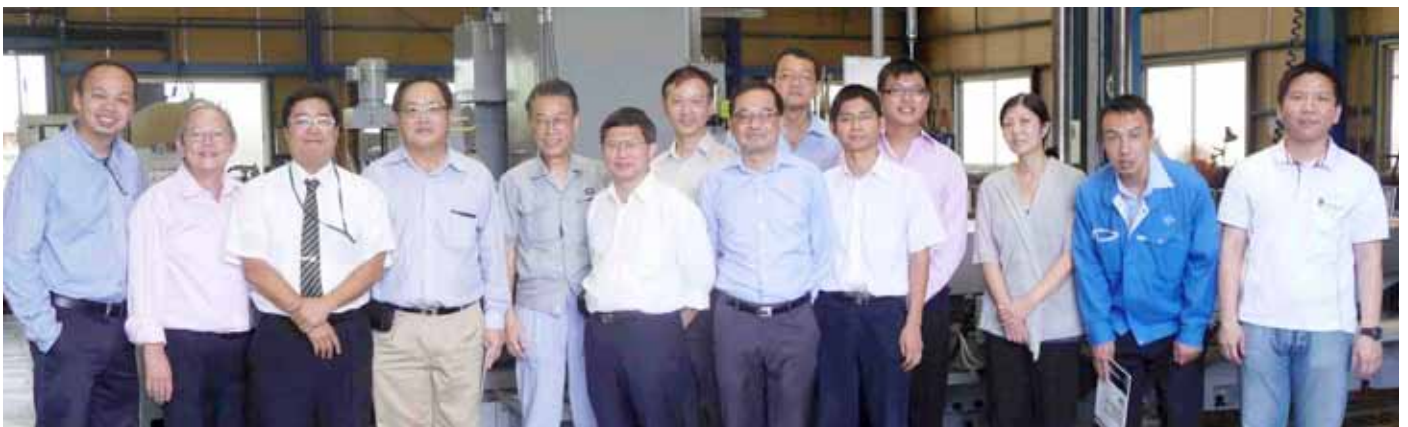


Ms Laura Xu is a Lead & Consultant for Operations Innovation Initiative of PE COI. She is a Principal Research Engineer with SIMTech. She has 15 years of experiences in giving training & providing consultancy in Lean manufacturing, ERP implementation, Business re-engineering, Supply chain modelling & design, Supply chain performance measurement and improvement and Value chain study. She has helped companies in different industries to improve their operation efficiency and competitiveness. Companies she has worked for include Endela Trading and Manufacturing, C&W Electronics, Microsoft Operations, Siemens Medical Instruments, Jurong Port, CIBA Vision Asian Manufacturing and Logistics, Maritime and Port Authority of Singapore, HITECH Heat Treatment Services, Association of Aerospace Industries, Infineon Technologies Asia Pacific, Eratech and CKE Manufacturing.

She is a Certified Production & Inventory Management (CPIM) practitioner and Certified Project Management Professional (PMP) by PMI, USA, and also certified in SCOR (Supply Chain Operation Reference-model) and JDEdwards/ Glovia ERP Applications. She has a Master Degree in Engineering from Nanyang Technological University of Singapore, Master Degree in Economy Management and Bachelor Degree in Mechanical Engineering from Tsinghua University of China.

PAST EVENTS

Collaborate to Innovate: Gun Drilling Capability Development Mission to Japan (12 to 16 Sep 2011)



Gun drilling delegates at Miroku Job Shop Factory – representatives from Daido Steel, Drillmaco, Fong Lee Metal Industries, Fuchs, Halliburton, HME Technologies, Miroku, SIMTech, Stamford Tool and Yudo Wanco

PE COI set up a Gun Drill CIP in Dec 2010 with 22 international and local member companies to jointly develop capabilities to innovatively create a larger market within the oil & gas industry. This mission provided a platform to build rapport among the key industrial decision makers with the ultimate intention of submitting industry-wide proposals for collaborative development.



Introduction of GDI delegates to Mr Tomobumi Yoda, Deputy GM, Forging Product and Mr Hisashi Hirose, Manager, Production Technology at Daido Steel



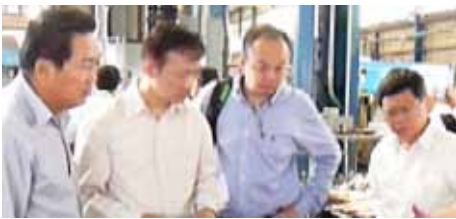
A 2.0m² Column Type Gun Drill Machine with an Incoloy 718 Benchmark Test Piece



Halliburton's Steven Hou inspecting the drill tip after resharpening



A high resolution image of a re-sharpened gun drill



Delegates seeing for the first time, the high resolution image of a worn cutting edge



Inspection of a 2.8m long gun drill using a tillable vision system

The Gun Drill CIP aims to foster closer relationships between its members and to create greater understanding of high aspect gun drilling of Inconel 718 for the Oil & Gas sector. The key objective of the Gun Drill CIP is to create a collaborative opportunity for inter- and intra-related companies to gain additional awareness of potential partnership, skill sets and resources associated with gun drilling from some of the leading members in Japan.

A Senior Technical Professional from Halliburton provided the specific tolerances, material alloys compositions and hole's straightness requirements to the team for further considerations. This mission covers three highly inter-related factories in Japan (Daido Steel, Shibukawa; Miroku Machine Tool Factory, Nankoku; Miroku Job-Shop Factory, Sagamihara) to deepen our

members' understanding of this specialised technology, starting from the mills & hot forging of exotic material, machine tool manufacturing to the first-hand experience with the gun drilling process.

Workshop and Roundtable Discussion on Protective, Decorative Easy-Clean Coatings (13 Oct 2011)

Functional coating provides an important means of product differentiation in terms of cost, quality, durability and user appeal. A recent workshop at SIMTech addressed the requirements for coatings and some of the capabilities and potential benefits of speciality coatings based on wet chemical sol-gel materials.

The workshop entitled Protective, Decorative Easy-Clean Coatings focused on capabilities and applications of multi-functional sol-gel wet chemical coatings and attracted 23 participants from 15 companies. Two speakers from SIMTech shared the institute's experience. Dr Linda Wu began with an introduction to the chemistry of sol-gel coatings and explained how the formulations of coatings could be adapted to meet end-user requirements using functional properties as reference. Case studies related to scratch-resistant transparent hard coatings, anti-fingerprint coatings and decorative coatings were presented too. Mr Peter Collier presented on the industry landscape for protective, decorative coatings and cited examples of industrial uses of sol-gel coating materials in applications ranging from protective films for

mirrors and absorbers for solar collectors, to decorative finishing for enclosures and corrosion protective layers for metal castings and fasteners.

The technical talks were followed by a presentation of a proposal for a collaborative industry project which would enable companies to evaluate the benefits of sol-gel coatings in selected applications, through materials testing and benchmarking, process studies and establishing guidelines for use. Formulations of sol-gel coatings would be geared up for different functional applications and after feasibility assessment, companies could prepare coatings on samples of product parts for validation. The goal of the project was to enable the transfer of new capabilities in speciality coatings to companies, and provide a means for sharing of costs of developments in manufacturing readiness level towards targeted end applications.

After the proposal was outlined, the attendees contributed to a survey of priorities for coatings developments, evaluating in terms of parts to be coated, coating and curing properties, decorative finishes and discussing the ranking of importance of functional properties.

Since the workshop, a collaborative project has been launched with three companies working with SIMTech. Applications for support from SPRING Singapore are being prepared under the Capability Development Scheme. Please contact Ms Verlin at 6793 8360, PECOI@SIMTech.a-star.edu.sg for further information.

Challenges and Case Studies: Measurement of Deep Hole Straightness Seminar - Marine, Oil & Gas and Aerospace (3 Nov 2011)

The main purpose of this seminar is to share the non-destructive inspection and measurement sensing technology used in the aerospace industry and how it can be applied for in-situ measurement of deep hole straightness for the Oil & Gas Sector. A total of 63 delegates from the aerospace, oil & gas, automotive, maritime and qualification societies attended this seminar.

There were two SIMTech presenters at the seminar. Dr Lim Beng Siong shared the challenges faced in deep hole drilling, geometrical and form characteristics of holes to be measured together with some of the actual samples that require NDT measurement. The key factors affecting the accuracy of measurement of deep hole straightness using ultrasonic techniques was discussed by Dr Stephen Brian Wong.

Industry members also participated as speakers. Dr Gan Woon Siong from Acoustical Services Singapore provided a conceptual design of an ultrasonic imaging system for in-situ deep holes misalignment measurement. Mr Yuval Levin, Director, Acoustic Eye presented a case study on the use of Acoustic Sensing System for the inspection of heat exchangers. A case study on the inspection of wide-chord fan blades was presented by Mr Chris Gartside, Director from Ultrasonic Sciences.



Seminar in progress



Speakers for the seminar

Gun Drilling Capabilities Development Mission to Yudo Wanco (4 Nov 2011)



1.6m work-piece set up with Advanced Sensory System for Drill Slippage Detection



Mission Team comprising 61 industry participants



Industry leaders given a rare glimpse of a high-resolution Cutting Edge Inspection System



Mr Kwan Tuck Sing, President of YudoWanco extending a warm welcome to the Gun Drilling CIP delegates

The Oil & Gas initiative organised this mission trip for our local companies to gain deeper insight of the technical challenges in gun drilling of high-yield strength (149 Ksi) Inconel 718. A total of 61 industry participants from the local industry, mainly top management, attended the event.

The delegates were given an opportunity to observe the drilling of a 8mm diameter hole with a depth of 1.6m (aspect ratio of 200); challenges involved with the

variability in material hardness; inability of the operator to re-sharpen the gun drill apex to its original conditions; drifting of the resultant hole due to inter- and intra-drills mismatch, Abbe's error; whipping and chattering; localised hardening and torsional stiffness of the drill stems. In addition, some of the more advanced techniques for the inspection of the cutting edges, tool wear were demonstrated together with an on-line data acquisition system using an array of Acoustics Emission sensors and accelerometers placed at critical positions.

PE COI Open House (10 Nov 2011)

This open house aims to showcase SIMTech facilities to the local PE companies to encourage them to use the equipment as well as to tap on our manufacturing capabilities. A total of 66 participants from industry and 13 participants from government agencies attended the open house.



Industry showing strong interest in our prototypes



Seminar in process



Scientist demonstrating technologies to industry

Gun Drilling Conference on Inconel-based High Aspect Ratio Holes (5-7 Dec 2011)

(Organised by SIMTech & PE COI; Led by Halliburton; Supported by A*STAR and SPRING Singapore)

The key objective of the Gun Drilling Conference is to provide a platform for the member companies to share the latest market demand, projection and forecast for the energy sector. The conference focuses on drilling/completion tools as well as the benchmarking results and preliminary proposals for further joint development amongst the initiative members.

Mr Dax Middlebrooks, Manager International Sourcing, D&E, Halliburton provided a comprehensive overview of the company's market leadership along with the supply/demand outlook for the energy sector, world demand for oil, projected spending for the global drilling and completion tools in the opening address. In order to meet this rapid growth, various methods have to be adopted by companies to meet the demand ranging from unconventional basins with tight gas, shale gas and coal bed

methane; deepwater High-Pressure, High-Temperature wells to maturing fields.

Dr Lim Beng Siong gave a detailed update of the capabilities development missions and suppliers development events held in 2011. He also addressed the gaps, common issues to be resolved and shared co-development industry-wide opportunities identified from the benchmark exercises conducted at Miroku, Japan and Yudo Wanco in Johore Bahru (JB).

Market opportunities associated with gun drilling particularly for the drilling/evaluation and wirelines/perforation tools were discussed by Mr John Paul Marshall, Lead from Halliburton. He also spoke on the gun drilling growth potential in the emerging market and the relative amount of spending by regions.



Speakers (from left to right) at the Gun Drilling Project Conference – Dr Liu Kui, Mr Kanno Shigeyuki, Dr Woon Keng Soon, Dr Lim Beng Siong, Mr Kwan Tuck Sing, Mr Dax Middlebrooks, Mr John Paul Marshall, Dr Gan Woon Siong, Dr Ko Jeong Hoon, Mr Kum Chun Wai, Dr Brian Stephen Wong and Dr Fang Zhongping

Dr Woon Keng Soon, SIMTech Scientist, shared some of the initial scientific observations from the preliminary study in the gun drilling of Inconel 718 conducted by the teams in Japan and JB. Some of the key constraints, challenges and gaps which were identified provided the seed for further industry-wide development. The wear behaviour associated with different geometry, drill slippage, apex re-sharpening and drill measurements techniques are recognised as critical factors for retaining hole's straightness.

On behalf of Miroku Machine Tool, SIMTech Scientist, Dr Liu Kui, presented on the set up of the work piece from Daido Steel, cutting parameter used as well as the re-sharpening strategies. Critical items which have been recommended for further development includes minimising the material hardness and yield strength variability; preventing deviation and slippages arising from re-sharpening and its combined effect on the inter- and intra-holes alignment, radial forces on the side margins and hole's straightness.

Dr Gan Woon Siong, Chairman of Acoustical Technologies discussed about the working principle, data acquisition and conversion techniques, interactive processing, image correction/enhancement techniques, key features and advantages of a seismic imaging system together with the embedded transducer for in-situ deep hole misalignment measurement.

Mr Huang Sheng, SIMTech Senior Research Engineer demonstrated the viability of using acoustic emission



Representatives from Acoustical Services, Amega West, Combi-Tools, Carpenter Technology, Fuchs, Halliburton, InterOffshore, Meiban, MMI, SIMTech, SuperUnion, Taimaru, TBT and YudoWanco

and accelerometer signals for drill slippage and instability detection in gun drilling together with the signal processing and filtration; dynamic modelling and monitoring to detect premature and unplanned events that will affect hole's straightness, run-out and concentricity.

Dr Li Qingfa, SIMTech Senior Scientist gave a preliminary indication on the advantages of incorporating refractory alloys into carbide material to prolong the gun drill life by increasing the thermal resistivity, hardness and rupture strength. Such capabilities can be developed by working with the sintered HIP (hot isostatic press) facility at SIMTech.

Dr Fang Zhongping, SIMTech Senior Scientist, demonstrated the viability of setting up an industry-wide Gun Drill Cutting Edge Measurement System for the determination of the drill diameter, apex offset values, bushes and incoming gun drill inspection. This system will be precision optical based, with advanced image processing, precision mechanics and steerable heads.

Dr Stephen Brian Wong, PE COI Consultant from SIMTech, gave a detailed description of the factors affecting the accuracy of deep hole's straightness measurement using pulse-echo ultrasonic imaging together with a phase array probe set up with courtesy from Olympus for hole's straightness and diameter measurements.

Dr Ko Jeong Hoon, SIMTech Scientist, highlighted some of the modelling techniques that can be used for damping and suppressing vibration, whipping and chattering; discussed on the study of the torsional effect on the drill stems specifically for extremely high aspect holes and how it can be applied towards down-hole drilling.

Contact us for your interest in joining these industry-wide projects:

Dr Lim Beng Siong

Senior Scientist, PE COI Oil & Gas Lead, SIMTech

Email: bslim@SIMTech.a-star.edu.sg | Mobile: 9664 3967

EQUIPMENT NEWS



55-Ton Electrical Injection Moulding System

An electric driven, 55-Ton, Tie Barless Injection Moulding System is available to support research and industry projects for moulding precision plastic parts such as medical devices, optical devices, precision products with engineering materials, thin wall parts, etc. This system is equipped with abrasion and corrosion resistance screws and barrel for moulding of engineering materials such as PEI and PEEK. It has additional screws and barrels for the support of different product sizes as well as a dedicated screw and barrel for moulding of optical/ transparent products. It has also been equipped with a 10K clean room module for supporting products such as medical devices that require clean room moulding environment.

Applications:

Suitable for producing Micro-fluidic parts with micro channels, optical parts and medical parts that require precision.



Heavy Duty Spin Forming Machine

This multi-axis spin forming machine with two rollers is used for high precision cold forming of large size axi-symmetrical components with thin wall and high strength on metal parts. It is cost effective for low volume production, high material savings, low energy consumption, easy lubrication, and CNC controlled. Its specifications include

- Forming modes: flow forming, groove & step forming, cone forming
- Diameter of formed components: 50~200mm
- Max length of formed components: 350mm
- Maximum forming load: 150KN (Axial & Radial)

Applications

- High precision forming of thin cylindrical, conical, concave and convex profile components with intricate internal/ external features for aerospace, oil & gas, automotive, and other PE industries (HMLV manufacturing)
- Typical workpiece materials to be formed: plain carbon & alloy steels, Ti alloys, Al alloys, Super alloys (INCONEL), etc.

PE Consultants Highlight

Metal Forming & Casting



Dr Atsushi Danno
Former Board Member and Director in TOYOTA CRL.

- High Precision Bulk-Metal Forming Technology

danno@SIMTech.a-star.edu.sg

Plastic, Metal & Ceramic Moulding



Dr Li Qingfa

- Powder Injection Moulding and Powder Metallurgy

qfli@SIMTech.a-star.edu.sg



Mr Chen Ge

- Plastic Injection Mould Design
- Mouldflow

gchen@SIMTech.a-star.edu.sg

Welding & Joining



Dr Sun Zheng

- Welding Processes and Welding Metallurgy

zsun@SIMTech.a-star.edu.sg



Dr Ying Ming

- Polymer Joining and Micro/ Nanojoining

mying@SIMTech.a-star.edu.sg

Machining



Mr Kanno Shigeyuki

- Precision Machining Technology, Micro-Machining and Micro-ecm

kanno@SIMTech.a-star.edu.sg



Dr Lim Gnian Cher

- Laser Machining and Processing

gclim@SIMTech.a-star.edu.sg



Mr Liu Peiling

- CAD/CAM/CNC toolkit and simulation system developer of InventorMould, Virtual CNC Training Lab & QuickCNC

plliu@SIMTech.a-star.edu.sg



Dr Khong Heng Poh

- Former Head of Process Engineering & Technology, Rolls-Royce Fuel Cell Systems, Singapore
- Machine Tool
- Automation

hpkhong@SIMTech.a-star.edu.sg

Plating & Coating



Dr Linda Wu

- Surface treatment and chemical modification
- Sol-gel based wet chemical coatings
- Nanoparticle synthesis and applications
- Anodising

ylwu@SIMTech.a-star.edu.sg



Dr Ding Xing Zhao

- Tribological Hard Coatings

xzding@SIMTech.a-star.edu.sg



Mr Chang Jen Heng

- Former R&D Director and co-founder of Technochem
- Decorative Plating, Chemical Etching, Metal Stripping and Recovery

jhchang@SIMTech.a-star.edu.sg



Dr Huang Zhaohong

- Electronics Thin Film Devices
- Photo Electrochemical Manufacturing
- Industrial Waste Treatment

zhhuang@SIMTech.a-star.edu.sg



Dr Sandor Nemeth

- High Temperature Resistant and Scratch Resistant Coatings

sandorn@SIMTech.a-star.edu.sg

Operations Management



Dr Lim Yan Guan, Roland

- Lean Manufacturing, ERP system and Supply Chain Management

yglim@SIMTech.a-star.edu.sg



Dr Zhang Nengsheng, Allan

- Information Technology in Manufacturing Operations Management

nzhang@SIMTech.a-star.edu.sg



Mr Chua Tay Jin

- Production Planning and Scheduling

tjchua@SIMTech.a-star.edu.sg



Ms Laura Xu

- Lean Manufacturing
- Supply Chain Design and Performance Measurement

xxu@SIMTech.a-star.edu.sg

Manufacturing Execution & Control



Dr Goh Kiah Mok

- Manufacturing System Design
 - Embedded System, Equipment and Device Interface
- gkmgoh@SIMTech.a-star.edu.sg



Mr Wong Ming Mao

- System & Supervisory Control
 - Automated Warehouse Control System
- mmwong@SIMTech.a-star.edu.sg



Mr Tan Chak Huah

- Shop Floor Execution & Control
 - Shop Floor Track-and-Trace
- chtan@SIMTech.a-star.edu.sg



Mr Zhao Yi Zhi

- Intelligent Manufacturing System
 - Wireless Network and RFID
 - Dynamic Reconfiguration for HMLV Control
- yzzhao@SIMTech.a-star.edu.sg



Ms Zhou Junhong

- Equipment health monitoring, fault diagnosis, prognosis
 - Manufacturing process optimisation
 - Data mining
- jzhou@simtech.a-star.edu.sg

Green Manufacturing



Dr Song Bin

- Green Manufacturing
 - Remanufacturing
- bsong@SIMTech.a-star.edu.sg

MedTech



Mr Kiyoshi Chikashige

- Medical devices
 - Design
- chikashige@SIMTech.a-star.edu.sg

Equipment Development



Ms Wan Siew Ping

- Equipment and System Conceptualisation
 - Automation and System Integration
 - Modular Design and Documentation
- spwan@SIMTech.a-star.edu.sg

Process & Tool Condition Monitoring



Dr Lim Beng Siong

- High Integrity and Performance Monitoring
 - Electrode, Tools and Work Piece Tracking
- bslim@SIMTech.a-star.edu.sg

Factory Automation



Dr Lin Wei

- Precision Mechanism and Machine Design
 - Manufacturing Automation
- wlin@SIMTech.a-star.edu.sg



Dr Lin Wen-Jong

- CAE for Precision Machines
 - Vibration Analysis and Control
- wjlin@SIMTech.a-star.edu.sg



Mr Chow Siew Loong

- Conceptual Design and Mechanical Design
 - Manufacturing Automation
- slchow@SIMTech.a-star.edu.sg

Reliability



Assoc Prof Tan Cher Ming

- Electronic & Electrical Reliability
 - Failure Analysis
 - Quality Engineering
- ECMTAN@ntu.edu.sg

Precision Measurements



Dr Fang Zhongping

- Optics
 - Metrology
- zpfang@SIMTech.a-star.edu.sg



Dr Liu Wei

- Wireless System and RF Antenna
 - RFID and Real-time Location System
- wliu@SIMTech.a-star.edu.sg



Dr Xu Jian

- Image Processing
 - Vision Inspection
- jxu@SIMTech.a-star.edu.sg

Material Characterisation



Ms Liu Yuchan

- Dimension Metrology
- yliu@SIMTech.a-star.edu.sg

Courses

The following eight courses are joint initiatives by SIMTech, A*STAR, and WDA. Each course consists of five to six modules.

- Graduate Diploma in Precision Measurement Characterisation: 3 Jan 2012
- Specialist Diploma in Precision Engineering: 3 Jan 2012
- Graduate Diploma in Manufacturing Operations Management: 4 Jan 2012
- Graduate Diploma in Mechatronics: 4 Jan 2012
- Graduate Diploma in MedTech: 30 Jan 2012
- Graduate Diploma in Factory Visibility and Control: Jan 2012
- PE OMNI Programme: 13 Feb 2012
- Graduate Diploma in Sustainable Manufacturing: Jul 2012

Contact person: **Ms Connie Ng**

Tel: 6793 8986

Email: yyng@SIMTech.a-star.edu.sg



About the Precision Engineering Centre of Innovation (PE COI)

The PE COI serves as a national resource and aims to proactively assist the upgrading of SMEs within the PE sector. It provides technology and IT related services and know-how to industry through the following means:

- Consultative role: companies requiring short-term advice in resolving imminent technical and productivity improvements issues can effectively use the PE COI to serve as their in-house consultants.
- Technology development: companies needing help in the development of new technology that require more than consultative advice will be channelled to the appropriate institutions such as the research institutes within A*STAR and other institutions of higher learning. The PE COI will act as a one-stop centre to facilitate faster response to industry's needs.
- The laboratory facilities at the PE COI will be made available to the consultants and companies as well as researchers from institutions.

For enquiries, please contact: PE COI Technical Hotline

Ms Verlin at 6793 8360

Email: PECOI@SIMTech.a-star.edu.sg

Website: PECOI.SIMTech.a-star.edu.sg

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