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Naib Canselor USM, YBhg. Profesor Dato' Dr. Omar Osman (kanan) menyampaikan cenderahati kepada Profesor Dr. Mitsuteru Inoue di majlis perasmian persidangan IGNITE 2016.

PPKBSM BERJAYA MENGANJURKAN PERSIDANGAN INTERNATIONAL CONFERENCE OF GLOBAL NETWORK FOR INNOVATIVE TECHNOLOGY 2016 (IGNITE 2016)

27 Januari 2016 - Universiti Sains Malaysia (USM) melalui Pusat Pengajian Kejuruteraan Bahan dan Sumber Mineral (PPKBSM) dan Toyohashi University of Technology (TUT, Japan) telah menganjurkan International Conference of Global Network for Innovative Technology ketiga (IGNITE 2016) pada 27 – 29 Januari 2016 bertempat di Evergreen Laurel Hotel, Pulau Pinang. Tema yang dipilih untuk persidangan pada kali ini adalah 'Advanced Materials for Innovative Technologies'. Persidangan ini telah disertai oleh lebih 250 orang peserta dalam negara (52%) dan luar negara (46%) termasuk dari Jepun, Indonesia, Filipina dan New Zealand. Sebanyak 209 kertas kerja telah dibentangkan dalam persidangan IGNITE 2016. Kertas kerja tersebut akan diterbitkan dalam Prosiding AIP (Scopus) manakala kertas kerja terpilih akan diterbitkan dalam Journal of Polymer Materials.

Persidangan IGNITE yang merupakan penganjuran bersama USM and TUT buat kali ketiga telah mengukuhkan lagi jalinan kerjasama antara Malaysia dan Japan, khususnya kedua-dua institusi ini. IGNITE 2016 juga menjadi platform kepada penyelidik, jurutera dan pendidik pelbagai bidang untuk membentangkan dan membincangkan inovasi yang paling baharu serta cabaran yang dihadapi dengan penyelesaian yang diterima pakai dalam bidang bahan termaju dan teknologi inovatif.

Persidangan ini telah dirasmikan oleh Naib Canselor USM, YBhg. Profesor Dato' Dr. Omar Osman dan upacara perasmian ini turut dihadiri oleh En. Ryuji Noda (Konsul-Jeneral Negara Jepun ke Malaysia), Timbalan Naib Canselor (TNC) (Hal Ehwal Akademik dan Antarabangsa), YBhg. Profesor Dato' Dr. Ahmad Shukri Mustapa Kamal, TNC (Jaringan Industri dan Masyarakat), YBhg. Profesor Dato' Dr. See Ching Mey, TNC (Penyelidikan dan Inovasi) YBhg. Profesor Dato' Dr. Muhamad Jantan, Dekan PPKBSM Profesor Dr. Zuhailawati Hussain, Pengerusi IGNITE 2016 USM, Profesor Dr. Hanafi Ismail dan Pengerusi IGNITE 2016 TUT, Profesor Dr. Atsunori Matsuda.

UCAPAN ALUAN DEKAN, PROFESOR DR. ZUHAILAWATI HUSSAIN

Assalamualaikum w.b.t dan Salam Sejahtera.

Terlebih dahulu saya ucapkan syabas dan tahniah kepada ahli jawatankuasa Buletin Enjinier di atas penerbitan Buletin Enjinier Jil. 18 Bil 01. Seperti sedia maklum, berkuatkuasa mulai 1 Januari 2016 sehingga 31 Disember 2018, jawatan kuasa pengurusan dan pentadbiran Pusat Pengajian Kejuruteraan Bahan dan Sumber Mineral (PPKBSM) akan diterajui oleh saya dan jawatankuasa yang baharu dilantik oleh pihak Universiti. Amanah yang dipertanggungjawapkan ini adalah sangat berat dan sudah pasti penuh dengan liku dan cabaran. PPKBSM telah ditubuhkan pada 1986 dan semenjak itu, PPKBSM telah berjaya mencapai banyak kejayaan sehingga menjadi antara pusat tanggungjawab (PTJ) yang cemerlang di USM. Mengekalkan kecemerlangan adalah jauh lebih sukar daripada mencapainya. Oleh demikian, saya menyeru kepada semua warga PPKBSM untuk bersama berganding bahu bagi memastikan visi serta misi PPKBSM menjadi PTJ yang dikenali, dihormati dan diiktiraf di peringkat global dan seterusnya dapat menyumbang kepada kecemerlangan 'Menara Ilmu' kita. Tidak dilupakan juga penghargaan tidak terhingga diberikan kepada mantan jawatankuasa pengurusan dan pentadbiran terdahulu diketuai oleh Profesor Dr. Hanafi Ismail di atas kejayaan menjadikan PPKBSM antara PTJ yang disegani di USM. Saya dan jawatankuasa pengurusan dan pentadbiran baharu PPKBSM amat mengharapkan teguran dan pandangan daripada semua pihak bagi memastikan PPKBSM terus cemerlang dan terbilang di masa hadapan.

Profesor Dr. Zuhailawati Hussain
Dekan, Pusat Pengajian Kejuruteraan Bahan & Sumber Mineral

Profesor Dr. Hanafi Ismail (kanan) menerima anugerah EUROINVENT 2016.

TERAJU BARU PPKBSM

1 Januari 2016 - Mulai 1 Januari 2016, Pusat Pengajian Kejuruteraan Bahan dan Sumber Mineral (PPKBSM) akan ditadbir oleh jawatan kuasa pengurusan baharu diketuai oleh Dekan, Profesor Dr. Zuhailawati binti Hussain. Beliau akan dibantu oleh Profesor Ir. Dr. Mariatti binti Jaafar (Timbalan Dekan Akademik, Pelajar dan Alumni) dan Profesor Madya Dr. Khairunisak binti Abdul Razak (Timbalan Dekan Penyelidikan, Siswazah dan Jaringan). Jawatan Pengerusi Rancangan Kejuruteraan Bahan diamanahkan kepada Profesor Madya Dr. Nurulakmal binti Mohd Sharif, Dr. Mohd Hazizan bin Mohd Hashim (Pengerusi Rancangan Kejuruteraan Sumber Mineral) manakala tanggungjawab Pengerusi Rancangan Kejuruteraan Polimer dipikul oleh Profesor Dr. Zulkifli bin Ahmad. Satu jawatan baharu telah diwujudkan bagi menyelia proses akreditasi serta menggalakkan program keusahawanan dan dinamakan Pengerusi Rancangan Akreditasi dan Unit Perniagaan. Profesor Madya Dr. Azura A. Rashid telah diberi kepercayaan menerajui jawatan baru ini. Semua lantikan ini berkuatkuasa sehingga 31 Disember 2018.

PROFESOR DR. HANAFI ISMAIL MENCIPTA KEJAYAAN DI EUROINVENT 2016

22 Mei 2016 - Profesor Dr. Hanafi Ismail dengan hasil inovasi, Produk MultiFunctional Eco-RubFoam mencipta kejayaan di pameran The 8th European Exhibition of Creativity and Innovation (EUROINVENT 2016) di Iasi, Romania. EUROINVENT merupakan persidangan, pameran dan promosi kreativiti dan inovasi serta penganugerahan antarabangsa yang berprestij di Eropah.

Profesor Dr. Hanafi Ismail mendapat anugerah pingat emas dan juga tiga anugerah khas juri antarabangsa dari Highly Innovative Unique Foundation Saudi Arabia dan Universitatea Tehnics Din Cluj-Napoca Romania. Profesor Dr. Hanafi Ismail bersyukur dengan pencapaian yang diperolehi dan akan terus memberi sumbangan kepada USM melalui kejayaan seperti ini.

LAWATAN PEMERIKSA LUAR PROGRAM KEJURUTERAAN POLIMER

28 April 2016 - Pemeriksa luar bagi Program Kejuruteraan Polimer, Profesor Dr. Greg Qiao dari University of Melbourne, Australia telah mengadakan kunjungan ke Pusat Pengajian Kejuruteraan Bahan & Sumber Mineral.

Lawatan yang bermula dari 25 hingga 28 April 2016 ini adalah merupakan keperluan yang telah ditetapkan oleh Universiti bagi program pra-siswazah di mana Pemeriksa Luar bertanggungjawab dalam menasihati dan menyumbang idea dalam melihat isi kandungan rancangan pra-siswazah khususnya.

Profesor Greg Qiao telah diberi pendedahan yang khusus berkaitan kurikulum bagi Program Kejuruteraan Polimer seperti kurikulum setiap kursus, semakan dokumen berkaitan peperiksaan, jaringan, pengajaran dan perjumpaan bersama pensyarah dan pelajar di samping berpeluang melawat makmal-makmal penyelidikan dan juga perpustakaan.

Profesor Greg Qiao turut menyampaikan syarahan pada hari terakhir lawatan beliau pada 28 April 2016. Syarahan yang bertajuk "Towards Polymeric Platform Technology Development" ini telah dihadiri oleh ramai pensyarah dan juga pelajar.

USM- SHIZUOKA UNIVERSITY LABORATORY SHORT TERM EXCHANGE PROGRAM

16 Jan 2016 - A group of three post-graduate students (Lim Zhe Xi, Nur Syafinaz Ridhuan, and Norasiah Mohammad Noordin) from the School of Materials & Mineral Resources Engineering, Universiti Sains Malaysia (USM) led by Prof. Ir. Dr. Cheong Kuan Yew were invited to participate in the USM-Shizuoka University Laboratory Short Term Exchange Program (SSSV) 2016 at Hamamatsu Campus, Shizuoka University for 7 days (9–16 Jan 2016). This SSSV Program was fully sponsored by Yamamoto International Student Foundation with a total amount of JPY ¥400,000.00. The group was hosted by Prof. Hirokazu Tatsuoka, Department of Engineering, Graduate School of Integrated Science and Technology. The students participated in a research symposium and laboratory visits. The students also enjoyed sightseeing trip to few tourism hotspots in Hamamatsu such as Ryotanji Temple, Cave Ryugashido, Houkouji Temple, Tokinosumika Fruit Park, Suzuki Plaza, and Hamamatsu Museum of Musical Instruments. The students were amazed with the working environment and culture in Shizuoka University and Japan especially the cleanliness, politeness as well as hard working spirits.

Photo taken during USM-Shizuoka University Laboratory Short Term Exchange Programme.

SESI TEMUDUGA CALON PELAJAR PRA-SISWAZAH BAGI AMBILAN SIDANG AKADEMIK 2016/2017

16 Mei 2016 - Sesi temuduga calon pelajar pra-siswazah bagi ambilan pada Sidang Akademik 2016/2017 telah diadakan dari 11 hingga 16 Mei 2016. Ini adalah kali pertama di pusat pengajian ini (dan keseluruhan program di Kampus Kejuruteraan) membuat sesi temuduga kepada calon sebelum layak ditawarkan pengajian di Universiti Sains Malaysia.

Kesemua calon yang hadir ke sesi temuduga ini merupakan calon yang telah disenarai pendek melalui permohonan pohon@usm . Seramai hampir 300 orang calon telah menghadiri temuduga di dua pusat temuduga yang diadakan di Kampus Kejuruteraan, USM dan di Kuala Lumpur. Beberapa orang pensyarah yang berpengalaman dilantik sebagai panel semasa sesi temuduga dijalankan. Calon-calon yang menghadiri temuduga di pusat pengajian juga berpeluang untuk melihat kawasan sekitar Kampus Kejuruteraan dan lawatan ke beberapa makmal.

SHORT COURSE ON THE INTRODUCTION TO THE CHARACTERIZATION AND PROCESSING OF RARE EARTH ELEMENTS (REES)

12 January 2016 - Mineral Resources Engineering Program organised a Short Course on the Introduction to the Characterization and Processing of Rare Earth Elements (REEs). This event was held at the School of Materials and Mineral Resources Engineering and was organised upon a special request by the Rare Earth Research Centre, Universiti Malaysia Pahang (UMP). There were six staffs from this centre participated in this short course. The main objective of the short course was to highlight and elaborate the terminology, definition, application and status of rare earth elements (REEs) in the world.

This event also served as a platform for a future development on teaching and research of rare earth elements among the universities and mining industries, especially between USM and UMP. First day activities include talk and seminar conducted by Assoc. Prof. Dr. Kamar Shah Ariffin, Dr. Hareyani Zabidi and Dr. Suhaina Ismail which covered the basis of geological occurrences, characterization and processes of rare earth elements (REEs). Second day activities include visit and a round table discussion. This short course received very positive feedback from the participants and the committee decided to have a second shortcourse focusing the extraction process of REEs.

CERAMAH INDUSTRI DARIPADA FU HAO MANUFACTURING (M) SDN. BHD.

19 April 2016 - Program Kejuruteraan Polimer telah menganjurkan satu 'Industrial Talk' yang bertujuan untuk memberikan pengetahuan tambahan tentang realiti sebenar dalam industri bagi membangunkan dan merekabentuk sesuatu produk. En. Gary Teh merupakan Pengurus Besar Fu Hao Manufacturing (M) Sdn. Bhd. bersama-sama dengan Cik Lin Pei Ching, Pengurus Kewangan telah hadir ke Pusat Pengajian Kejuruteraan Bahan & Sumber Mineral untuk berkongsi pengalaman dan juga ilmu berkenaan rekabentuk produk dan juga bagaimana untuk melaksanakan pengekosan bagi sesuatu produk yang akan dipasarkan. Perkongsian ilmu selama 2 jam ini dapat membantu para pelajar Tahun 4 membuat pengekosan bagi rekabentuk model kereta F1 yang sedang dibangunkan oleh mereka bagi subjek rekabentuk ini.

AKTIVITI RAMADHAN: LAWATAN KE RUMAH ANAK YATIM

29 Jun 2016 - Sempena kedatangan Aidilfitri, satu program lawatan serta menyampaikan sumbangan ke rumah Anak Yatim Nur Hidayah, Changkat Jering dan Rumah Anak Yatim Ummu Sofiah, Trong, Perak telah diadakan. Lawatan ini adalah hasil kerjasama Pusat Pengajian Kejuruteraan Bahan dan Sumber Mineral (PPKBSM) dan Kelab Sukan dan Rekreasi (KSR) PPKBSM.

CATHODIC PROTECTION FIELD TRIP TO NACE FMS

5 April 2016 - A total of 25 students and 7 staffs of School of Materials and Mineral Resources Engineering participated in a Cathodic Protection Field Trip hosted and sponsored by NACE International-Founding Malaysia Section. The SMMRE staffs and students were welcomed by Michelle Lau, the director of NACE FMS. Then, Mr. Ahmad Shamiri Wahab, the committee of NACE FMS, who is also a NACE certified Cathodic Protection Technologist with 8 years working experience in Cathodic Protection Field, presented an introduction of Cathodic Protection to the students and staffs. This was followed by hands on Cathodic Protection demonstration. The hands on were carried on the spot at the NACE FMS resource centre , guided by the committees of NACE FMS. A Cathodic Protection Practical QA/QC checklist were given to students to ensure the students understands the demonstration and to setup a CP system for data collection.

On the 5th April, the students, staffs and NACE FMS committee members were gathered and went to Klang for Cathodic Protection on site practice. At the Cathodic Protection site, the students were given a set of questionnaire which required the students to make use of the equipment provided to obtain information from the test field. In the questionnaire, the students were required to collect data from various Cathodic Protection Systems such as Sacrificial Cathodic Protection System and Impressed Current Cathodic Protection System. At the end of the site visit, the group returned to NACE resource centre for a Q&A session.

After the Q&A session, a career talk was given by Dr. Lee Chee Hong. He presented an insight to the undergraduates on choosing their career path towards corrosion specialist. Dr. Lee Chee Hong received his PhD in Corrosion Science and Engineering from the Corrosion and Protection Centre, School of Materials, University of Manchester (formerly known as UMIST), UK. He is currently a lead materials & corrosion engineer for Synergy Engineering Group; his professional practices include corrosion modelling, specialist corrosion studies, metallurgy, material selection with the aim of long term integrity of facilities for the oil and gas sectors, power and process industries. With his professional advises and experience, the students were able to clear their doubts towards choosing their career path in the field of corrosion engineering.

Participants of Cathodic Protection field trip at NACE's CP test site, Klang.

LAWATAN KE RUMAH SEJAHTERA PERMATANG TINGGI

2 Feb 2016 - Kelab Sukan & Rekreasi PPKBSM telah menganjurkan satu lawatan ke Rumah Sejahtera Permatang Tinggi yang bertempat di Bukit Mertajam. Terdapat 75 penghuni orang tua yang berusia di antara 60 hingga 91 tahun yang tinggal di Rumah Sejahtera ini. Rumah Sejahtera ini diuruskan bersama oleh badan-badan NGO serta dibantu kewangan dan kawalselia oleh Jabatan Kebajikan Masyarakat Malaysia. Lawatan ini diketuai oleh Prof. Fauzi dan Prof. Chow serta diikuti oleh 6 rakan staf lain (Dr. Shah Rizal, Dr. Pung, En. Azam, Puan Mahani, Puan Haslina dan En. Mokhtar) dan 4 pelajar PPKBSM. Sempena Tahun Baru Cina 2016, Kelab Sukan & Rekreasi PPKBSM telah mengambil inisiatif untuk menyumbangkan bantuan kepada penghuni-penghuni Rumah Sejahtera Permatang Tinggi.

Sumbangan dalam bentuk barangan keperluan (seperti, beras, minyak masak, milo, nestum, serbuk susu, cecair pencuci baju, dettol dan lain-lain) serta sejumlah sumbangan wang telah diberikan kepada Rumah Kebajikan Sejahtera tersebut. Profesor Dr. Chow dan Puan Haslina turut diberi peluang memberikan limau mandarin kepada mereka yang menghuni di rumah tersebut. Satu lawatan yang menarik dan menginsafkan dan diharapkan pada masa depan, usaha sukarela sebegini boleh terus disumbangkan secara berkala dan marilah sama-sama memupuk amalan keperihatian yang murni kepada masyarakat kita, khususnya golongan orang tua yang memerlukan sokongan dan keperihatinan kita bersama.

Lawatan staf dan pelajar ke Rumah Sejahtera Permatang Tinggi.

PRIM BEST STUDENT AWARD

19 March 2016 - Congratulations to Polymer Engineering student's, Wang Leong Kwan, who has won the PRIM Best Student Awards from Plastic and Rubber Institute Malaysia (PRIM). PRIM invites nominations every year from universities in Malaysia competing for the awards. The award was presented to the best student with outstanding academic achievement and contribution to the university. Dato' Dr Ong Eng Long, Technical Adviser for Kossan Rubber Industries Sdn Bhd, presented the award at the event, held at Setia City Convention Centre, Selangor. Wang Leong Kwan received cash rewards of RM1000 and plaque.

Wang Leong Kwan (left) received PRIM Best Student Award from Dato' Dr Ong Eng Long (right).

MPA-PRPG BEST FINAL YEAR PROJECT AWARD

24 June 2016 - Polymer Engineering undergraduate student Nurul Farzana Bt Gafri has won the Best Final Year Project Award from Malaysia Petrochemicals Association, Plastic Resins Producers Group (MPA-PRPG) in recognition of her outstanding final project work. Nurul Farzana, received the award for her project on 'Preparation and Characterization of Nanoemulsion Poly(methyl methacrylate): Effect of Monomer Loading '. She was presented with the award, along with RM 1000 prize money and certificate, by Mr. Ishak Zainal Abidin, the MPA-PRPG 's Chairman.

Nurul Farzana Bt Gafri (left) received MPA-PRPG Best Final Year Project Award from Mr. Ishak Zainal Abidin (middle).

NACE MALAYSIA USM STUDENT SECTION INDUSTRIAL TALK- A REWARDING CAREER IN CORROSION

4 May 2016 - Industrial talk activity entitled "A Rewarding Career in Corrosion" was successfully organized by NACE Malaysian USM Student Section and School of Materials & Mineral Resources Engineering. The main objective of the event was to introduce and to raise corrosion awareness at a fundamental level from the perspective of industry players. Three speakers, who are also NACE Founding Malaysia Section committee members were invited to give insights on the prospects of corrosion science and management in the industry. They were Miss Sherine Wong Sian Yun from Synergy Oil & Gas Engineering Sdn Bhd, Mr. Mohamad Hasrul Hilmi from PETRONAS Penapisan (Melaka) Sdn Bhd., and Miss Kamila Hamid from Wood Groups Kenny and their topics were "Career in the Corrosion Industries", "Corrosion Engineers in Plant" and "Corrosion Management Frame" respectively. The event was attended by 70 participants, including lecturers and undergraduate students.

Photo taken during the NACE Malaysia USM Student Section Industrial Talk.

PROGRAM MIMATES KE SEKOLAH

7 Mei 2016 - Program "MIMATES Ke Sekolah" di Sekolah Menengah Kebangsaan Lubok Buntar merupakan program kemasyarakatan yang bertujuan untuk memperkenalkan Universiti Sains Malaysia dan Pusat Pengajian Kejuruteraan Bahan & Sumber Mineral (PPKBSM) kepada komuniti setempat secara amnya dan para pelajar sekolah menengah secara khususnya. Program ini merupakan anjuran Mineral & Material Engineering Society (MIMATES) dengan kerjasama PPKBSM dan Transkrian Hope Association Malaysia (TRAM). Program motivasi, ceramah kerjaya dan aktiviti berkumpulan telah diadakan dengan tujuan untuk meningkatkan kemahiran sosial dan kemahiran komunikasi dua hala di kalangan pelajar sekolah dan mahasiswa USM. Selain itu, program ini dapat memupuk semangat kerjasama dan bertanggungjawab antara pelajar melalui aktiviti berkumpulan yang telah dianjurkan.

Gambar kenangan program MIMATES ke Sekolah Menengah Kebangsaan Lubok Buntar.

MAJLIS MAKAN MALAM PUSAT PENGAJIAN BAHAN DAN SUMBER MINERAL SIDANG 2015/2016

12 Mei 2016 - Majlis makan malam Pusat Pengajian Kejuruteraan Bahan dan Sumber Mineral telah diadakan di Dewan Serbaguna USM Kampus Kejuruteraan. Program ini dianjurkan oleh Mineral & Material Engineering Society (MIMATES) dengan kerjasama Pusat Pengajian Kejuruteraan Bahan dan Sumber Mineral (PPKBSM). Majlis ini diadakan bagi merapatkan hubungan silaturahim antara pelajar PPKBSM dan meraikan pelajar tahun 4 yang bakal menamatkan pengajian mereka.

Gambar kenangan staf akademik bersama pelajar semasa Majlis Makan Malam PPKBSM.

List of SMMRE Postgraduate Students Viva from January 2016 - June 2016

No.	Student Nama / Date	Degree	Title of Thesis	Name of Supervisor
1	Muhamad Ridhwan Hafiz bin Rosdi 14 January 2016	M.Sc	Preparation and Development of an EVA Copolymer Emulsification System	Profesor Dr. Azlan Ariffin
2	Abdul Hakim bin Hashim 14 January 2016	Ph.D	Preparation of Carbon Nanotubes Metal Oxides Electrode by Electrophoretic Deposition for Supercapacitor Application	Profesor Dr. Azizan Aziz Assoc. Prof. Dr. Ahmad Azmin Mohamad Assoc. Prof. Dr. Sharif Hussein Sharif Zein
3	Rohani binti Abdul Majid 15 February 2016	Ph.D	Studies on Preparation and Properties of Poly (Vinyl Chloride)/Epoxidized Natural Rubber/Kenaf Core Powder Composites	Profesor Dr. Hanafi Ismail Assoc. Prof. Dr. Razaina Mat Taib
4	Robin Ong Su Kiat 11 April 2016	Ph.D	Non-Destructive Electrical Test Detection on Copper Wire Micro-Crack Weld Defect in Semiconductor Device	Profesor Ir. Dr. Cheong Kuan Yew
5	Nor Suhaida binti Shahabudin 12 April 2016	M.Sc	Optimization of Alumina Coated Scaffold Properties and Its Biocompatibility Assessment	Profesor Dr. Zainal Arifin Ahmad Dr. Norazharuddin Shah Abdullah
6	Emee Marina binti Salleh 14 April 2016	Ph.D	Mechanical Compatibility and Degradation of Biodegradable Mg-Zn Alloy Based Composite Fabricated Using Powder Metallurgy	Profesor Dr. Zuhailawati Hussain Dr. Sivakumar a/l Ramakrishnan
7	Dody Ariawan 27 April 2016	Ph.D	Mechanical, Morphological, Thermal and Durability Properties of Kenaf Fibre Reinforced Unsaturated Polyester Fabricated by Resin Transfer Moulding	Profesor Dr. Zainal Arifin Mohd Ishak Assoc. Prof. Dr. Razaina Mat Taib
8	Norwanis binti Hasan 28 April 2016	Ph.D	Development of Cement Syntactic Foam and Characterisations of Its Properties for Sound Insulation Application	Assoc. Prof. Ir. Dr. Syed Fuad Saiyid Hashim Assoc. Prof. Dr. Zulkifli Mohamad Ariff
9	Hasniyati bt Md Razi 9 May 2016	Ph.D	Mechanical and Biodegradable Properties of Hydroxyapatite Coated Magnesium Deposited by Cold Spray	Profesor Dr. Zuhailawati Hussain Dr. Sivakumar a/l Ramakrishnan
10	Myo Thuya Thein 27 May 2016	Ph.D	Synthesis and Characterization of ZnO Based Nanocomposites	Assoc. Prof. Dr. Pung Swee Yong Assoc. Prof. Dr. Zainovia Lockman
11	Zaid Aws Ali Ghaleb Al-Bahiri 30 May 2016	Ph.D	Preparation and Characterization of Graphene Filled Epoxy Thin Film Nanocomposite for Electronic Applications	Profesor Ir. Dr. Mariatti Jaafar Assoc. Prof. Dr. Zulkifli Mohamad Ariff
12	Tan Pi Lin 31 May 2016	Ph.D	Preparation and Characterization of Metalloporphyrine Thin Film	Profesor Ir. Dr. Cheong Kuan Yew Profesor Dr. Chow Wen Shyang Profesor Dr. Yeap Guan Yeow
13	Afifah binti Mohd Ali 10 June 2016	Ph.D	Wear Resistant Performance of Zirconia Toughened Alumina (ZTA) Added with MgO and CeO_2	Profesor Dr. Zainal Arifin Ahmad Profesor Dr. Mani Maran a/l Ratnam Dr. Norazharuddin Shah Abdullah
14	Shazlin binti Mohamed Shaari 14 June 2016	Ph.D	Characterization and Properties of Chitosan-Filled Natural Rubber Compounds	Profesor Dr. Hanafi Ismail Assoc. Prof. Dr. Nadras Othman
15	Muhammad Bisyrul Hafi bin Othman 20 June 2016	Ph.D	Synthesis and Characterization of Low Dielectric Constant Hyperbranched Polyimide Containing S-Triazine for Optoelectronic Application	Profesor Dr. Hazizan Md Akil Profesor Dr. Hasnah binti Osman

ANUGERAH PERKHIDMATAN CEMERLANG USM 2015

BIL	NAMA	JAWATAN	KATEGORI
1	PROF. IR. DR. MARIATTI JAAFAR @ MUSTAPHA	PENSYARAH UNIVERSITI VK7	AKADEMIK
2	PROF. MADYA DR. KHAIRUNISAK ABDUL RAZAK	PENSYARAH UNIVERSITI DS54	AKADEMIK
3	PROF. MADYA IR. DR. SYED FUAD SAIYID HASHIM	PENSYARAH UNIVERSITI DS54	AKADEMIK
4	PROF. MADYA DR. AZHAR ABU BAKAR	PENSYARAH UNIVERSITI DS54	AKADEMIK
5	EN. MUHAMMAD KHAIRI KHALID	PENOLONG JURUTERA JA29	TEKNIKAL
6	PN. FAUZIATUN DAHARI	SETIAUSAHA PEJABAT N27	PENTADBIRAN
7	PN. ROSILA SULEIMAN	SETIAUSAHA PEJABAT N27	PENTADBIRAN

SIJIL DEKAN

SENARAI SIJIL DEKAN SEMESTER II, SIDANG AKADEMIK 2015/2016

KEJURUTERAAN BAHAN

TAHUN 1

NURSYAZWANI BINTI ISMAIL
ISAMUDDIN BIN MOHAMED IQUBAL
LEW MEI PEI
WONG PEI CHYI
LEE MOI GING
TAN YEE WERN
NG YI CHENG
ANG XUE YONG
LIM SIN JOU
TAN ZHI HUI
LIM WAN XUAN
SOO QIAN YEE
TAN MING XI
ONG CHIA CHIA
PAULINE KONG SWEE KEI
YAP SAW YIN

TAHUN 2

HEAH SOO MEI
WONG CHEE LEONG
IVON TIEW
KONG CHEE XIAN
OOI LHAANG CHEE
CHAI SHIR YING

TAHUN 3

AARON TAN CHENG SHIONG
TAN PENG PHIN
TAN JOO KEAN
LIM CHUN MING
LIM ZE EN
OOI CHIA YING
TEH JIN JIAN
FUN YAN CHIN
SOO KUAN LIM
KHOR YONG LING
THOR JIN ANN
SOO SOCK KUAN
LEE ANGIE
CHEAH WEI KIAN
ONG YEE CHIN

TAHUN 4

NUR ADRIANA NAZIFA BINTI ABU BAKAR
HOR CHEE HOONG
LOW JIONG XIONG
NG PHOOI YAN
NUR AISHAH BINTI MOKHTAR
NURSYAHIRAH BINTI ISMAIL
OOI SHEE MIN
MAIZATUL SYIMA NUR BINTI NORAINI
AHMAD IKMAL BIN MOHD RADZI
AZLINA BT AZMAN CHEAH
FOONG SUET KAY
HO HONG HUI
LIM WENG LIP
MOHAMAD FAIZAL BIN MOHD RAZALI
NEOH SOO HUAN
NUR FAREEZA BINTI KARIM
TAN ZHI QIN
WAN KIN CHOONG
WONG PHUI JIN
WONG SI MIN
JOANNA ANUSHA A/P DARMARAJAH
KOH LIAN JUN
LEONG QIAO LIN
LIM SHI HONG
CHAN JI KIT
LAI CHAI MEI
LEE WEI KEAN
TANG CHIN WUI
BEH CHIN YE
CH'NG MUN SUNN
CHONG SU FANG
HOO XIAO FEN
LAW HON KIN
LEONG TENG TENG
LOO FOONG LING
LOW SU YEIAN
TENG JIN WEN
YONG XUAN HUI

KEJURUTERAAN SUMBER MINERAL

TAHUN 1

NUR AZLINAH BINTI ABDUL RAHMAN

TAHUN 2

SUCHITRA A/P PERUMAL
NORFATEHA BINTI AB HAN

TAHUN 3

MUHAMMAD HARITH IRFAN BIN KHAIRUL ANWAR
MAISARAH BINTI AHMAD BAKARI

TAHUN 4

SHAFINAS BINTI SAAD
MOHAMAD NAZRIN BIN MOHAMAD GHAZALI
MUHAMAD ASYRAF B ABDUL WAHID
OLLEMADTHEE A/P KUNASAGARAN
YAP HUEI YEONG
SITI NORAZURA BINTI MOHAMAD NOOR
KHAIRUL ZHAFIRAN BIN AWANG
MOHD AMIROL BIN AHMAD ZAMANHURI
NOOR SHAFIQAH ATIRAH BINTI NOOR-SHAM
NOR ATIKAH BINTI RAMLI
AHMAD AMIRUL AIMAN BIN MOHD SAFIE
MUHAMAD NAIM BIN MOHD ISA
AHMAD SHAHIDDIN BIN ABU BAKAR
MUHAMMAD NOR SALAM BIN ABD RANNI
NUR ZAFIRAH BINTI NOOR MOHAMAD
CHIK KEIN YANG
KHONG LING HAN
NOR FAZIRA BINTI MD ZAHIR
PUGALYENTHIRAN A/L SINAIYAH
YAO BENJAMIN

KEJURUTERAAN POLIMER

TAHUN 1

CHAI JUNYI
OO YEW HUI LIK
NG LEE YONG
TEW MAEI NEE
THNG CHIN SHENG
CHAN PEI WEN
LIM YUAN TING
TAN MEI PING
BONG POH YEE
CHUAH KIAN SHIANG
TAN SIEW MIAN

TAHUN 2

NUR SYAMSINAR BINTI SARDI
WAN ABDUR RAHMAN BIN WAN MOHD AMIN
NURHAFIZ SYAZA BIN NORFAIZAL
YAP SOON YOU
DARRYL WONG JUN CHEN
CHUA JING TING
CHOW LI CHIN
NG CHI LOON
YAP CIA LING
ONG MUN YEE

TAHUN 3

LIM SHU BEE
LAW YEONG SHYANG
NEO EN PEI
THAI GAR LOCK
CHIEW KUAN ZHENG
GOH YIK XIANG
SOO HUI FEN
LEONG SIEW THUNG
JONG CHENG KIAT
CHAI POI SENG
GAN IVY
LOH LEH HEE
TEH YE SAM

TAHUN 4

FAHZIMRAN AFNOR BIN AFENDI
NAJAMUNIRAHAFIZA BINTI NAJAMULHAK
NURUL HAMIZAH BINTI MOHD NASIR
WAN MOHAMAD HAFIZ BIN MOHD GHAZALI
NURMIZAN BIN MAIDIN
NURUL HUSNAA BINTI CHE HANAFI
TAN WAI KEAT
DEENA DEANNA BT AZHAR
LIM CHUNG YING
MUHAMMAD IZZAT BIN MOHAMMAD ISBIR
MUHAMMAD NURUDDIN BIN MOHAR
NUR AZIMAH BINTI MD YUSOFF
OOI CHUAN HONG
ZURAIN NURIDAYU BT ZAILAN
CHUA LIAN TATT
LING LEE YING
NOR LIANA BINTI MOHD FOUZI
NURLIYANA AZREEN BINTI AZHAR
SIN YIN TIN
SITI HAJAR BINTI MD ISA
NOR HIDAYAH BINTI ZAKARIA
NURFATIHIN BINTI ALI
SYUKRIYAH BINTI MOHD YUSSOF
KUWN MOEI TING
LEE KAH CHOON
LIM WEE KIAN
LIM WEI CHUN
LIM YU HSIEN
NURUL FARZANA BINTI GAFRI
TIUN TZE THING
NASUHA BINTI MARZUKI
NORDALILA BINTI MOKSIN
NUR EZZA SOFIAH BINTI UMORUDDIN
JOYCE A/P MICHAEL RETNASINGAM
LEE CHEE KEONG
WANG LEONG KWAN

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2	EN. MOHD YUSOFF BIN ABDULLAH	JABATAN PEMBANGUNAN	PPKBSM

Visitors to the SMMRE (January 2016 to June 2016)

No.	Date	Name	Organization	Purpose
1.	02.03.2016	Takaomi Kobayashi	Nagaoka Technology, Japan.	Research Collaboration
2.	25.04.2016	Profesor Dr. Greg Qiao	University of Melbourne, Australia.	External Examiner, Polymer Engineering Programme

Gambar kenangan peserta "Short Course on the Introduction to the Characterization and Processing of Rare Earth Elements (REEs)."

Gambar kenangan staf PPKBSM bersama dengan Profesor Greg Qiao (duduk, tiga dari kiri).

Gambar kenangan aktiviti Kelab Sukan & Rekreasi PPKBSM.

Gambar kenangan aktiviti Kelab Sukan & Rekreasi PPKBSM.

Article 1

Disturbing Fact: Mercury Used In Artisanal Small Scale Gold Mining

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What is ASGM and mercury relationship?

Artisanal small scale gold mining (ASGM) is a small scale gold mining activity practiced by local people using conventional methods and unfortunately with less concern on damage to the surrounding environment and human being. Mercury has been widely used to extract gold in ASGM process for many decades in many countries especially in Asian and African countries.

Why worry about mercury?

Mercury is a powerful neurotoxin that is harmful to people, but especially to developing fetuses, and young children. Once emitted, mercury can travel great distances through the atmosphere, causing global contamination of ecosystems, fish, birds, mammals, and the human food chain. Worldwide, consumption of mercury contaminated seafood puts billions of people at risk of mercury poisoning, which affects brain and nervous system development and function. Local exposures in mining communities that use mercury can be even more acute (UNEP, 2012).

Worldwide mercury consumption and emission

The two charts below showed the mercury consumption and emission in the world. It is a shocked reality that actually mercury is indeed a serious problem in gold traditional mining activities.

Figure 1 shows mercury demand and consumptions annually with the total of 4,167 tons of mercury. ASGM is the single largest demand for mercury in the world. An estimated 1400 tonnes of mercury were used by ASGM miners globally in 2011 (www.mercurywatch.org).

Figure 2 describes the mercury emissions to atmosphere with the total of 1,921 tonnes. ASGM is the largest source of mercury pollution to air and water combined. It is second only to coal combustion as a source of worldwide mercury emission to the atmosphere.

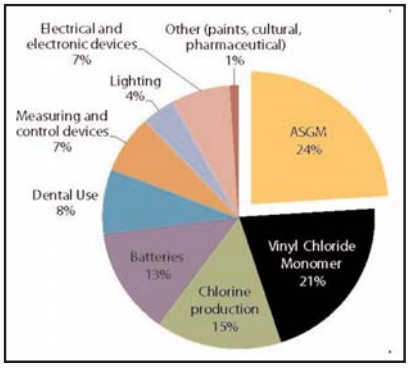


Figure 1. Worldwide mercury consumption and emissions (source: United Nation Environment Programme, Summary of Supply, Trade and demand information on mercury)

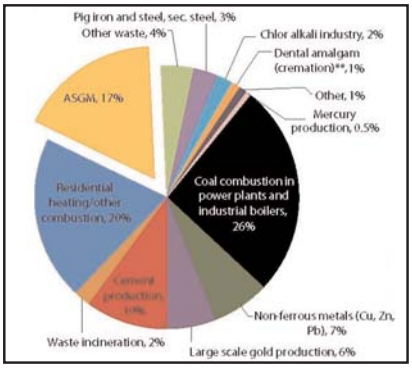
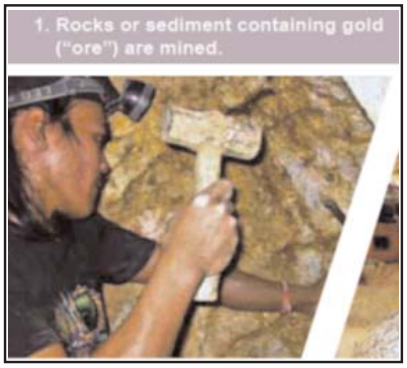
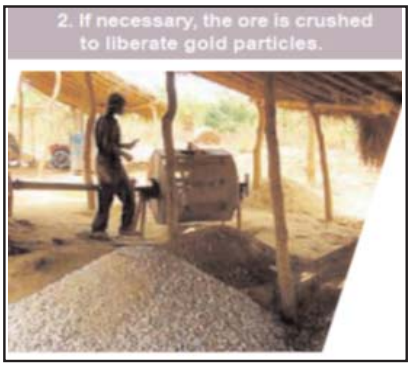


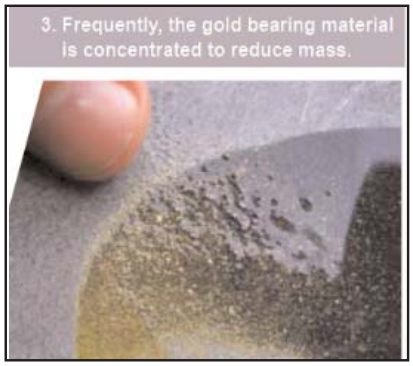
Figure 2. Mercury emissions to atmosphere (source: United Nation Environment Programme, Summary of Supply, Trade and demand information on mercury)

How is mercury used to capture gold?

The following figures shortly described how is mercury used to capture gold and showed some facts related to the process. Basically, when mercury is brought into contact with gold particles in sediments or crushed ore, it forms "amalgam" - a soft mixture of roughly 50% mercury and 50% gold. To recover gold from the amalgam, it is heated to evaporate the mercury, leaving the gold behind. Mercury is released into air, water, and soil in several of the steps of this process.







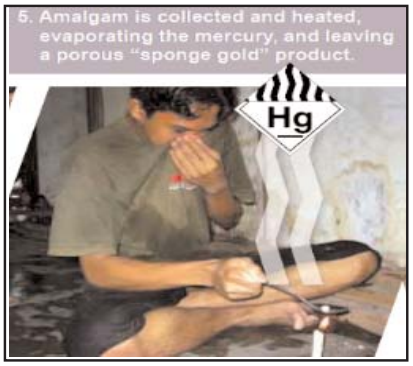


Figure 3. The basic process flow of using mercury to extract gold or amalgamation process.

Unlike many pollutants, mercury is an element- it cannot be broken down in the environment. The element symbol for mercury is Hg. The diamond symbol at right, is used here to designate mercury vapor emission and human exposure.

Why mercury used widely in gold extraction?

There are some reasons why mercury has been used widely in artisanal small scale gold mining as stated below:

- Quick and easy
- Independent - it can be used by one person independently
- Extracts gold in most field conditions
- Cheaper than most alternative techniques
- Facilitates precise transactions and divides profits – between labourers and owners for example
- Miners are not aware of the risks, and those that are aware often do not have access to the capacity or capital required for alternatives
- It is one method that permits custom processing of small individual ore batches - often an important socio economic structure.

WHO mercury facts in gold traditional mining

Millions of miners, infants, children, women of child bearing age (potentially pregnant), and breast-feeding women, work or live in ASGM communities and are at risk of mercury exposure. Pictured below is a man burning amalgam in front of children and in a residential area. Many are unaware of the dangers.

Figure 4. A man burning amalgam in front of children and in a residential area (source: UNEP, 2012)

Mercury vapors in the air around amalgam burning sites can be alarmingly high and almost always exceed the WHO limit for public exposure of 1,000 nanogram/cubic meter (Information on the Human Health effects of Mercury, website). This risks the health of workers but also those in the communities surrounding the processing centers. Exposure to levels of mercury vapors above 1,200,000 nanogram/cubic meter can be fatal.

Solution approach?

The above explained facts are really disturbing and a sad reality that has to be taken seriously by all the stakeholders especially the authorities. It is not that because there is no other option to extract gold or mercury is the only option but there are some methods that are safe and friendly that can be reliable and effective to capture gold. They start from lowering the use of mercury by mining and concentrate amalgamation methods until using cheap technology that is mercury-free or zero mercury such as gravity separation methods and direct smelting.

Approaching with friendly and effective strategy to the traditional gold miners is the success keywords to avoid the mercury disaster in the future. The following paragraph described in general how to do public outreach to traditional gold miners. Reductions in mercury use are more likely to be accepted by miners and become permanent if they increase or at least maintain the income. This can be achieved in numerous ways, including:

1. Conserving or eliminating the need for mercury and other reagents, saving costs
2. Saving time by more efficient processing
3. Recovering more gold by improving extraction techniques, which might include using better technology or using existing technology better
4. Getting a better price for gold by following standards that get a better market price.

Technical interventions for mercury reduction can follow a two-step incremental approach or leap straight to step two where feasible. This two steps approach can be taken into consideration for traditional gold miners as described in the following:

Step 1: Reduce mercury use and emissions through improved practices, which use less mercury. This increases (or at least maintains) income for miners, increases awareness, improves health through lower exposures, and can build positive relationships needed to go to step 2.

Step 2: Eliminate mercury use by using alternative mercury-free technologies that increase (or at least maintain) income for miners, and are better for health and the environment.

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Article 2

Linguistic Cognition using Hermeneutic Operative Calculus

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Abstract. In this paper a new representation of logic using mathematical principles has been developed for the linguistic cognition called Hermeneutic Operative Calculus. This Hermeneutic Operative Calculus is a new language interpretive calculus developed to account for the syntactic, semantic and pragmatic features of linguistic for natural language and allows removing the restrictions of any particular natural language in the semantic field its map out. The logic of Hermeneutic Operative Calculus capable of represent

the syntactic and semantic of factual information of a natural language precisely in any language. The logic of this Hermeneutic Operative Calculus has two different forms of operations called object and meta-operations. The object operation allow for listing the various objects, picturing the various propositions and so forth. The meta-operation would specify what cannot be specified by the object operation like semantical stances of a proposition. The basic operative processes of linguistics and cognitive logic will be mathematically conceptualized and elaborated in this paper.
Keywords: predicate calculus, mathematical logic, Hermeneutic Operative Calculus, grammar, linguistics, cognitive logic

Introduction

Hermeneutic Operative Calculus is a new calculus developed to account for the syntactic, semantic and pragmatic features of natural language. The logic of Hermeneutic Operative Calculus capable of represent the syntactic and semantic of factual information of a natural language precisely in any language.

Hermeneutics in Artificial Intelligence (AI)

Schleiermacher [1] defines hermeneutics as 'the art of avoiding misunderstandings'. Hermeneutics is imparting the practice of historical retrieval, the re-construction of the historical context of presupposition in a discourse. Hermeneutics does not reconstruct the past for its own sake; it always seeks to understand the particular way a problem engages the present. So far, few AI researches have attempted to adopt AI techniques to hermeneutics and thereby develop logical or computational models of interpretation. Hermeneutics readily lends itself to the disciplines within the human sciences, which in general, "deal with the world of meaningful objects and actions (as opposed to physical objects and events in themselves)" [2]. The Hermeneutic Operative Calculus is able to translate the natural language to the methods suitable for scientific enquiries and learning machines in the Artificial Intelligence. This Operative Calculus is also able to help to decipher the effect of a sentence offered in a social situation or context by removing the restrictions of any particular natural language in the semantic field its map out and establish linguistically the foundational context for ontology and conceptualization.

Elements of Hermeneutic Operative Calculus

The logic of this Hermeneutic Operative Calculus has two different forms of operations called object and meta-operations. The object operation allow for listing the various objects, picturing the various propositions and so forth. The meta-operation would specify what cannot be specified by the object operation like semantical stances of a proposition [5]. The basic operative processes of linguistics and cognitive logic will be mathematically conceptualized and elaborated in this paper. We describe a particular realization (or interpretation) of the logic of language using Hermeneutic Operative Calculus as the Object Language and natural (English) language as the meta-language.

a. There is a universe of concrete particulars U, the individual elements of which are represented by the Latin letters, a, b, c, and so forth. A group of them will be represented by the capital letters A, B, C and so forth. The domain will be taken to be infinite in principle while finite when space and time dimensions are stated explicitly.

b. The categories Space and Time will be represented by S and T respectively. Both can be divided into an infinite number of finite elements and ordered with respect to each other. In fact Space and Time do not exist as elements without an ordering operation of some kind. One kind of ordering lead to the tenses i, j, k, i.e. Past, Present and Future and another to aspects.

c. There is also the universe 'V' of dependent elements such as qualities, processes, shape and so forth [4]. Though actions are slightly different but they also do not exist apart from a doer whether animate or inanimate, they will also be included in this category. It is possible, however, to state within the calculus conditions whereby actions will turn out to be a special sub-category of the category of dependent particulars. The Greek letter α,β,γ will be used to denote individual elements.

d. The semantic field is definable in terms of concepts which are taken to be forms of consciousness individuated and detached from the originating sources and existing as objective elements. We shall assume a number of features about them.

e. They are organized into networks of relations such as 'subordinate to', 'contrary to', 'contradictory to', 'the opposite of' and so forth. Such relational linkages determine at least part of the logic of languages and in particular syllogisms such as those studied by logicians.

f. A network of concepts implicitly defines a category of objects in the object universe. Concepts pertaining to concrete objects may not range over, for example, the domains of qualities or actions and so forth.

Cognitive Acts in the Form Hermeneutic Operative Calculus

A variety of cognitive acts are recognized as real and necessary to explain to generation of propositional pictures in general and the logical and grammatical intuitions we have about language.

Intra Propositional Cognitive Acts

a. Object identification act whereby a particular object, say 'a' is said to be so-and-so. The particular as represented by say, 'a' is assumed to be perceptual awareness devoid of conceptual apprehension. Object identification is then conceptual awareness of what the thing is. If the concept underlying this awareness is 'x', the conceptual awareness is represented as $x \approx_I a$ with the symbol '$\approx_I$' represent the object identifying cognitive act.

b. Case indexing operation whereby an entity is said to be the Agent; the Object on which an action is effected; the instrument in effecting a certain action; the spatial, temporal, location of an event the one oriented to the speaker, i.e. the vocative, the origin of a movement; the terminal of a movement; the associate of an agent; the recipient of an ascription and so forth. There is no separate symbol for the operation but it is shown by indexing the entity with the case that is imposed for example if '$\mathcal{A}$' is the symbol for the agentive and if the entity 'a' is subjected to this case-indexing then it would be symbolized as '$a^{\mathcal{A}}$' and so forth. The case of an object is that which distinguishes it from the state of being simply an element in the universe of objects. An object has to be 'cased' or case indexed when it is brought in relation to another category.

c. Ascription operation when such category of objects as qualities, attitudes, values, characters, actions and so forth are said to be true of an entity in general or in a particular instance, the cognitive act involved is the ascription operation. Again there is no separate symbol for this operation but it is shown by the symbolic device of writing the symbol of the object ascribed immediately next to the entity, i.e. ($a_0{}^{\mathcal{A}}$) and so forth where '$\mathcal{A}$' is the case-symbol for the nominative.

d. Selection operation when an element in a propositional picture is isolated for additional ascription we have the selection operation. It's symbolic representation is explained in the next section.

Inter Propositional Operations

a. Logical Operations with the Exception of Affirmation and Negation

These are such operations as conjunctive coordination ($p \wedge q$) and disjunctive coordination ($p \vee q$). These will be taken to the special cases of universal conjunction ALL(p,q,r,…) and universal disjunction EXIST(p,q,r,…).

b. Presupposition

When a class of prepositions is brought together and a new one subset as true while the other as asserted we have this presupposition operation, symbolized as '$P \circ Q$'.i.e.

$(P_1, P_2, P_3, \ldots, P_i, P_{i+1}, P_{i+2}, \ldots, P_n) \rightarrow (P_1, P_2, P_3, \ldots, P_i) \circ (P_i, P_{i+1}, \ldots, P_n)$.

The selection operation can now be shown as below. For example if the truth of say '$x \approx_I a$' is presupposed and 'a' is isolated for further ascription as $x \approx_I a \circ a^{\phi}$. It can be seen that as defined the selectio act is dependent on the act of presupposing the truth of a particular proposition i.e. the validity of a propositional picture of reality

c. Propositional Acts

These are acts done on propositions and they are viz. affirmation and negation. Affirmation will not be separately symbolized but negation will be indicated by N(P). Such propositional acts must be distinguished from assertion, denial and so forth which are speech acts i.e. a species of acts. Two features of the above acts, taken to be intuitively true, are described in the following postulates:

RI: All cognitive acts are recursive i.e. a particular act can be affected upon its product.

R2: Each cognitive act defines its own conditions of affirmation and negation.

It must be remarked here that it is recursively of the cognitive acts such as those described above that underlies the capacity individuals have to generate an infinite number of sentences from a finite set of elements, a feature of linguistic competence Chomsky (1965)[3] has described.

Demonstrative Acts for Referential Perspective

Referential Perspective are elements of the calculus of a particular sort but nevertheless necessary to truly picture human consciousness to addressing demonstrative acts. References to concrete particulars seem to be of peculiar importance in natural language and in the structure of human consciousness [5]. These objects are spatio-temporal bodies and form in relation to the human body the origin of reference to dependent entities, spatial locations and time slices. We shall distinguish two referential frames: Local Reference Frame (LRF) and General Reference Frame (GRF). When the body of the speaker is used as the origin of reference (e.g. this, that, etc.) when speaking we have the LRF referential perspective. When the reference is made to an object in general where referential identity has to be established through description alone (e.g. 'The man …') we have the GRF referential perspectivObject introduction within LRF will be indicated by the subscript 'l' e.g. 'al' and within GRF by the absence of 'l ' e.g. 'a'. The use of pronouns particularly, 'I' and 'You' (and plural 'We' and 'You') seems to indicate that there is yet another referential perspective which we shall call Person Reference Frame (PRF). The grammatical distinctions of first person, second person and third person cannot be reduced to the referential perspective of LRF and GRF. Here is where the need to assume as real the entities that we have termed self, (or psyches) gets support. The entities involved in the role relationships 'I' and 'thou' are not non-intelligent entities but rather intelligent ones capable of perceptions, consciousness, intentions, wants and wishes and so forth. The first, second and third Person distinctions will be shown in the calculus by the superscripts f, s and t respectively i.e. S^f, S^s, S^t.

Semantic Representation Of Sentences Using Hermeneutic Operative Calculus

Example : We illustrate the Hermeneutic Operative Calculus with an example:

For the sentence : 'The old man shot the dog that barked'.

We define X: system of micro conceptual worlds that introduce concrete objects, Y: system of micro conceptual worlds that introduce action, processes and states, U: real world Concrete particulars for the object (spatially and temporally identified and classified), V: real world dependent particulars (states, qualities, action and processes).

Let {MAN,DOG} ∈ X,
{BARKING,SHOOTING,OLD} ∈ Y,
{a,b}∈ U and α ∈ V. Let $\approx_I$ as Conceptual Intentional Identifier (the conceptual cognition intentionally cognize the real object [7]) and Δ_n refers to the contents of line 'n' counting from the top. Other type of representations has been listed as Table 1.

The sentence can be represented as such:

The sentence 'That is man' can be semantically represented as $(X_{MAN})(U_a)(MAN \approx_I a)$.

The sentence 'That is dog' can be semantically represented as $(X_{DOG})(U_b)(DOG \approx_I b)$.

The Hermeneutic Operative Calculus described thus far is certainly not complete or even sufficiently adequate to describe what we already know of sentence coding for natural language processing. But we shall leave it at that as it would suffice for the purposes here.

Conclusion

The Hermeneutic Operative Calculus is capable of represent the syntactic and semantic of factual information of a linguistic cognition for any natural language. The basic operative processes of linguistics and cognitive logic can be systematically conceptualized and coded mathematically using Hermeneutic Operative Calculus. The Hermeneutic Operative Calculus is able to translate the natural language to the methods suitable for scientific enquiries and learning machines in the Artificial Intelligence. This Operative Calculus is also able to help to decipher the effect of a sentence offered in a social situation or context by removing the restrictions of any particular natural language in the semantic field its map out and establish linguistically the foundational context for ontology and conceptualization.

TABLE 1. (a) Case Type Representation (b) Frame Representation (c) Tense Representation.

Case Type	Symbol
Agentive-'subject-of'	
Goal-'direct-object-of'	
Causative-'instrumental-for'	
Dative-'indirect-object-of'	
Comparative-'compared-to'	

(a)

Frame	Symbol
GRF	Nill
LRF	*l*

(b)

Tense	Symbol
Past	i
Present	j
Future	k

(c)

a) $[(That_1\ is\ man) \wedge (That_2\ is\ dog)] \circ (that_1\ shot\ that_2) \rightarrow The\ man\ shot\ the\ dog$

Micro conceptual worlds	Real world system categories	Operative processes of grammar
$X_{MAN}, X_{DOG}, Y_{SHOOTING}$	$U_{a,b}, V_\delta, \delta: SHOOTING$	$\Delta_1: MAN \approx_I a \cdot (subject-of)$ $\Delta_2: DOG \approx_I b \cdot (subject-of)$ $(\Delta_1 \wedge \Delta_2) \circ a \cdot (subject-of)b$ $\cdot (direct\ object-of)\delta \cup (past)$
$X_{x_1}, X_{x_2}, Y_\delta$	$U_{a,b}, V_\delta,$	$\Delta_1: x_1 \approx_I a^{\phi}$ $\Delta_2: x_2 \approx_I b^{\phi}$ $(\Delta_1 \wedge \Delta_2) \circ a^{\phi} b^{\phi} - \delta \cup i$

Acknowledgments

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Article 3

Vibration Damping Materials: Magnetorheology, applications and challenges

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Abstract: In the incompatible continual search for better damping materials, significant research has been carried out. Magnetorheological (MR) materials including magnetorheological fluids (MRFs) and magnetorheological elastomers (MREs) are a new class of damping materials that offer several advantages compare to rubber as a commonly used material for damping, such that include good mechanical properties and high damping performance. Generally, MR materials consist of a non-magnetic medium (normally an oil or elastomer) containing a suspension of magnetically permeable particles which promote energy absorption. These materials have rheological properties that can be changed by variation of the magnetic field during fabrication or in service. In addition, MREs become particularly more attractive for structural application where the matrix is a solid elastic polymer which is able to overcome the limitation of particle sedimentation and leakage in MRFs. This article presents a review of MREs, applications and challenges.

Keywords: Magnetorheological elastomer (MREs), damping materials, vibration.

1.0 Introduction

Increasing numbers of new materials are being developed with the aim of overcoming the limitations of rubber as a commonly used material for damping; in this area enhancement of damping through rubber modification or rubber selection to increase viscous flow, not surprisingly, generally results in reduction in stiffness and strength [1]. A new class of damping materials, magnetorheological (MR) materials, offers several distinct advantages when compared to rubbers on their own. MR materials consist of a non-magnetic medium (normally an oil or elastomer) containing a suspension of magnetically permeable particles. These materials promote damping mainly by the viscous flow of the non-magnetic medium, but inclusion of magnetic particles enables additional damping through magnetic particle interaction and interfacial damping. These materials also have rheological properties that can be changed by variation of the magnetic field during fabrication or in service. Since the MR effect was discovered by Rainbow in 1948 [2], MR materials have expanded to become a large family which includes MR fluids (MRFs) and MR elastomers (MREs) [3].

2.0 Magnetorheological fluids (MRFs)

MRFs are the most common MR materials. They are composed of oils with micrometer sized ferromagnetic particles. They exhibit Newtonian like behaviour in the absence of a magnetic field, but become viscoelastic solids with a certain yield stress when a magnetic field is applied. When an MRF is exposed to a magnetic field, the ferromagnetic particles are magnetized and attracted to each other to form chains in the direction of the external magnetic field which restricts the flow of the fluid and results in a change in rheological behaviour to that more of a solid [3, 4]. Figure 1 shows MRF structure in the absence of a magnetic field and under a magnetic field.
The mechanical energy needed to yield these structures increases as the applied magnetic field increases, resulting in a field dependent yield stress. In order to deform the MRFs under an applied magnetic field, extra force must be exerted to break the cluster of chains and columns [3, 4].
MRFs have been proven to be commercially viable and well suited for many applications, such as automotive suspensions, clutches, brakes, actuators and artificial joints [5]. However, a number of limiting problems still exist with MRFs. MRFs are prone to particle settling with time due to the density mismatch of particles and the carrier fluid, which may degrade the MR response. In addition, the wear of the magnetic particles can also lead to a reduction in the fluid's performance and eventual failure of the MRF device.

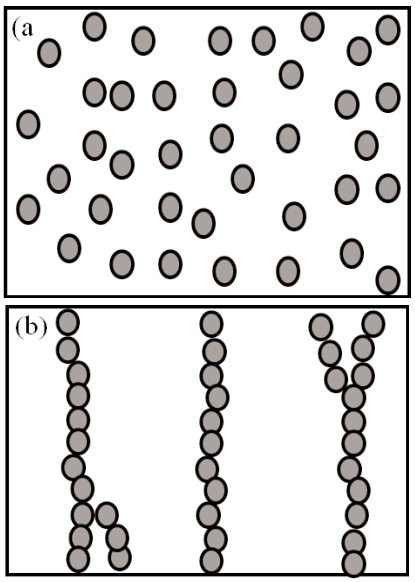

Figure 1 MRF structure; (a) in the absence of magnetic field and (b) under a magnetic field.

3.0 Magnetorheological elastomers (MREs)

MREs can be thought of as a new generation of MR materials following on from MRFs where the matrix is a solid elastic polymer rather than carrier oil. The obvious advantage from using elastic polymer as a matrix material is that the particle sedimentation problem in MRFs is overcome. Moreover, MREs do not need containers or seals to hold or prevent leakage. MREs can be utilized for damping, either separately incorporated or within a composite structure such as with steel plates.
Suitable matrix materials for MREs include natural rubber, silicone rubber, polybutadiene, polyisobutylene, polyisoprene, and polyurethene rubber [6-12]. These materials are usually nonmagnetic viscoelastic materials that can be uniformly mixed with the magnetizable particles and subsequently processed into final solid form through conventional rubber or plastic processing equipment. The particle

material of choice for MREs is iron. This is because of its high permeability, low remanent magnetisation and high saturation magnetisation. High permeability and saturation magnetisation provide high inter-particle attraction, and thereby produce strong chains and columnar structures [3, 13, 14].

MRFs and MREs have another difference in the way they behave; MREs are generally used in their pre-yield state while MRFs typically work in their post-yield state. In the pre-yield state, a material behaves like a linear viscoelastic material, while in the post-yield state flow occurs. Figure 2 indicates typical pre-yield and post yield states in MR materials. MREs have recently gained attention because pre yield behavior gives higher stiffness and damping performance compared to MRFs.

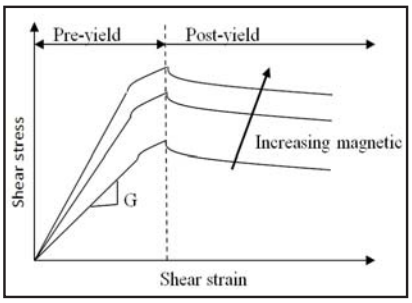

Figure 2 Typical pre-yield and post-yield states in MR materials.

MREs can be fabricated either with or without a magnetic field. The former results in isotropic MREs, while the latter results in anisotropic MREs. Isotropic MREs can be characterized by a uniform magnetic particle distribution in the matrix. Anisotropic MREs have a special chain like structure of magnetic particles in a matrix as a result of curing the matrix under a strong magnetic field. When individual particles are exposed to an applied magnetic field during curing, magnetic dipole moments pointing along the field direction are induced in them. A magnetic force will cause the north pole of one particle to attract the south pole of its neighbour resulting in formation of chains and columnar structures inside the matrix. Upon curing the matrix, the particle is locked into place [15]. Anisotropic MREs are found to produce material with much larger stiffness and damping compared to those cured in the absence of a magnetic field. Furthermore, during service, a magnetic field can be used to affect Young's modulus of isotropic and anisotropic MREs and hence provide benefits in vibration control [7].

4.0 MRE applications

MREs have many potential engineering applications for vibration control in damping and vibration isolation systems. MRE devices have begun to see successful commercial applications, with most of them in automotive and industrial engine mounts. The Ford Motor Company has patented a tunable automotive bushing based on MREs [16]. The stiffness of the bushing is adjusted by a variable magnetic field generated from a suspension control module. The dynamic stiffness control reduces suspension deflection and improves passenger comfort. Deng and Gong have also developed a shear mode adaptive tuned vibration absorber (ATVA) based on MREs [17]. Results have shown that the natural frequency of the ATVA can be tuned from 27.5 Hz to 40 Hz which provides better performance compared to conventional passive absorbers in terms of frequency-shift property and vibration absorption capacity. Ginder et al. have constructed MRE tunable automotive engine mounts that have excellent damping to reduce engine vibration and fatigue [9].

With the rapid growth of commercial applications over the last few years, many people consider they are just witnessing the beginning of an explosion of MRE devices and applications. Indeed, numerous applications are currently at the research and development stage. Dyke et al. have developed a semi-active MRE damper which can be utilized to suppress vibration caused by earthquakes in civil structures such as building and bridges [18]. Furthermore, some work has been carried out to explore the use of MRE in sensors, microwave absorption, electronic writing pads and touch-sensitive screens [19, 20].

5.0 Challenges

One of the biggest challenges in developing MREs is cost. Carbonyl iron particles, the most commonly used particles, are relatively expensive at $13-15/kg in bulk. More cheaply produced iron particles, iron oxide (Fe_3O_4) and barium ferrite ($BaFe_{12}O_{19}$) tend to be irregular in shape, have wider size distributions, and simply do not perform as well [21, 22]. Some iron alloy particles actually perform better than carbonyl iron, but are significantly more expensive [23]. It is apparent that more applications would quickly become commercially viable if the material cost could be reduced.

Simply, the material cost could be reduced by reducing the amount of iron employed. However the desire to obtain the largest effect with smallest particle concentration and magnetic field strength is a big challenge. Furthermore, the particles used have a magnetic saturation point. Once this is reached, no matter how much the field is increased, no additional change in rheological properties is observed. This obviously limits the size of change in rheological properties obtainable [24].

Moreover, research in MREs is still in its infancy. Optimal selection of MRE components, the technology of their manufacture, characterization and analysis, as well as development of mathematical models describing their mechanical and dynamic properties are very valid scientific issues [25]. Thus, it is desirable to carry out experiments and analytical analyses by varying design parameters, such as the type of filler, size, volume friction, morphology, filler interphase, as well as surface treatment on filler surface in order to understand how magnetic particles affect the mechanical behavior and energy absorption in MREs. Conventional rubber processing equipment must be modified to provide a magnetic field during curing process. Furthermore, thick MREs are difficult to fabricate because the magnetic field will decreases sharply as the thickness of the MREs increases [4]. Although numerous works have been conducted on the dynamic mechanical behaviour of MREs [4, 11, 26-30], research on the actual damping mechanisms of MREs is still in its early stages. There are still many key issues and unsolved problems existing in the damping mechanisms of this new composite material. Therefore, appropriate methods and analyses need to be carried out and developed in order to understand the damping mechanisms in MREs.

6.0 Conclusion

Magnetorheological materials offer several distinct advantages when compared to common damping materials. Formation of magnetic particle chains under an applied magnetic field results in a change in rheological behavior of the materials and increases stiffness and enhances damping performance. However, the most significant issues in developing these materials are cost and particle performance. Each of the limitations and challenges described commands a better understanding of magnetorheology, particularly of the interactions and energy absorption mechanisms between the particle and matrix properties. Such information is necessary to gain better understanding on the advantages and limitations of the material capability. Overcoming limitations will lead to improvement in materials performance and, as well as foster the development of new applications.

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