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RECENT ADVANCES IN ENERGY & ENVIRONMENT

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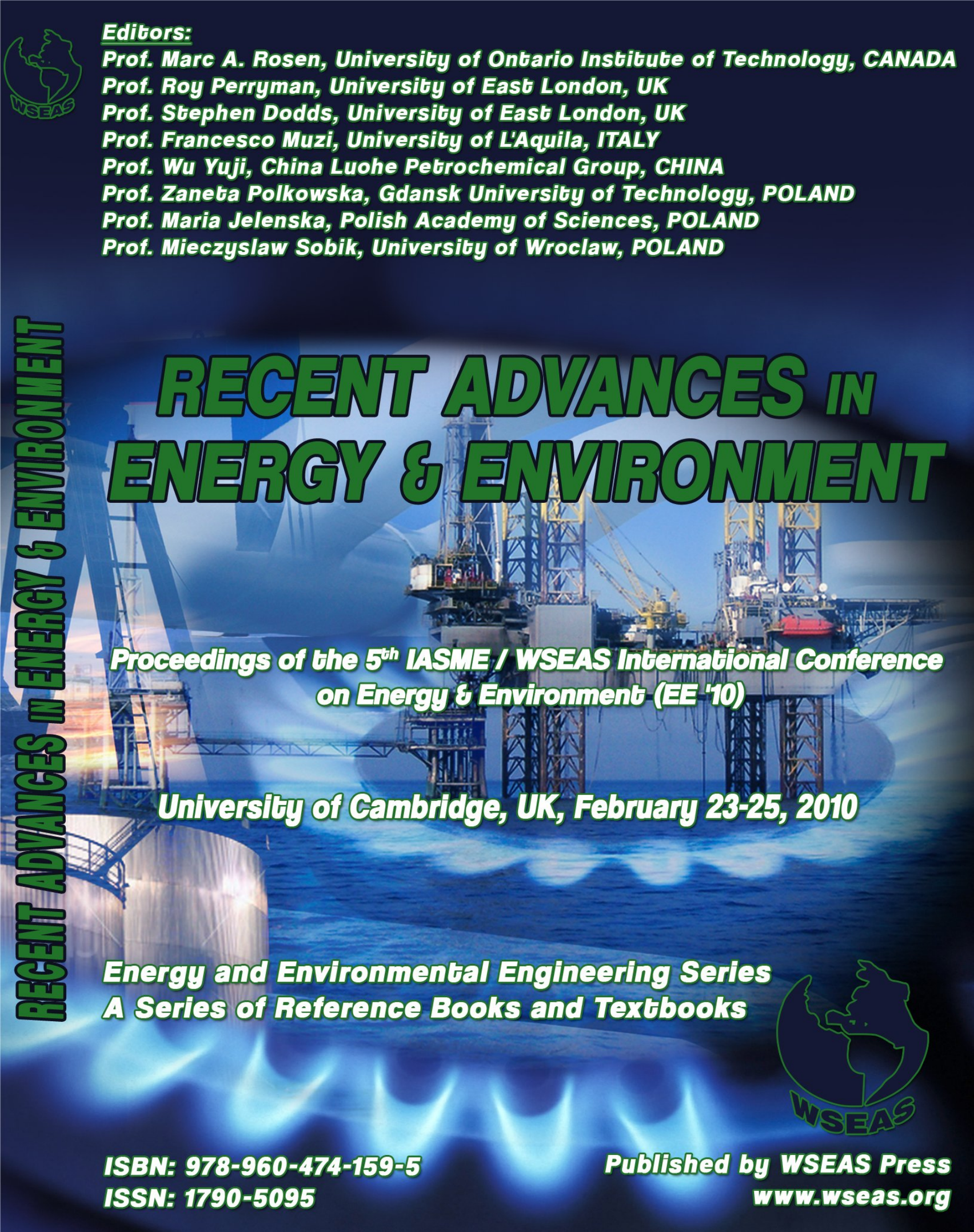

Proceedings of the 5th IASME / WSEAS International Conference on Energy & Environment (EE '10)

University of Cambridge, UK, February 23-25, 2010

Energy and Environmental Engineering Series
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Preface

This year the 5TH IASME / WSEAS International Conference on ENERGY & ENVIRONMENT (EE '10) was held at the University of Cambridge, UK, February 23-25, 2010. The conference remains faithful to its original idea of providing a platform to discuss renewable energy sources and technology, power generation, fuel cells, hybrid systems and vehicles, generalized electric machines, electric vehicles, power quality standards, transmission and distribution, circuit breakers, combined heat and power systems, energy conservation in industry, thermodynamics of ecosystems, environmental management, strategic management, nuclear energy and environmental protection, socio-economic and infrastructure issues etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Dimethyl Ether (DME): A Clean Fuel for the 21st Century and Catalysts for it

Lecturer Kaoru Takeishi
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Abstract: Dimethyl ether (DME) is the smallest ether, and its chemical formula is CH3OCH3. DME usually exists as gas, but it is easy to liquefy by cooling at -25oC at atmospheric pressure and by pressurizing under 5 atm at room temperature. Therefore, DME is easy to handle like liquefied petroleum gas (LPG). DME will be used as fuel of substitute of LPG. In China, DME is mixed into LPG and used as a domestic fuel. Cetane number of DME is 55-60, so DME will be used as a diesel fuel. In Japan, China, Sweden and so on, DME buses and trucks are testing on public roads. DME does not contain poisonous substances, and it burns with no particulate matters (PM), no sulphur oxides (SOx), and less nitrogen oxides (NOx). Therefore, DME is expected as a clean fuel for the 21st century. DME is able to replace light oil and LPG, and its physical properties are similar to those of LPG. It is possible that DME infrastructures will be settled more rapidly than hydrogen, because existing LPG infrastructures can be used for DME. On the other hand, it is expected that fuel cell is one of the methods to restrain the global green effect. Steam reforming of methane, LPG, gasoline, and methanol is actively researched and developed as hydrogen supply methods for the fuel cells. Methanol steam reforming is easy to perform at around 250-300oC. However, the toxicity of methanol is high, and its infrastructure is not well developed. The infrastructures for natural gas, LPG, and gasoline are well established, but those steam reforming are difficult even at high temperatures around 800oC, and they contain sulphur resulting in catalyst poisoning. DME is expected as excellent hydrogen carrier and hydrogen storage, because DME will be easy to reform into hydrogen if there will be excellent catalysts of DME steam reforming. Therefore, I have been studying on DME steam reforming for hydrogen production, and researching on catalysts for DME steam reforming and DME synthesis.
The results of steam reforming of DME over several catalysts suggested the following facts: H2 production with steam reforming of DME consists of two steps. The first step is hydrolysis of DME into methanol. The second step is steam reforming of methanol that produces H2 and CO2. The rate determining step is hydrolysis of DME into methanol. The copper alumina catalysts prepared by the sol-gel method are excellent for H2 production by steam reforming of DME. The reason is that gamma-Al2O3 for the hydrolysis and Cu for methanol-steam reforming are co-existing closely on the catalyst surface. The consecutive reactions smoothly occur. Addition of Zn, Mn, or Fe into Cu(30wt.%)/Al2O3 activates steam reforming of DME. The Cu-Zn(29-1wt.%)/Al2O3 catalyst shows the excellent activity of DME steam reforming; the DME conversion is 95%, H2 yield is 95%, and CO concentration was 0.8 mol.%. I have developed a new catalyst for H2 production from DME, and the catalyst give us a great potential for H2 supply from DME.
I have also developed catalysts for direct DME synthesis from syngas (mixture of hydrogen and carbon monoxide). The catalysts are prepared by the sol-gel method, and the surface of the catalysts is optimum for direct DME synthesis. Copper sites for methanol synthesis from syngas, gamma-Al2O3 sites for dehydration of methanol into DME, and copper sites for water-gas shift reaction from H2O & CO into H2 & CO2, are co-existing closely on the catalyst surface. The consecutive reactions (methanol synthesis, methanol dehydration, and water-gas shift reaction) smoothly occur, and DME is produced fast. Therefore, these catalysts will be very effective for new energy society of DME and hydrogen.

Brief Biography of the Speaker:
Apr. 2009 - Present: Lecturer, Faculty of Engineering, Shizuoka University
Oct. 1994 - Mar. 2009: Assistant Professor, Faculty of Engineering, Shizuoka University
Mar. 2005: Doctor of Engineering, Tokyo Institute of Technology
Apr. 1989 - Sep. 1994: Assistant Professor, Junior College of Engineering, Shizuoka University
Apr. 1987 - Mar. 1989: Researcher, Gotemba R&D Laboratory, Dow Chemical Japan
Apr. 1985 - Mar. 1987: Master Course of Electronic Chemistry, Tokyo Institute of Technology (Master of Science)
Apr. 1981 - Mar. 1985: Undergraduate Course of Chemistry, Science University of Tokyo (Bachelor of Science)
My main research field is catalysis chemistry. Now, I have specially been working for catalyst development for new fuels such as dimethyl ether (DME) and hydrogen.

Plenary Lecture 2

Fine Particulate Emission Control of Power Plants

Dr. Mohammad Rasul
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Abstract: One of the major air pollution problems of coal fired power plants is fine particulate matter emission. Fine particulate matters are considered potentially hazardous to health because of their high probability of deposition in deeper parts of the respiratory tract. Electrostatic precipitators (ESP) are one of the most widely used devices which are capable of controlling particulate emission effectively from power plants and other process industries. ESP system consists of flow field, electrostatic field and particle dynamics. Although the dust collecting efficiency of the industrial ESP is as high as 99.5%, an upcoming strict environmental protection agency (EPA) regulation has led the Australian power plants to start finding new technologies to meet new requirements for emission control at minimum cost and thus control their fine particulate emissions to a much greater degree than ever before. This presentation describes the numerical simulation and model development of ESP systems (i.e. flow field, electrostatic field and particle dynamics) using computational fluid dynamics (CFD) code FLUENT and successful application of those models into an industrial ESP. The presentation recommends the options for controlling fine particle emission of power plants through improvement of the ESP efficiency.

Brief Biography of the Speaker:
Dr Rasul obtained his PhD in the area of Energy and Environment from The University of Queensland, Australia. He obtained his Master of Engineering in Energy Technology from Asian Institute of Technology, Bangkok, Thailand. His first degree is in Mechanical Engineering from Bangladesh University of Engineering and Technology, Dhaka, Bangladesh. Currently, Dr Rasul is a Senior Lecturer in Mechanical Engineering and Head of Department of Sustainability, College of Engineering and Built Environment, Faculty of Sciences, Engineering and Health, Central Queensland University, Australia. Dr Rasul has significant experience in working with process and environmental engineering industry in Australia as a consultant and senior R&D Engineer. Much of his research has been carried out for process industries. With over 115 publications and 15 research grants, Dr Rasul is specialised and experienced in research, teaching and consultancy in the areas of energy and environment, thermodynamics and thermofluid engineering, environmental fluid mechanics, process and power industry's energy and pollution analysis, industrial and renewable energy systems analysis. Dr Rasul is a member of Engineers Australia and Australasian Association of Engineering Education.

Plenary Lecture 3

Models of Aerodynamics and Physics of Hurricanes

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Abstract: Theoretical models have been developed to describe the aerodynamics and physics in quasi-steady hurricanes moving over open seas. The vertical structure of hurricane was modeled as consisting of lower, hurricane boundary layer (HBL) and upper, quasi-adiabatic layer, connected by a thin condensation layer in the eye wall region. Except the friction at the air/sea interface, the modeling avoided the common turbulent approximations, while explicitly or implicitly used basic stability constraints.
Based on observations, it was assumed that the hurricanes propagate along the warm air bands located over the warm oceanic currents, and under action of "sailing" wind. It was also assumed that the mass, humidity, momentum, and angular momentum of air are transferred from the lower to upper hurricane layers through the hurricane eye wall.
The air wind in HBL is highly affected by several physical processes, which have also been analyzed: (i) a specific oceanic wave – air interaction, (ii) evaporation at the sea surface, (iii) horizontal thermal flux from the warm air band to the hurricane core, and (iv) sudden condensation at the upper boundary of HBL, which is treated similar to slow combustion. Aerodynamic analyses of HBL resulted in space distributions of dynamic and thermodynamic variables. Additionally, a set of integral balance relations established for HBL, allowed expressing the key hurricane parameters via the horizontal temperature drop and sailing wind speed, which are considered to be given.
The HBL model was coupled with the model of upper AL of hurricane. Analysis of AL established a stability constraint for existence of steady hurricane, and resulted in analytical formulas for space distributions of dynamic variables. The values of key hurricane variables calculated using the coupled model, seem to be realistic.
Several observed effects have been explained and quantitatively described using this modeling. They include: (i) change in direction of hurricane angular velocity from cyclonic in lower part of hurricane to anti-cyclonic in the upper one, (ii) change in radial direction of radial wind component from centripetal in the lower part of hurricane to the centrifugal in its upper part, (iii) change in the radial distribution of angular momentum from radially increased in HBL to a constant value in AL, and (iv) sudden increase of temperature at the upper part of HBL.
The following three-step model of hurricane genesis and maturing in sub-tropical zones has been proposed and analyzed: (i) a sudden formation of plume; (ii) rotating the plume initiated by the horizontal component of trading wind, and (iii) propagation of external boundary of rotated plume due to the Kelvin-Helmholtz instability and under action of Coriolis force. A simple model showed that outward propagation of just formed rotational plume is possible only if the initial rotation of plume is cyclonic. The model calculations demonstrate very realistic features as compared with observations.
Based on these models, a simple idea of hurricane destabilizing by flights of supersonic jets has been proposed.

Brief Biography of the Speaker:
Arkady I. Leonov is a full professor at the Department of Polymer Engineering, and adjunct professor of applied mathematics at the University of Akron, Ohio, USA. He worked in broad scientific areas: classic and polymer related continuum mechanics of solids and liquids, geophysical fluid mechanics, polymer rheology and polymer fluid mechanics, polymer physics and physico-chemistry, polymer processing, and mathematical sociology. He authored and co-authored over 200 scientific papers published in reviewed journals, made numerous presentations at national and international conferences, published alone or with colleagues' four scientific monographs and four book chapters. He is a member of Society of Rheology, American Academy of Mechanics, and Honorable Member of British Society of Rheology. The presentation topics have been preliminary published in Electronic Arxiv Journal, Physics of Atmosphere and Ocean, 2008.

Plenary Lecture 4

Approaching Electrical Equipments Viability within Industrial Ecology Framework

Professor Cornelia Aida Bulucea
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Abstract: The main purpose of this approach is to highlight that an orientation towards the future industrial metabolism requires changes in human behavior and technical patterns. Industrial Ecology is an emerging framework within Sustainable Development. The concepts, tools and goals of Industrial Ecology had to be addressed, along with the understanding that Sustainable Development is not about certificates or licenses, it needs to be about the vitality of life on Earth. Definitely, the future needs for Sustainable Development include a human moral change through education, and an industrial metabolism shift through responsible practical actions. Based on the strong conviction that Nature has so far generated life, Industrial Ecology seeks for a new approach of the industrial systems, viewed not in isolation from the Nature surroundings systems, but in concert with them. Learning from the Nature means to look forward for an analogy of the technical systems created by humans with the natural ecological systems, defining this way the industrial ecosystems. Even the understanding of Nature will be always far above the human understanding, we should try to use our knowledge about the Universe in assessing the viability of the industrial systems according to the ecosystems patterns. These models will overview the relationships between various industrial systems, as well as the interactions with the environmental systems, further on directing to feedbacks creation within the “no waste webs”. This study is focused on the electrical equipments issues, and encompasses the design and operation assessment in a way that respects the framework of Industrial Ecology. Although Science not clarified and unified technical and ecological viewpoints, to address meaningfully many of the problems facing humanity today, a set of conditions for the performance of sustainable electrical equipments must be formulated. Since exergy has a significant role to play in evaluating and increasing the efficiencies of electrical technologies and systems, this presentation goes on to adopt a dualist view, incorporating technical and environmental dimensions, to describe exergy applicability to electrical devices. Examples are used to illustrate, explain and interpret the use of exergy and embodied energy as tools to understand and minimize the environmental impacts, as well as to optimize the efficiency of material and energy use within the industrial ecosystems.

Brief Biography of the Speaker:
Cornelia Aida Bulucea is currently an Associate Professor in Electrotechnics, Electrical Machines and Environment Electrical Equipments in the Faculty of Electromechanical and Environmental Engineering, University of Craiova, Romania. She is graduate from the Faculty of Electrical Engineering Craiova and she received the Ph.D degree from Bucharest Polytechnic Institute. In Publishing House she is author of four books in electrical engineering area. Research work is focused on improved solutions for electrical networks on basis of new electric equipments and environmental impact of energy and electric transportation systems. She has extensive experience in both experimental and theoretical research work, certified by over 50 journal and conference research papers and 13 research projects from industry. She has held in the Association for Environment Protection OLTENIA and she is a regular invited keynote lecture for environmental engineering symposia organized by Chamber of Commerce and Industry OLTENIA. Due to WSEAS recognition as huge scientific Forum she participated in five WSEAS International Conferences, presenting papers and chairing sessions. She was Plenary Lecturer in the WSEAS International Conference on POWER SYSTEMS, held by the University of Cantabria, Santander, Spain, September 23-25, 2008. She is very proud of her 10 papers published in the WSEAS Conferences Books and 3 papers published in WSEAS TRANSACTIONS ON ENVIRONMENT AND DEVELOPMENT, and in WSEAS TRANSACTIONS ON ADVANCES IN ENGINEERING EDUCATION.

Plenary Lecture 5

Airborne Imaging in the Tropical Environment: Past Experience & Future Prospects

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Abstract: Imaging spectrometry, also called hyperspectral imaging, is gaining widespread interest as a remote sensing technique that allows for quantitative determination of the abundance and composition of Earth surface materials at the subpixel resolution level. Hyperspectral imaging sensors collect radiance data from airborne and spaceborne platforms that must be converted to apparent surface reflectance before analysis techniques can be brought to bear. In this plenary, I present my past experience using airborne hyperspectral imaging sensor for a variety of environmental and forest engineering related applications. I begin by providing a brief overview of airborne hyperspectral sensing and show its operational set up for data acquisition over the Malaysian airspace as a showcase of a tropical environment. I next present a series of examples using the AISA sensor system for a variety of environmental research and commercial applications. These include precision forestry and agriculture using individual timber tree and oil palm, respectively, rice paddies land use mapping, coastal zone management and derivation of useful parameters of interests for montane dipterocarp hill forest environmental conservation and management. In addition, I outline my efforts to propose a carbon flux and dynamics model with lidar-derived tropical forest structure for improved carbon stocks and flux estimation. I then explore the use of airborne hyperspectral sensor observations for other environmental related applications. Lastly, I provide a preview of the next generation airborne hyperspectral systems which hopes to provide spatially continuous estimates of detail forest composition and structure for future and better environmental planning and sustainable development. The truth seems to be out there for the use of airborne hyperspectral remote sensing for operational environmental applications and forestry.

Brief Biography of the Speaker:
He is a Senior Professor (Grade VK6/B) in the Department of Forest Production at Universiti Putra Malaysia (UPM), and was a Visiting Professor with Yale and Kyoto University. His research expertise is in Forest Engineering Surveying. His research interests include hyperspectral image processing, the estimation of tropical forest aboveground biomass using airborne hyperspectral sensing, and improving model carbon projections of the land surface using other remote sensing data. He was the Coordinator of Tropical Forest Airborne Observatory (TropAIR) and the principal investigator for three Search-and-Rescue (SAR) operations for the missing military and civilian aircrafts in Malaysia.

Plenary Lecture 6

Energy Labeling of Pumps and Electrical Motors Assemblies Method

Professor Mircea Grigoriu
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Abstract: For the present and the near future, European plan for energy consumption mitigation dedicates a consistent chapter to electrical motors energy labeling, as a measure of energy efficiency and environmental friendliness of these equipments. The most adequate model for the pumps energy labeling approach seems to be a deepening particularization of the general installation and buildings labeling, accepted at international level and covered by national and international regulations. The paper presents the method developed by the Romanian Cleaner Production Center in cooperation with Multigama ltd., the representative of KSB Pumps Group from Germany. The method emphases follow ups of energy efficiency savings improvement and environmental impact effects evaluation. There are considered the potential extension to the whole pumping system evaluation from the energy efficiency point of view. The method consider the specific “electrical motor”-“pump” operation characteristics and restrictions, the potential of flexibility of the system and energy mitigation limitations.

Brief Biography of the Speaker:
Mircea Grigoriu is assistant professor of Department of Energy and Environmental Engineering, University POLITEHNICA of Bucharest, Romania, where he is also the coordinator of the Hydraulic Machineries Laboratory and director of the Romanian Cleaner Production Center. His main research interests concern Pumping systems energy efficiency and the energy savings and environmental impact; Pumping systems design, operation, automatics, diagnostics and protection; Climate changes assessment; Management systems. In these fields, he authored or co-authored over 50 scientific papers published in reviewed journals or presented at international conferences. He was minister of Environment counselor, national focal point of the UNFCCC of Romania and now is listed in the Roster of experts of UNFCCC. He is technical counselor of important pumping equipments producers. He is a redactor at the Energetica Journal edited by the National Energy Producers Association (IEA), representing Eurelectric in Romania.

Plenary Lecture 7

Used Vegetable Oil as Fuel in Diesel Engine

Professor Charalampos Arapatsakos
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Abstract: Air pollution is made up of many kinds of gases, droplets and particles that reduce the quality of air. Moreover, air pollution originates from both natural and anthropogenic sources. The largest source of human made pollution is the burning of fossil fuels, including coal, oil and gas in our homes, factories and cars. Natural sources related to volcanoes that produce sulfur, chlorine and ash. Wildfires make smoke and carbon monoxide. Air pollution is either primary or secondary. Primary pollution is put directly to the air, such as smoke and car exhausts. Secondary pollution forms in the air when chemical reactions changes primary pollutants. Photochemical smog is an example of secondary pollution. The health effects caused by air pollutants may range from subtle biochemical and physiological changes to difficulty breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions system. These effects can result in increased medication use, more hospital admissions and even premature death. There are several many types of air pollutant. These include smog, acid rain, the greenhouse effect and holes in the ozone layer. The atmospheric conditions such as the wind, rain, stability affect the transportation of the air pollutant. This paper examines the use of diesel-used vegetable oil mixtures in four-stroke diesel engine. The mixtures used are the following: diesel-5% used vegetable oil, diesel-10% used vegetable oil, diesel-20% used vegetable oil, diesel-30% used vegetable oil, diesel-40% used vegetable oil, diesel-50% used vegetable oil. For those mixtures the gas emissions of carbon monoxide (CO), hydrocarbons (HC), nitrogen monoxide (NO), smoke are being measured, and the fuel consumption is also examined.

Brief Biography of the Speaker:
Dr. Charalampos Arapatsakos is a Greek citizen, who has been born in Athens. He has studied Mechanical of Engineering. He is a Ph.D. Assoc. Professor in the University of Thrace in Greece. At the present he is a member of Technical Chamber of Greece, member of Electrical and Mechanical Engineering Association and member of Combustion Institute of Greece too. Mr C. Arapatsakos has participated in many research programs about biofuels, gas emissions and antipollution technology. His research domains are mainly on biofuels and their use in internal combustion engines, the power variation from the use of biofuels, the gas emissions and mechanical damages.

Plenary Lecture 8

A Better Environment through Better Terology

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Abstract: A better environment can be achieved through the decreased emission of pollutants and the optimization of the production of green energies. Also, making maintenance interventions as effective and efficient as possible plays an important part in getting equipment to function as well as it can and, no less importantly, in minimizing the downtime caused by faults. The paper summarizes the latest developments in the areas of decreased emissions and green energy production achieved by the author and his team, highlighting the most recent aspects of this group's research, namely 3D models for fault diagnosis.
The paper will also describe the current position of several projects that contribute to a better environment, including on-condition maintenance for wind farms. This is based on the remote acquisition of data through IP networks and also on the introduction of new protocols and low-cost hardware, in order to implement local solutions for collecting data in each wind generator. The paper will also discuss and make proposals concerning prediction algorithms based on data series models.
Another way of safeguarding the environment is by reducing Diesel engine emissions, particularly in urban buses, through the achievement of emission levels lower than the most recent standards. However, as this involves political decisions, it would need to be implemented through concrete systems that, in this case, use new algorithms based on Hidden Markov Chains, which are proving to be a good predictive tool.
The above proposals are being added to a core system called SMIT (Integrated Modular System for Terology), which has a modular structure, like a jigsaw puzzle that grows in response to new developments and the challenges that organizations face.
Currently, further new research projects are being undertaken, such as integrated asset management from an environmental perspective, which will allow the optimization of the integration of international standards, with the objective of organizing and planning maintenance with the environment as a major consideration.
Another interesting project is related to aiding fault diagnosis through the use of 3D models that, in the near future, will enable causes of faults to be identified as efficiently as possible. However, if this project is to make a significant contribution in this area, it will only be through developments achieved by global collaboration using the web and free software resources, as this will minimize the time required for the development of new models.

Brief Biography of the Speaker:
Jose Manuel Torres Farinha (www.torresfarinha.com) is Licentiate in Electrical Engineering by Coimbra University, and PhD in Mechanical Engineering by Oporto University. He is Senior Member and Specialist in Industrial Maintenance by "Ordem dos Engenheiros", that is the Association that represents the long-cycle theoretically scientific studies in-depth in Portugal (CLAIU member). He is Coordinator Professor at Engineering School of Coimbra (www.isec.pt) and member, since 1994, of the Mechanical Engineering Center of Coimbra University – CEMUC - (http://www2.dem.uc.pt/cemuc/index.htm), that is classified as Excellent by "Fundacao para a Ciencia e a Tecnologia - FCT" - (http://alfa.fct.mctes.pt/index.phtml.en), after evaluation by an international team. The main research of Jose Manuel Torres Farinha is in the Maintenance Management field but through an enlarged view called Terology that is supported by an information maintenance system, that includes fault diagnosis, and on condition maintenance, with emphasis in an ecological approach. He wrote a book, chapters of books and has many papers published in national and international journals and conferences. He was President of one of the biggest higher institutions in Portugal, where he introduced some innovative vectors, namely, by the first time in Portugal, the certification of a higher education institution and, also, made its evaluation by EUA (European University Association). He also worked, some years ago, in the area of hospital maintenance, namely in hospitals in the centre of Portugal. Additionally, he also collaborates in national technical studies in the maintenance area.

Plenary Lecture 9

A Novel Technique of Digital Signal Processing on Solar Geomagnetic Induced Current to Detect and Prevent Power Black Out

Professor Hari Kumar Naidu
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Abstract: The recent developments in the field of Digital Signal Processing and remote sensing with its wide spectrum of sensor systems provide opportunity to gather information on solar wind, solar flares and other solar phenomena occurring in space as well as high geological resistivity areas consisting of igneous rock formation on earth by Geographical information system, through which the power transmission lines are passing, in space and time domain.

Significant contribution is being made recently by developing state of art sensor systems, building launch capabilities of remote sensing series satellites & developing advanced Digital Signal Processing techniques. With judicious combination of satellite data sets with Geographical Information Systems by SCADA, it is possible to carry out detailed mapping and correlating advanced digital image processing techniques like artificial intelligence & neural network, which may further improve the accuracy of the derived thematic layers from satellite image for forecasting effects of developing solar Geo magnetic disturbances on power systems and transformers and the location of high resistivity area in which these power equipments are existing.

This lecture will present the causes & nature of geomagnetic storms & their resulting effects on Electrical power system since the solar flares can cause transient fluctuations in the earth's magnetic field. This in turn create transient fluctuations on the exposed power transmission lines and transformer neutral terminals by developing Geo magnetic Induced current in high resistivity earth areas, which is the quasi direct current compared to 50/60 Hz and thereafter analyzing it by novel Digital Signal Processing techniques to prevent blackouts in future.

Brief Biography of the Speaker:

Hari Kumar Naidu is a Professor of Electrical and Electronics Engineering, Adhiyamaan college of Engineering, Hosur, Tamil-Nadu, India.

His area of expertise at present is Power system reliability and SCADA communication for real time reliable power system automation.

He authored two books in electrical engineering field. In addition, he authored or co-authored over 16 numbers of scientific papers published in reviewed journals or presented at International conferences. He is reviewer for a reputed International Journal. He had organized as coordinator for 6 numbers of National level conferences, seminars, workshops. In addition, he attended 17 numbers of conferences, workshops and training programmes in India & abroad including chairing few. Besides Academics he has vast field working experience in Saudi- Arabia, Sultanate of Oman and Qatar (Arabian Gulf) in various senior capacities. He had obtained Master of Electrical Engineering and Bachelor of Electrical Engineering qualifications from the reputed National Regional Engineering college, Bhopal, India.

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