Contents

INVITED TALKS

INV01

ON THE USE OF PERMANENT MAGNET MACHINES IN ELECTRIC VEHICLES

Noureddine Takorabet*
GREEN - Université de Lorraine, Vandoeuvre lès Nancy, France
noureddine.takorabet@univ-lorraine.fr

ABSTRACT: In order fulfill the new European standards for fuel economy and reduction of greenhouse gas emissions, the automotive industry proposes technologies of power trains which are more respectful of the environment. Hybrid Electric Vehicles (HEVs) based on a combination of electric and fossil energies provide a considerable reduction in fuel consumption while the full Electric Vehicles(EVs) provide zero CO2 emissions. The drive train including the electric motor and static converter is a key element in these applications. To improve the autonomy of electric cars, the energy efficiency of the drive train is an important criterion for choosing the electric motors. Different topologies of electric motors can be used for this purpose. Induction machines (IMs) or Switched Reluctance Motors (SRMs) have the advantage of robustness and low cost but they present low efficiency compared to synchronous motors. Permanent Magnet (PM) motors have an advantage of high efficiency and compactness and high torque density; they may, however, have other drawbacks due to their topology characterized by a constant and uncontrollable magnetic flux.
In this paper, we present different topologies of powertrains and some Permanent Magnet machine architectures with their advantages, disadvantages and the implementation of electric vehicles. The concept of the variable speed drive is a key point in the design of the electric motor. An overview of the latest advances in the design and optimization of permanent magnet machines will be discussed and illustrated.

KEYWORDS: Electric Vehicle, Permanent Magnet Motors, Design and Optimization.

INV02

STRUCTURAL AND TEMPERATURE ASPECTS OF DESIGN WEAR RISISTANT UHMWPE-BASED POLYMER-POLYMERIC AND SOLID LUBRICATING COMPOSITES

S.V. Panin [1,2], L.A. Kornienko [1], N.S.Thuk [2], M. Poltaranin [1,2], L.R. Ivanova [1],

S. Piriyayon [3], T. Mandoung [4]

[1]*Institute of Strength Physics and Materials Science SB RAS, Tomsk, Russia*

[2]*Tomsk Polytechnic University, Tomsk, Russia*

[3]*Rajamangala University of Technology Suvarnabhumi*

[4]*Rajamangala University of Technology Phra Nakhon*

ABSTRACT: Ultra high molecular weight polyethylene (UHMWPE) is widely used in orthopedic surgery for joints replacement due to its good processability, very low friction coefficient, high impact resistance, high resistant to abrasion, chemical resistance and biocompatibility. Even though UHMWPE has very low wear compared to other polymers, the latter is still a major problem in tribotechnical applications. A lot of attention recently has been paid to increasing the strength and wear resistance of composite polymeric materials. Traditionally, strength and wear resistance of polyolefins are increased by the addition of micron size reinforcement particles of inorganic material. Recently, intensive investigations have been carried out to explore the possibility to add nano-sized fillers due to theirs redundant surface energy. The small size of the filler can also provide a very fine and uniform structure of UHMWPE specimens.

HDPE is often copolymerized with other monomers (e.g., polypropylene) to achieve improved processing characteristics or to alter the physical and mechanical properties of the polymer. However, most of the UHMWPEs used to fabricate orthopedic implants are homopolymers, and so we will restrict our further discussion to polymers with only a single type of monomer. Beside using the techniques is chemical modification (adding graft HDPE and UHMWPE) surface treatment (ion implantation and electron-beam irradiation) were employed. These treatments overcoming successfully the problem on UHMWPE wear resistance and mechanical properties.

UHMWPE powder with particle size of 15-20 μm, molecular weight is 4.0×10^6 g/mol, (GUR 2122 by Ticona, Germany) and graft UHMWPE with maleic anhydride functional groups realized by modification of the polymers in reacting gases (UHMWPE -g-SMA) were used. Wear tests were performed using the block-on-ring scheme. The applied load was set to 160 N and the revolution rate was 100 rpm. Analysis of permolecular structure was performed by means of a scanning electron microscopy (SEM). Crystallinity degree was measured by differential scanning calorimerty (DSC) and the chemical composition was studied by FTIR spectroscopy. Friction coefficient was measured by pin-on-disk tribometer. In addition, the nanoindentation test was used to determine the surface hardness and elastic modulus of the surface layer.

It is shown that conditional chemical modification of UHMWPE with maleic anhydride (UHMWPE-g-SMA) can improve wear resistance and mechanical properties of UHMWPE-based composite.

Adding of graft-UHMWPE combined with fillers reinforcement can improve wear resistance. Especially when added AlO(OH) micron size particles. Mechanical properties and crystallinity did not change substantially when graft UHMWPE and fillers are added.

Wear resistance of irradiated specimens reached the maximum value at N+ ion dose of $1*10^{17}$ ion cm^{-2}, with rather low surface roughness. In this way, wear intensity was reduced up to 5 times in contrast with pure UHMWPE. Surface hardness of irradiated samples was increased by increasing of N+ ion dose during treatment process while its elastic modulus was reduced.

High-energy impact during treatment process leads to increasing of crystallinity in UHMWPE which probably provides low wear rate for the specimens. The conclusions indicate that N+ ion implantation of UHMWPE can be used for producing bearing materials in tribological application for its excellent wear resistance compared with pure UHMWPE.

KEYWORDS:

INV03

WASTE TO ENERGY: POTENTIAL & CHALLENGES FOR INDIA

Naveen Kumar

Centre for Advanced Studies & Research in Automotive Engineering, Delhi Technological University, 110042, Delhi, India

E-mail: naveenkumardce@gmail.com, Mobile : +919891963530

ABSTRACT: Waste generated in different rural and urban areas can be converted into energy and byproducts. Waste conversion into fuels and chemicals using feedstocks such as food waste and biomass undoubtedly is very strategic in rural areas for employment generation, cleaner environment and better income. In many rural areas in India and other developing countries in Africa, biofuels from agricultural wastes and other ligno-cellulosic materials are very attractive preposition for poverty alleviation providing additional income and energy security to rural population. Feedstocks availability is a major challenge for sustainability of biofuels and biomass waste materials such as sludge waste, waste cooking oils and food waste shall be a promising option.

Food and biomass wastes are increasingly becoming more and more reliable feedstocks for biofuel production nowadays especially in countries like India, where agro-based products are largely produced. They are non-seasonal, require little pretreatment, do not compete with the food chain, largely produced worldwide and contain other chemical components.

Generally, depending on the areas of interest; waste is classified based on the basis of source and its composition. Wastes are classified as *Industrial waste,* if their initials source comes from the industry. Examples of such waste include; textile waste, ternary waste, clinical waste, restaurant waste, electronic waste etc. Wastes are also classification based on chemical compositions. Waste composition determines the conversion technology suitable for industrial application. Based on this classification, waste are classified as; *organic waste, toxic waste, cellulosic waste, inorganic waste* etc. The choice for conversion technology depends upon the chemical composition, the desired product, the efficiency and other parameters such as cost, operational parameters and so on. Different technologies including b*io-chemical, thermo-chemical, chemical and bio-refinery processes* are widely adapted.

Bio-chemical processes are mostly low temperature operations. The mechanism of most bio-chemical processes is the catalytic or non-catalytic bio-decomposition of organic content of waste into different grades of fuels or as intermediates for chemicals. In summary, bio-chemical conversion processes include bio-ethanol, bio-hydrogen, biogas and fuel cell. Enzymatic *hydrolysis and Saccharification* are additional examples in this category.

Thermo-chemical processes are either high temperature or medium temperature chemical reactions. Waste materials can be converted using high temperature thermo-chemical processes include pyrolysis and gasification routes. Pyrolysis is widely used and efficient thermal processes to obtain liquid from agricultural waste and other ligno-cellulosic containing materials at moderate temperature range from 550^0C-700^0C. The factors that affect the pyrolysis conversion of food and biomass wastes materials into biofuels are; reaction temperature, heating rate, material residence time, catalyst concentration/loading and moisture content. Slow pyrolysis referred to as low temperature pyrolysis is characterized by low operation temperature range (150^0C-450^0C), long residence time producing solid bio-char. Fast pyrolysis is high temperature operation producing about 60%–75% of bio-oil, some solids and gaseous phase products. Flash pyrolysis is similar to gasification due to the high temperature attributed to this process.

Gasification is a high temperature thermal degradation of organic components of the feedstocks into lighter hydrocarbons in the range of C4-C8 with good fuel properties. Although FW may not be suitable for this conversion process owing to their high moisture content, BW materials are excellent candidates in this regards. Products of gasification are largely used as cooking fuels. Gasification technology is well developed technology in India with small scale gasifiers already developed and in use in many parts of the country.

Innovative technologies for conversion of waste cooking oil and related feedstocks to fuels have been well investigated. One of such technologies is supercritical transesterification using high temperature and pressure to derive the reacting medium to its supercritical state for exceptional reactivity. Ultrasonic transesterification of vegetable oils has also been investigated as well. The main products of transesterification are fatty acids methyl esters [FAMEs] of the corresponding triglycerides and glycerol.

The bio-refinery concept is fast becoming very attractive and studied in details in many parts of the world.

Food and biomass wastes constituting nuisance in both rural and urban communities can become sure of sustainable energy and income if converted into useful products and byproducts. Conversion technologies including chemical, thermo-chemical, bio-chemical and bio-refinery have proven to be useful technologies. Fuels and products from such processes are suitable for domestic and industrial applications specially in the rural areas.

KEYWORDS: conversion technologies, fuels and chemicals, waste biomass, food waste.

MACHINERY & ENERGY

ME01

CLEANING SCHEDULE OPTIMIZATION OF INDUSTRIAL HEAT EXCHANGER NETWORK

Totok R. Biyanto, Hendra Cordova, and Totok Soehartanto

Engineering Physics Department, Industrial Technology Faculty,

Institute Technolgy Sepuluh Nopember Surabaya (ITS), Indonesia, trb@ep.its.ac.id

ABSTRACT: All industries constantly strive to reduce the specific energy consumption to a lower level and thereby increase the profit margin and also reduce carbon dioxide emission. Increasing energy cost is also a major concern for the industries. For example, the crude oil price has risen from USD 30/bbl in the year 2000 to USD 100/bbl or above in ten years. Improved process technologies, process operation and heat recovery through heat integration are some of the approaches employed by the industries to reduce the energy consumption. Heat integration involves the use of a network of heat exchangers whereby the heat in the product or intermediate streams is recovered into the feed streams. This approach reduces the heat loss through the product streams while it also reduces the energy required to heat the feed streams. Unfortunately, fouling in heat exchangers is an undesirable process that reduces the realization of the maximum benefits of heat integration. Fouling in Heat Exchanger Network (HEN) is a serious problem. It causes loss in efficiency over time, loss of production due to downtime for cleaning and extra maintenance. Fouling mitigation is essential. For this purpose, effective methods of fouling mitigation are important. Cleaning scheduling is an alternative method to mitigate the fouling. The objective of this research is to develop optimum cleaning scheduling for industrial HEN which maximizes energy recovery and minimizes shutdowns. The approach of this research includes (i) Collecting operational data, properties and blending information; (ii) Perform data pre-processing (iii) Fouling calculation; (iv) Develop neural network (NN) fouling prediction model; (v) Develop cleaning scheduling optimization. The complex nature of the heat exchanger fouling characteristics due to changes in operating conditions and crude oil blends (feed stocks) has been captured reasonably well by the NN and HEN cleaning scheduling is developed. The saving resulted from the cleaning schedule in the HEN is around US $ 1.3 milions or 23% of maximum potential savings.

KEYWORDS: Heat Exchanger Network, Fouling, Cleaning scheduling Optimization, Neural network.

ME02

INVESTIGATIONS ON EFFECTS OF ALCOHOL TYPES ON ESTERIFICATION OF PYROLYSIS USING GREEN CO-SOLVENTS: PRELIMINARY RESULTS

Yahaya Alhassan[1&2*], Naveen Kumar[1], Idris M. Bugaje[2], Harveer S. Pali[1], and Parvesh Khatkar[1]

[1]Centre for Advanced Studies & Research in Automotive Engineering, Delhi Technological University, 110042-New Delhi

[2]Petrochemical and Allied Department, National Research Institute for Chemical Technology, P.M.B. 1052-Zaria, Nigeria

ABSTRACT: Esterification of carboxylic acids present in pyrolysis oil is one of the technologies used in upgrading the fuel properties of the oil. This is affected by the nature of alcohol used as solvent, activity of the catalyst used or both. In this preliminary research, supercritical esterification of waste tyre pyrolysis oil was used as an upgrading technique for improving fuel properties of this oil. In addition, green solvents are introduced as both co-solvents and catalysts in the process. We investigated the effects of alcohol type (Methanol and Ethanol) as co-solvents in green solvents. Results indicated that density and viscosity of Deep Eutectic Solvents (DESs), reduced with increasing temperature with viscosity been affected much especially beyond 60^0C. Methanol-DESs co-solvents systems reduced TAN with lowest value of 6.29% while Ethanol-DESs counterparts varied. Fuel properties tested indicated that increasing alcohol chain length increases the miscibility of the final products which separation difficult thus increases viscosity. Density was not affected by alcohol type or co-solvent system but its volume. Although calorific values of the final products were improved significantly up to 37.46 (MJ/Kg), they were still below the standard limit generally. Carbon residue values of all samples were higher than the maximum limit of ASTM D6751-08. Finally, we concluded that, although supercritical esterification of pyrolysis improved the some fuel properties, it could not improve some important properties of the oil.

KEYWORDS: Esterification, Co-solvents, Fuel properties, FAMEs.

ME03

PRODUCTIVITY IMPROVEMENT FOR A HARD A DISK DRIVE INDUSTRY BY REDUCING MACHINES DOWNTIME OF HEAD GIMBAL ASSEMBLY LINE

Ubolrat Wangrakdiskul[1] and Noppawan Pengruang[2]

[1,2] Production Engineering, Faculty of Engineering, King's Mongkut University of Technology North Bangkok, Bangkok, Thailand, Email, ubl@kmutnb.ac.th

ABSTRACT: The hard disk drives Industry is one of the most important businesses in Thailand having the export value for $11.8 US billion dollars in 2013. Therefore, improving the productivity and process for enhancement the global competitiveness of the company is crucial. The case study company has set the policy to modify its semi-automated assembly line to be the automated assembly line in order to improve the productivity and rapidly produce the products. However, after installing the new automated assembly line, it turns to increase the downtime more than in the past. We have studied, analysed the causes of machines breakdown and further to find out the method for preventing this problem. As these, the 7 tools of quality principles, which using the causes and effect diagram and check sheets, are implemented. In addition, the 7 wastes technique focusing on waiting and inefficiency of the process are also considered. It can be concluded that the alternatives method for solving this problem can reduce the downtime of assembly line from 44% to be 28% of total production time.

KEYWORDS: Hard disk drives, Downtime of machines, 7 wastes, Productivity.

ME04

PHOTOCATALYTIC AND ANTIBACTERIAL ACTIVITY OF ZnO NANOPARTICLES PREPARED BY PRECIPITATION METHOD

Weerachai Sangchay

Faculty of Industrial Technology, Songkhla Rajabhat University, Songkhla, Thailand,

weerachai.sang@yahoo.com

ABSTRACT: The powders of ZnO were prepared by precipitation method. The prepared powders were calined at the temperature of 300, 500 and 700 °C for 2 h with the heating rate of 10°C/min. The microstructures of the fabricated powders were characterized by SEM and XRD techniques, and the results show that all samples reveal only a hexagonal or wurzite structure. The photocatalytic activities of the powders were also tested via the degradation of methylene blue (MB) solution under UV irradiation. Finally, antibacterial activity efficiency was evaluated by the inactivation of *E.coli*. It was observed that higher temperature of fabricated powders gives better photocatalytic and antibacterial activity.

KEYWORDS: Photocataltyic activity, Antibacterial activity, ZnO nanoparticles, Precipitation method.

ME05

AN EXPERIMENTAL STUDY ON PERFORMANCE AND EMISSION CHARACTERISTICS OF A LIGHT DUTY SINGLE CYLINDER DIESEL ENGINE FUELED WITH ISOBUTANOL AND DIESEL BLEND

Mohd Waqar Naseer Siddiquee and Vasu Kumar

Delhi Technological University, New Delhi, India, mohdwaqar.siddiquee@gmail.com.

Delhi Technological University, New Delhi, India, vasu.rossi@gmail.com

ABSTRACT:Global concern on ecological imbalance and energy security due to rapid increase in automotive sector and large scale exploitation of petroleum resources has created a great demand for alternative fuels because conventional petroleum derived fuels are depleting at very faster rate. Currently alternative fuel for automotive sector is the area of research round the globe. Many researchers concluded that alcohols can be used as a fuel for the internal combustion engines but most of the work is carried on short chain alcohols like methanol and ethanol. Long chain alcohols having adequate combustion properties are studied at a lesser extent. Butanol which is a long chain alcohol is better suited as a blending agent with diesel than short chain alcohols because it has various properties similar to diesel. Butanol can be produced from bio refineries and also be produced in existing ethanol producing facilities with little or no modification. Butanol is better than ethanol, due to its higher energy content and low miscibility in water. It can be seen as one of the viable solution for the application in diesel engine. Combining exhaust gas recirculation (EGR) along with butanol and diesel blend can achieve reduction in NOx and soot emissions. In present investigation 10%, 20% and 30% (by volume) blends of isobutanol and diesel were prepared. Isobutanol is miscible in diesel and their blend is stable. A number of exhaustive tests have been conducted on an unmodified single cylinder diesel engine employing EGR. In this study performance and emissions characteristics like brake specific fuel consumption (BSFC), brake thermal efficiency (BTE), brake power, NOx, CO, HC etc. has been evaluated and compared with diesel as baseline.

KEYWORDS: Performance, Emission, Isobutanol and Diesel Blend.

ME06

PRELIMINARY STUDY ON SHEATH CORE BI-COMPONENT TITANIUM DIOXIDE/POLY(LACTIC ACID) FIBER BY MELT SPINNING

Nanjaporn Roungpaisan[1]*, Natee Srisawat[1], Natthaphop suwannamek, and Chureerat Prahsarn[2]

[1]Department of Textile Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Pathumthani 12110, Thailand

[2]National Metal and Materials Technology Center, 114 Paholyothin Rd., Klong Luang, Pathumthani 12120, Thailand, nanjaprs@gmail.com

ABSTRACT: In this preliminary study, The Sheath/core bi-component fibers between titanium dioxide and Poly(lactic acid) were prepared by using Hills Bi-component Fibers Machine. Which the sheath was diluted concentration from 10% TiO_2/PLA masterbatch to 1%, 1.5% and 2% and varied proportion sheath/Core fibers at 0/100, 10/90, 30/70, 50/50 and 70/30 respectively. Thermal behaviour of the TiO_2/PLA sheath/core fiber was studied using differential scanning calorimetry. Optical Microscope and scanning electron microscope were used investigate the particle of titanium dioxide on fiber suface and cross-section. The additional of titanium and proportion of two phase between TiO_2(Sheath) and PLA(Core) contruibutes significant role on improving the whiteness and crystallinity properties of the final fibers.

KEYWORDS: Sheath/Core bi-component fibers, Titanium dioxide, Melt spinning fiber.

ME07

THE PHOTOCATALYTIC ACTIVITIES OF NANO-TITANIUM DIOXIDE ON THE COTTON FABRICS FOR SELF-CLEANING PROPERTIES

Siripan Metanawin,[1] Tanapak Metanawin,[2] Praripatsaya Panutumrong,[1]
Sunee Hathaiwaseewong,[1] and Tirapong Chaichalermvong[1]

[1]Department of Textile Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Pathum Thani, Thailand.

[2]Department of Materials and Production Technology Engineering, Faculty of Engineering, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand, tmw@kmutnb.ac.th.

ABSTRACT: The study of photocatalysis of nano titanium dioxide on the cotton fabrics have been investigated through self-cleaning properties. The mini-emulsion technique was employed to prepare the encapsulation of titanium dioxide nano particles in polystyrene beads prior used. The mini-emulsion was coated on the cotton fabrics using Pad-dry method. The loading amount of TiO_2 particles into the mini-emulsion were various from 1% wt to 40%wt. The particles sizes of the TiO_2-encapsulated polystyrene mini-emulsion were investigated by dynamic light scattering. It was noticed that the particle size of the mini-emulsion was in the range of 100-200 nm. The morphology of treated cotton fabrics were investigated using scanning electron microscopy. The crystal structure of TiO_2–encapsulated PS mini emulsion which coated on cotton fabrics were examined by X-ray diffraction spectroscopy. In order to investigate the photocatalytic activities of TiO_2 through the self-cleaning characteristics of the cotton fabrics, colorant stains were created on the samples. Coffee stains were used as colorant organic stains. The result shown that the coffee stained on the cotton fabrics significantly showed the improving of the self-cleaning properties under UV radiation.

KEYWORDS: nano titanium dioxide, mini-emulsion, self-cleaning, encapsulation, photocatalytic oxidation.

ME08

THE EFFECT OF NANO-ZINC OXIDE ON THE SELF-CLEANING PROPERTIES OF COTTON FABRICS FOR TEXTILE APPLICATION

Praripatsaya Panutumrong[1], Tanapak Metanawin,[2] Siripan Metanawin,[3] and Narongchai O-Charoen[1]

[1]Department of Materials and Metallurgical Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, aum_kung@hotmail.co.uk.

[2] Department of Materials and Production Technology Engineering, Faculty of Engineering, King Mongkut'sUniversity of Technology North Bangkok, Bangkok, Thailand, tmw@kmutnb.ac.th.

[3]Department of Textile Engineering, Faculty of Engineering, Rajamangala University of Technology Thanyaburi, Pathum Thani, Thailand, siripan.m@en.rmutt.ac.th.

ABSTRACT: The self-cleaning properties of nano-zinc oxide on cotton fabrics have been investigated. The cotton fabric has been prepared by pad-dry method. The nano-zinc oxide was encapsulated in the polystyrene particle by mini-emulsion process prior used. The loading amount of zinc oxide particles into the mini-emulsion were various from 1% wt to 40%wt. The particles sizes of ZnO-encapsulated polystyrene mini-emulsion were determined using dynamic light scattering. It was showed that the particle size of the mini-emulsion was in the range of 124-205 nm. The topography and morphology of ZnO-encapsulated polystyrene which coated on cotton fabrics was observed using scanning electron microscopy. The crystal structure of ZnO-coated on cotton fabrics was explored by X-ray diffraction spectroscopy. The photocatalytic activities of zinc oxide were present through the self-cleaning properties. The presents of the zinc oxide on cotton fabrics significantly showed the improving of the self-cleaning properties under UV radiation.

KEYWORDS: zinc oxide, mini-emulsion, self-cleaning, encapsulation, photocatalytic oxidation.

ME09

FABRICATION AND STUDIES OF COMPOSITE MEMBRANE BASED ON GRAPHENE DOPED NAFION MEMBRANE FOR DECREASING PLATINUM LOADING.

Nadeem Yamin[1] and Abhishake Goyal[2]

Department of Polymer science and chemical technology, Delhi Technological University, India,

email. [1]yamin.nadeem@gmail.com, [2]abhishek.goyal1919@yahoo.co.in

ABSTRACT: Fuel cells are a promising energy source on account of their high efficiency and low emissions. Proton exchange membrane fuel cells (PEMFC) are clean and environmental-friendly power sources, which can become future energy solutions especially for transport vehicles. They exhibit good energy efficiency and high power density per volume. Working at low temperatures (<900C), hydrogen fuelled proton exchange membrane fuel cells (PEMFCs) are identified as promising alternatives for powering autos, houses and electronics. At the middle of the proton exchange membrane (PEM) fuel cell is the membrane electrode assembly (MEA). The MEA consists of a proton exchange membrane, catalyst layers, and gas diffusion layers (GDL). However, most of the researchers have already mentioned that PEMFC are not competitive enough to rechargeable lithium ion battery with respect to price because of the rare metal used such as platinum in it. Presence of platinum in PEM fuel cells is one of the reasons why fuel cells are excluded from commercialization. Therefore, reducing the amount of platinum used in fuel cells is very important for their commercialization. The catalyst layer of a PEM fuel cell is a porous mixture of polymer, carbon, and platinum. The characteristics of the catalyst layer play a critical role in determining the performance of the PEM fuel cell. In this work, we develop modified electrodes for PEMFC. Graphite owing to its conductivity, corrosion resistance and easy machinability, is the preferred material in the system. Silane functionalised Graphene oxide is synthesized through the grafting of Graphene oxide in APTES(3-aminopropyl silane) which was used as a filler in nafion fuel cell. Functionalised silane is allowed to react with adam's catalyst (PtO2) which helps to reduce the platinum catalyst and increase the water uptake and proton conductivity . The prepared composite carries various hydrophilic functional groups (-NH2, -OH, -CO2H).

KEYWORDS: Nafion, Graphene, Adam’s catalyst.

ME10

STUDY OF MECHANICAL AND FRICTION BEHAVIOUR OF POLYSTYRENE BASED NANO COMPOSITES

Prashant Chaudhary[1], Vatsal Gupta[1], Bhavesh Gulia[1], Prince Gulati[1], and Kunal Barolia[1]

[1]Delhi Technological University, India, guliya.prashant@gmail.com

ABSTRACT: The present study considers the mechanical and frictional behavior of polymer composite material prepared using Polystyrene (PS) as the base material and nano-sized zinc oxide (ZnO) , Titanium Oxide(TiO_2) as the filler. The optimal parameter combination for minimum coefficient of friction (COF) is found at 5 wt% filler of ZnO_2 and lowest specific wear rate is obtained at the filler content of 15 wt%, load ZnO_2. The overall properties, considering mechanical and frictional at once, of the composite is found to best at 7% loading of TiO_2 and in all, better than ZnO_2 composites at each of four concentrations. The results show that the friction coefficient and specific wear rate are significantly influenced by the increase of filler content. The mechanical test includes tensile testing, 3-point flexural test and izod impact test.

KEYWORDS: Mechanical properties, coefficient of friction, polymer composites.

ME11

PERFORMANCE ANALYSIS OF A CI ENGINE IN DUAL MODE WITH HYDROGEN AND DIESEL

Ashish Kumar Singh[1], Naveen Kumar[2], and Parvesh Kumar[3]

[1]*Delhi Technology University, Delhi, India, aksingh.dtu@gmail.com*

[2]*Delhi Technology University, Delhi, India, naveenkumardce@gmail.com*

[3]*Delhi Technology University, Delhi, India, pkkhatkar12@gmail.com*

ABSTRACT: Energy consumption has risen tremendously in the last few decades. Hence, the energy security comes into the consideration for the area supposed to address. With higher rate of depletion of the conventional fuels, the pursuit for a suitable alternative fuel has gathered great momentum. Though diesel engines are the most trusted power sources in the transportation industry, due to stringent emission norms and rapid depletion of petroleum resources there has been a continuous effort to use alternative fuels. Hydrogen is one of the best alternatives for conventional fuels. Hydrogen has its own benefits and limitations in its use as a fuel in automotive engine system. In present scenario, hydrogen cannot be directly used as a fuel as it has higher auto ignition temperature. And in this context, one alternative method is to use hydrogen in enrichment or induction. Therefore, use of Hydrogen is experimented with to improve the performance of a dual fuel compression ignition engine running on Diesel. A compression ignition engine was fuelled with diesel enriched with hydrogen and various performance, emission characteristics were evaluated and results compared with baseline data of diesel. The result shows improvement in brake thermal efficiency (BTE) with the addition of enriched-diesel as compared to neat diesel also Dual fuel engine with hydrogen showed a reduction in NOx and smoke emission..

KEYWORDS: Hydrogen, Diesel, dual fuel, performance, emission.

ME12

EXPERIMENTAL RESULTS OF FAULT RIDE THROUGH OF GRID TIE INVERTERS FOR PHOTOVOLTAIC SYSTEM

Paiboon Kiatsookkhanatorn

Rajamangala University of Technology Suvarnabhumi (RUS), Department of Electrical Engineering, Nonthaburi, Thailand, paiboonkiat@hotmail.com.

ABSTRACT: This paper presents experimental results of fault ride through (FRT) of grid tie inverters for photovoltaic system. Paper has shown the simple FRT tester to simulate a fault condition occurs within the utility systems. The proposed tester can be worked under certain conditions and simulated fault conditions as well. The FRT tester was tested to the two brand inverters; model A and model B, when a voltage during a fault condition from 10 percent to 70 percent. The experimental results reveal that the model A can be remain connected to the utility systems at 100 ms before disconnecting itself from the utility systems when the fault condition occurs and the voltage at 20 percent. The model B remain connected to the utility systems, although the occurrence of faults and the voltage reduce to 40 percent, however, this inverter had been disconnected itself from the utility systems at 125ms when voltage reduce to 50 percent. In additional, the experimental results of these are compared with the Provincial Electricity Authority (PEA) standard, both inverter are not reaching to the requirement PEA.

KEYWORDS: Grid Tie Inverters, Photovoltaic, Fault-Ride-Through.

ME13

THE DEVELOPMENT OF INTERLOCKING BLOCK PRODUCTION TECHNOLOGY FOR USING IN COMMUNITY

Thaveesak Srichanin[1] and Napat Watjanatepin[2]

[1] Civil Engineering Department, Faculty of Engineering and Architecture,

Rajamangala University of Technology Suvarnabhumi, Thailand.

[2] Electrical Engineering Department, Faculty of Engineering and Architecture,

Rajamangala University of Technology Suvarnabhumi, Thailand.thaveesaks@yahoo.com

ABSTRACT: The objectives of this research as follow: (1)To develop the compressed Interlocking block for the community. (2) Study of the capacity of Compressive Strength of Interlocking block production waste materials from industry (aluminum powder). (3) Study of maturation process for Interlocking block production by using moisture control. (4) To development of real time moisture content measurement system for interlocking block production by using microwave sensor. The Author was develop the compressed Interlocking block machine, the moisture control room, the microwave moisture sensor. Author also test the mixing ratio of aluminum powder. The results found that the compressing machine can produces 35 of interlocking block per hour. The block weight is equal to 5.20 kg and the density is about 1.88 kg/m3. The block size is 25.0cmx12.5cmx10.0cm. The composition of block by mixing 500 gram of aluminum powder with 3.5 kg of soil with 2 kg of sand and 10% of water is very good. They can receive the highest compression. The block weight was reduce around 15% when compare with the standard block. The size of moisture control room is 1.3mx1.3mx1.0m. It can ventilation air flow is about 1160 m3/hour and could put the 24 of block in side. The total time that used for finish the block moisture reduce is around 40 hours. Lastly, the microwave sensor can used for moisture measurement of the interlocking block as a real time operation. The range of frequency between 81.9 MHz to 84.2 MHz are very appropriate for the moisture measurement.

KEYWORDS: Interlocking block, Microwave moisture sensor, Moisture control, Block compression machine, aluminium powder.

ME14

EFFECTS OF MMass DIFFUSIVITY ON THE DEHUMIDIFICATION PERFORMANCE OF A DAMPER CONTROLLED DESICCANT DEHUMIDIFIER

Byung Ha Kang[1], Choong-Sub Lee[2], and Dae-Young Lee[3]

[1]School of Mechanical Engineering , Kookmin University, Korea. bhkang@kookmin.ac.kr

[2]Korea Institute of Science and Technology, ldy@kist.re.kr

[3]Department of Mechanical Engineering, Graduate School, Kookmin University

ABSTRACT: In order to apply the desiccant dehumidifier or the desiccant cooling system to the commercial or industrial use in a large capacity, the size of desiccant wheel is needed to be scaled up. However, these applications have difficulties in manufacturing and rotating the required large size of desiccant wheel due to the brittle nature of the desiccant material and the heavy weight of wheel. In the present study, a damper-controlled desiccant dehumidifier with fixed desiccant modules is employed. In this desiccant dehumidifier, instead of the desiccant material moving around between the sorption and desorption sides, the air streams for the sorption and desorption processes flow alternately by controlling the dampers while the desiccant module is fixed in position. The dehumidifier may be comprised of multiple pairs of desiccant modules so that the sorption and desorption processes operate consecutively. A prototype of the damper-controlled desiccant dehumidifier consisting of two desiccant modules has been built in a small scale. The dehumidification performance has been tested in various operation conditions including damper periods. Performance comparison has been made with numerical simulation results to investigate the effect of mass diffusivity on the dehumidification performance.

KEYWORDS: Dehumidification, Desiccant Cooling.

ME15

PERFORMANCE EXPERIMENT ON THERMOELECTRIC COOLING AND POWER GENERATION FOR Bi-Te MODULE

Byung Ha Kang[1], Yeon Ho Sim[2], and Sukhyun Kim[3]

[1]School of Mechanical Engineering , Kookmin University, Korea,

[1]bhkang@kookmin.ac.kr, [2]syh6551@naver.com,

ABSTRACT: With the rise in energy consumption and environmental awareness, the worldwide demand for waste heat recovery systems and clean energy systems is growing. One promising system is thermoelectric cooling and power generation by thermoelectric modules. Thermoelectric module(TEM) is divided into the hot side and the cold side. TEM creates voltage by Seebeck effect when there is temperature difference between the two surfaces. Conversely, when voltage is applied to TEM, it creates a temperature difference by Peltier effect. In this paper, cooling and power generation experiments have been carried out for Bi-Te(bismuth telluride) thermoelectric module. Fixing hot side of the TEM at a constant temperature, cold side temperature was investigated the effect of Input voltage on the cooling performance. Through this experiment, cooling performance of TEM was evaluated. Power generation was investigated through the experiment for output power with the temperature difference. Thermal efficiency by this experiment was evaluated. The results obtained are very useful in the design of thermoelectric cooling system or power generation system for energy harvesting.

KEYWORDS: Thermoelectric Module, Cooling System, Power Generation.

ME16

THE EFFECT OF NITROGEN ION IMPLANTATION ON WEAR PROPERTIES OF UHMWPE

Tinnakorn Poowadin and Sai Sriyotha

Mechanical Engineering Department, Rajamangala University of Technology Isan, Thailand,

poowadin@yahoo.com

ABSTRACT: This research presents the experimental results of wear resistance and mechanical properties of UHMWPE subsequent nitrogen (N+) ion implantation. UHMWPE specimens were implanted with the dose of 0.5–2×10^17 ion/cm^2. The modified surface layer of implanted samples were studied by the optical profilometer "NewView™ 6200", pin on disk tribometer, differential scanning calorimetry (DSC) and scanning electron microscopy (SEM). The tribological properties were investigated by using friction and wear testing machine (model SMT-1) under dry condition. The change of the properties mentioned above are observed and discussed. It was found that wear intensity of implanted sample with the dose of 1×10^17 ion/cm^2 (UHMWPE+N+1) showed 5 times lower in contrast with pure UHMWPE. Surface hardness of implanted sample was increased by increasing of ion dose while its elastic modulus was reduced. It should be mention that, after running wear test for a while, the hard surface layer can be easily worn out and this modified layer would not provide any resistance to the applied load. However the subsurface layer results in the smoother surface which can provide low wear intensity during wear test. These results might be related to the effects of N+ ion implantation of polymers that changes the properties of the polymeric materials.

KEYWORDS: Tribology, Wear Property, UHMWPE, Ion Implantation.

ME17

A STUDY ON THE CREEPAGE DISCHARGE CHARACTERISTICS OF POLYMER ACCORDING TO TEMPERATURE

Seungmin Bang[1], Onyou Lee[1], Junil Kim[1], Jong O Kang[1], Hongseok Lee[1], and Hyoungku Kang[1]

[1]Korea National University of Transportation, 380-702, Chungju-si, Republic of Korea, Kang@ut.ac.kr.

ABSTRACT: The polymer has been used as a substitution insulation material for porcelain for to developing the industrial applications such as a surge arrester, cut out switch, and power bushing due to its excellent electrical and chemical characteristics. In many case, industrial applications are installed outdoor and a porcelain insulator condition. Therefore, the study on the comparison of dielectric characteristics between a polymer insulator and a porcelain insulator should be performed. In this study, the creepage discharge characteristics of a polymer insulator and a porcelain insulator are conducted according to various temperatures and moisture.

KEYWORDS: Polymer, Porcelain, Insulator, Temperature, Moisture.

ME18

A STUDY ON DIELECTRIC CHARACTERISTICS OF NON-CROSS LINKED POLYOLEFIN MATERIALS FOR DISTRIBUTION POWER CABLE

Junil Kim[1], Onyou Lee[1], Seungmin Bang[1], Jong O Kang[1], Hongseok Lee[1], Yeong Ho Jeong[1], and Hyoungku Kang[1]

[1]Korea National University of Transportation, 380-702, Chungju-si, Republic of Korea, Kang@ut.ac.kr.

ABSTRACT: A cross linked polyethylene (XLPE) material has been widely used to develop a distribution power cable due to its excellent electrical characteristics and mechanical strength. However, several problems such as environmental disruption, electrical aging, thermosetting property, and impurities which cause degradation also arise. Therefore, a novel dielectric material should be developed to substitute for the XLPE. Several kinds of polyolefin materials to substitute for the conventional dielectric material, XLPE are developed and A sphere-to-sphere electrode system made with stainless steel is used to perform the experiments according to the ASTM D-149 protocol under an AC input voltage condition. The experimental results are calculated by the weibull distribution method and analysed by an FEM. Finally, the dielectric characteristics of the conventional XLPE and novel polyolefin are experimented compared with each other in this study.

KEYWORDS: ASTM D-149, Polypropylene, Cross Linked Polyethylene, Non-Cross Linked Polyethylene, Polyolefin, Dielectric Characteristics, Distribution Power Cable.

ME19

AN EXPERIMENT ON REGENERATION PERFORMANCE OF LIQUID DESICCANT FOR PLATE TYPE HEAT EXCHANGER ACCORDING TO THE GROOVE SHAPES

Young Soo Chang[1] and Byung Ha Kang[2]

Department of Mechanical Engineering, Graduate School, Kookmin University, Korea,

[1]yschang@kookmin.ac.kr, [2]bhkang@kookmin.ac.kr

ABSTRACT: Liquid desiccant dehumidification systems is energy efficient air conditioning systems, which demonstrated superiority over the traditional vapor compression type system by al lowing both temperature and humidity to be controlled independently. Its advantage is removing the air latent load, friendly environment, removing of pollutants from the process air and reduction of the electrical energy. In this study, regeneration performance of liquid desiccant along the plate type heat exchanger have been investigated and wettability of liquid desiccant on the plate type heat exchanger have been investigated. Liquid desiccant was supplied on the plate heat exchangers 0.5mm, 1.0mm, 1.5mm three kinds of groove gaps. It is found that plate heat exchanger of 1.0 mm groove gap shows the largest wettability. And experimental study have been carried out the heat and mass transfer characteristics of Liquid desiccant for three kinds of grooved plate heat exchanger type. The 1.0mm groove gap shows the best regeneration performa nce. The effects of air humidity, air flow rate and liquid desiccant flow rate have been studied in detail.

KEYWORDS: Liquid Desiccant, Regeneration Performance, Plate Type Heat Exchanger.

ME20

DYNAMIC NEURAL NETWORK MODEL FOR COOLING LOAD PREDICTION

Hwataik Han[1], Sholahudin, and Azimil Gani Alam

Department of Mechanical Engineering, Graduate School, Kookmin University, Korea,

[1]hhan@kookmin.ac.kr, [2]sholahudin.mesin@gmail.com, [3]ganiazimil@yahoo.com

ABSTRACT: It is intended to develop a dynamic neural network model to predict instantaneous building load depending on various combinations of current input parameters. Instantaneous cooling load is determined by the outdoor weather conditions and indoor heat sources for a given building. Cooling load has been calculated in a sample building for two weeks in Seoul using Energy Plus. The data sets obtained are used to train using artificial neural networks. Dry bulb temperature, relative humidity, global horizontal radiation, direct normal radiation, wind direction, wind speed, and number of occupancy are chosen as the input parameters for training, while cooling load as the output. The dynamic neural network model has been found to predict improved results in estimating building cooling load with time delay compared to static models. The results of this study show the feasibility of using machine learning technique to predict instantaneous cooling load for optimal building operations.

KEYWORDS: Cooling Load, Neural Network, Building Energy.

ME21

ELECTRODES COATED WITH PANI/GRAPHENE OXIDE TO IMPROVE THE PERFORMANCE OF PEMFC

Nadeem Yamin[1], Abhishake Goyal[2], and Naveen Kumar[3]

Delhi Technological University, India, yamin.nadeem@gmail.com

ABSTRACT: Fuel cells have gained a tremendous amount of attention due to high energy demand and to reduce the dependence on conventional sources of energy. There are a number of fuel cells but Proton Exchange Membrane Fuel Cell (PEMFC) is considered as the best alternative to present internal combustion (IC) engines in future. These have per- fluorinated sulfonic acid membrane which conducts proton but does not allow electrons to pass through them. These membranes have limitations as they need necessary humidification to keep good proton conductivity resulting in water management issues. Also, this membrane operates on a temperature less than 80^{o}C due to water utilisation. At the heart of PEMFC is the membrane electrode assembly (MEA). The MEA consists of a proton exchange membrane, catalyst layers, and gas diffusion layers (GDL). Presence of platinum in PEM fuel cells is one of the reasons why fuel cells are excluded from commercialization. Therefore, reducing the amount of platinum used in fuel cells is very important for their commercialization. In this work, efforts have been made to bring the amount of platinum without compromising in performance. To increase the conductivity of the fuel cell, a composite is prepared. This composite is formed by using derivative of aniline. i.e. m- aminoaniline. The process initially involves preparation of graphene oxide. Graphene oxide is known for its conduction properties due to the presence of ∏- conjugation. Graphene oxide is bonded with m-aminoaniline which is further polymerised using HCl. Different ratio of graphene and m-aminoaniline were prepared and coated on the GDL and studied. Instead of using aniline, m-aminoaniline is used as one of the nitrogen present in it is used for polymerisation while the other is used for its reaction with unreacted -O- derivatives of graphene and platinum.

KEYWORDS: Nafion, Graphene, PEMFC, Platinum, GDL.

ME22

FABRICATION OF GRAPHENE DOPED NAFION MEMBRANE FOR DECREASING PLATINUM LOADING

Nadeem Yamin[1], Abhishake Goyal[2], and Naveen Kumar[3]

Delhi Technological University, India, yamin.nadeem@gmail.com

ABSTRACT: Fuel cells are a promising energy source on account of their high efficiency and low emissions. Proton exchange membrane fuel cells (PEMFC) are clean and environmental-friendly power sources, which can become future energy solutions especially for transport vehicles. They exhibit good energy efficiency and high power density per volume. Working at low temperatures ($<90^0$C), hydrogen fuelled proton exchange membrane fuel cells (PEMFCs) are identified as promising alternatives for powering autos, houses and electronics. At the middle of the proton exchange membrane (PEM) fuel cell is the membrane electrode assembly (MEA). The MEA consists of a proton exchange membrane, catalyst layers, and gas diffusion layers (GDL). However, most of the researchers have already mentioned that PEMFC are not competitive enough to rechargeable lithium ion battery with respect to price because of the rare metal used such as platinum in it. Presence of platinum in PEM fuel cells is one of the reasons why fuel cells are excluded from commercialization. Therefore, reducing the amount of platinum used in fuel cells is very important for their commercialization. The catalyst layer of a PEM fuel cell is a porous mixture of polymer, carbon, and platinum. The characteristics of the catalyst layer play a critical role in determining the performance of the PEM fuel cell. In this work, we develop modified electrodes for PEMFC. Graphite owing to its conductivity, corrosion resistance and easy machinability, is the preferred material in the system. Silane functionalised Graphene oxide is synthesized through the grafting of Graphene oxide in APTES (3-aminopropyl silane) which was used as filler in Nafion fuel cell. Functionalised silane is allowed to react with Adam's catalyst (PtO_2) which helps to reduce the platinum catalyst and increase the water uptake and proton conductivity. The prepared composite carries various hydrophilic functional groups ($-NH_2$, -OH, $-CO_2H$).

KEYWORDS: Nafion, Graphene, Adam's catalyst.

ME23

MECHANICAL PROPERTIES OF CROSSLINKED RECYCLE HIGH DENSITY POLYETHYLENE

Anuchit Khongrit[1] and Jittiwat Nithikarnjanatharn[2]

[1]Faculty of Industrial Technology, Nakhon Ratchasima Rajabhat University, Thailand,

anuchit_nrru@hotmail.com

[2]Department of Industrial Engineering, Faculty of Engineering and Architecture

Rajamangala University of Technology Isan, Nakhon Ratchasima, Thailand.

ABSTRACT: The studied of mechanical properties of Crosslinked Recycle-high density polyethyle ne (R-HDPE) via Siland-moisture crosslink technique. Effect of Vinyltrimethoxy silane content and moisture crosslink period was evaluated. R-HDPE/silane grafting prepared by melt compoundi ng using a co-rotating twin screw extruder, compression molded was used to prepared sample. Subsequently the sample was stored in sauna incubation with distinction period. Mechanical properties such Tensile strength, Young's Modulus, elongation at break and Izod impact resistance was performed. The result show that The Young's modulus of R-HDPE crosslink overall increases with Silane content and sauna period in each case. Tensile strength of R-HDPE crosslink was slightly increase with high level of silane and sauna period except elongation at break was Decrease. Impact strength of R-HDPE crosslink was significantly improved with raise sauna period.

KEYWORDS:

ME24

A REVIEW ON THRUST VECTORING AND ITS EFFECT ON VERTICAL TAKE OFF AND LANDING SYSTEMS

Samarth Jain[1], Vasu Kumar, and Naveen Kumar

Department of Mechanical Engineering, Delhi Technological University, India, [1]samarthdtu@gmail.com

ABSTRACT: Thrust vectoring is a technology that has not been effectively put into use at a commercial scale but has the potential to greatly influence the aircraft propulsion system due to its high controlling capabilities and easy maneuverability. Aircrafts using vectored thrust rely to a lesser extent on aerodynamic control surfaces such as ailerons or elevator to perform various maneuvers and turns than conventional-engine aircrafts and thus have a great advantage in combat situations. A thrust vectoring system comprising a working fluid source mounted to an aircraft, and a vectoring nozzle connected to the working fluid source which has an extendable conduit defining a passage from an inlet to an outlet. The passage is adjustable so that the direction of the working fluid exiting the outlet is different than the working fluid entering the inlet when the conduit of the vectoring nozzle is extended. This conduit provides a way to change the direction of working fluid exiting the nozzle and correspondingly change the thrust vector of the aircraft. This review explores the various advantages and disadvantages of thrust vectoring and their types which have been developed over the years along with the possible ways of utilising thrust vectoring effectively in the development of aircrafts.

KEYWORDS: Thrust Vectoring, Propulsion.

ME25

REVIEW ON EMISSION CHARACTERISTICS OF ALGAE FUEL BLENDED WITH DIESEL IN A CI ENGINE

Aseem Jain[1], Dhruv Gupta, and Vasu Kumar

Department of Mechanical Engineering, Delhi Technological University, India, [1]ast8995@gmail.com

ABSTRACT: The decreasing availability of fossil fuels resulting in their escalating prices and also the release of hazardous chemicals from their combustion causing environmental degradation and various health problems worldwide calls for an immediate and necessary employment of alternative fuels. Use of Alternative fuels such as Bio fuels on the other hand, whose combustion results in low emissions of particulate matter, oxides of carbon and nitrogen is a promising solution to meet the future demands and promote the sustainable development. Algal fuel is one such alternative fuel which uses algae as its source. The easy growth of algae even on lands not suitable for regular crops and use of wastewater, requiring little attention makes the fuel economical and beneficial and results in minimization of waste. Algae fuels can cut CO2 emissions by 50 to 70 percent in comparison to the petroleum fuels since algae like any other plant releases CO2 during its metabolism but the amount of CO2 required for algae to thrive is far greater than the amount released. Reduction in the emissions of carbon monoxide (CO), particulate matter (PM), unburnt hydrocarbons is significantly observed using algae fuel in comparison to the fossil fuels without any prior engine modification making algae based fuels, a long term and sustainable source of fuels. The review paper evaluates the emission characteristics of algae fuel blended with diesel in a CI engine.

KEYWORDS: Algae, Biodiesel, Emission, PM.

ME26

BIODIESEL PRODUCTION FROM MICROALGEA : A REVIEW

Jatin Aggarwal[1], Vasu Kumar, and Dhruv Gupta

Department of Mechanical Engineering, Delhi Technological University, India,

[1]jatinagarwal090@gmail.com

ABSTRACT: Continued reliance on fossil fuel energy resources is unsustainable. Excessive and continuous use of petro-diesel is now recognized as unsustainable because of depleting supplies and increasing environmental degradation by increasing the concentration of green house gases like CO2. Renewable fuels are required for the environmental and economic stability. Biodiesel, a carbon-neutral and renewable fuel is the alternative to the petro-diesel. Ist and 2nd generation biofuels derived from food crops eg. oil seed, have limited ability to achieve targets for biofuel production. Thus, there is a need of 3rd generation biofuel derived from microalgae. This 3rd generation biofuel can meet the global requirement as they produce about 10 times more oil than food crops in same time period and over same area. Algae are produced in open ponds, closed systems or probioreactors. Algae have an excellent oil yield (about 50% of their weight is oil) and they can be produced on non-agricultural lands such as arid desert regions, thus does not compete with the land used for food production ulinke the 1st generation biofuels. Like fossil fuels, algae fuel releases CO2 when burnt, but unlike fossil fuel, algae fuel and other biofuels only release CO2 recently removed from the atmosphere via photosynthesis as the algae grow, thus is environment friendly and will offer great help in fighting against the greenhouse emissions. This paper reviews the cultivation, harvesting and processing of the current microalgae used for biodiesel production.

KEYWORDS: Biodiesel, Algae.

ME27

MICROSTRUCTURE AND STRENGTH ANALYSIS OF FRICTION STIR WELDED (Al/SiC_p) METAL MATRIX COMPOSITES

Mohd Rashid

Department of Mechanical Engineering,Delhi Technological University, India,

rashid.khan04@gmail.com

ABSTRACT: Friction Stir Welding (FSW) is a solid state welding process for joining materials. In this process a high speed tool is introduced into the weld seam and due to localized frictional heat, plastic deformation and transverse movement along the weld seam, joining is accomplished. This welding technique is energy efficient, environment friendly, and versatile. In particular, it can be used to join high-strength aluminium alloys and other metallic alloys that are hard to weld by conventional fusion welding. The present work focuses onFSWof aluminium (Al) based metal matrix composites (MMCs) reinforced with silicon carbide particles (Al/SiCp MMCs) which have gained wide acceptance in the fabrication of light weight structures requiring higher strength, high temperature capability and good wear resistance. FSW process parameters play major role in deciding the performance of welded joints. Microstructure, micro hardness and EDX (Energy dispersive X-ray spectroscopy)analysis has been performed to evaluate the weld zone molecular characteristics and strength of friction stir welded composites.Result shows that distribution ofsilicon carbide (SiC) particles in the nugget zone (NZ) is more homogeneous than that in the base material. Scanning electron microscopic (SEM) analysis indicates that part of the silicon carbide is dissolved into the aluminiummatrix in the nugget zone (NZ) due to intense plastic deformation during FSW.

KEYWORDS: Friction stir welding, Al/SiCp MMCs, Microstructure, Strength.

ME28

MICROSTRUCTURE ANALYSIS OF PISTON RINGS AND WEARS RESISTANCE OF COATING BY PHYSICAL VAPOUR DEPOSITION

Shailesh Kumar Singh

Delhi Technological University, India, shaileshsonu10@gmail.com

ABSTRACT: Besides the established Physical Vapour Deposition (PVD) coatings for the wear protection of machining tools, this investigation deals with coating development and model wear test results from PVD coatings on piston rings for combustion engines. Surfaces subjected to the dynamic wear conditions were examined using optical and scanning electron microscopes. Comparisons are made between the coated and uncoated substrates for wear resistance. This testi ng undertaken included abrasion, impact and combined impact-abrasion on uncoated and coated systems. Different coating thicknesses applied to a number of different substrates were tested duri ng the experimental stage. Substrate materials consist of aluminium, mild steel, and tool steels in annealed and heat treated conditions. Thick and thin coatings of CrN, and Cr-N were applied to the substrates which were then subjected to dynamic wear tests. Coatings were applied using High Velocity Oxy Fuel (HVOF) thermal spray and PVD processes. Comparisons are also made between the experimental results and mathematical models for determining the wear coefficients of materials tested. The main wear characteristics associated with surfaces in sliding and impact conditions and the effects of rebound on impact of materials are discussed. The application of advanced coating systems to reduce wear is also mentioned. The main findings drawn from this research are based on the effects of dynamic abrasion tests on coated and uncoated samples and the effect of different substrates and coating combinations on wear resistance. The main differences between the sliding and impact test conditions, the coating type and the effects of co ating thickness on wear resistance are reported.

KEYWORDS: Chromium Nitride, Piston Rings, Arc Vapour Deposition Coatings, Wear Resistance.

ME29

SCRATCH TESTING FOR EVALUATE COHESIVE BOND STRENGTH OF THERMAL SPRAYED COATING

Hathaipat Koiprasert, Sirinee Thaiwatthana, and Panadda Sheppard

National Metal and Materials Technology Center, National Science and Technology Development Agency, Pathumthani, hathaik@mtec.or.th

ABSTRACT: Scratch testing often used for measure bond strength of thin coating. However, some researchers proposed an idea of drawing an indenter across the cross-section of a thermal sprayed coating which is a thick coating and measure a cone area as a representation for the bond strength of the coating. The larger cone area means the lower cohesive bond strength than the other coating. This method is expected to replaces the conventional pull-off test method and can reduce testing time and cost in the long run due to a significant cost reduction in consumables, energy and time saving from the curing step of the glue used in the pull-off test. This research investigates the possibility of using the scratch test to measure the cohesive bond strength of coatings. The coatings used in this work are dense plasma sprayed Mo-NiCrBSi composite, porous plasma sprayed Al_2O_3-TiO_2, ZrO_2-Y_2O_3 and electric arc sprayed (EAS) NiAl, high velocity oxy fuel (HVOF) sprayed NiCrAlY which are a bondcoating materials. The coatings were chosen to represent a large variety of commercial thermal sprayed coatings. The cohesion results obtained from the scratch test method were then compared to the results from the pull-off test in order to create a better understanding of the relationship of the two testing techniques.

KEYWORDS: Cohesive strength, Thermal Sprayed Coating, Scratch test, Pull-off test.

ME30

COMPARISON THE MECHANICAL PROPERTY OF PRODUCT FROM P/M PROCESS

Sompong Piriyayon[1] and Wuttiporn Wanchai[2]

[1]Faculty of Engineering and Architecture, Rajamangala University of Technology Suvarnabhumi, Nonthaburi, Thailand, somponggg@hotmail.com

[2]K.Powder Metal Co.,Ltd. Bangkok, Thailand, kpowdermetal@hotmail.com, somponggg@hotmail.com

ABSTRACT: The manufacturing parts in Thailand such as the components in electrical appliances, equipment parts for office, parts for machinery, parts for machine tools and automotive. In which those products are many components that are manufactured by processing of compressed powder metal (Powder Metallurgy) or P/M process. For the production of the P/M Process is a process has no waste of the production or very few fraction of waste. This process can reduce production costs, such as shaping, milling, drilling, lathe work and casting, etc., in the industrial sector. Currently, K. Powder Metal Co., Ltd. is a manufacturer of parts made of metal powder such as Bush, Bearing, Gear, Shock absorber part. Raw materials for the production was mixed element from Canada with relatively high reliability of the materials refer to a higher price as well. For reduce the production costs, the company took the initiative to purchase raw materials from Taiwan that contain mineral components with the same volume fraction but with a cheaper price. Make the specimen from two sources of the raw materials that from Canada and Taiwan. Then tests and compare the mechanical properties, including tensile testing, hardness test and the impact test. Results show that the ingredients of such products from Canada to the ultimate tensile strength and hardness are higher than the raw material from Taiwan. But the impact property of the raw materials from Taiwan is higher than raw materials from Canada.

KEYWORDS: P/M Process, forming, Mechanical Property, Sintering.

ME31

EXPERIMENTAL INVESTIGATION ON PERFORMANCE AND EMISSIONS CHARACTERISTICS OF DUAL FUEL ENGINE USING CNG AND JATROPHA OIL METHYL ESTER

Parvesh Kumar[1], Naveen Kumar, and Ashish Kumar Singh

Mechanical Engineering Department, Delhi Technological University, India, pkkhatkar12@gmail.com.

ABSTRACT: In a developing economy like India, crude petroleum serves as a major source for meeting energy needs. The crude oil consumption in India during 2013-14 was 210 million tonnes. Escalating prices of petroleum fuels coupled with environmental degradation has led to growing interest in alternative fuels like vegetable oils, alcohols, CNG, LPG, Producer gas and biogas. Transesterified vegetable oil has properties quite similar to that of diesel fuel. Although there are several advantages of using vegetable oil derivative (biodiesel) as a diesel engine fuel, there are some disadvantages in its utilization such as increase in oxides of nitrogen and deposits in combustion chamber. This problem can be alleviated to a great extent by using biodiesel in a dual mode operation along with CNG which is a cleaner fuel and has the potential to meet stringent emission norms. In the present study, biodiesel from Jatropha oil was prepared and pilot injection of this fuel was carried. In the present scenario of energy scarcity, there is greater need of cleaner fuels. In the present investigation, it is proposed that a small (<15% of fuel energy) pilot injection of Jatropha oil Methyl Ester, injected during the compression stroke, with high volatility and low auto ignition temperature will act to initiate combustion of a CNG charge which was fed to the engine along with intake air through the inlet manifold during suction stroke of the engine, in a stationary, constant RPM, air cooled CI engine. The effect of the pilot charge on various performance, emission and combustion characteristics was investigated, as well as the extension of the load range of the engine. The results show that there is an increase in brake thermal efficiency of the engine and drastic reduction in various emissions such as CO, NOx, CO_2, HC etc when CNG is used as a duel fuel in the operation of CI engine with Jatropha oil methyl ester.

KEYWORDS: P/M Process, Forming, Mechanical Property, Sintering.

ME32

CONVERSION OF SAL SEED OIL TO BIODIESEL USING NON-CATALYTICAL SUPERCRITICAL TRANSESTERIFICATION METHOD

Harveer Singh Pali[1] and Naveen Kumar

[1]Centre for Advanced Studies & Research in Automotive Engineering, Delhi Technological University, India, harvirpali@gmail.com

ABSTRACT: High energy demand and limited availability of fossil fuels are the key issue and a point of apprehension as it results in hike of fuel prices. It is necessary to extend renewable energy resources while considering the impact on environment. Demand of alternative fuels has increased a lot in the last decade. Therefore, researchers have already started working on the aim of developing a green fuel to overcome the future energy demand. A renewable substitute fu el for petroleum diesel fuel made from vegetable oil or animal fats. The vegetable oils, as alt ernative engine fuels, are all extremely viscous with viscosities ranging from 10 to 20 times g reater than that of petroleum diesel fuel. The purpose of the transesterification process is to l ower the viscosity of the oil and converted into biodisel. Transesterification of vegetable oils in s upercritical methanol are performed without using any catalyst. The cost of biodiesel, however, is the main obstacle to commercialization of the product. Application of the biodiesel is not re quire any prior engine modifications for its usual advantage among other alternative fuels while using it within certain boundaries. However, the process biodiesel production is in itself time consuming which increases the cost of production while decreasing the yield. Supercritical method is drawing major attention for its efficient means with overcoming the negatives of conventional production processes. This method generally results in a high conversion rate of triglycerides into the FAME's (fatty acid methyl ester). But, it is confined to vegetable oils having low FFA content. The most important variables affecting the methyl ester yield during the transesterification reaction are the molar ratio of methanol to oil, reaction time and the reaction temperature. Hence, in the present study, a non-catalytic supercritical transesterification process was utilized to produce biodiesel from sal seed oil. The analysis for the influence of temperature and time of run was done on the yield of Fatty acid methyl esters (FAMEs), diglycerides (DG) and triglycerides (TG). Results revealed that FAME's content increases with increase in temperature and the time of run. However, the pattern was uniform for all initial range of tempe ratures though a slight decrement was observed at higher temperature due to the thermal degradation of esters. In the present work the yield of conversion increases to 94% in 10 min. The viscosity values of vegetable oils are between 28 and 46 mm2/s, whereas after the supercritical transesterification of vegetable oil methyl esters are between 4.1 and 5.6 mm2/s. Supercritical transesterification is a promising method for a more environmentally friendly biodiesel production as a result of its feedstock flexibility, production efficiency and environmentally friendly benefits.

KEYWORDS: Biodiesel, Fatty Acid Methyl Ester, Sal Seed Oil, Supercritical Transesterification, Yield.

ME33

ADVANCEMENT IN BRAKING TECHNOLOGY AND HYDRAULIC BRAKE ACTUATION FOR AN ALL TERRAIN VEHICLE (ATV)

Vatsal Rustagi[1] and Nimesh Mittal[2]

Department of Mechanical Engineering, Delhi Technological University, India,

[1]vatsal.rustagi@gmail.com, [2]nimesh.m12@gmail.com

ABSTRACT: The intent of this paper is to create a clear understanding of hydraulic brake actuation system and advancement in braking technology as it relates to off-highway vehicles. For the last 5 years, the world has generated an average of 750 new braking system related patents per year. The paper describes a programme of systematic analysis of these hydraulic braking systems. The purpose of the research has been to establish the evolutionary status of cutting edge braking technology and to design a diagonal split hydraulic braking system for an All Terrain Vehicle. The paper is divided into three main sections. The first section outlines design objective & six design prerequisites used for selecting the service brakes, the full power brake actuation system and hydraulic brake actuation system along with results. The second section, Brake Actuation Systems, includes advantages of a full power brake system and a brief description of reverse modulation brake systems. The third section describes the advancement in braking technology. The actual selection of the service brakes is beyond the scope of this paper. However, it is assumed the vehicle's brakes have been properly sized and are fully operational. The brakes are referred to throughout to emphasize the importance of their relationship to the brake actuation system.

KEYWORDS:

ME34

DEVELOPMENT AND APPLICATION OF FRICTION-LESS BEARING SYSTEM IN WIND TURBINE

Vasu Kumar[1], Dhruv Gupta, and Naveen Kumar

Department of Mechanical Engineering, Delhi Technological University, India, [1]vasu.rossi@gmail.com

ABSTRACT: Most of the energy demands today are being met by burning of fossil fuels. But as the energy demand climbs, and the fossil fuel sources deplete, need arises for cleaner, greener and most importantly, renewable source of energy. The simple math is that less fossil fuel consumption equals less CO2. So, efforts to turn wind into a viable option for producing electricity on a large scale have increased manifold globally. The current wind turbines are marred by two major problems. Firstly, their huge size and requirement of open space restricts installation in areas where the power generated is most needed; secondly, the high cost of upkeep as they require frequent greasing and repair & replacement of damaged/worn out parts. Use of magnetic levitation (or Maglev) technology to develop frictionless bearings can provide a way forward. This change in bearings' design will help overcome these problems as well as increase the percentage of energy harnessed from the wind's kinetic energy.

KEYWORDS: Alternate Energy, Friction-Less Bearings, Maglev, Renewable Energy, Wind Energy.

ME35

A REVIEW ON PROTON EXCHANGE MEMBRANE FUEL CELL

Abhishek Aggarwal[1], Vasu Kumar, and Naveen Kumar

Department of Mechanical Engineering, Delhi Technological University, India,

[1]Abhishek26aggarwal@gmail.com

ABSTRACT: In the light of the rapid depletion of the fossil fuels to the magnitude that it has started to threaten the sustainability of the growth in the automobile and other fossil fuel powered sectors, an urgent need for the development of alternative fuels and power sources for the vehicles has been recognised. Several alternate fuels such as biodiesel, solar power, CNG, LPG and several other fuels have been discovered, tested and used over long periods of extensive research. Among these, fuel cells are the most promising and the cleanest source of energy to power our automobiles. The following text aims to review the technology of proton exchange membrane fuel cells (PEMFC) in particular among all types of fuel cells due to its several advantages over its counterparts in its utilization as an alternative automotive fuel. A PEMFC consists is a type of fuel cell which consists of a flexible polymer electrolyte as opposed to a solid ceramic electrolyte in SOFC or a molten electrolyte in the Molten Carbonate fuel cell (MCFC). This gives the PEMFC an edge to be preferred for the mobile applications such as its planned utilisation as an alternative power source in automobiles. PEMFC offers other advantages too such as high fuel cell and mass specific power density, its low temperature operation capabilities etc. This paper reviews the development of Hydrogen PEMFC and Direct Alcohol PEMFC. The text explores the design details of the fuel cell stacks and other components of PEMFC's. The advantages and disadvantages of both the PEMFC's along with the constraints in their usage as automobile power source have been studied to determine their feasibility and possibility of their future use. Also, the issue of water balance in the PEMFC has been studied as it is one of the biggest engineering challenges in the development of fuel cells.

KEYWORDS: Hydrogen PEMFC, Direct Alcohol PEMFC, Water Balance, Fuel Cell Stacks.

ME36

THIN-LAYER DRYING KINETICS OF CARROT

Sutida Phitakwinai[1], Wanich Nilnont[1], and Wutthikrai Buakaew[2]

[1]Rajamangala University of Technology Suvarnabhumi, Nonthaburi, Thailand.

[2]Rajamagala University of Technology Rattanakosin, Nakhon Pathom, Thailand.

ABSTRACT: This paper was aimed to study the drying kinetics of carrot and investigate the thin-layer drying kinetics of carrot by using a hot air dryer. The carrot was dried for the temperatures of 40, 50, and 60 °C with the airflow rate fixed at 1 m/s. According to the experiment result, the drying rate curve showed that drying process took place only in the falling rate period. The effective moisture diffusivity of carrot increased when the drying temperature increased as well as the drying rate increased.

KEYWORDS: Drying Kinetics, Hot Air Dryer, Carrot.

ME37

THE EFFECT OF CARBURIZING TOWARDS THE RATING DESIGN OF TUBE COIL OF Ni-BASE SUPER ALLOYS GRADE 35Cr-45Ni-Nb

Chokchai Singhatham and Krittee Eidhed

Department of Materials and Production Technology Engineering, Faculty of Engineering, King Mongkut's University of Technology North Bangkok,Thailand, singhatham@yahoo.com

ABSTRACT: This paper focuses on phenomena of tube carburizing towards the rating design on tube in the ethylene furnaces of petrochemical plants. Tube coil materials use the Ni-base super alloys grade 35Cr-45Ni-Nb alloy. The specimens cut form three different height level of used tube as following specimens No.A, No.B and No.C are cut form a range of 8-9 m., 1-2 m. and 0-1 m., respectively. From the visual inspection, it is found that the surface roughness of the tube induced cracking both form internal and external surfaces, when measure the deformed shape of tube it is found that specimen No. A has highly deformed than No. B, No. C and new tube, respectively. Results from the SEM-EDS analysis show that the carbon concentration of tube No. B outstrips than No. C and No. A, respectively. The HV hardness and strength of the used tube are lower compared with the new tube. The reduction of hardness of used tube No.C is more than No.B and No.A, respectively. The reduction ultimate strength of used tube No.B is higher than No.C and No.A, respectively, due to the effect of the change in internal energy and the strain hardening phenomena. Data from this research can be used for the suggestion of the rerating design by recalculating the maximum allowable working pressure (MAWP) due to the reduction of mechanical properties towards carburizing induced..

KEYWORDS: Ethylene furnaces, Carburizing, Carbide precipitation, Ni-base super alloy, Welding, maximum allowable working pressure (MAWP) and Rating design.

ME38

A COMPARISON ON THE USE OF ISOPENTANE AND R22 IN AN APPLICATION OF TESLA TURBINE IN ORGANIC RANKINE CYCLE

Kosart Thawichsri[1)] and Wanich Nilnont[2)]

[1)]Energy Engineering Department, Siam Technology College, Bangkok, Thailand,

kosartpikpik@yahoo.com.sg.

[2)]Mechanical Engineering Department, Rajamangala University of Technology Suvarnabhumi, Nonthaburi, Thailand, emnil@live.com.

ABSTRACT: This paper aims to compare the use of Isopentane and Refrigerant 22 (R22) as working fluid expanding in an application of Tasla turbine in Organic Rankine Cycle (ORC). The working fluid has fixed point below boiling water and works in low-temperature sources between 80-120 °C which can be produced from waste heat, solar-thermal energy and geothermal energy etc. The experiment on ORC using Tasla turbine reveals that the suitability of high pressure pump for working fluid has result on the efficiency of work. In addition, Thermodynamics theory on P-h diagram also presented the effect of heat sources' temperature and flow rate on any work. Thus, the study and design on ORC machine has to concern mainly on pressure pump, flow rate and optimized temperature. Result of experiment and calculation of ORC using Isopentane efficiency was 30% better than R22 estimate. The Tesla Turbine is cheaper and easily structure than other turbines which can be applicable on Organic Rankine Cycle Machine. Further study on the machine can be developed throughout the county due to its low cost and efficiency.

KEYWORDS: Tesla turbine, Organic rankine cycle, Low-temperature sources, Flow rate, High pressure pump.

ME39

COMPRESSED AIR ENGINES: A REVIEW STUDY

Anant Govil[1] and Bharat Singh[2]

[1]*Delhi Technological University, Delhi, India*

[2]*Delhi Technological University, Delhi, India*

ABSTRACT: In the present scenario, due to depletion of fossil fuels there is an inevitable need to find the best replacement of conventional fuels. A rapid growth of petroleum price accompanies the scarcity of these conventional fuels. Thus to overcome these problems there is an urgent need to curb the over usage of conventional fuels and discover new alternative fuels. Thorough researches have been carried out globally to evaluate the possible modification in internal combustion engine to replace the existing petroleum based fuel systems. COMPRESSED AIR ENGINE (CAE) has great potential to replace conventional IC Engines. CAEs run solely on air, which is abundant in nature. Unlike fossil fuels, it does not produce harmful gases at exhaust, but produce expanded cool air which in turn can bring down the global temperature. But there are some limitations of it due to which it hasn't been commercialised till now. The major disadvantage of a Compressed Air Engine is its low efficiency and low RPM. Its mass per energy ratio is very low. Also factors like unavailability of refilling centres and carrying a storage cylinder along all the time have reduced the commercial acceptance of CAE on global scale.

KEYWORDS: Compressed Air Engine, Global temperature.

ME40

EFFECT OF EGR AND WATER INJECTION ON HYTHANE-MAHUA OIL METHYL ESTER POWERED DUAL FUEL MEDIUM CAPACITY COMPREESION IGNITION ENGINE

Bharat Singh[1 *] and Pradeep Kumar[2]
[1) *] *Mechanical Engineering Department, Delhi Technological University, Delhi, India, bharat.dtu12@gmail.com*
[2)] *Civil Engineering Department, Delhi Technological University, Delhi, India, ajayby2@gmail.com*

ABSTRACT: Rapid depletion of conventional fossil fuels has not only pushed the costs for crude oil but has also raised worries about the future energy requirements. Hydrogen has proven as a very promising alternative through eliminating major problems with fossil fuels, primarily in terms of emissions. Research on hydrogen has opened up possibilities of using Hydrogen in a dual fuel operation and the present paper also investigates the same. Over the last few decades, Hythane has emerged as a budding prospective to replace the existing petroleum products. Hythane can be used in both spark ignition and compression ignition engines for propelling the vehicles. When compared with conventional fuels, Hythane is much cleaner and fuel efficient as CO, CO2, CH, SO_X and smoke emissions in exhausts are almost negligible. In the present investigation, a medium capacity, single cylinder, four-stroke, air-cooled, static diesel engine coupled to an electric dynamometer was adapted to study the performance and emission characteristics. The engine was fuelled with Hythane and pilot injection of mahua oil methyl ester was carried out. Effects of exhaust gas recirculation (EGR) and water injection on the setup were observed. The results suggest that large EGR rate decreases the engine power output. The NO_X levels showed significant decrease with increase in EGR rates.

KEYWORDS: Hythane, Mahua Oil Methyl Ester, EGR.

ME41

CHEMICAL PROPERTIES OF LIGHTWEIGHT AGGREGATE MADE WITH DRY BOTTOM ASH

Joung-Soo Sun[1], Jin-Man Kim[2*], Ha-Na Lee[3], Hong-Beom Choi[3], and Jea-Seong Yu[3]

[1)] Doctor Course, Department of Architectural Engineering, Kongju National University, Cheonan, Korea, jssun@kongju.ac.kr,

[2)] Professor, Department of Architectural Engineering, Kongju National University, Cheonan, Korea, jmkim@kongju.ac.kr*

[3)] Master Course, Department of Architectural Engineering, Kongju University, Cheonan, Korea, a20140151@kongju.ac.kr, chbekd@kongju.ac.kr, tolyu@kongju.ac.kr

ABSTRACT: Recently, some coal thermoelectric power plants discharge bottom ash, one of the coal ashes using an air cooling system. This bottom ash is called dry bottom ash (or bottom ash, discharged from a dry process, hereafter, 'dBA'), and this dBA is porous and very lightweight, so it is judged that it can be used as a lightweight aggregate, and as a result of a review of its physical characteristics through preceding studies, its applicability as a lightweight aggregate has been confirmed. Thus, this study attempted to review the characteristics of its chemical composition in accordance with the Domestic Standard KS F 2534 "Lightweight aggregate for structural concrete." Measuring items included ignition loss and quantities of SO_3 and chloride according to the KS F 2534. As a result of a tracking observation for six months, the ignition loss was overall under 2%, so the unburned coal content turned out to be suitable for the standard. As a result of measurement using XRF, the quantity of SO_3 was 0.06wt%, which was a much lower value as compared to wet bottom ash and fly ash and it turned out to be suitable for the standard. The quantity of chloride was 0.01g/㎥, which was considerably lower than the standard, so it satisfied all Korea Standards on chemical properties as a lightweight aggregate for the dBA.

KEYWORDS: Coal ash, Bottom ash, Dry bottom ash, Lightweight aggregate.

ME42

PRESSURE BEHAVIOUR IN A SNUBBER ARRAY OF A RECIPROCATING HYDROGEN COMPRESSION SYSTEM BY EXPERIMENT AND CFD

M. Sq. Rahman[1], H. M. Jeong[2], and H. S. Chung[3]

[1]Professor, Dept. of Agricultural & Industrial Engineering, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh, m_sq_rahman@yahoo.com

[2]Professor, Dept. of Mechanical and Precision Engineering, Gyeongsang National University, Korea, [2] hmjeong@gnu.ac.kr, [3] hschung@gnu.ac.kr

.

ABSTRACT: Increasing demand behavior of non-fossil energy because of fossil-energy is declining; hydrogen energy for high volume is become crucial. Consequently requirement of processing equipment for this occasion is getting raise. One of the most important process is compressing that will increase pressure of hydrogen gas. This is needed especially for transferring and storing the gas. Technically the appropriate type of the system is by using reciprocating compressor. Because of this, pressure characteristic by using this compressor's type becomes highly fluctuate. This phenomenon, of course, is very bad not only for hydrogen processing itself, but also for lifetime of equipment used. In order to reduce fluctuation of pressure produced by reciprocating compressor, snubber is used. This component has simple construction but very important function. It is a tube of round-end at sides, inlet and outlet ports and tilt plate inside the tube called buffer. Buffer separates the inlet and outlet. So gas flow from inlet will crash the buffer and be distributed to whole part the tube. By this way fluctuation of the gas is reduced. An experiment to observe reduction of pressure fluctuation in the compressing system utilizing snubber array has been done. The experiment measured pressure in several points along the snubber array. An analysis by using Fast Fourier Transform method is conducted. Pure signal of static pressure is filtered from noisy signal by FFT. The experiment is run for several speeds of piston. It is controlled by adjustable frequency regulator connected to the piston-reciprocating compressor with V-belt. Analyzing experimental data, it is found that the pressure fluctuations are reduced from 89.9749% - 94.1617% with pressure loss 1.5013% - 6.3154% for compressor operation at different speed which ensure its good performance as pulsation damper in hydrogen compressor.

KEYWORDS: Hydrogen gas, Reciprocating compressor, Snubber array, Fluctuation, FFT.

ME43

HYDROGEN FUELLED INTERNAL COMBUSTION ENGINES A REVIEW STUDY

Bharat Singh[1) *] and Pradeep Kumar[2)]

[1) *] *Mechanical Engineering Department, Delhi Technological University, Delhi, India, bharat.dtu12@gmail.com*

[2)] *Civil Engineering Department, Delhi Technological University, Delhi, India, ajayby2@gmail.com*

ABSTRACT: Rapid depletion of conventional fossil fuels has not only pushed the costs for crude oil but has also raised worries about the future energy requirements. Hydrogen has proven as a very promising alternative through eliminating major problems with fossil fuels, primarily in terms of emissions. Research on hydrogen has opened up possibilities of using it in both spark ignition and compression ignition engines for propelling the vehicles. When compared with conventional fuels, Hydrogen is much cleaner and fuel efficient as CO, CO_2, CH, SO_X and smoke emissions in exhausts are almost negligible. Properties like high burning speed, wide range of flammability and a high octane number makes hydrogen as one of the most promising alternative fuel. Although energy per unit mass of hydrogen is more than twice than that of gasoline but 4 times more volume is required to store that energy. The main hurdle that hydrogen faces as a budding alternative fuel is the lack of standardization of production and storage of hydrogen. This paper critically reviews recent developments in hydrogen fuelling systems. Hydrogen-engine fundamentals, properties of hydrogen as an Internal Combustion Engine fuel have also been discussed.

KEY WORDS: Hydrogen, Flammability, Internal Combustion Engine.

ME44

PERFERMANCE AND EMISSION CHARACTERISTICS OF N-BUTANOL AND ISO-BUTANOL DIESEL BLEND COMPARISON

Mohd Waqar Naseer Siddiquee and Vasu Kumar

Delhi Technological University, New Delhi, India, mohdwaqar.siddiquee@gmail.com.

Delhi Technological University, New Delhi, India, vasu.rossi@gmail.com

Email: mohdwaqar.siddiquee@gmail.com

ABSTRACT: To comply with the future stringent emission standards, innovative diesel engine technology, exhaust gas after-treatment, and clean alternative fuels are required. On the other hand, the growing energy demand and limited petroleum resources in the world have guided researchers towards the use of clean alternative fuels like alcohols for their better tendency to decrease the engine emissions. The use of oxygenated fuels like alcohols showed tendency to decrease internal combustion engine emissions. The use of alcohols as a blending agent in diesel fuel is rising, because of its benefits like enrichment of oxygen, premixed low temperature combustion and enhancement of the diffusive combustion phase. Several researchers have investigated the relationship between LTC operational range and cetane number. In a light-duty diesel engine working at high loads, a low-cetane fuel allowed a homogeneous lean mixture with improved NOx and smoke emissions joint to a good thermal efficiency. The very low cetane number limits the usage of neat alcohols in diesel engines so they should be blended with diesel fuel without any modifications in the engine fuel system. Alcohol has higher heat of vaporization; therefore, it reduces the peak temperature inside the combustion chamber leading to lower NOx emissions and increased engine power. The oxygen presence in alcohol fuel provides soot-free combustion. Long chain alcohol like butanol is better suited for blending in diesel than short chain alcohol like methanol and ethanol, because of its higher energy content, stability in blend, low corrosiveness and lower miscibility in water. The use of EGR with blends of butanol and diesel can achieve LTC and simultaneously decrease the NOx emissions and the soot emissions with a slight decrease in the fuel economy. An experimental investigation is conducted to evaluate the effects of using blends of n-butanol and isobutanol with diesel fuel separately, with 10%, 20% and 30% (by volume) of both the alcohols, on the performance and exhaust emissions namely break power, brake specific fuel consumption (BSFC), brake thermal efficiency (BTE) and emissions of a single cylinder, four-stroke, direct injection diesel engine employing EGR.

KEYWORDS: Performance, Emission, n-butanol and Isobutanol Diesel Blend

ME45

A NOVEL PRODUCTION ROUTE FOR SYNTHESIS OF GLYCEROL *TERT*-BUTYL ETHER [GTBE] UNDER SUPERCRITICAL CONDITIONS: TAGUCHI OPTIMIZATION AND CHARACTERIZATION

Yahaya Alhassan[1&2*], Naveen Kumar[1], and Idris M. Bugaje[2]

[1)] *Centre for Advanced Studies & Research in Automotive Engineering, Delhi Technological University, 110042-New Delhi*

[2)] *Petrochemical and Allied Department, National Research Institute for Chemical Technology, P.M.B. 1052-Zaria, Nigeria*

ABSTRACT: Large volume of crude glycerol is produced annually from biodiesel processing plants worldwide. In spite of its promising industrial applications such as in Pharmaceutical companies, upgrading biodiesel-derived crude glycerol is expensive. Etherification a simple chemical reaction similar to esterification can effectively convert crude glycerol from biodiesel industry into its corresponding alkyl ether. In this research work, supercritical etherification of biodiesel-derived crude glycerol was conducted using *tert*-butyl methyl ether. The reaction condition conditions for its conversion including co-solvent ratio (% v/v), glycerol to co-solvent ratio (% w/w), reaction temperature (^{o}C) and reaction time (min) was conducted using Taguchi experimental design. In addition, fuel properties of the products were evaluated using standard methods. The results revealed that, supercritical temperature and molar ratio of the most predominant factors influencing the conversion of glycerol into fatty acids *tert*-butyl methyl ethers. Temperature contributes about 56% while molar ratio contributes 28.6% of the conversion. Other factors including co-solvent ratio contributed 11.4% while reaction time contributed 3.8% respectively. Interestingly, the research found that fuel properties of crude glycerol were improved by ether formation. Ethers have higher calorific values than their corresponding fatty acids (about 59.4% higher) present in the glycerides. Fuel properties tested showed improvements in properties like calorific value 29.5%, viscosity 53.6% and density 69.5%. On the negative side also, polymerization product was noted during high temperature supercritical etherification resulting in deposition of high-density undesired product. It could be concluded that supercritical etherification of crude is an effective technology for conversion of biodiesel-derived crude glycerol into yet another fuel with improved fuel properties which can be used as an octane number improver.

KEYWORDS: Etherififcation, conversion, heating value, Taguchi design, fuel properties.

ME46

PROPERTIES OF MORTAR USING LIGHTWEIGT FINE AGGREGATE MADE BY BOTTOM ASH DISCHARGED FROM AIR COOLING PROCESS

Hong-Beom, Choi[1], Jin-Man, Kim[2*] Mao, Li[1], Joung-Soo, Sun[3], Sun-Mi, Choi[3] , and Kil-Hee, Kim[2]

[1)] Dept. of Architectural Engineering, Kongju National University, Cheonan, Republic of Korea

chbekd@kongju.ac.kr, limaogbk@163.com

[2)] Professor, Dept. of architectural Engineering, Kongju National University, Cheonan, Republic of Korea*

jmkim@kongju.ac.kr, kimkh@kongju.ac.kr

[3)] Dept. of architectural Engineering, Kongju National University, Cheonan, Republic of Korea

jssun@kongju.ac.kr, smchoi@kongju.ac.kr

ABSTRACT: As a kind of a fly ash, bottom ash tends to increase in quantity as the power production of thermal power plants increases. Especially, bottom ash discharged through the dry process is light-weight with porosity, so it seems possible to be used as lightweight aggregate to make building lighter. Thus, this study aims to evaluate the characteristics of dry-process bottom ash by processing dry-process bottom ash fit for the quality standard of artificial lightweight aggregate and using it as lightweight fine aggregate for concrete.

As a result of this experiment, the mortar using lightweight aggregate processed fit for the quality standard a little increased in unit mass, compared to the other mortar using raw bottom ash, but it showed superior liquidity and strength.

KEYWORDS:

ME47

OPTIMUM REPLACEMENT RATIO OF FLY ASH IN THE LOW STRENGTH EXTRUDING SOLID WITH HIGH VOLUME UN-REFINING FLY ASH

Myeong Jin Lee[1], Jin Man Kim[2)*], Duck Jin Choi[3)], Domg Won Lee[4)], and Hwan-Dae Jeong[5)]

[1)] Department of Architectural Engineering, Kongju National University, Cheonan, South Korea, mjlee69@kongju.ac.kr,

[2)] Professor, Department of Architectural Engineering, Kongju National University, Cheonan, South Korea,jmkim@kongju.ac.kr*

[3)] Department of Architectural Engineering, Kongju National University, Cheonan, South Korea, duckjini@kongju.ac.kr

[4)] Department of Architectural Engineering, Kongju National University, Cheonan, South Korea, Dwlee423@naver.com

[5)] Eco Friendly Concrete Research Centre, Kongju National University, Cheonan, South Korea, hwandae1@naver.com

ABSTRACT: This study reviewed strength characteristics of cement extruding solid with a massive content of unrefined fly ash to develop a high value-added use of coal ash and improve the economic efficiency of the extruded panel. As a result, under all curing conditions, as the replacement rate of the unrefined fly ash in the total power is increased, the strength of extruded solid shows trends being decreased. However, up to 80% of the unrefined fly ash replacement ratio, it shows development of a bending strength over 4.0MPa under all curing conditions, which is minimum strength required for handling when manufacturing and constructing. We consider that it will be possible to replace up to 80% of the powder materials in the production of extruded panels by unrefined fly ash.

KEYWORDS: Extruding panel, Un-refining fly ash, Curing condition, High volume fly ash.

ME48

FAILURE MODE ANALYSIS FOR RELIABILITY EVALUATION OF FLAT PLATE SOLAR COLLECTOR

Ki-Won LEE[1], Jung-Seok KIM[2], and Jun-Young CHOI[3]

[1]Hanyang University, Seoul 133-791, Korea, lkw106@ktl.re.kr.

[2]Korea University, Seoul 136-713, Korea, js-kim@ktl.re.kr.

[3]Korea Testing Laboratory, Ansan 426-910, Korea, liya67@ktl.re.kr.

ABSTRACT: The global warming is a serious problem associated with the environmental problem. As refer to the report 'World Energy Outlook' published by IEA (International Energy Agency), the expected proportion of new and renewable energy in the world is close to 33 percentage in 2035. Solar energy is quantitatively unlimited, clean and non-polluting resource. It has a great potential for industrial and commercial usages. The solar collector is able to perform with the high durability and the high thermal performance. Furthermore, flat plate solar collector is used primarily for the domestic house, which is currently the most popular with its high durability. However, the reliability evaluation of flat plate solar collector has just been launched. In this study, we derive the appropriate accelerated life test, and present the applicable test method at field in order to evaluate the reliability by analyzing the failure mode of the flat plate solar collector with the FMEA(Failure Mode and Effect Analysis).

KEYWORDS: Flat Plate, Solar Collector, FMEA, Failure Mode, Accelerated Life Test.

ME49

A NUMERICAL ANALYSIS OF SEPARATION PERFORMANCE FOR CYCLONE OIL SEPARATOR DESIGN

Seongil Jang[1], Joon Ahn[2] *, and Si Hyung Lim[2]

[1] *Department of Mechanical Engineering, Graduate School, Kookmin University, Seoul 136-702, Korea*

[2]* *School of mechanical systems Engineering, Kookmin University, Seoul 136-702, Korea,*

Jahn@kookmin.ac.kr

ABSTRACT: Recent years have witnessed a growing concern over saving energy because of global warming issues and energy price hikes caused by increased oil prices. The need to improve energy efficiency to reduce energy consumption has been raised. In order to improve a refrigeration system's energy efficiency, the separation efficiency of its oil separator should be improved. Thus, an oil separator with high separation efficiency and low pressure drop should be designed. So using the Numerical analysis, designed a new oil separator. A series of numerical simulation has been carried out to study peformance of a cyclone type oil separator, which is designed for the compressor of a refrigeration system. Working fluid is R22, which is a typical refrigerant, and mineral oil droplet is supplied. Depending on the outlet tube length, separation efficiency varies from 98.79 to 98.95%. Considering both of the separation efficiency, outlet tube length of the separator has been designed as 158 mm.

KEYWORDS: Oil Separator, Oleophilic Surface, Refrigeration System.

ME50

A STUDY ON THE STS304, STS316 AND STS430'S CORROSION BEHAVIOR UNDER THE SIMILAR PEMFC CONDITION

MinSeok Moon[1#], MyeongHan Yoo[1], JeHa Oh[1], and ShinJae Kang[2]

[1)]Korea Institute of Carbon Convergence Technology, Jeonju, Korea

[2)] Jeonbuk National University, Jeonju, Korea

ABSTRACT: The fuel-cell system has classified one of the renewable-energy. The production cost of the stack has 60 percent or more of the fuel-cell system as a whole. And, in the PEM fuel-cell system has a need to reduce to the weight of the whole system, and reduce to the total fabrication cost for the fuel-cell stack. This system will be a request for an increased durability during the operating condition. Typically bipolar plates are an essential component of PEMFC and other fuel-cell systems. In order to the reducing both of the weight and cost on the bipolar plates, Recently, many engineers have expected that the metallic bipolar plate will replace from a high dense graphite bipolar plate. The graphite material has very stabilized chemical resistance and an excellent electrical conductivity. However, the graphite material has a few weaknesses that it has a lofty cost, and gas leak problem. And the graphite has tough to the machining process, and costly machining payment, because of the graphite material has a brittle property.
In this study, the focus of the investigation is metallic bipolar plate's possibility within PEMFC's condition with commercial stainless steel. Therefore, this research has analysis with STS304, STS316 and STS430 for the microstructure by OM, SEM, and XRD, ICP, and Potentiodynamic polarization.

KEYWORDS: PEMFC, Metallic Bipolar Plate, Corrosion Behavior, STS304, STS316,STS430.

ME51

SUPERCRITICAL TRANSESTERIFICATION OF RUBBER SEED (HEAVEA BROSILIANCES) OIL INTO BIODIESEL: OPTIMIZATION OF REACTION CONDITIONS AND REACTION KINETICS

Ezeanyanaso S. Chika[1)*], Okunola O. Joshua[2)], Yahaya A. Alhassan[3)],Igwe C. Chima[1)], and Elemo G. Nwakaego[1)]

[1)*]*Federal Institute of Industrial Research Oshodi [FIIRO], P.M.B 21023, Lagos - Nigeria*

[2)]*Federal University, Dutsima, Katsina State, Nigeria.*

[3)]*Delhi Technology University, New Delhi, India*

ABSTRACT: Feedstocks availability is until today one of the major challenges that has to be overcome for biodiesel to effectively compete with fossil diesel in the market. In addition, fuel quality of the final biodiesel has to meet some minimum requirement, such that its total energy density can be related to that of its fossil counterpart. In this research work, effective biodiesel production route (supercritical technology) was employed for the production of glycerol free biodiesel from largely available rubber seed oil in Nigeria. Conditions like reaction temperature, reaction time, type and concentration of catalyst, molar ratio of methanol and level of agitation were considered. It was observed that as the reaction pressure was increased, the reaction time decreased. At a reaction pressure of 100 bar, the reaction lasted for rubber seed oil resulted in 87.1% yield in 5 minutes. Additionally, in this process the process was unaffected by free fatty acid content of the feedstock. The rubber seed methyl ester and their diesel blends were comparatively analysed for fuel properties such as density, kinematic, oxidative stability, calorific value, cold flow, water content, cetane number, copper strip corrosion and acid number were found to be within the acceptable limit. The reaction kinetics studied showed that the reaction proceeds with a pseudo-order mechanism with activation energy of 11.432 cal/mol. It could be concluded that the process was effective in converting rubber seed oil into biodiesel without any pre-treatment.

KEYWORDS : Optimization, Supercritical Technology, Glycerol Free, Fuel Properties.

ME52

THE COMPARISON OF CFD ANALYSIS AND EXPERIMENTS OF BUBBLE PUMP ON CAPACITY OF HEAT MEDIUM

Kwangsung Lee[1)] * and Jeongtae Kim[2)]

[1)]**Department of Energy Mechanical Engineering, Institute of Marine Industry, Gyeongsang University, Tongyeong, Republic of Korea*

[2)] *Daewoo Shipbuilding & Marine Engineering Corporation Ltd., Geoje, Republic of Korea*

ABSTRACT: This study is on a comparison of CFD analysis and experiments of bubble pump on capacity of the heat medium. The experimental facilities were composed of electrical heater used for providing the heat source to generate bubbles, Storage tank with a capacity of 40Liters and heat exchanger. The separator and condenser of the air bubble pump were installed separately. As a result, the amount of the heat medium in the bubble pump performance came good. The CFD simulation had a similar to the result of an experiment within 10% of dispersion and clarified the gas-liquid flow patterns of two phase in an air lift pump.

KEYWORDS:

ME53

EXPERIMENTAL OBSERVATION OF CONDENSATION MODE TRANSITION ON HYDROPHOBIC TEXTURED SURFACES

Ki Wook Kim, Yong Hwan Kim, and Ji Hwan Jeong

School of Mechanical Engineering, Pusan National University

Busan 609-735Korea

ABSTRACT: Nickel-based flat surface and textured surfaces were fabricated and chemical coating was applied to produce hydrophobic surfaces with a contact angle of about 142-155°. Steam was condensed under the atmospheric pressure and the condensate flow. It was visually observed that a drop-wise condensation occurred initially and later changed into a film-wise condensation. In order to find the reason why the condensation mode changed, water vapor condensation on these surfaces was observed using an environmental scanning electron microscope

KEYWORDS: Drop-Wise Condensation, Film-Wise Condensation, Textured Surface, Hydrophobicity.

ME54

PRODUCTION AND EVALUATION OF EXTRUDED SNACKS FROM BLEND OF BAMBARA GROUNDNUT, HUNGRY RICE AND CARROT

Jane .N. C. Okafor[1*] and Jane C. Ani[2]

[1]Nutrition and Toxicology Division, Federal Institute of Industrial Research, Oshodi, P.M.B. 21023 Ikeja, Lagos, Nigeria.

[2]Department of Food Science and Technology, University of Nigeria, Nsukka, Nigeria.

ABSTRACT: Dietary diversification and fortification is been advocated as intervention strategy to reduce prevalence of malnutrition related diseases in Africa and other developing countries. This has necessitated research into development of nutrient dense, shelf stable ready-to-eat extruded snacks from under utilized indigenous crops. The objective of the study were (i) To produce nutritious extruded snacks from blends of Bambara nut, hungry rice and carrot flour (ii) determine the quality and acceptability of products. Composite flour was produced from roasted bambara nut and hungry rice, mixed with graded levels of carrot and extruded using a single screw extruder. Proximate composition, mineral, vitamin, anti-nutrients and sensory properties were evaluated using standard methods. Extrudate had high protein (15-16%), vitamin A (180-550.13mg/100g retinol) and minerals (iron and zinc) contents. Extrusion significantly ($P<0.05$) reduced moisture content and brought about concentration of other proximate principles. It also significantly ($P<0.05$) reduced phytate from 91.01-81.11mg/100g to 36.75-30.58mg/100g, tannin from 0.16mg-0.26/100g to 0.06-0.09mg/100g. Trypsin inhibitor and Haemagglunatinin activities were reduced from 6.81-8.32mg/100g and 4.01-6.50Hu/mg protein respectively, to undetectable levels. Extrusion improved protein digestibility of the snacks (from 84.62-86.57 to 86.74 -89.08%). Vitamin A and minerals were not significantly ($P>0.05$) affected by the extrusion cooking, while there was a significant reduction ($P<0.05$) of vitamin C from 6.21-8.96mg/100g to 2.51-4.05mg/100g in the extruded snacks. Significant ($P<0.05$) reductions were observed in vitamin B1(40-50%), B2(15-24%), B3(15-24%) and B6 (25-30%) content of the extruded snacks. There were no significant differences between the sensory qualities of the control and products with 5% to 15% carrot inclusion. It is evident from its nutritional composition, that the developed snack contain high quantity of protein, vitamin A, iron and zinc and so could be utilized in alleviating protein –energy malnutrition and micronutrient deficiency.

KEYWORDS: Indigenous Crop, Extruded Snacks, Malnutrition.

ME55

A STUDY OF REDUCTION METHOD OF METAL DAWN EFFECT ON BUTT WELDING OF SHIPYARD 'S MAIN PLATE CUT BY PLASMA

Jeongtae Kim[1)], Hyomin Jeong[2)], Kwangsung Lee[2)], Kwangwoon Jeong[2)], and Hanshik Chung[†]

[1)]Department of DSME CO Ltd., 3370 Geoje-daero, Geoje-si, Gyeongsangnam-do, 656-714 Korea

[2)]Department of Gyeongsang National University, Cheondaegukchi-Gil 38, Tongyeong, Gyeongnam 650-160, Korea,

[†]Department of Gyeongsang National University, Cheondaegukchi-Gil 38, Tongyeong, Gyeongnam 650-160, Korea,

ABSTRACT: This paper was to study the effect to Metal dawn phenomenon of I groove submerged arc welding depending on the plasma cutting surface characteristics, and how to reduce the causes and characteristics Metal dawn phenomenon. Shipbuilding and marine structures is designed to use the thick plates and welded by high current to obtain deep penetration. Metal dawn phenomenon has been occurred frequently depending on the quality of cutting surface and it makes degrade of the welding quality and modification of the welding. As a result, it was confirmed that I Groove plasma cutting characteristics get bevel form of 2 to 4 degrees to one side direction from the vertical position with Metal dawn phenomenon. This is the main reason of Metal dawn phenomenon in butt joint welding and 4 degree reverse bevel on the upper surface of base metal by submerged arc welding brought the effect of significant reduction of Metal dawn phenomenon.

KEYWORDS:

ME56

PROPERTIES OF NON-PORTLAND CEMENT MATRIX WITH THE TYPES AND ADDITION RATIOS OF ALKALI ACTIVATOR

SunGyu Park[1)]

[1)]*Division of Architecture, Mokwon University, 88 Doanbukro-ro, Seo-gu, Daejeon, 302-318, Korea*

ABSTRACT: Cement industry consumes huge energy during the plasticity process, and exhausts the largest amount of CO2 among industrial materials as its main ingredient is CaCO3. In particular, CO2 causes the global warming which requires any alternative construction material to cement. This experimental study considers manufacturing method of the non-portland cement matrix for the building materials using blast furnace slag that is the industrial by-product. Various specimens were prepared with the different types and addition ratios of the alkali activator. The properties of these specimens were investigated by slump flow test, setting time test, compressive strength test and flexural strength test. As a result, sodium hydroxide(NaOH) addition ratio of 6M shows the suitable results for building materials in strength properties. It was judged that experiment results of non-cement matrix with kind of waste resources and alkali activators were useful to basic data for mixtures design and evaluation properties of building materials.

KEYWORDS:

ME57

DESIGN AND MANUFACTURING OF 3MW GEARLESS WIND GENERATOR

Nguyen Ngoc Tan[1)], Tran Anh Vo[1)], Duong Thanh Hung[1)], Do Hyun Chio[1)], and Hyun Chul Kim[2)]*

[1)]*Department of Mechanical Engineering, Inje University, Gimhae, 621-749, Korea*

[2)]**High Safety Vehicle Core Technology Research Center, Department of Mechanical & Automotive Engineering, Inje University, Gimhae, 621-749, Korea*

ABSTRACT: Today, wind power is renewable power which can help countries meet their sustainable development goals through provision of access to clean, secure, reliable and affordable energy. In this paper, the full process of designing and manufacturing 3MW driven-direct wind turbine was presented. The generator was designed and simulated using SolidWorks. Then, structure analysis in order to obtain structure deformation, strain and stress, turbine's life time was also challenged by ANSYS. Finally, the real fabricating process which includes casting, machining and assembling was mentioned.

KEYWORDS:

ME58

A STUDY OF REFRIGERATOR PERFORMANCE BY A CHANGE OF SUPERHEAT

Yun Jae Ju[1], Young Ha Park[2], Han Shik Chung[3], Seung Il Choi[4], and Chul Su Kim[1]

[1]KTENG Co., Ltd. 133-1 Sinhyeon-ri, Opo-eup, Gwangju-si, Gyeonggi-do,Korea

[2]Department of Navy Technical Petty Officer Majors, Gwangnyeong 2-ei, Aewol-eup, Jeju-si, Jeju Special Self-Governing Province, Korea

[3]College of Marine Science, Gyeongsang National University, Korea

[4]New Technology Training Center of Korea Polytechnics, 20, Yusang-ro, Deokjin-gu, Jeonju-si, Jeollabuk-do, Korea

ABSTRACT: According to recent rapid progress development of electrical and electronics industry, the studies of steady state operating refrigeration system that is using inverter with variable capacity of fan and compressor or electronic expansion valve are increasing. Through these equipments, system can achive high efficiency and comfortability as well as distribute saving energy operating by system automation. In this study, analyse the COP(Coefficient of Performance) through controlling expansion valve manually also we can verify a refrigeration theory according to change of evaporator pressure.

KEYWORDS: Refrigeration, Expansion Valve, COP(Coefficient of Performance).

ME59

DEVELOPMENT OF A SLIDING TYPE WINDOW WITH HIGH AIRTIGHTNESS PERFORMANCE

Hyok Soo Jang[1)]*, Jong Jun Park[1)], Young Il Kim[2)], and Kwang-Seop. Chung[2)]
[1)]**Graduate School of Energy and Environment, Seoul National University of Science and Technology, Seoul, Korea*
[2)]*School of Architecture, Seoul National University of Science & Technology, Seoul 139-743, Korea*

ABSTRACT: Due to the rapid industrial development of the rising countries including China, the total energy consumption of the world has phenomenally increased, and the actual damage from Green House Gas, which has endlessly raised, is becoming a reality. As an alternative to this, the whole world is concentrating its focus on technological development for reducing energy which is unnecessarily wasted in buildings. It's because reduction in the building energy field among the whole energy consumption by industry was analyzed to be the most effective. Accordingly, the purpose of this study is, first, to develop the running method and air-tightness frame that makes air-tightness easier by observing the fact that the limit of airtightness technology, which causes direct heat loss, lies in sliding window running method and structure of the frame. second, to get the building energy to be used in the planned scope through the development of sliding windows & doors having "0"performance of air infiltration amount by applying the above technology. The evaluation of the evaluation of the research results includes running test, airtight performance, watertight performance, insulation performance, and sound insulation performance of the manufactured windows, and individual evaluations were implemented in the state-authorized testing method.

KEYWORDS:

ME60

A STUDY ON THE AIR FLOW RATE PREDICTION OF PORTABLE DIGITAL AIR FLOW METER THROUGH INTERNAL FLOW ANALYSIS

Sang-Taek Oh[1)]*, Seung-Wook Lee[1)], Jeong-Rae Moon[1)], Young-Il Kim[2)], and Kwang-Seop. Chung[2)]

[1)]**Seoul Industry Engineering Co., Ltd. R&D Center, 186 Gosan-ro, Namyangju-si, Gyeonggi-do 472-050, Korea*

[2)]*School of Architecture, Seoul National University of Science & Technology, Seoul 139-743, Korea*

ABSTRACT: Small portable air flow meter is primarily manufactured in vane type or hot-wires type. These types cause errors by the installation position and by ones who measures which result in a low reliability of data. In this study, the performance of air flow according to 3 blower types was predicted through an internal air flow analysis in order to develop a flow nozzle type that can measure up to 400 CMH. Analytical model consists of polyhedral mesh of over 2 million, and the similar result was derived by two compared to the test result of existing model (140D, 20H), and was applied to the air flow analysis according to blower type in later. A blower model is compared by conducting the internal flow analysis against 3 types of models: Case2 (140D, 30H), Case3(160D, 20H) in reference to Case1(140D, 20H), the existing model. Out of 3 types of models through the flow analysis, Case 3 model produced the result that complies to the development goal, and thus suggest a blower type of Case3.

KEYWORDS:

ME61

PERFORMANCE EVALUATION OF KTE-1000BA BY CONTROLLING EVAPORATOR PRESSURE

[1]Yoon Jin Kang, [2]Wook Jin Kim, [3]Jong Sun Hwang, [4]Seon hyeong Cho, and [2]Chul Su Kim

[1]Daelim University, Department of Building System Technology, 29, Imgok-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Korea

[2]KTENG Co., 133-1 Sinhyeon-ri, Opo-eup, Gwangju-si, Gyeonggi-do, Korea 464-925

[3]Jeonnam Provincial College, Department of Renewable Energy Electricity, 152, Jungnogwon-ro, Damyang-eup, Damyang-gun, Jeollanam-do, Korea

[4]Korea Polytechnics, 15, Gukchaebosang-ro 43-gil, Seo-gu, Daegu, Korea

Email: rnd@kteng.com

ABSTRACT: In this study, confirm change of KTE-1000BA's performance according to evaporator pressure controlled by needle valve manually. The refrigerant HCFC22 is used for operating. The evaporator pressure condition is 1bar, 2bar, 3bar respectively. Also needle valve is controlled in accordance with low pressure suitably. Test results show that the coefficient of performance(COP) of KTE-1000BA was going to increase up to 1~3% with increase of evaporator pressure. This means that the more refrigerant's specific volume decrease, the more energy of compressor is saved. But the cooling capacity may also have possible that it will decrease.

KEYWORDS :

ME62

AN EFFECTIVE HYDROTHERMAL ZnO NANOWIRE GROWTH WITH DISPERSION FOR POWER NANOGENERATOR APPLICATION

Taeheon Kim[1)]*, Xueqiu You[2)], Jeehoon Han[1)], and James Jungho Pak[1)]

*[1)]*School of Electrical Engineering, Korea University, 5-Ga, Anam-Dong, Seongbuk-Gu, Seoul 136-713, Republic of Korea*

[2)]Center for Multidimensional Carbon Materials, Institute for Basic Science (IBS), 50, UNIST-Gil, Eonyang-Eup, Ulju-Gun, Ulsan 689-798, Republic of Korea

ABSTRACT: The power demand of an individual component increases and wired power supply to all the components would be more difficult. Therefore, a device with self-power generation capability would be very useful and essential many applications. Piezoelectric ZnO nanowire has drawn much attention in developing a small and portable power generator for realizing self-powered micro/nano-systems, but its power level is still quite low. In order to increase the generated power level of the ZnO nanowire-based nanogenerator, an effective hydrothermal ZnO nanowire growth method has been developed to generate higher output signals (Vout and Iout) than other reported ZnO nanowire-based nanogenerators. ZnO nanowire growth was performed on the surface of deposited Au (200 nm)/Ti (50 nm) electrode on SiO2/Si substrate (2 cm × 2 cm). This growth method can produce individually vertical ZnO nanowires under the experimental conditions of the extremely low concentration of 0.05 mM ZnO seed solution, 0.8 g PVA (Poly vinyl alcohol) dispersion agent, and dispersion treatment of using tip sonication. The ZnO nanowire's diameter, length, and growth density are about 1.5 um, 4~6 um, and 20 nanowires/100 um2, respectively. The fabricated ZnO nanowire-based nanogenerator showed the open-circuit peak voltage of 8 V and the short-circuit peak current of 400~600 nA

KEYWORDS:

ME63

STRENGTH PROPERTIES OF NON-PORTLAND CEMENT MATRIX WITH THE TYPES AND ADDITION RATIOS OF ALKALI ACTIVATOR

Sun-Gyu Park

Division of Architecture, Mokwon University, Daejeon, Korea, psg@mokwon.ac.kr

ABSTRACT: This experimental study considers manufacturing method of the non-portland cement matrix for the building materials using blast furnace slag that is the industrial by-product. Various specimens were prepared with the different types and addition ratios of the alkali activator. The properties of these specimens were investigated by slump flow test, setting time test, compressive strength test and flexural strength test. As a result, sodium hydroxide(NaOH) addition ratio of 6M shows the suitable results for building materials in strength properties. It was judged that experiment results of non-cement matrix with kind of waste resources and alkali activators were useful to basic data for mixtures design and evaluation properties of building materials.

KEYWORDS: Non-Portland Cement Matrix, Blast Furnace Slag, Compressive Strength, Alkali Activator.

ME64

EXPERIMENTAL STUDY ON HEAT TRANSFER PERFORMANCE OF BRAZED PLATE HEAT EXCHANGERS WITH SINGLE-PHASE FLOW

Man Bae Kim[1)] and Chang Yong Park[2)]*

[1)]*Graduate School of Engineering, Seoul National University of Science and Technology, Seoul 139-743, Korea*

[2)]**Department of Mechanical System Design Engineering, Seoul National University of Science and Technology, Seoul 139-743, Korea*

ABSTRACT: Heat transfer performance of brazed plate heat exchangers were measured and analyzed in this experimental study. The heat exchangers with different plate numbers of 10, 20, 30, and 40 were used for measurement and their plate pattern was identical. Experiment was performed with distilled water by changing hot-side flow rate with cold-side flow rate fixed. Experimental results were compared with calculated values by correlations based on gasketed plate heat exchangers and it showed that the heat transfer performance of brazed plated heat exchangers were higher than those of gasketed. From the pressure drop characteristics measured by independent experiments, it could be inferred that turbulent flow occurred at Reynolds numbers higher than a certain value in flow channels of brazed plate heat exchangers. A new correlation to predict the Nusselt number was developed and its absolute average deviation was 2.62% compared with the values from experimental data.

KEYWORDS:

ME65

COMPARATIVE STUDY ON THE PERFORMANCE OF VARIOUS WIND TURBINE MPPT ALGORITHMS

Inho Ra[1] and Sung ho Kim[2]

[1] *Department of Control & Robotics engineering , Collage of Engineering, Kunsan National University*

[2]**Department of Information & Communication engineering, College of Engineering, Kunsan National University*

ABSTRACT: In renewable energy resources, wind turbines are the most promising renewable energy source due to cost effective, clean energy source and better efficiency. The capacity of the output power depends upon the accuracy with which the peak power points are tracked by MPPT controller irrespective of what type of generator is used. Generally, duty ratio of the DC/DC converter is controlled in different ways to track maximum power point (MPP). There are so many MPPT algorithms for wind turbine system such as Perturb and Observe (P&O), Incremental Conductance (IC) and Torque control mechanisms. In this work, a comparative study through several experiments using different maximum power point tracking (MPPT) algorithms is presented. For efficient experiment, wind turbine emulator and DC-DC convertor from Lab-Volt 8134-20 training device are used. Furthermore, Arduino mega 2560 is used for monitoring and control of MPPT algorithms.

KEYWORDS:

ME66

CHARACTERISTICS ON THE DYNAMICS AND FIRE RESISTANCE OF THE FIRE RESISTANT BOARD MADE WITH OYSTER SHELL AND DRY (PROCESSED) BOTTOM ASH

Ui In Jung[1], Bong Joo Kim[2]* , and Jin Man Kim[2]

[1] *Department of Architectural Engineering, Kongju National University, Cheonan, South Korea, prince8292@kongju.ac.kr*

[2]* *Professor, Department of Architectural Engineering, Kongju National University, Cheonan, South Korea, bingma@kongju.ac.kr jmkim@kongju.ac.kr*

ABSTRACT : Most of the existing fire proofing protection is damaged and the structure is exposed to the caloric heat when in ultra-high temperature fire that are over 1,000℃ or in explosion accompanied fire. In order to prevent such damage, the advanced countries use calcium-based or magnesium-based fireproof board instead. but they are expensive and difficult to handle. In this study, the dynamics and the thermal characteristics have been reviewed in order to apply the high performance fire board that used oyster shell, which is an industrial by products, and bottom ash, as an aggregate. The compressive strength of 7-day material age ranged from 20.77(Mpa) to 34.48(Mpa). The reverse side temperature of the test piece specimen with 2.5 ㎝ thickness ranged from 105.9℃ to 122.5℃ at a heating temperature of 300℃, 202.4℃ to 208.5℃ at a heating temperature of 600℃, and 251.3℃ to 270.4℃ at a heating temperature of 900℃.

KEYWORDS:

ME67

THERMOELECTRIC PROPERTIES OF Tl-DOPED PbTe

Anek Charoenphakdee[1)*]
[1)*]*Thermoelectric and Nanotechnology Research Center, Faculty of Science and Technology, Rajamangala University of Technology Suvarnabhumi, 60 Moo 3, Asian Highway [Bangkok-Nakhonsawan], Huntra Phranakhon Si Ayutthaya 13000, Thailand*
Email: deanscirmutsb@gmail.com

ABSTRACT: The efficiency of thermoelectric energy converters is limited by the material thermoelectric figure of merit (zT). The recent advances in zT based on nanostructures limiting the phonon heat conduction is nearing a fundamental limit: The thermal conductivity cannot be reduced below the amorphous limit. We explored enhancing the Seebeck coefficient through a distortion of the electronic density of states and report a successful implementation through the use of the thallium impurity levels in lead telluride (PbTe). Such band structure engineering results in a doubling of zT in p-type PbTe to above 1.5 at 773 kelvin. Use of this new physical principle in conjunction with nanostructuring to lower the thermal conductivity could further enhance zT and enable more widespread use of thermoelectric systems.

KEYWORDS: zT, PbTe, Thermoelectric, Seebeck coefficient, Thermal conductivity.

ELECTRICAL & ELECTRONICS

EE01

AU AIR LEVEL PROCESS CONTROL SYSTEM

Warranipit Suvittayakul[1] and Narong Aphiratsakun[2]
[1]*Assumption University, Samutprakarn, Thailand, qq_12@hotmail.com*
[2]*Assumption University, Samutprakarn, Thailand, nott_abac@hotmail.com.*

ABSTRACT: Process control is an important aspect area to be studied as many industries are dealing with this type of control. This paper reviews on a motor, an inverter as a plant, a photo sensor as level sensors and the ABB Programmable Logic Controller (PLC) as a controller. This review article will be beneficial to the reader to understand the process control with links between a feedback control system loop diagram and the actual system model. To control the level of the ball, a PI controller is used to adjust the output responses. With this system, an offset value is needed to maintain the ball level when the desired level is reached. Readers can apply the air level process control concept to other process controls such as position control, speed control, pressure control, flow control, temperature control and more. This paper is showing how the air level set point can be adjusted by using mobile applications as iOS and Android.

KEYWORDS: Industrial Process Control, Proportional-Integration (PI), Programmable Logic Control (PLC).

EE02

DESIGN AND CONSTRUCTION OF THE MICROCONTROLLER-BASED WIRELESS WEATHER STATION

Napat Watjanatepin [1] and Chaiyant Boonmee

Rajamangala University of Technology Suvarnabhumi (RUS), Solar Energy Research and Technology Transfer Center, Faculty of Engineering and Architecture, Nonthaburi, Thailand, watjanatepin@yahoo.com.

ABSTRACT: The objective of this research is to develop the 45mW solar cell to be a solar irradiance sensor while using the microcontroller for control the RF receiver and transmitter system. Then the developed system is used to test the measurement percentage errors with the reference weather station and also tested with the longest of operating distance. Moreover, the author has developed the weather monitoring software by using LabVIEW. The results found that the relative humidity measurement error is equal to 3.106 %, the temperature measurement error is equal to 0.685 %, the wind direction measurement error is equal to 5.236% and the wind speed measurement error is equal to 4.527 %, and the solar irradiance measurement error is equal to 0.501 %. The longest distance between the weather sensor and receiver unit is equal to 145 meters.

KEYWORDS: Wireless weather station, Monitoring software, Microcontroller, LabVIEW, Solar irradiance.

EE03

DEVELOPMENT OF AN AUTOMOTIVE ANTI-THEFT SYSTEM

Pulkit Batra[1]
[1]*Delhi Technological University (Erstwhile Delhi College of Engineering), New Delhi, India, pulkitbatra12@gmail.com*

ABSTRACT: Automotive Theft has been an obstinate problem around the world. Design and manufacture of anti-theft systems have become more and more complex due to the rise in complexity of theft in the system. Most of the anti-theft systems available in the market, are the alarm types which audibly deter some thieves away but do not prevent one's car from being stolen and even are not good enough to meet the growing complexity of theft in the country. This paper presents a simple and an efficient anti-theft system which provides improved security by the use of efficient access mechanisms and immobilization systems. This security system can immobilise an automobile and its key auto systems through remote control when it is stolen. It hence deters thieves from committing the theft. It also effectively prevents stealing of key auto systems for reselling by introducing four layers of security features written in the form of firmware and embedded on the Electronic Control Units (ECUs). The particulars of system design and operation are defined in the paper. The experimental outcomes show that this system is practicable and the owner can steadily control his vehicle within a few seconds.

KEYWORDS: ECUs-Electronic Control Units.

EE04

ANALOGUE SIMULATION WITH PROTEUS AND WinFACT PROGRAMS FOR UNDERGRADUATE CONTROL SYSTEM COURSE

Preecha Sakarung [1]

[1] *Rajamangala University of Technology Suvarnabhumi (RUS), Section of Electrical Engineering, Supanburi, Thailand, preecha_s@rmutsb.ac.th.*

ABSTRACT: In this paper, an analogue simulation technique used for undergraduate control system course is presented and discussed. This technique is applied to control the processes of a first-order controlled plant (PT1) and a second-order controlled plant (PT2). With the WinFACT program, the block diagram concept is used to represent the control system of which the complex behaviours are described by transfer functions shown in both time domain and laplace domain. To better understand the correspondences between time domain and laplace domain, the concept of block diagram is therefore changed into a realised electric circuit by using the analogue simulation technique. From the block diagram simulated by WinFACT program, the realisation of the entire electric circuit system consisting of the three components of the control system: controller, process plant and measure sensor, is done with the use of Proteus simulation software. The realised electric circuit is created with the three major elements: operation amplifier (op-amp), resistance and capacitance. The advantages of the analogue technique used with the two software are also reported.

KEYWORDS: analogue simulation, Proteus, WinFACT.

EE05

DESIGN AND IMPLEMENTATION OF HUMAN-ROBOT INTERACTIVE SYSTEM BASED ON KINECT

NIU Jie and WANG Yao

School of Electrical and Electronic Engineering, Changzhou College of Information Technology, Changzhou, China, njrogel@gmail.com

ABSTRACT: Static hand gesture based Human-Computer-Interaction (HCI) is one of the most natural and intuitive ways to communicate between people and machines, since it closely mimics how human interact with each other. At present, most gesture recognition systems use skin color model. The segmentation results are affected by to the light, background and other conditions. In this paper, an application of gesture-based robust human-robot interaction is proposed using a Kinect sensor. First, we use a double threshold method which uses the color and depth image information to segment hand, then uses the template-based technology to do gesture model training to improve the recognition rate. The methods mentioned above have been applied in a real robot system named as TENGXIN which has just obtained the third place in China's 17th National Robot Competition held in Hefei. Experiment results show that the correctness rate of the proposed scheme attains 96.25% which validate the practicability and effectiveness of the application system.

KEYWORDS: Kinect, Gesture Recognition, Robot, Human-robot Interaction.

EE06

DESIGN AND TEST OF FREQUENCY FILTER WITH FINITE IMPULSE RESPONSE

Supavit Muangjaroen[1]

[1]*Rajamangala University of Technology Suvarnabhumi , Thailand , Supavitjack@gmail.com*

ABSTRACT: In this paper, we present the design and test of FIR filter circuit using Matlab program simulation. Filter circuit is used in many other method work such as communication, control and medical device etc. there are 4 types of filter circuit according to their frequency response, low pass filter (LPF), high pass filter (HPF), band pass filter (BPF) and band stop filter (BSF). One common disadvantage with the recorded signal is it's always been mixed by noise already, In order to increase quality of the recorded signal, noise is eliminated by the FIR digital filter. The designed FIR digital filter has the cut off frequency at 0.75 kHz,1 kHz, 1.25 kHz and 1.5 kHz. The original signal is mixed with noise that is generated from Matlab program comparing two signals, original and mixed signal (original signal and noise) which is filter by the designed filter shown that MSE value graph of all cut off frequency tends to decrease in the same way**.**

KEYWORDS: Filter, finite impulse response, noise, digital filter circuit.

EE07

PERFORMANCE COMPARISON OF THREE-LEVEL AND MULTI-LEVEL INVERTER FOR GRID-CONNECTED PHOTOVOLTAIG SYSTEM

Chaiyant. Boonmee[1], Pakorn Somboonkit, and Napat Watjanatepin

Department of Electrical Engineering, Faculty of Engineering and Architecture, University of Technology Suvarnabhumi, Nonthaburi Center, Nonthaburi 11000, Thailand, yant.aj@gmail.com

ABSTRACT: Grid-connected inverters for photovoltaic system (PV) mostly use the three-level grid-connected inverter, which generates the three voltage level at the output of inverter. The inverter can inject the sinusoidal current to utility grid through a set of filter. Even though, the three-level grid-connected inverter can be operated in high efficiency, but it still has some drawback causing lower inverter performance. Such as, the high total harmonic distortion(THD) of output voltage, using the high switching frequency in order to reduce the filter size high change rate of voltage crossing the power switches of the inverter and power losses cause by mismatch of PV power. To improve the performance of inverter for grid-connected PV system, the cascaded H-bridge multi-level inverter topology is a choice to reduce some drawbacks of three-level inverter.

This paper present the comparison studies the performance of using three-level topology and cascaded H-bridge multi-level topology grid-connected inverters for PV systems. By the both inverter topologies have to operate as a single-phase grid-connected inverter in the same condition. The compared performance indicators consist of the total harmonic distortion of injected current to grid, injected power changing while the irradiation is changed and the efficiency of the both systems in the same testing condition.The simulation results by MATLAB/SIMULINK are verified the accuracy of the both topologies performance.

KEYWORDS: Grid-Connected Inverter, Multi-Level inverter, Photovoltaic System.

EE08

STATE-OF-THE-ART FOR REACTIVE POWER COMPENSATION AND HARMONIC MITIGATION TECHNOLOGIES

Pasist Suwanapingkarl and Arnon Singhasathein

Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand,
pasist.s@rmutp.ac.th, pasist@hotmail.co.uk

ABSTRACT: The impacts of reactive power and harmonic distortion are dramatically increasing in the distribution power system, especially Medium Voltage (MV) and Low Voltage (LV) levels. In practical, these two problems are part of power quality issues, and hence these affect the stability and reliability in the customer and power systems. The reactive power (in Var) is defined by the Alternating Current (AC) power triangle (bases on Pythagorean Theorem), which is the sine function of the apparent power vector (or imaginary part of apparent power). It can be also presented in the relationship between the apparent power vector (in VA) and the active power vector (in W). The reactive power are normally affected the available power in the system such as the power losses in the transformer, the voltage drops in the electrical equipment etc. The harmonic distortion can be fined by the deviation of voltage, current and frequency. This is due to the use of power electronic such as Variable Frequency Drive (VFD), inverter, converter etc. Therefore, this paper analyses the technologies of reactive power compensation and harmonic mitigation in the distribution power network as these technologies are still developed, hence increase the performance of supply and control systems. In order to ensure these technologies can implement in practical, the practical parameters and the international standards are also considered. The suggestion solutions and future trend are presented. The MATLAB/Simulink software is chosen as it can support complicate modelling and analysis.

KEYWORDS: Distribution power system, Harmonic distortion, Harmonic mitigation, Low voltage, MATLAB/Simulink, Medium voltage, Power quality, Reactive power.

EE09

ANALYSIS HARMONIC MITIGATION OF MEDIUM AND SMALL INDUSTRIAL BUSINESSES IN DISTRIBUTION POWER NETWORK

Pasist Suwanapingkarl[1], Arnon Singhasathein[1], Nattaphong Phanthuna[1], Manat Boonthienthong[1], Kwanchanok Srivallop[2], and Wannipa Ketken[3]

[1]Rajamangala University of Technology Phra Nakhon, Bangkok, Thailand.
[2]I AM Consulting Co., Ltd., Bangkok, Thailand.
[3]Pranangklao Hospital, Bangkok, Thailand.
pasist.s@rmutp.ac.th, pasist@hotmail.co.uk

ABSTRACT: In practical, the existing medium and small industrial business is normally uses the Variable Frequency Drive (VFD) or Adjust Speed Drive (ASD) or Variable Speed Drive (VSD), which typically uses to drive and adjust the operating speed of mechanical load such as motor. The typical topologies of these control are Voltage Source Inverter (VSI), Current Source Inverter (CSI), six-step inverter, load commutated inverter, cycloconverter (or Matrix Converter; MC) and double fed slip recovery system, hence the most three algorithm controls are applied, which include scalar control, vector control (or Field-Oriented Control; FOC) and Direct Torque Control (DTC). It can be noted that these speed control can be affected the quality of supply in the customer and power systems, especially the distortion in voltage, current and frequency (calls harmonic distortion). This results in failure operation of equipment and protection system. This paper analyses the harmonic distortion in the medium and small industrial businesses due to the various type of VFD. The maximum and minimum distortion is taken into account. The practical parameters and international standards such as Institute of Electrical and Electronics Engineers (IEEE) standards are considered in order to ensure the accurate of simulation results. The computer software that support complicate modelling and analysis such as The MATLAB/Simulink software is chosen.

KEYWORDS: Adjust Speed Drive (ASD), Distribution power system, Harmonic distortion, Harmonic mitigation, Low voltage, MATLAB/Simulink, Medium voltage, Variable Frequency Drive (VFD), Variable Speed Drive (VSD).

EE10

DESIGN OF SMART WIRELESS STREET LIGHTING SYSTEM BY USING MICROCONTROLLER

Gunawan Wibisono, Harry Sudibyo, Gde Dharma Nugraha, and Ndaru Setyawan

Department of Electrical Engineering, Faculty of Engineering, University of Indonesia
gunawan@eng.ui.ac.id

ABSTRACT: To achieve efficiency of operation and monitoring of street lighting and can adapt with environment condition. In this research smart streetlight system based on microcontroller that can turn on automatically in the evening, in the dark, and controlled by server is designed, tested, and analyzed. The lamp can reach its maximum brightness if the motion detector sensing the object. Except solar power, this system is using back up power that supplied by national electric company. By testing this system obtained motion detector can detect maximum range 12 meters and 180°. Light will trigger the sensor if illumination less than 140 lux. Error tolerance of current sensor and voltage sensor are 1,32 ± 2,39 % and 4,73 ± 11,62 %.

KEYWORDS: smart streetlight, microcontroller, motion detector, light sensor, solar power.

EE11

RESEARCH FOR DEVELOPING MV POWER-SEMICONDUCTOR-TYPE FAULT CURRENT LIMITER BASED ON MAGNETIC TURN-OFF PRINCIPLE

Kwanghee Yun, Moon Young Hyun, and Jeong Youngsik

Yonsei University

ykh@powernix.kr

ABSTRACT: Due to this large network, many faults are arises with various reasons. And if we fail to cut off the fault current immediately, our expensive facilities would be damaged and the fault could be expanded to a large blackout. The expected fault current has continually increased in this huge and complicated electrical network environment. And finally, the fault current level exceeded the interrupting capability of Circuit Breaker(CB) in several dense network areas in Korea. Upgrading CBs can be a solution because it will make them have a better interrupting capability. But it takes time and needs unnecessary replacement of adjacent electrical facilities to make the size meet one another. It is clearly neither economical nor desirable way in terms of reliability. The Fault Current Limiter(FCL) can be applied to settle this large fault current. With FCLs we don't have to replace the CBs with upper ratings, also various type of FCLs are under development. This paper presents a research activity on developing a new Solid State Fault Current Limiter(SSFCL), which is based on the Magnetic Turn Off(MTO) theory using power electrionics and without using superconducting materials.

KEYWORDS: MTO, Current Limiter, Power Electronics, Fault Current.

EE12

REGENERATIVE BRAKING SYSTEM: A REVIEW STUDY

Pradeep Kumar [1)*] and Amit Sharma[2)]
[1)] Civil Engineering Department, Delhi Technological University, Delhi, India, ajayby2@gmail.com*
[2)] Mechanical Engineering Department, Delhi Technological University, Delhi, India, amitsharma54321000@gmail.com

ABSTRACT: In the present world, due to depletion of conventional fuels, conservation of energy resources has become an inevitable requirement. The energy consumption in transportation sector is a major stake holder in the global energy consumption and utilisation. Energy losses occurring in the transportation sector have a drastic effect on the global energy scenario. In real world on-road driving conditions, most of the vehicle's energy is lost during braking. Over the years, extensive researches have been carried out worldwide to reduce the losses occurring at braking system. Regenerative braking has gained popularity as a solution to problems occurring due to braking losses. Regenerative braking is an energy conservation mechanism in which the energy dissipated during deceleration and braking is stored in form of electricity. The electricity produced can be utilised immediately or can be preserved for future purposes. That energy can be transformed back into kinetic energy and used to speed up the vehicle. This stored energy results in increased efficiency of the vehicle. The main disadvantages of regenerative braking are the complexity of design, increased cost and weight of the vehicle. This paper mainly emphasizes the different ways of storing energy using various methods of regenerative braking.

KEYWORDS: Regenerative Braking System, Heat loss, Electricity.

EE13

BACKGROUND MODELS BENCHMARK FOR OBJECT DETECTION

P. Sritanauthaikorn[1)*], P. Sinpaitoon[2)], S. Thongkullaphat[1)], and T. Borirakarawin[3)]
[1)] *Faculty of Engineering and Architecture, Rajamangala University of Technology Suvarnabhumi, Thailand, *patcharanun@rmutsb.ac.th*
[2)] *Faculty of Technical Education, Rajamangala University of Technology Suvarnabhumi, Thailand*
[3)] *National Institute of Metrology (Thailand), Thailand*

ABSTRACT: One of the important preprocessing processes of object detection is background model. There are 2 kinds of creating background as static and dynamic backgrounds. It is suited in different situations such as indoor and outdoor environment. The static background model is fixed frame and the dynamic background models are varying frame as median filter, moving average, moving average with a learning rate, moving average with Maadi's learning rate, and Gaussian mixture model. Those are compared with indoor and outdoor scene in their performance. The experiment result showed the fixed frame is suited for indoor and outdoor scene if the fixed frame is clear scene and do not present the interested object. Moving average with a learning rate, Moving average with Maadi's learning rate and Gaussian mixture model are better than the other dynamic models for outdoor scene.

KEYWORDS: Background model, median filter, moving average.

EE14

ROBUST VEHICLE DETECTION AND TRACKING SYSTEM BASED ON VISION SYSTEM

Seunghwan Baek[1)*], Heungseob Kim[1)], Woosung Che[2)], and Kwangsuck Boo[1)]
[1)*] *High Safety Vehicle Core Technology Research Center, Inje University, Gimhae, Gyeongnam, Korea, baek.inje@gmail.com*
[2)] *Department of Mechatronics Engineering, Kyungsung University, Busan, Korea*

ABSTRACT: This paper presents a method to detect the present vehicles from side and rear for BSDS(Blind Spot Detection System) with vision system. Because the real image acquired during car driving has a lot of information to exam the target vehicle, background image, and the noises such as lighting and shading, it is hard to extract only the target vehicle for the background image with satisfied robustness. In this paper, the target vehicle is detected by repetitive image processing such as sobel and morphological operations and a Kalman filter is also designed to cancel the background image and prevent the misreading of the target image. Compared to previous researches, the proposed method can get an image processing with much improved speed and robustness. Various experiments were performed on the highway driving situations to evaluate the performance of the proposed algorithm.

KEYWORDS: Blind Spot Detection System(BSDS), Lane Change Assist(LCA), Vehicle Detection, Collision Prevention, Kalman Filter.

EE15

DIRECT YAW MOMENT CONTROL FOR LANE DEPARTURE PREVENTION IN VEHICLE

Moonyoung Yoon[1)], Woosung Che[2)], Seunghwan Baek[3)], Kwangsuck Boo[3)], and Heungseob Kim[3)*]
[1)] *Department of Mechanical Engineering, Inje University, Gimhae, Gyeongnam, Korea*
[2)] *Department of Mechatronics Engineering, Kyungsung University, Busan, Korea*
[3)] *High Safety Vehicle Core Technology Research Center, Inje University, Gimhae, Gyeongnam, Korea, mechhsk@inje.ac.kr*

ABSTRACT: Driver assistance systems have been developed to increase safety and convenience. Vehicle stability control (VSC) system prevents vehicle from spin out and drift has been determined the compensated yaw moment with direct yaw moment control. The direct yaw moment control method is very effective that the yaw moment can be controlled regardless of driver steering input. Lane Keeping System (LKS) and lane departure warning system (LDWS) have been developed to prevent a dangerous situation from careless driving and drowsiness.
This paper proposes the control scheme to assist prevent lane departure and maneuver the vehicle back to the original lane. The lateral deviation from the original lane at look-ahead time is estimated with the yaw angle and yaw rate and the compensated yaw moment should be generated according to this lateral deviation. Also when the driver executes additional steering moment during the direct yaw moment control, the control results are compared. PreScan is used to evaluate the control method in practical road situations and the vehicle dynamic model and controller is composed of Matlab/Simulink. The various computer simulations for typical lane departure prevention with the proposed method are implemented in straight and curved load.

KEY WORDS: Lane Departure Prevention, Direct Yaw moment Control, PreScan, Lateral Deviation.

EE16

EXPERIMENTAL OF 3 PHASE MOTOR MEASURING SYSTEM ON BASIC ENGINEERING LABORATORY

Ong-art Sadmai[1]
[1]*Department of Electrical Engineering, Rajamangala University of Technology Thanyaburi, Prathumthanee, Thailand, ong-art.s@en.rmutt.ac.th.*

ABSTRACT: This paper investigates the characteristics of phase shift, line current, phase current, line voltage and frequency of many kinds 3 phase motor. The experimental device has been developed under LabVIEW programming. Based on, star – delta connection of 3 phase motor. The experimental result shows that 3 phase voltages have not been changed at every time of operating of 3 phase motor but current signal of phase current was not true sine wave. Moreover, the resulting of experimental has been showed many kinds of useful data of 3 phase system and the result of experimental can get accurate result with simplified calculation.

KEYWORDS: 3 phase motor, basic of laboratory, measuring.

EE17

A STATE OF CHARGE ESTIMATION TECHNIQUE USING A LINEARIZED BATTERY MODEL

Il Song Kim
Department of Electrical Engineering, Korea National University of Transportation, Republic of KOREA, iskim@ut.ac.kr

ABSTRACT: A new state of charge estimation technique for high power batteries that considers the linearized model is proposed in this paper. A mathematical battery model based on a linear state space equation is established, and an SOC estimation algorithm using a Kalman filter is presented. The accuracy of the proposed system is verified by the new validation method. A temperature dependent output voltage equation is developed, and the performance of the proposed method is demonstrated by various driving test inputs.

KEYWORDS: State of Charge, SOC, Battery Modeling, Kalman Filter, Linearized Battery Model.

EE18

RELIABILITY ANALYSIS OF HIGH SPEED CIRCUIT BREAKER BASED ON FMECA

Y. S. Moon and K. H. Choi*
Department of Electric Railway and Signaling Engineering, Seoul National University of Science and Technology, 232 Gongneung-ro, Seoul, 139-743, Korea

ABSTRACT: FMECA(Failure Mode, Effects and Criticality Analysis) method is applied to analyze the reliability of high-speed circuit breaker(HSCB) of metro trains. Failed components and related failure modes are deduced from the past operation and maintenance records of the metro trains, and the effects of the failure modes are categorized by the severity levels determined by the impact on the train operation. These results are used to estimate the criticality of the failure modes quantitatively. The analysis results base on the proposed criticality analysis method shows that some failure modes of HSCB have a great impact on the train operation among 15 failure modes deduced from the maintenance records

KEYWORDS:

EE19

CO-DESIGN DUAL BAND LNA AND BANDPASS FILTER RF FIELD DETECTOR FOR MONITORING GROUND CHECK OF RADIO NAVIGATION AIDS SYSTEMS

Gunawan Wibisono and Muh Wildan
Dept of Electrical Engineering, Fact of Engineering, Universitas Indonesia
Kampus Baru UI Depok 16424 INDONESIA
Email: gunawan@eng.ui.ac.id

Abstract: Low noise amplifier (LNA) and Bandpass Filter (BPF) areradio frequency(RF) frond-end circuit of receiving device and *RF Field Detector* holding very important role to reduce noise of the system from the RF system. The design of dual-band LNA circuit and BPF are a solution to combining two devices with different working frequencies into a multi-function device and has a multiband capabilities are expected to produce low noise figure, high gain, stable in the absence of oscillations, simultaneously. This thesis discusses about design of co-design dual band LNA and BPF from RF field detector for application monitoring ground check of Radio Navigation Aids (RNA) equipment. To gain dual band function at Very High Frequency Omni Range (VOR) / Instrument Landing System Localizer (ILS LOC) working at band working on band VHF 108 – 118 MHz and ILS Glide Slope (GP)on band UHF 328.6 MHz – 335.4 MHz, the researcher applied lumped element designed to resound at middle-frequency 113.0 MHz and 332.0 MHzwith 2SC3583 transistors that are well suited to the application of VHF and UHF. In this thesis designed 3 (three) that is dual band LNA circuit, the conventional design of dual-band LNA and BPF, and co-design dual-band LNA and BPF were then simulated, fabricated, measured and analyzed the results. The co-design is a series of LNA and BPF are combined in a circuit. Bandpass filters are designed also serves as a substitute for the output matching impedance of the LNA, so it has the advantage of components becomes less and dimensions of the devices become smaller, but still have the same parameter specification of conventional design dual band LNA and BPF. Simulation results show that the dual-band LNA can work at a frequency of 113.0 MHz and 332.0 MHz with gain> 10dB, input return loss <-10 db, and a noise figure <2dB for the third circuit design, so it still meets the design specification standards . While the results of the manufacturing value gain and input return loss gain slightly decreased the value of simulation results but still meet the design specifications for the VHF band, but achievement value on the UHF band are still out of tolerance from the design specifications.

KEYWORDS: Dual Band LNA, Bandpass Filter, lumped, Radio Navigation Aids, VOR, ILS LOC, ILS GP.

EE20

HARDWARE DESIGN AND PROTECTION FUNCTION OF IED FOR LARGE CAPACITY GENERATOR

Yoon Sang Kim[1)] and Chul-Won Park[2)*]

[1)] *Dept. of Computer and Science Eng., Korea Univ. of Technology and Education, Cheonan, South Korea, yoonsang@koreatech.ac.kr*

[2)*] *Dept. of Electrical Eng., Gangneung-Wonju National University, Wonju, South Korea, cwpark1@gwnu.ac.kr*

ABSTRACT: Even though the occurrence of generator faults is less than the one of transmission and substation facility faults, those incidents caused by the generator faults have had a big impact on our daily life. As most of protection and control systems for large capacity generator in South Korea have depended upon foreign technologies, the demand for the modernization and localization of the ones is also growing. This paper deals with hardware (H/W) design and protection function of intelligent electronic device (IED) for large capacity generator, which allows for command and data exchange through communication for measuring, monitoring, protection and control. Functions for stator protection, rotor protection, and field protection for the system are presented. In addition, the details of the IED including specification, elements (on relay and measurement), functions (on communication and module) are described.

KEYWORDS: Field, Generator faults, Generator protection, IED, Large capacity generator, Protection and control system, Rotor, Stator.

EE21

RESEARCH FOR DEVELOPING MV POWER-SEMICONDUCTOR-TYPE FAULT CURRENT LIMITER BASED ON MAGNETIC TURN-OFF PRINCIPLE

Yoon Kwang Hee[1)], Young-Sik Jeong[2)], and Moon Yung Hyun[3)*]

[1)] *Ph. D. Candidate, Electrical & Electronic Engineering, Yonsei University, Seoul, South Korea, ykh@yonsei.ac.kr*

[2)] *Research and development department, Powernix Co.,Ltd. Seoul, Korea, jys@powernix.kr*

[3)*] *Professor, Electrical & Electronic Engineering, Yonsei University, Seoul, South Korea, moon@yonsei.ac.kr*

ABSTRACT: Due to this large network, many faults are arises with various reasons. And if we fail to cut off the fault current immediately, our expensive facilities would be damaged and the fault could be expanded to a large blackout. The expected fault current has continually increased in this huge and complicated electrical network environment. And finally, the fault current level exceeded the interrupting capability of Circuit Breaker (CB) in several dense network areas in Korea. Upgrading CBs can be a solution because it will make them have a better interrupting capability. But it takes time and needs unnecessary replacement of adjacent electrical facilities to make the size meet one another. It is clearly neither economical nor desirable way in terms of reliability. The Fault Current Limiter (FCL) can be applied to settle this large fault current. With FCLs we don't have to replace the CBs with upper ratings, also various type of FCLs are under development. This paper presents a research activity on developing a new Solid State Fault Current Limiter (SSFCL), which is based on the Magnetic Turn Off (MTO) theory using power electronics and without using superconducting materials.

KEYWORDS: Fault Current, Circuit Breaker, Fault Current Limiter, Magnetic Turn Off.

EE22

A STUDY ON PROTECTION ALGORITHM AND CHRACTERISTIC CURVE OF IED FOR GENERATOR ROTOR

Yu-Yeong Park[1)], Kyung-Min Lee[2)], and Chul-Won Park[3)*]

[1)] *Department of Electrical Eng., Gangneung-Wonju National University, Wonju, South Korea, orange1513@naver.com*
[2)] *Department of Electrical Eng., Gangneung-Wonju National University, Wonju, South Korea, point2529@naver.com*
[3)*] *Department of Electrical Eng., Gangneung-Wonju National University, Wonju, South Korea, cwpark1@gwnu.ac.kr*

ABSTRACT: Generator is one of major equipments in power system. IED (Intelligent Electronic Device) should quickly minimize damage to protection during internal faults of generator. The most widely-used scheme for detecting a loss of excitation in generator rotor is to use the variation of impedance obtained from generator terminals. In this paper, characteristic curves of the loss of excitation for generator rotor protection was reviewed, and offset mho algorithm using a DFT (Discrete Fourier Transform) filter was proposed. First, the protection scheme and the characteristic curve by the offset mho impedance for detecting a loss of excitation were analyzed. Second, the generator control system was modeled using the PSCAD, and various data of loss of excitation was collected through PSCAD simulation. Third, the performance of the proposed scheme using the simulated data by PSCAD was evaluated. Finally, the proposed scheme was evaluated by using the real filed data of A thermal power plants in Korea.

KEYWORDS: Characteristic curve, Generator control system, Generator protection, IED, Loss of excitation, Modeling, Offset mho impedance, Power system, PSCAD, Rotor protection.

EE23

A STUDY ON OPTIMAL DESIGN OF FAST CHARGER IN CCCV MODE FOR EXTENDED RANGE ELECTRIC VEHICLE

Ji-Yong Chun[1)], Hyun-Byeong Chae[2)], MoonTack Cho[3)]
[1)] *Div. of Automotive Engineering, Ajou Motor College, Boryung City, Chungcheongnamdo, 355-769, Korea*
[2)] *President, CTI-KOREA,Chunan City, Chungcheongnamdo, 330-816, Korea*
[3)] *Dept. of Electrical & electric Engineering, Daewon University College, Chungcheongbukdo, 390-702, Korea*

ABSTRACT: This paper presents a charger technology for the electric vehicles that enables charge and discharge not only for low voltage and high voltage but also for any battery type by using a high performance DSP. The proposed charger was made to function as generalized fast and low battery by using PWM buck converter that runs with CCCV (Constant Current Constant Voltage) mode. Besides, by designing the controller as fixed-type and varied suiting to the load characteristics, constant output was ensured even during power trip. Also, by controlling the battery type, charge, and discharge, a/s becomes easy. This battery would be possibly implemented not only in the Off Board Charger of the electric vehicles but also in the On Board Charger of EREV(Extended Range Electric Vehicle) in future.

KEYWORDS: Charger, DSP, CCCV.

SCIENCE AND TECHNOLOGY

ST01

APPLICATION OF RUN THEORY IN THE DEFINE DROUGHT CHARACTERISTICS FOR THE ANALYSIS OF DROUGHT IN CHIANG MAI PROVINCE

Nattawut Intaboot

Rajamangala University of Technology Suvarnabhumi (RUS), Faculty of Engineering and Architecture, Nonthaburi, Thailand, nuttawut_took@hotmail.com

ABSTRACT: The analysis of drought or lack of water has any method. In the study was conducted using Run Theory in to the define drought characteristics for the analysis of drought in the Hod district in Chiang Mai province during 1954-2003 (50 years). To consider the threshold demand to be about 80% of the average of all the data. The study found that over 50 years the number of months of severe drought 344 months is 57.33%, of the dry conditions 55 times, the crisis of drought duration 10 months, drought magnitude 806.73 mm, and drought intensity 134.45 mm/month. Therefore, the analysis concluded that Run approach can be defined the nature of the drought. However, the nature of the drought of the analysis is based on the truncation level. The truncation level to make the appearance of drought changed if the truncation level near the mean the result will show the drought has a lot and intense. But, if the define truncation level is lower than the mean the results will show the minimum and mild drought. Thus, this point as a limitation of the run approaches another point to consider.

KEYWORDS: Run Theory, Drought Characteristics, Threshold Demand, Chiang Mai province.

ST02

CRACK DETECTION IN FIBER CONCRETE BY ELECTRICAL IMAGING METHODS

N. Wiwattanachang[1] , P.H. Giao[2], and C. Vichalai[3]
[1]Rajamangala University of Technology Suvarnabhumi, Nonthaburi, Thailand, narongchaiwiwatt@gmail.com
[2]Asian Institute of Technology (AIT), Pathum Thani, Thailand, hgiao@ait.ac.th
[3] Huikri, Maesai, Cheng Rai, chanaropv@gmail.com

ABSTRACT: This study presents results from an application of the electrical imaging method to monitor the artificial cracks in fiber concrete model. A comprehensive study on resistivity testing of the concrete samples and imaging of the fiber concrete model with cracks was conducted in this study. The dimension of fiber concrete model which were 1,250-mm diameter and 250-mm hight and measuring points were marked at every 50-mm by Wenner Schlumberger configuration with a set of 48 electrodes were used in this study. The electric imaging surveys were automatically performed by using the SYSCAL R1 Plus. The results indicated that both crack direction and depth could be accurately determined in the inverted resistivity sections.

KEYWORDS: Electrical imaging, artificial cracks, fiber concrete, mass concrete, Wenner Schlumberger configuration.

ST03

RESEARCH ON VEHICULAR COMMUNICATIONS TECHNOLOGY: V2V

Vipul Garg[1], Prashant Goel[2], and Ashish Singh[3]
[1]Maharaja Agrasen Institute of Technology, India, vipulgarg95@gmail.com
[2]Delhi Technological University, India, aksingh.dtu@gmail.com
[3]Maharaja Agrasen Institute of Technology, India, prashantgoel44@gmail.com

ABSTRACT: In the past years, Vehicular communications have become a major part in the automobile industry for the safety and survival of the people. Vehicular networks have attracted a lot of attention recently. Vehicular communications use either the IEEE 802.11a or IEEE 802.11p wireless standard. With the support of the Dedicated Short Range Communications (DSRC), it has its wide range of applications such as energy efficiency, real-time traffic monitoring, infotainment, congestion control, and road safety. One potential application of vehicular networks is to use video cameras embedded in vehicles to support video surveillance. Traditional surveillance systems only rely on fixed stations on the roads to monitor road conditions. With vehicular cameras, deeper and richer road conditions may be tracked. In this paper, we study the related communication issues to support such surveillance scenarios. We use monitoring and tracking suspicious vehicles (such as stolen cars) on the road through license plate recognition (LPR) as an example (our results should be applicable to other scenarios as well). We show how vehicles can work cooperatively through vehicle-to-vehicle (V2V) communications to achieve this goal. With a tracking and a reporting module, our solution does not rely on infrastructure networks. The tracking module allows handoff of a tracking job to neighbouring vehicles as necessary and report of suspicious vehicles to nearby police cars. The reporting module can help guide message flows to avoid flooding the network. Simulation results verify the message efficiency of our approach. We also show how the framework can be applied to the developing WAVE/DSRC (Wireless Access in Vehicular Environments/Dedicated Short Range Communications) standards.

KEYWORDS: Vehicular network, dedicated short range communication (DSRC), Vehicular communication.

ST04

SPEECH EMOTION RECOGNITION IN CONSENSUS BUILDING

Ning He [1], Jinji Zhang [2], Yanjun Li [3], and Xiaogang Wang [4]

[1, 2, 4] *School of Software, Changzhou College of Information Technology, Changzhou 213164, China, 89039650@qq.com, 284780746@qq.com, wxiaog@ccit.js.cn*

[3] *Graduate School of Information, Production and Systems research center, Waseda University. Kitakyushu, Fukuoka, Japan, liyanjun@ruri.waseda.jp*

ABSTRACT: The argument served as a base of understanding the support or opposite polarity of the participants is indispensable for practical consensus building whether in public organization or in company. For the reason that video meeting or e-conference becomes more and more frequently, in many cases, we obtain audio or video data directly. However, the existing studies mostly lie in text analysis and semantic extraction after making some pre-process to the audio or video data on the literal work. They also suffer the problem of the large size of the lexicon database, ambiguity grammar and lack of obtaining the manner of speaking. In this research, we utilize the audio data and exploit the Hidden Markov Model (HMM) to recognize the speech emotion by utilizing the MFCC coefficient of sound and speech. The dependence of the support state and emotion types is proved by Chi- square test. We propose such a novel speech emotion recognition approach by mining the abundant speech emotion for around 80% polarity recognition accuracy. The experiment showing the result is provided to demonstrate the effectiveness of the proposed method, which can be applied to discover the attention of the speech utterance in a consensus building process.

KEYWORDS: Consensus building, Speech emotion recognition, HMM, MFCC, Chi-square test.

ST05

DEVELOPMENT OF CW AND Q-SWITCHED DIODE PUMPED ND:YVO4 LASER

Gagan Thakkar[1)]* and Vatsal Rustagi[2)]
[1)]Applied Physics, Delhi Technological University, New Delhi, Delhi, gagan.1401@gmail.com
[2)]Mechanical, Delhi Technological University, New Delhi, Delhi, vatsal.rustagi@gmail.com

ABSTRACT: The development and parameter of continuous wave and Q-switched diode pumped Nd: YVO_4 laser is discussed. Suitable laser diode of wavelength 808 nm was selected in order to obtain the required output. Its power was observed to be 0.11 mW at 834 mW input power. Passive Q-switch Cr^{4+}: YAG was used to obtain the Q-switch laser and its pulse width was recorded to be around 20-25 ns.

KEY WORDS: Nd: YVO_4 laser, Q-switch, diode pumped.

ST06

INVENTORY CONTROL SYSTEM

Drishty Kapoor[1)]
[1)]*Computer Science, ITM University, Sector-23, Gurgaon, Haryana, India, sfkapoor@gmail.com*

ABSTRACT: An integrated package of hardware and software including all the control systems to monitor the quantity, location and status of inventory can be termed as Inventory Control System. Day by day "update" keyword is becoming a necessity in all sought of things be it any household item or a software. We need to adapt new technology to survive in the world of competitors by enhancing the earlier version of software.
The system is capable of keeping a log of spares available and is intelligent enough to tell which spare have been taken from which supplier and in which quantity plus the amount of spares being sold to individual customer under what requirement. Also, an indication would be provided by the system to get an acknowledged about the number of available for individual sectors including its price which can be helpful for us in deciding our selling profit. An Inventory Control System includes java source code, class files, odbc, .mdb, Ms-Access file. The connectivity of Net Beans software with Ms-Access will be done via JDBC.

KEYWORDS: ODBC, JDBC, Net Beans.

ST07

EXHAUST GAS RECIRCULATION (EGR) IN INTERNAL COMBUSTION ENGINES: A REVIEW

Amritesh Kumar[1)*] and Anant Govil[2)]
[1)*] *Mechanical Engineering Department, Delhi Technological University, Delhi, India, anand.amritesh@gmail.com*
[2)] *Mechanical Engineering Department, Delhi Technological University, Delhi, India, anantafbbs@gmail.com*

ABSTRACT: In the present world, Internal Combustion Engines are the main power house of the automobile vehicles. Increasing numbers of on-road vehicles have enlarged their share in total global energy utilization and has also effected the environment due to increased emissions. The main constituents of vehicle exhaust are CO, HC, NO_X, PM, soot, etc. from which NOx are one of the most destructive component. Over the year, exhaustive researches have been carried out across the globe to reduce the negative effects of NO_X on the environment. Exhaust gas recirculation (EGR), catalyst and water injection are few methods that have shown potential to minimize the negative impacts of NO_X. EGR along with substantial reduction in NO_X level also increases the engine life as the mean cylinder temperature gets reduced. Downsides of incorporating EGR in an IC Engine include increment in PM emissions and fuel consumption. Since, the amount of oxygen available in the cylinder is reduced by EGR, the peak power produced by the engine decreases. In this paper, effects of Exhaust Gas Recirculation (EGR) on performance and emissions of internal combustion engines are reviewed. Methods to reduce NO_X emissions from IC engines are analyzed and the foreseeable use of EGR are emphasized.

KEY WORDS: Exhaust Gas Recirculation, NO_X emission, Internal Combustion Engines.

ST08

ELECTRICAL ENERGY EFFICIENT SYSTEM DESIGN USING AUTOMATION AND ARTIFICIAL INTELLIGENCE FOR CLASSROOMS

Rashi Batra[1)] and Anisha Gupta[2)*]

[1)] *Faculty of Engineering and Technology, Jamia Millia Islamia, New Delhi, Delhi, India, rashi0422@gmail.com*

[2)*] *Department of Computer Science and Engineering, Jaypee University of Information and Technology, Waknaghat, Himachal Pradesh, India, anishaguptajuit@gmail.com*

ABSTRACT: With the growing need for energy efficiency and conservation of resources, we desire to automate everyday tasks so as to reduce human involvement. We have seen an increase in the popularity of home automation systems and escalating interests in the application domain of 'Internet of Things'. This paper presents the design and implementation of a Ethernet-based intelligent system for conserving electrical energy in large organizations such as a University. It uses the available infrastructure of the classroom that includes surveillance camera and Ethernet connectivity according to the minimum cost criteria. It is monitored and controlled locally or remotely through the Internet cloud. Unlike home automation systems, it works on a class schedule which resides at server side database through which commands can be sent to a Raspberry Pi unit installed in the classroom which can toggle the light switches as per the schedule of the class. The system compares the captured image of the class with a template of an empty class image and controls the lights according to the occupancy.

KEY WORDS: Automation, University, energy conservation, Raspberry Pi

ST09

EFFECT OF MODIFICATION OF PLENUM LENGTH ON ENGINE EFFICIENCY: A REVIEW

Amit Sharma and Amritesh Kumar
Delhi Technological University
amit54321000@gmail.com

ABSTRACT: Increasing usage of petroleum based fuels has been a matter of serious concern due to depletion of global resources. Meticulous research has been done globally to evaluate the suitability of variety of designs for internal combustion engine. Modifications in intake manifold can bring a significant effect on volumetric efficiency, fuel consumption and engine efficiency. Engine characteristics like thermal efficiency, brake torque and specific fuel consumption is dependent on plenum length. Normally, in a car, the plenum length is kept constant but a static intake manifold can be optimized for a particular rpm of an engine. So when the rpm of the engine is not constant, the overall efficiency of the engine increases or decreases with it which leads to uneven fuel consumption. To counter this plenum should be designed such that it length varies with varying rpm of engine. It has been observed that it is necessary to shorten the plenum length at higher engine speed and to extend the plenum length when the engine speed is low. This leads to constant optimized efficiency of the engine as length of the plenum is varying with varying engine speed. This paper focuses on the effects of intake plenum length on the performance characteristics of an Internal Combustion Engine.

KEY WORDS: Internal Combustion Engine, Plenum length, Efficiency.

ST10

RESEARCH ON AN AUTOMATIC METHOD OF TRANSFERRING FROM ER SCHEMA TO OWL DL ONTOLOGY

Wei Zhou
Software College, Changzhou College of Information Technology, Changzhou, China,wnvjungle@aliyun.com.

ABSTRACT: As a conceptual model, ontology is used to describe relationships among concepts. Through these relationships, we can describe the semantics of concepts. Ontology has the effective performance of describing the hierarchical structure of concepts and the semantic model, so it is applied to the research on the semantic-preserving data integration. In this paper, we mainly discuss a method about how to transfer from entity-relationship(ER) schema to OWL DL ontology automatically and give the converting algorithm in detail. Compared to similar algorithms, this algorithm realizes the automatic transferring function, which overcomes the complex work brought by manual conversion methods.

Keywords: Data Integration, ER Schema, OWL DL, Ontology

ST11

A STUDY ON THE DETERMINATION OF MINIMUM AIRFLOW FOR STRATIFICATION CONTROL OF SINGLE DUCT VAV TERMINAL UNITS

Young-Hum Cho[1], Jae-Hun Jo[2], and Jae-Han Lim [3]

[1] Professor, School of Architecture, Yeungnam University, Korea, yhcho@ynu.ac.kr
[2]Professor, Division of Architecture, Inha University, Korea, jhjo@inha.ac.kr
[3]Professor, Division of Architecture, Ewha Womans University, Korea, limit0@ewha.ac.kr

ABSTRACT: The objective of this study was proposed a stratification control method for the minimum air flow of VAV terminal unit. The minimum air flow rate of the VAV terminal unit is the key factor affecting the thermal comfort, indoor air quality (IAQ), stratification and energy consumption, depending on the operating mode of the VAV system. Therefore, selecting the proper minimum air flow is very important. In this study, building simulation was conducted to evaluate the indoor thermal comfort, stratification, IAQ and energy consumption according to the fixed minimum air flow rate of the VAV terminal units. Also, an algorithm was proposed considering the stratification and variable minimum airflow rate depend on indoor load. The result of the fixed minimum air flow rate simulation is that minimum air flow rate considering stratification satisfies all the conditions of indoor thermal comfort, IAQ and without stratification. And the proposed method was found to be more effective than the existing control method. The energy comparison with the existing control method, the method reduces the energy consumption.

KEYWORDS: Variable air volume system, Minimum airflow, Thermal comfort, Indoor air quality, Energy consumption

ST12

EFFECT OF THE APPLICATION OF SAFETY PATROL MANAGEMENT SYSTEM (SPMS) UPON THE REDUCTION OF DISASTER & ACCIDENT OCCURRENCES IN CONSTRUCTION SITE

Yeo-Chan, Yoon[1)*], Kwang-Seop, Chung[2)], Young Il, Kim[2)], Seon-Hay, Kim[2)], Ji-Hoon, Kim[2)], and Sung-Min, Kim[3)]

[1)]Chong-Jo Enc & Chong-Jo Clean Tech Co , Seoul, South Korea*
[2)] School of Architecture, Seoul National University of Science & Technology, Seoul, South Korea
[3)]KISTEC(Korea Infrastructure Safety Corporation), Goyang, South Korea

ABSTRACT: The disaster and safety accidents in any construction site occur inevitably. Since the on-site disaster and accident occurrence became one of major concerning factors in construction site, architects & building executers have been flooded with safety management advices. The purpose of this paper is to survey and analyze the effect of the application of Safety Patrol Management System(SPMS) upon the reduction of disaster & accident occurrences in construction site. In order to estimate and reduce the disaster and accident ratio in construction site, various surveyed data has been analyzed. It will establish the suitable design standards and suggest the basic database for estimating disaster and accident ratio.

KEY WORDS:

ST13

THE STUDY ON EFFICACY OF *Hydrilla verticillata* FOR NITRATE AND PHOSPHATE ABSORPTION IN NATURAL FRESHWATER RESERVOIRS

Joompot Poomsripanon

Department of Science, Faculty of Science and Technology

Rajamangala University of technology Suvarnabhumi

ABSTRACT: The purposes of this research were : 1) to study the efficiency of absorption of nitrate and phosphate of the Hydrilla (*Hydrilla verticillata*) in natural fresh water reservoirs. The findings of this research and application can be used for biological process to wastewater treatment. The samples of the Hydrilla were collected from 10 water reservoirs in Ayutthaya province and analyzed for the amount of nitrate and phosphate in from samples by Calorimetric method (Salicylic). The results showed that the Hydrilla effective in absorbing phosphate than nitrate through the percent of phosphate absorption from 10 fresh water reservoirs were 0.37, 0.46, 0.36, 0.35, 0.35, 0.25, 0.44, 0.62, and 1.00, respectively, while the percent absorption of nitrates were 0.01461, 0.01524, 0.01397, 0.01417, 0.01411, 0.01483, 0.01317, 0.01373, 0.01298 and 0.01301 respectively**.** Thus, Hydrilla can be used as phosphate adsorbent in natural fresh water reservoirs. However, the other water plants should be studied to be the nitrates absorber in natural water reservoirs in the future.

KEYWORDS: Hydrilla verticillata, nitrate, phosphate, natural water reservoirs, Phranakorn Si Ayutthaya Province.

AGRICULTURAL TECHNOLOGY

AG01

APPLICATION OF LYSOSOME ISOLATED FROM *Candida utilis* AS ANTIMICROBIAL OF *Salmonella typhimurium*

Titik Budiati[1] and Wahyu Suryaningsih[1]

[1]*Food Technology Department, State Polytechnic of Jember, Jember, Indonesia, titik.budiati@gmail.com*

ABSTRACT: Lysosome, a cell organelle, showed its potency as antimicrobial. *Candida utilis* isolated from pineapple waste harbored lysosomes in the cells. The aim of this study was to investigate the antimicrobial activity of lysosomes isolated from *C. utilis* in pineapple waste to *Salmonella typhimurium.* The antimicrobial activity of lysosomes from *C. utilis* to *S. typhimurium* was observed at pH ranged from 2 to 9 of phosphate buffer with concentration ranged from 0% to 90%. Lysosome showed antimicrobial activity to *S. typhimurium* which is correlated with the pH of phosphate buffer. The optimal activity of lysosome isolated from *C. utilis* was found at pH 5 of phosphate buffer, at concentration of 60%. Lysosome showed antimicrobial activity at 30^{o}C and 37^{o}C. The mortality rate of *S. typhimurium* was found as 66.7%. In conclusion, lysosomes isolated from *C. utilis* in pineapple waste can be used as antimicrobial of *S. typhimurium* as pathogenic bacteria that can live in organisms with the body temperature at 30 ^{o}C and 37^{o}C.

KEYWORDS: Antibacterial, *Candida utilis*, Lysosome, *Salmonella typhimurium.*

AG02

THE EFFECT OF AIR VELOCITY UNDER OPTIMAL TEMPERATURE CONDITIONS FOR DRYING DUCKWEED

Surachet Bumrungkeeree[1]

Faculty of Agricultural Technology and agro-Industry, Rajamangala University of Technology Suvarnabhumi, Huntra District, Ayuthaya, Thailand, bsukeeree@gmail.com

ABSTRACT: Duckweed is a small-aquatic plant, which float on the surface of fresh water and widely distributed in nature. This plant is highly nutritious that is suitable for animal nutrition. Its dry matter consists of 20-40% of protein, 4-6% of fiber. Effect of air velocity under optimal temperature conditions for drying duckweed was found out. Air velocities, time, and difficulty of grinding were the important parameters. Twenty five percent increment of fan speed was adjusted into three air flow speeds including 50%, 75% and 100%. Each of thousand grams of fresh duckweed was dried in hot air oven at $60\,^{\circ}C$ incorporation with those fan speeds. The properties and ability of grinding of dried products were compared. The results showed that at 50%, 75% and 100% of fan speeds consumed 6.00, 5.30 and 4.45 hrs of drying duckweed, respectively. The samples were reversed twice during drying process and decreased 600 grams in weight. The dried product also showed easily grinding with no difference in color. It is interesting that increase in air flow speed decreased time to drying.

KEYWORDS: Duck weed, Air velocity, optimal temperature, drying.

AG03

EFFECT OF SUPPLEMENTING PREMATURE RICE FLOUR ON THE QUALITY OF NORMAL WHEAT BREAD

Tosporn Namhong[1)], Siriwan Suknikom[2)], and Supavadee Rawdsiri[3)]

[1,2,3)]Department of Food Science and Technology Faculty of Agricultural Technology and Agro-Industry Rajamangala University of Technology Suvarnabhumi, Ayutthaya Thailand

ABSTRACT: Premature rice or young rice had been harvested in order to avoid flooding during the rainy season which flooding disaster are normally occurred. These premature rice were seeked for the possibility of processing when they have to be harvested before being matured. Premature rice from Hom nil, Hom Prathum and Rice berry varieties were investigated in this experiment. It was found that flour from Hom nil premature rice was the highest in crude fiber content which were 21.15% when compared to the others. These flour (Hom nil , Hom Prathum and rice berry) were then experimented to use instead of wheat flour in normal wheat bread with the ratio of 20% of total flour used.The result had shown that bread with color rice flour had more protein content than the others , contrastly bread with Hom Prathum rice flour had more crude fiber content . With sensory evaluation, the total preference of bread with Hom Prathum rice flour was not significantly different from the normal wheat bread. It could be concluded that premature rice could be used for processing and could nourishing the nutritional value of the products.

KEYWORDS:

SOCIAL SCIENCE

SS01

THE DEVELOPMENT AND IMPLEMENTATION OF ENGINEERING ELECTRONICS E-BOOK

Napat Watjanatepin[1)]

[1)]*Rajamangala University of Technology Suvarnabhumi (RUS), Electrical Engineering Traininge Center, Faculty of Engineering and Architecture, Nonthaburi, Thailand., watjanatepin@yahoo.com.*

ABSTRACT: Static hand gesture based Human-Computer-Interaction (HCI) is one of the most natural and intuitive ways to communicate between people and machines, since it closely mimics how human interact with each other. At present, most gesture recognition systems use skin color model. The segmentation results are affected by to the light, background and other conditions. In this paper, an application of gesture-based robust human-robot interaction is proposed using a Kinect sensor. First, we use a double threshold method which uses the color and depth image information to segment hand, then uses the template-based technology to do gesture model training to improve the recognition rate. The methods mentioned above have been applied in a real robot system named as TENGXIN which has just obtained the third place in China's 17th National Robot Competition held in Hefei. Experiment results show that the correctness rate of the proposed scheme attains 96.25% which validate the practicability and effectiveness of the application system.

KEYWORDS: Engineering Electronics, e-Book, Efficiency of e-Book, Achievement.

SS02

THE PARTICIPATORY ACTION RESEARCH TO DEVELOP OTOP NETWORK STRATEGIC PLAN IN DON CHEDI DISTRICT, SUPHANBURI

Junphen Wannarak[1)], Juntarawat Arkarametanon[2)], Watcharee Phetwong[3)], and Suphanan Jantree[4)]

[1,2)]Department of marketing, [3)]Department of business computer and information system, [4)]Department of account,

Rajamangala University of Technology Suvarnabhumi , Suphanburi- Chainat rd.

Yanyaw, Samchuk Suphanburi, Thailand

ABSTRACT: This research aimed to develop OTOP Network Strategic Plan in Don Chedi District, Suphanburi with the participatory action research. Sample groups included 1) 141 OTOP entrepreneurs in Don Chedi District, Suphanburi, and 2) 11 experts in related field. The research process was divided into 3 steps as 1) study current status and problem of OTOP entrepreneurs with group discussion method and collect data with SWOT technique. 2) develop the strategic plan with content analysis method, and 3) ensure the strategic plan effectiveness with brainstorming method. The research findings had showed that Don Chedi District obtain competitive advantage in term of being the historic site, there are different learning sources, citizens in the community are unite and possesses many health promoting OTOP products which finally came up with the development of OTOP Network Strategic Plan in Don Chedi District, Suphanburi. The strategic, therefore, included 3 missions as 1) to inherit historical heritage and generations. 2) to promote unique and historic compliant OTOP products, and 3) to develop and refine OTOP products for international market. The strategic plan, finally, consisted of 7 strategies and 18 projects.

KEYWORDS: Suphanburi OTOP strategic plan.

SS03

THE RELATIONSHIP BETWEEN EARNINGS AND CASH FLOWS ON STOCK RETURN

Attawan Juntasutho

School of Accounting, Bangkok University, Thailand, attawan.j@bu.ac.th

ABSTRACT: The objective of this study is to examine the relationship between earnings and cash flows on the stock return of the company listed in the Stock Exchange of Thailand. The populations are listed companies in SET50 INDEX during January 1, 2013 and June 30, 2011. Financial performance consists of 1) earnings before tax and 2) net income. Cash flow performance consist of 1)cash flows from operating activities, 2)cash flows from investing activities, 3)cash flows from financing activities and 4) net cash flow. This study employed data from 2010 to 2013. The study applied pooled, yearly simple regression analysis and simple regression analysis by industry group at statistical significance level of 0.05. Descriptive and inferential statistics are employed to analyze the data. The results of pooled and yearly simple regression analysis indicate that earnings before tax, net income, cash flows from operating activities, cash flows from investing activities, cash flows from financing activities and net cash flow have no significant relationship with stock returns. However, when analyzed by industry group, earnings before tax, net income, cash flows from operating activities and net cash flow of services industry group have positive significant relationship with stock return.

KEYWORDS: Earnings, Cash Flows, Stock Return.

SS04

QUALITY OF EARNINGS: A CASE STUDY OF LISTED COMPANIES IN SET50 INDEX GROUP

Attawan Juntasutho

School of Accounting, Bangkok University, Thailand, attawan.j@bu.ac.th

ABSTRACT: The object of this study is to compare the quality of earnings of listed companies in SET50 INDEX Group. The 36 companies in the SET50 INDEX were use as simple. Financial data used in the study was gathered from financial statements of the listed companies from the year 2009 to 2013. The Sloan et al. 1999 model technique is applied in this study focusing on the Working Capital Accruals model and Total Net Operational Accruals model was investigated using a Pearson's correlation. The results from this study are as follows, when comparing the Working Capital Accrual model with Net Operating Accrual model, the former method had higher Quality of Earning than the average of SET50 INDEX. This can be concluded that, when applying conservative principle, the latter method showed better performance. In addition, this study indicated that there is significant relationship between the working Capital Accrual model and the Total Net Operational Accruals model. Recommendations form this study, the measurement of earning quality by using Working Capital Accruals model and Total Net Operational Accruals Method of Slone et al. (1999), which using accruals divided by average assets. These two methods can get the difference results. Therefore the data users should carefully apply, however, the good earning quality should come from these two methods which are relating and has the same direction of the earning quality result; if the working capital accruals increase, total net operation accruals will increase; If the working capital decrease, total net operation accruals will decrease.

KEYWORDS: Earnings, Quality, SET50 INDEX.

SS05

A COMPARATIVE STUDY OF ACCOUNTING PRACTICES AND TAX PRACTICES OF INSTALLMENT SALES, HIRE-PURCHASE AND LEASING BUSINESSES

Surachai Am-ugsorn[1)]

[1)]*Faculty of Business Administration and Information Technology, Rajamangala University of Technology Suvarnabhumi, Ayutthay, Thailand*

ABSTRACT: The purposes of this research were to examine and compare principles of revenue-expense recognition based on accounting practices and tax practices. Moreover, this study aimed to investigate problems of implementation of both principles on installment sales, hire-purchase and leasing businesses. The data were collected from the accounting standards compared to Revenue Code, articles and other related academic papers to distinguish these two principles. Semi-structured interview and in-depth interview were applied to gather data from 12 respondents selected by using purposive sampling. The respondents were bookkeepers having experience in installment sales, hire-purchase and leasing businesses. They were chosen from total 30 bookkeepers attending Continuous Professional Development of Bookkeepers. This project was held by Rajamangala University of Technology Suvarnabhumi to support the accounting standards improved in 2014. The problems were caused by 1) complexity of accounting principles and tax principles, 2) difference between accounting principles and tax principles, and 3) use of obsolete accounting principles and tax principles. Therefore, the following suggestions were provided as follows. The Revenue Department should amend laws and define methods of depreciation calculation of hire-purchase assets to suit specific cases. Besides, Federation of Accounting Professions should always thoroughly enhance users' understanding of accounting standards before implementing the new or revised accounting standards. In addition, financial reporting standards for non-publicly accountable entities should be improved to be concordant with the tax principles. Furthermore, the bookkeepers should continuously develop their professional knowledge on both tax laws and accounting standards to properly implement the principles.

KEYWORDS: Installment Sales, Hire-Purchase, Leasing Businesses.

SS06

FACTORS RELATED TO DECISION MAKING ON FURTHER STUDY IN BACHELOR DEGREE OF ACCOUNTING (TRANSFER PROGRAM), RAJAMANGALA UNIVERSITY OF TECHNOLOGY

Thitithana Trisit, Waraporn Nakmai, Jureeporn Suksomkit

Rajamangala University of Technology Suvarnabhumi, Suphanburi Campus, Thailand, m.trisit@gmail.com

ABSTRACT: The purposes of this research were to examine and compare principles of revenue-expense recognition based on accounting practices and tax practices. Moreover, this study aimed to investigate problems of implementation of both principles on installment sales, hire-purchase and leasing businesses. The data were collected from the accounting standards compared to Revenue Code, articles and other related academic papers to distinguish these two principles. Semi-structured interview and in-depth interview were applied to gather data from 12 respondents selected by using purposive sampling. The respondents were bookkeepers having experience in installment sales, hire-purchase and leasing businesses. They were chosen from total 30 bookkeepers attending Continuous Professional Development of Bookkeepers. This project was held by Rajamangala University of Technology Suvarnabhumi to support the accounting standards improved in 2014. The problems were caused by 1) complexity of accounting principles and tax principles, 2) difference between accounting principles and tax principles, and 3) use of obsolete accounting principles and tax principles. Therefore, the following suggestions were provided as follows. The Revenue Department should amend laws and define methods of depreciation calculation of hire-purchase assets to suit specific cases. Besides, Federation of Accounting Professions should always thoroughly enhance users' understanding of accounting standards before implementing the new or revised accounting standards. In addition, financial reporting standards for non-publicly accountable entities should be improved to be concordant with the tax principles. Furthermore, the bookkeepers should continuously develop their professional knowledge on both tax laws and accounting standards to properly implement the principles.

KEYWORDS: Installment Sales, Hire-Purchase, Leasing Businesses.

SS07

MOTIVATION TO DETERMINE ADMISSION TO THE FACULTY OF ENGINEERING AND ARCHITECTURE, ARCHITECTURE AND LANDSCAPE ARCHITECTURE, RAJAMANGALA UNIVERSITY OF TECHNOLOGY SUVARNABHUMI NONTHABURI ACADEMIC YEAR 2014

Patarawadee Siriwan[1)]

[1)]*Rajamangala* University of Technology Suvarnabhumi, Nonthaburi, Thailand, *email: pla012@windowslive.com*

ABSTRACT: This study aims to investigate the generality of students in Years1, 2, 3, 4, 5 and the scheme of incentives in the decision to study in the Faculty of Engineering and Architecture. Architecture and Landscape Architecture in Rajamangala University of Technology Suvarnabhumi, Nonthaburi, similar to the motivation to study in the Faculty of Engineering and Architecture. The architecture students are in Landscape Architecture between male students and female students. The population is the first year students 1, 2, 3, 4, 5 for 83studentsThe instruments was a questionnaire to create on 1 set with 2 part. The 1st partis the question students about the general information and the 2nd part is a question about the motive for the decision to study in the Faculty of Engineering and Architecture. The questionnaires were returned from students of 83 accounted for 100 percent processed with the computer program SPSS for Window version 10.00 1 (Statistical Package for the Social Science for Windows version 10.00) by using frequency, percentage, portion and t-test.

Results of the study were as follows:

1 Introduction information

- Among male students than females. Were aged 20 years or older and have graduated from high school a lot.
- Most of the students graduated from the Academy under the Government. The average score reflects Savannah High School from 2:51 to 3:00 as possible.
- Students who pass the admission to study at the Faculty of Engineering and Architecture were ranked third.
- Most of the students have been spending more than the average monthly income of 5,000 baht to the parents of the students.
- Most of the students have been spending an average of more than 5,000 baht a month to the parents of the students. The average monthly income of 5,000 - 10,000 baht and a twist of his mother's residence, most students are single and have owned a home during the study, most students stay with their parents.

2 The motivation for choosing to study in the Faculty of Engineering and Architecture.

Overall, the students motivated in their decision to study in the Faculty of Engineering and Architecture,Rajamangala University of Technology SuvarnabhumiNonthaburi. The motivation level is the level of 10 topics. Scores in the range appropriate to the Faculty of Engineering and Architecture. Interest in the arts His parents encourage students to study architectural ambition and willingness to learn, Faculty of Engineering and Architecture. Rajamangala University of Technology Suvarnabhumi Nonthaburisuit your abilities and your own personality. The cost is not very high. At the end, you can run multiple occupation. At the end of the study at a higher level in various fields. Already graduated can easily work the teachers have experience teaching high and academic standards are high I suggest level 12 topics to study architecture. Encourage seniors to study Architecture. Selected for the Like the environment and atmosphere of Technology SuvarnabhumiNonthaburi travel easy. Parents' occupations related to architecture. The reputation of the Faculty of Engineering and Architecture.Rajamangala University of Technology SuvarnabhumiNonthaburi high educational standards that are well-known and respected professional in the field. 've Seen people who have graduated from. Faculty of Engineering and Architecture Rajamangala University of Technology Suvarnabhumi Nonthaburi already successful career, according to relatives. Study as friend, students have commented on the opening of the Faculty of Engineering and Architecture is the first branch of interior design.

KEYWORDS: Motivation Decision, Faculties of Engineering and Architecture, Nonthaburi, Academic Year 2014.

SS08

QUESTIONNAIRE AND OBSERVATION STUDY ON THE USAGE PATTERNS OF SANITARY FIXTURES IN THE TOILET OF HIGH SCHOOL BUILDING

Kwang-Seop, Chung[1)*], Dong-Hyeok Kim[1)], Seon-Hay, Kim[1)], Young Il, Kim[1)], and Kyeong-Hwan Moon[2)]

[1)])School of Architecture, Seoul National University of Science and Technology, Seoul, South Korea.

[2)] Graduate School of Energy and Environment, Seoul National University of Science and Technology, Seoul, South Korea

ABSTRACT: In designing a toilet, the minimum number of sanitary fixtures is determined by the purpose and level of building, the number of using people, and etc. Currently, specific regulations for the number of sanitary fixtures (the number of water closets, urinals) in the toilets are not available but the law regulates only the occupied area of the water closets and urinals according to the size of toilets. An effective design cannot be achieved without clear standards in designing the number of sanitary fixtures. Thus, the standards for the number of sanitary fixtures should be established to design the toilets.
This study used the questionnaire and observation study for using the male and female toilets in the high school building to analyze the average number of toilet usage, the time of usage, the time zone of excessive usage, and etc. And, furthermore, it provided the basic data to determine the number of sanitary fixtures (number of water closets, urinals).

KEYWORDS:

SS09

ANALYSIS ON THE LEGAL ISSUE OF PRE-LAWSUIT STEP OF DEFECT DISPUTE IN APARTMENT BUILDING

Junmo Park[1)], Deok Deok Seo[2)], Sang-Kweon Um[2)], and Kyekhen Cho[3)]
[1)]Chungbuk national university, 52 Naesudong-ro, Heungduk-gu, Cheongju-si,
361763 Chungbuk, Korea
[2)]Halla university, 28 Halla university-gil, Wonju-si,
220712 Gangwon, Korea, seodk@halla.ac.kr
[3)]Gangwon development research institute, 5Chungang-ro, Chuncheon-si,
220041 Gangwon, Korea

ABSTRACT: In Korea, the dispute over the defects in apartment buildings is becoming a social issue. This study analyzed major issues in the perspective of law, particularly focusing on matters that become issues before they turn into lawsuits. The analysis found imperfections in each regulation relating to each issue and pointed out that such regulations are only conventional. Also, this study proposed the revision of parceling-out contract and management agreement alongside related regulations in order to rationally coordinate and improve the terms of contract based on mutual trust and sincerity between producer and consumer.

KEYWORDS: Legal Issue, Defect Dispute, Apartment Building.

ST14

ANALYSIS OF ROAD SAFETY BETWEEN SUPHAN BURI - CHAI NAT RD. CASE STUDY: JUNCTION

Orawan Jantasuto
Department of Civil Engineering (Suphan Buri), Faculty of Engineering and Architecture, Rajamangala University of Technology Suvarnabhumi, Thailand,
Email: i.orawanj@hotmail.com

ABSTRACT: Transportation is an important of movement of people, animals or goods from one location to another. Essentially transportation focuses on safety of the road. Due to Safety is an important part of the trip for people, animals or goods. A research study was conducted to analysis safety on the road between Suphan Buri - Chai Nat Rd. (340) and case study is junctions. Four Junctions which have the Yan Yao Junction, the Sugar Industry Junction, the Ban Kluai Junction, the Sri Pra Jan Hospital Junction and the Sapparodted Temple Junction, were surveyed and analyzed data. This research of safety junction analysis has consist of the view range, the extra lane, the wide street, the lighting, the corner of junction, the turning radius, the stiffness of surface road, the number of separate lane. The result found that the accidents mainly occurred at the junctions which haven't traffic lights or fire alarms, inadequate lighting and vision aren't clear. This study is useful and primary safety guidelines for improvement of the road.

KEYWORDS: road safety, accident, junction.

Author Index

ISFT2016 in India

The 5th International Symposium on the Fusion Technologies

- Chairman : Dr. Naveen Kumar
- Date : December 05~09, 2016
- Country : India

ISFT2017 in Korea

The 6th International Symposium on the Fusion Technologies

- Chairman : Dr. Chulsu Kim
- Date : July 30 ~ August 03, 2017
- Country : Korea

TOPIC

- ❖ Machinery & Energy
- ❖ Electrical & Electronics
- ❖ Science and Technology
- ❖ Agricultural Technology
- ❖ Social Science
- ❖ Civil and Architecture

◈ Please contact to ISFT secretariat for more details.

FUSION Science & Technologies

- Organized by
  International Society on the Fusion Science & Technologies
- http://www.isft365.org | isft365@gmail.com