ABSTRACT BOOK

CONFERENCE

INTERNATIONAL CONFERENCE ON
CLEAN WATER, AIR & SOIL

Ho Chi Minh City University of Transport, Vietnam

26-28 JULY 2019

Table of Contents

THEME 1: CLEAN WATER, AIR & SOIL

THEME 2: WATER CONSERVATION & MANAGEMENT

THEME 3: GEOLOGY, ECOLOGY & LANDSCAPES

THEME 4: POSTER COLORS

ABOUT CLEANWAS 2019

Introduction

CleanWAS is the conference organized every year since 2012 under The International Water, Air and Soil Conservation Society (INWASCON) with joint supports from Universiti Kebangsaan Malaysia and International Islamic University Malaysia.

CleanWAS Provide productive opportunities for academics and practitioners from interdisciplinary fields of Environmental Sciences to meet, share and take away expertise and ideas in related disciplines.

CleanWAS 2019 offers interdisciplinary themes of quality R&D topical developments from potential contributors and experts and provides an opportunity in bring in the new techniques and horizons that will contribute to clean environment.

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Ho Chi Minh City University of Transport, abbreviation: UT-HCMC (Vietnamese: Đại học Giao thông Vận tải Thành phố Hồ Chí Minh) is a public university under the Ministry of Transport in Vietnam. The university provides associate, undergraduate and postgraduate education in various areas of transport. The main campus is located in Binh Thanh District, Ho Chi Minh City. The predecessor of the university was the Ho Chi Minh City branch of Vietnam Maritime University, founded in 1988. From this branch, it was upgraded to university status in 2001.

On 18th May 1988, Ministry of Transport and Communications issued the Decision No. 1252/TCCB-LĐ on the establishment of Ho Chi Minh City In-service Training Center of Transport. In the first school year 1988 -1989, with 20 officials, lecturers, this Center enrolled 253 students in majors of Ship navigation, Marine Engineering, Ship electricity, Sea Transport Economics, Mechanization of Cargo Handling, Waterway and Offshore Construction, Ship building in all the levels of training. This set the foundation for the development of Ho Chi Minh City University of Transport.

Together with the social-economic development of Viet Nam, the high demands of constructing the infrastructurers, especially in maritime, road, railway, urban traffic system, inland waterway, airway... in the South of Viet Nam (especially in the important economic region – Ho Chi Minh City, Bien Hoa, Vung Tau, Dong Nai, Can Tho and Tay Nguyen, South Central Viet Nam) required the skillful and high quality workforce specializing in technology, trasport management. In addition, after 10 years of developing, the branch of Vietnam Maritime University has become a well-known and prestigious regular training center. This branch worker independently in regarding in organization and finance, with high quality officials and lecturers as well as good facilities, scientific research activities and wide national and international relations.

Since 2011, UT-HCMC has been actively improving the quantity as well as the quality of officials and academic staff. UT-HCMC has put focus on enhancing the quality of university training, upgrading the facilities, reforming the curriculum and innovating the teaching approaches. UT-HCMC has also encouraged many national and local organizations to provide many scholarships, funds for equipting the laboratories and for the research projects.

Address

Ho Chi Minh City University of Transport, No. 02 Voõ Oanh Street, Ward 25, Biình Thaạnh District, Hoồ Chií Minh City, Vietnam

Room Reservation

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While booking room, please tell the receipt that you are the participant to CleanWAS, then you will enjoy the best offer

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- **Conference Programme**

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- **International Water, Air & Soil Conservation Society**

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European Desalination Society,

International Desalination Association (IDA).

Prof. Dr. Claudio M. Amescua García

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Associate Prof. Dr. Ahmad Safuan Rashid

Department of Geotechnics & Transportation,

Faculty of Engineering, Universiti Teknologi Malaysia

Skudai, Johor, Malaysia

Special Invitation Guest

Prof. Dr. P. K. Goel

Editor in Chief

Nature Environment and Pollution Technology

India

CONFERENCE PROGRAM

Friday, 26th July 2019	
TIME	**DESCRIPTION**
9:00-17.00	Registration & Participants Arrival (Main Hall at Ho Chi Minh City University of Transport)

Friday, 26th July 2019		
TIME	**DESCRIPTION**	
9.00-12.00	**Opening Ceremony (Main Hall)** PRESIDENT INWASCON: Prof. Dr. Kamaruzzaman (Dean Kulliyah of Science, IIUM) CONFERENCE CHAIR: Associate. Prof. Dong Van Huong (Acting President, UT-HCMC)	
	Keynote Lecture (Main Hall) 1) Prof. Dr. Miriam Balaban (European Desalination Society, Italy) 1) Assoc Prof. Dr. Nguyen-Quang (Dalhousie University, Canada)	
12.00-12.30	Coffee Break	
12.30-13.00	Poster Session (Evaluation)	
13.00-14.30	Lunch Break & Friday Prayer	
Parallel Session 1		
14.30-16.30	**Session 1A** **(ROOM I)**	**Session 1B** **(ROOM II)**
16.30-17.00	Tea Break	
20.00-22.30	Conference Dinner (Ho Chi Minh City University of Transport) **OPTIONAL**	

Saturday, 27th July 2019		
TIME	**DESCRIPTION**	
09.00-11.00	**Keynote Lectures (Main Hall**) 1) Prof. Dr. Claudio M. Amescua García (UNA, Mexico) 2) Associate Prof. Dr. Ahmad Safuan Rashid (UTM, Malaysia) 3) Dr. Rodeano Roslee (UMS, Malaysia)	
11.00-11.30	Coffee Break	
Parallel Session 2		
11.30-13.00	**Session 2A (ROOM I)**	**Session 2B (ROOM II)**
13.00-14.30	Lunch Break	
Parallel Session 3		
14.30-16.30	**Session 3A (ROOM I)**	**Session 3B (ROOM II)**
16.30- 17.00	**Group discussion and Way forward**	
17.00-17.30	**Closing Ceremony**	
17.30 –18.00	**Tea Break - Conference Ends**	
Sunday, 28th July 2019		
FIELD EXCURSION (OPTIONAL)		

TECHNICAL SESSIONS

Parallel Session 1
26th July 2019

Session 1A (Clean WAS)		
Venue: ROOM I		
Session Chair: Prof. Dr. Ahmed Jalal Khan Chowdhury		
Time	**Paper ID**	**Title**
14.30	1915	PRELIMINARY STUDY OF PHOSPHORUS REMOVAL EFFICIENCY USING AERATED AND UNAERATED STEEL SLAG FILTER IN PRIMARY AND TEXTILE EFFLUENT
14.50	1916	MECHANICAL PROPERTIES AND TOXICITY CHARACTERISTIC OF PETROLEUM SLUDGE INCORPORATED WITH PALM OIL FUEL ASH AND QUARRY DUST IN SOLIDIFICATION/STABILIZATION MATRICES
15.10	1923	IMPACT OF OCEAN ACIDIFICATION ON TACHYPLEUS GIGAS EGGS AND INSTAR DURING GROWTH, MOLTING SUCCESS, SURVIVAL AND CONDITION INDEX
15.30	1940	A STUDY ON THE READINESS AMONG MALAYSIAN TO ADOPT FOOD WASTE COMPOSTING METHOD
15.50	1954	RARE ACTINOMYCETES FROM KUANTAN MANGROVE FOREST SEDIMENT
16.10	1956	EFFECTS OF PLANTING JATROPHA CURCAS ON THE PHYSICOCHEMICAL PROPERTIES OF BAUXITE MINED SOIL
16.30	1982	THE CHARACTERISTICS AND DISINFECTION PERFORMANCE OF ENVIRONMENT-FRIENDLY NANO/MICRO-SIZED MATERIALS DERIVED FROM FISHERY WASTE

Session 1B (WC2EM, IGOGEL)		
Venue: ROOM II		
Session Chair: Dr. Mohd Armi Abu Samah		
Time	**Paper ID**	**Title**
14.30	1902	GEOLOGICAL, HISTORICAL, CULTURAL AND CONTEMPORARY SIGNIFICANCE OF BRINE SEEPAGE IN ARUNACHAL PRADESH, INDIA
14.50	1963	PRELIMINARY STUDY IN DISCOVERING 2-PROPEN-1-ONE, 1-(2,4-DIHYDROXYPHENYL)-3-(4-METHOXYPHENYL)- FROM SYZYGIUM AQUEUM LEAVES AS A TYROSINASE INHIBITOR IN FOOD PRODUCT: EXPERIMENTAL AND THEORETICAL APPROACH
15.10	1919	THE APPLICATION OF DIRECT CONTACT MEMBRANE DISTILLATION TECHNOLOGY TO TREAT ANAEROBIC EFFLUENT FROM RUBBER INDUSTRY
15.30	1920	REMOVAL OF METHYLENE BLUE FROM AQUEOUS SOLUTION USING SUSTAINABLE ADSORBENT PREPARED FROM H3PO4 ACTIVATION OF BANANA PEEL WASTE
15.50	1922	TOXICITY ASSESSMENT OF MARINE CLAY STABILIZED WITH POLYURETHANE
16.10	1925	SETTLEMENT OF SOFT SOIL TREATED WITH GROUP OF FLOATING BOTTOM ASH COLUMNS

Saturday, 27th July 2019

Parallel Session 2

Session 2A (CleanWAS)		
Venue: ROOM I		
Session Chair: Dr. Noor Faizul Hadry		
Time	**Paper ID**	**Title**
11.30	1961	STUDY ON EFFECTS OF IIUM FOOD WASTE COMPOST AND INORGANIC FERTILIZER ON GROWTH PERFOMANCE OF MUSTARD (Brassica juncea)
11.50	1959	EVALUATION OF INDOOR AIR POLLUTANTS IN LIVESTOCK BUILDING: A PRELIMINARY STUDY
12.10	1964	MICROBES FROM WASTEWATER TREATED MANGROVE SOIL AND THEIR HEAVY METAL ACCUMULATION AND ZN SOLUBILIZATION
12.30	1951	ECOLOGY AND OCCURRENCE OF PUGILINA (HEMIFUSUS) SPECIES CLASS: GASTROPODA: FAMILY: MELONGENIDAE FROM THONDI COAST–PALK BAY IN TAMIL NADU.

Session 2B (WC2EM and ICOGEL)		
Venue: ROOM II		
Session Chair: Prof Dr. Muhammad Aqeel Ashraf		
Time	**Paper ID**	**Title**
11.30	1901	STUDY ON COASTAL EROSION SIGNS THROUGH LANDSCAPE SURVEY APPLYING UNMANNED AERIAL VEHICLE (UAV) AERIAL PHOTOGRAPHY - A CASE STUDY ON COASTAL SETTLEMENTS IN HUALIEN, EAST TAIWAN
11.50	1905	REUSE POTENTIAL OF LAUNDRY WATER IN PRODUCING LIQUID ORGANO-MINERAL FERTILIZER USING VEGETABLE WASTE
12.10	1903	GREEN SUSTAINABLE AIRPORTS: THE DEPLOYMENT OF RENEWABLE ENERGY AT VIETNAM AIRPORTS. IS THAT FEASIBLE?
12.30	1927	ADVANCED TEACHING AND LEARNING MEDTHOD FOR ENGINEERING AND TECHNOLOGY STUDENTS AIMING AT THE STRATEGIC DEVELOPMENT OF THE INDUSTRY 4.0
12.50	1915	OPPORTUNITIES AND CHALLENGES FOR VIETNAM EDUCATION BACKGROUND TOWARD EDUCATION 4.0

Parallel Session 3

Session 3A (CleanWAS)		
Venue: ROOM I		
Session Chair: Dr Rodeano Roslee		
Time	**Paper ID**	**Title**
14.30	1902	BOD LOAD ANALYSIS FOR THE CHAO PHRAYA RIVER BASIN, THAILAND
14.50	1904	PHYTOREMEDIATION EFFICIENCIES OF SPIRODELA POLYRHIZA AND BRASSICA OLERACEA IN REMOVING NUTRIENTS FROM TREATED SEWAGE EFFLUENT
15.10	1960	TREND STUDY AND ASSESSMENT OF HEAVY METAL CONTAMINATION IN SURFACE WATER OF THE KLANG ESTUARY AREA, SELANGOR, MALAYSIA
15.30	1940	THERMOPHILIC ANAEROBIC GRANULAR MEMBRANE DISTILLATION BIOREACTOR FOR WASTEWATER REUSE
15.50	1944	INVESTIGATING THE DIMETHYL ETHER (DME) FUEL SUPPLY SYSTEMS FOR INTERNAL COMBUSTION ENGINE
16.10	1952	APPLICATION CONNECTING BETWEEN BOOST AND MATLAB SIMULINK SURVEY TRANSFER PROCESS OF PPCI ENGINE
16.30	1917	ADSORPTION OF TMA AND H2S BY POROUS DIATOMITE CERAMIC FILTER

Session 3B (WC2EM and ICOGEL)		
Venue: ROOM II		
Session Chair: Dr Ahmad Safuan Rashid		
Time	**Paper ID**	**Title**
14.30	1953	CLOSED-LOOP COMBUSTION CONTROL IN PPCI ENGINE
14.50	1909	SYNTHESIS AND CONTROL 3-DOF PLANAR PARTLY DECOUPLED PARALLEL MANIPULATOR
15.10	1950	COMBUSTION CHARACTERISTICS OF SI ENGINE FUELED WITH 2,5-DIMETHYLFURAN AND GASOLINE BLENDS USING AVL-BOOST SIMULATION
15.30	1941	FISH PROCESSING WASTEWATER TREATMENT USING MEMBRANE BIOREACTOR (MBR) WITH ONLINE MONITORING SYSTEM
15.50	1913	THE INTERPLAY BETWEEN ARTS AND WASTE MANAGEMENT: A PHENOMENOLOGICAL STUDY
16.10	1912	USING A COMBINED GIS-MULTICRITERIA ANALYSIS METHODOLOGY FOR NATURAL RESOURCES PROTECTION: A CASE STUDY FOR OLIVE MILL WASTEWATER DISPOSAL SITES CHOICE
16.30	1906	SEASONAL OCCURRENCE AND GEO-ACCUMULATION OF HEAVY METALS IN SOIL SPOILED FROM METAL INDUSTRIAL WASTE

POSTER SESSION
Friday-Saturday, 26-27th July 2019

Time	Poster Title
Full Day	GAMMA SPECTROMETRY ANALYTICAL DETERMINATION OF RADIATION LEVELS IN TWO SELECTED AREAS OF SRI LANKA
Full Day	ADSORPTION OF TMA AND H2S BY POROUS DIATOMITE CERAMIC FILTER
Full Day	ADVANCED TECHNOLOGY SOLUTIONS FOR TREATMENT AND CONTROL NOXIOUS EMISSION OF LARGE MARINE DIESEL ENGINES: A BRIEF REVIEW
Full Day	THE ATMOSPHERE CONSTITUENTS FOR GAS CARBONITRIDING ANCHORAGE WEDGE
Full Day	CHECKLIST OF COMMERCIALLY IMPORTANT FISHES OF COASTAL WATERS OF PEKAN, PAHANG MALAYSIA
Full Day	STUDY ON COASTAL EROSION SIGNS THROUGH LANDSCAPE SURVEY APPLYING UNMANNED AERIAL VEHICLE (UAV) AERIAL PHOTOGRAPHY - A CASE STUDY ON COASTAL SETTLEMENTS IN HUALIEN, EAST TAIWAN
Full Day	ADVANCED TECHNOLOGY SOLUTIONS FOR TREATMENT AND CONTROL NOXIOUS EMISSION OF LARGE MARINE DIESEL ENGINES: A BRIEF REVIEW
Full Day	THE BREAKTHROUGH TECHNOLOGY SOLUTIONS FOR CONTROL AND TREATMENT OIL SPILL ON THE SEA
Full Day	APPLICATION CONNECTING BETWEEN BOOST AND MATLAB SIMULINK SURVEY TRANSFER PROCESS OF PPCI ENGINE
Full Day	CURRENT SITUATION AND SOLUTIONS FOR THE ENVIRONMENTAL POLLUTION IN VIETNAM
Full Day	STUDYING THE EFFECT OF WORKING STABILITY TO STABILITY OF FORTLIFT MACHINE
Full Day	RESEARCH USING COMPOSITE MATERIALS IN MANUFACTURING PRESSURE-RESISTANT CIRCULAR DETAILS WITH THE TWO SPHERICAL BOTTOM BY WINDING TECHNOLOGY
Full Day	BUILDING THE PROGRAM OF CALCULATION FOR THE THICKNESS AND REASONABLE LANDSCAPE APPLYING THE SHAFT LINERS
Full Day	AN OVERVIEW STUDY ON THE LASER TECHNOLOGY AND APPLICATIONS IN THE MECHANICAL AND MACHINE MANUFACTURING INDUSTRY
Full Day	THE FORMATION OF THE ENVIRONMENT FOR GASEOUS CARBONIZING WHEN USING SOME DIFFERENT GASES
Full Day	THE ATMOSPHERE CONSTITUENTS FOR GAS CARBONITRIDING ANCHORAGE WEDGE

Full Day	INVESTIGATING THE DIMETHYL ETHER (DME) FUEL SUPPLY SYSTEMS FOR INTERNAL COMBUSTION ENGINE
Full Day	A TEMPERATURE AND HUMIDITY EFFECTS COMPENSATION SOLUTION FOR METAL OXIDE SENSOR IN MEASURING TOXIC GAS CONCENTRATION
Full Day	EFFICIENT OPERATION SOLUTIONS FOR MARINE ENGINE SERIES OF MAN B&W S46ME-B8.5 IN LOW STEAMING
Full Day	STUDYING SIMULATION FUZZY BASED-PID CONTROLLER TO CONTROL WATER LEVELS IN MARINE BOILERS
Full Day	DUST CONTROL SOLUTIONS IN CEMENT PRODUCTION LINE IN VIETNAM
Full Day	SOLUTIONS FOR THE UNSTABLE WORKING OF A TURBOCHARGER IN MARINE DIESEL ENGINES
Full Day	MAKING WASTEWATER A RESOURCE TO BE VALORISED RATHER THAN A COST TO BE MINIMIZED
Full Day	PILOT SYSTEMS USING ELECTRODIALYSIS TO PRODUCE SAFE DRINKING WATER
Full Day	EURPOEAN DESALINATION SOCIETY: AIMS & OBJECTIVES
Full Day	DESALINATION & WATER TREATMENT JOURNAL: AIMS & SCOPE

ONE DAY TOUR-HO CHI MINH CITY
Sunday28th July 2019

One Day Tour –Ho Chi Minh City

All participants who want to join the tour should confirm names with MISS FARAH. Only paid participants can join the trip freely other participants need to pay 50$ for the tour. All participants should assemble in the lobby of Palace Saigon Hotel at 8:00 AM.

The tour bus will get back to hotel at around 8:00 PM.

8:00AM – 8:30AM	Pick Up Time At Lobby With Tour Guide
8:30AM – 10:30AM	Visit Reunification Palace
10:30AM – 11:30AM	Visit Notre Dame Cathedral
11:30AM – 1:00AM	Central Post Office War Remnants Museum
1:00PM – 2:30PM	Buffet Lunch
2:30PM – 4:00PM	Travel 2.5 hours to Cu Chi Tunnels
4:00PM – 6:00PM	Cu Chi Tunnels tour
6:00PM – 7:30PM	Taste tea and sweet potatoes
7:30PM – 8:00PM	Back To Hotel

Tour Coordinator

Ms. Farah Awanis

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ABSTRACTS FOR ORAL PAPERS

THEME I

CLEAN WATER, AIR & SOIL

EFFECT OF PERMEABILITY-LEACHING PROCESS ON SOME PHYSICAL PROPERTIES OF COLLAPSIBLE CHARACTERISTICS OF SOILS

Prof. Dr. Saad F I Alabdullah

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Gypseous soils are distributed in many regions in Iraq. The dissolution and leaching of gypsum by the action of water flow through soil mass cause several problems. Such problems are observed in soil underneath the foundation of many buildings and engineering structures due to the continuous changes in engineering properties of soil with time.

Permeability-Leaching test is carried out using the Soil Leaching Apparatus. The results show that the leaching strain and accumulative dissolved gypsum increase with time, while a gradual decrease can be observed in permeability coefficient (k) with time and with the increase in leaching stress. Also, the permeability obtained by upward flow direction (UWF) is less than that obtained by downward flow (DWF).

Moreover, direct shear test is carried out on soil before and after leaching, and the results show that shear strength parameters (c & Ø) decrease after leaching for soils except the first soil which shows an increase in the cohesion (c) and a decrease in the internal friction (Ø).

BOD LOAD ANALYSIS FOR THE CHAO PHRAYA RIVER BASIN, THAILAND

Nuanchan Singkran[1], Pitchaya Anantawong[2]**,** Naree Intharawichian[3]

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The loads of BOD in the Chao Phraya River Basin (CPRB), Thailand were determined in terms of how they were generated (BODgen), accumulated (stocked) in the environment (BODen), and discharged into the Chao Phraya River (BODCPR) using material flow analysis. The BODgen from the industrial sector was detected the most, but BODen and BODCPR from this point source were not considerably higher than those from the domestic sector. The BODgen, BODen, and BODCPR from swine farming and aquaculture across the river basin were lower than those from the domestic and industrial sectors. Of the total 251,884 t/y BODCPR, 49,614 t/y were in the upper river section, 35,976 t/y in the middle river section, and 166,294 t/y in the lower river section. These amounts were more than the carrying capacities of the relevant river sections to accommodate the BOD loads (i.e., 7,230 t/y, 18,380 t/y, and 37,851 t/y for the upper, middle, and lower river sections, respectively). This study indicated that the first priority in BOD reduction in the CPRB should emphasize domestic wastewater by increasing wastewater treatment efficiency and onsite installations of the wastewater treatment systems, while the second should be on paddy fields and other nonpoint sources. Specific best management practices may be considered for reducing BOD from agricultural activities.

Keywords: BOD, environment, pollution management, material flow analysis, river basin, water quality

NATURAL RADIOACTIVITY IN FLY ASH AT THE LANDFILL AREAS OF SOME COAL FIRED POWER PLANTS IN VIETNAM AND RADIOLOGICAL HAZARDS TO THE HUMAN HEALTH

Truong Thi Hong Loan[1,2], Vu Ngoc Ba[1], Truong Thi Xuan Truong[2], Nguyen Quang Dao[2], Phan Thi Xuan Mai[2], Le Xuan Thuyen[3]

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In this work, the activity concentration of the natural radionuclides 232Th, 238U and 40K in fly ash samples collected from different locations of the landfill area from a coal – fired power station in Viet Nam were measured. The radiological hazard indexes to the human health such as indoor/outdoor, external/internal annual effective dose rates, and total effective dose equivalent, the excess lifetime cancer risks from fly ash and commercial products that contain fly ash were evaluated. From that some discussions for using fly ash as construction materials were given.

Keywords: Radiological; hazard; fly; ash; radionuclides

PHYTOREMEDIATION EFFICIENCIES OF SPIRODELA POLYRHIZA AND BRASSICA OLERACEA IN REMOVING NUTRIENTS FROM TREATED SEWAGE EFFLUENT

Ng Kah Mun[1,2], Radin Maya Saphira Binti Radin Mohamed[1], Muhammad Nizam Bin Zakaria[1], Yuichiro Mishima[2] and Muhammad Safwan Miswan[1]

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Industrialization is main causes of contamination of soil environment. The core objective of study was investigation of occurrence and geo-accumulation of toxic elements in the metal industry waste landfills. Seasonal variations in toxic heavy metals like Ag, Al, Cd, Cr, Cu, Co, Ni, Pb, Sr, Zn, Ga, Tl, Fe and Mn, were investigated in industrial waste landfills of Gujranwala, Pakistan. Samples were collected during three seasons as November 2016 (Season 1), March 2017 (Season 2) and July 2017 (Season 3). Initially, pH,(>8) colour (Brown to Black), odour (Phenolic) and textures (Clay to Gravel) of the samples were observed. Moisture contents were 0.2-35% in season-1, 0.4-15% season-2 and 1.0-14.7 in season-3. As-collected samples were digested using HNO3 and H2O2 for sample preparation. Analysis of powdered and prepared samples was performed using ICP-OES. Analysis revealed that Al, Fe, Cu, Pb, Zn, Cr, Mn, B, Ni, Sr are ranging from 1.6 to 380 g/kg of the dry sample with lowest amount of nickel and highest of aluminium. Secondly, Co, Cd, Bi and Ag were found < 1.0 g/kg. Geoaccumation of toxic metals was calculated ranging uncontaminated (>0) and very strong (>5). Calculation revealed that aluminium showing the strongest accumulation whereas iron shows least level of accumulation in soil. Results shows significantly contamination exceeding the threshold limits of metals toxicity. It is recommended that preventive measures need to be taken for management of heavy metals in waste landfill sites to reduce risk of environmental damage.

Keywords: Contamination; Landfill; Season; Digested; Aluminium

SEASONAL OCCURRENCE AND GEO-ACCUMULATION OF HEAVY METALS IN SOIL SPOILED FROM METAL INDUSTRIAL WASTE

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The study investigates the capacity of phytoremediation as a post-treatment step for the nutrients rich treated sewage effluent from Saga City Sewage Treatment Plant, Saga, Japan. Phytoremediation in the context of this study is the removal of nutrients such as ammoniacal nitrogen, nitrate nitrogen and phosphorus from the nutrients rich treated sewage effluent. In this study, Spirodela polyrhiza and Brassica oleracea were used to phytoremediate the treated sewage effluent collected from Saga City Sewage Treatment Plant under laboratory scale. Plants were grown in polypropylene planter box supplied with 8000 ml treated sewage effluent with indoor environment and full water retention throughout the experimental studies. The removal efficiency and daily absorption of nutrients by phytoremediation plants were determined. It was found that the most optimal removal efficiency and average daily nutrient removal rate of Spirodela polyrhiza throughout the experiment were 92.42±1.29% or 15.4 mg/L/day of ammoniacal nitrogen achieved in day 1, 78.69±10.31% 2.68 mg/L/day of nitrate nitrogen achieved in day 4 and 93.45±3.26% or 0.51 mg/L/day of phosphorus in day 3 of experiment. On the other hand, the removal efficiency and average daily nutrient removal rate of Brassica oleracea throughout the experiment of a total of 8 days were 76.07±10.38% or 1.68 mg/L/day of ammoniacal nitrogen, 78.38±0.40% or 1.19 mg/L/day of nitrate nitrogen and 67.40±10.91% or 0.10 mg/L/day of phosphorus. The combination of findings demonstrate that phytoremediation of Spirodela polyrhiza is far more effective in removing nutrients from the nutrients rich treated sewage effluent than Brassica oleracea. The significants of the study includes reduce the possibility of eutrophication outbreak caused by the disposal of treated sewage effluent, advocating less dependency of global demand for non-renewable phosphorus resources in the agriculture sector and solving food demand due to increasing world population

Keywords: Phytoremediation, Treated Sewage, Effluent, Spirodela polyrhiza, Brassica oleracea

ESTABLISHMENT OF LOCAL WATER QUALITY INDEX FORMULA FOR THE CAI RIVER BASIN – NINH THUAN PROVINCE

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In 2015, the General Department of Environment has issued the Decision No 711/QD-TCMT to issue a formula to assess a surface water quality for the Cau River Basin and the Nhue Day River Basin. This is an attempt for localization on the environmental management to increase the according level with local natural conditions and socio-economic development. Based on the theory of Fuzzy comprehensive evaluation, the study chosen the suitable index formula and determined the weight of its quality components to assess the surface water quality in accordance with natural conditions as well as socio-economic development in the Cai River Basin with 3 main river's branches: Cai River, Lu River and Quao River. Natural characteristics as well as regional socio-economic development are shown by through the observed data set of surface water quality in the period of 2010-2018. The study also applied the new water quality index (it is only used for Cai River Basin) to identify the quality level of surface water flow in the Cai River Basin in the beginning few months of 2019.

Keywords: Water resource, water quality, water quality index, river, river basin, environmental management, fuzzy theory, fuzzy comprehensive evaluation, Entropy weight.

UTILIZATION OF CITRUS PEELS: LARVICIDAL EFFECT OF MANDARIN ORANGE (*CITRUS RETICULATE*) PEEL EXTRACTS ON AEDES AEGYPTI L.

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Mandarin orange (Citrus reticulate) is one of the common fruits eaten during Lunar New Year with a production of 21.2 million metric tons from China in 2017, and Southeast Asia including Malaysia remains the largest export market for Chinese oranges. As a result, a large amount of orange peel was generated after the festival, and the waste was commonly managed as compost; however, the orange peels may post higher value application. In this study, the peels were chemically processed to remove any potential pesticides and chemicals on the surface of peels and extracted according to a modified version of the Association of Official Analytical Chemists (AOAC) standard extraction method. The larvicidal effect of the mandarin orange extract on Aedes aegypti L. was compared with one of the well tested botanical insecticides-lemongrass (Cymbopogon Citratus) extract. Both the extracts were administered to 3rd to 4th instar of larvae according to WHO standard larvicidal testing. Probit analysis using at least five concentrations and the concentration that was lethal to 50% (LC50) and 95% (LC95) of the organisms was applied to compare their toxicology. Mandarin orange peel extract was as effective as the lemongrass extract in larvicidal activity on Ae. aegypti larvae as the orange peel extract demonstrated no significant difference of LC50 value with the lemongrass extract. In the perspective of economic, the lower cost of the orange peel waste post high potential to develop into commercial larvicide in controlling of mosquito larvae, and the future study could focus on the formulation and field test of the orange extract.

Keywords: Larvicidal effect, Plant extract, Mandarin orange, lemongrass, Aedes aeg

ULTRASONIC WAVES MECHANISM IN THE MITIGATION OF FORMATION DAMAGE

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This article presents a comprehensive overview of the ultrasonic waves mechanisms in Enhanced Oil Recovery (EOR) operations. Increasing demands of fossil fuels especially petroleum product persuades the researcher to look for modern EOR stimulation technology. Currently, sophisticated EOR techniques can recovery around 60-65 % of in-situ oil reserves. Among other EOR methods, ultrasonic waves also play important role in wellbore stimulation along with on surface crude oil transportation. Ultrasonic waves have been occupied a non-trivial position since the inception of oil and gas sector. Immense research has been performed on the application ultrasonic waves in petroleum industry. However, to the best of our knowledge, other authors had not outlined the mechanism of ultrasonic waves during its application. Current work illustrates the undergone mechanism of ultrasonic waves during its propagation for the purpose of the mitigation of formation damage in the close proximity of the wellbore. During ultrasonic waves propagation, cavitation takes place where bubble could not further sustain, it implodes with high local pressure (1000 atm) and temperature (5000 K). This high temperature is chiefly responsible for the free radicle HO · generation as shown in following reaction, if water is irradiated with ultrasonic waves. Meanwhile, shocking waves produced due to high pressure govern the chemical activity and damaged permeability recovery.

Keywords: Fossil fuels, Technology, Ultrasonic, EOR, Waves

THE CHARACTERISTICS AND DISINFECTION PERFORMANCE OF ENVIRONMENT-FRIENDLY NANO/MICRO-SIZED MATERIALS DERIVED FROM FISHERY WASTE

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Fishery waste is a debatable issue in the seafood-harvesting districts nowadays. The overwhelming majority of shrimp shells and oyster shells are considered waste, which causes adversities such as abhorrent smells and environmental pollution. Every year, there are about 6 to 8 million tons of oyster shells, shrimp are discharged globally; only Southeast Asia accounts for about 1.5 million tons. The discharge cost is expensive, for example, cost up to 150 USD / ton in Australia. Chitosan and CaO materials are modified from fishery wastes (shrimp shells and oyster shells) and they are a well-known material possessing high antibacterial activity against a massive abundance of microorganisms with a low cost and friendly with environmental. In this study, the objectives are antibacterial efficiency of an environmental-friendly antibacterial agent made from fishery waste against Gram-negative bacteria -Klebsiella pneumonia (K. pneumonia) will be investigated. The antibacterial kinetic results will be fitted by a modified Hom model. Chitosan and calcium oxide are widely used in bacterial disinfection. This study was investigated with varied characteristics through FTIR, SEM, BET, DLS, XRD. Some particular properties of both materials were found in this study. At the concentration of bacterial 105 CFU/mL, the effect of 0.05 g/L of CTS and 0.1 g/L of CaO to the time of bacteria survival were 1h and 1.5h, respectively. However, three initial concentrations of bacteria (105, 106, 107 CFU/mL) were used to determine the effect of initial concentrations on the deactivation rate. It is observed that the inactivate rate of bacteria was decreased with an increasing initial concentration. According to the data, this determines that chitosan is the good candidate for disinfection bacteria at low concentration of 0.05 g/l, whereas the amount of CaO is 0.10 g/L. Modified Hom kinetic models were used in the present study and the results that the R2 values were great fitness with the model by using experimental data.

Keywords: Disinfection, Klebsiella pneumonia, chitosan, calcium oxide, antibacterial

THEORETICAL AND PRACTICAL ASPECTS OF USING EFFECTIVE MICROORGANISMS (EM) AND FERMENTED BOKASHI ON AGRICULTURE APPLICATION

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Biofertilizer is essential to maintain agricultural productivity while effectively reduce the external input of chemical fertilizer. Academic research would generally focus on the relationship between applying pure strain of microorganism and the crop yield, but it was suggested that using mixed culture of microorganisms would have better effect on plant growth based on effective microorganisms (EM) theory. EM consists of mixed culture of beneficial microorganisms, including lactic acid bacteria, yeast, photosynthetic bacteria, and actinomycetes in a carbohydrate-rich liquid. The efficacy of using EM on agricultural production, however, has shown contradict results. EM generally showed positive results when applied on soil with high quality of organic matter, but some studies suggested there were no significant effect, or even sometimes negative effect, on crop growth when applied on soil with much agrochemical. According to Professor Teruo Higa, the founder of EM technology, the soil microorganisms could be classified into three groups: “positive microorganisms”, “negative microorganisms”, and “opportunist microorganisms”. Depending on the dominant species of microorganisms, soil could be categorized into four types: disease-inducing, disease suppressing, zymogenic, and synthetic soils. Some possible mechanisms that EM technology could not show optimal results were discussed. In addition, the importance of using “bokashi”, the fermented organic matter produced by EM microorganisms, was emphasized. With the proper understanding of EM theory, the successful rate of using biofertilzer on plant growth could be significantly improved.

Keywords: Biofertilizer; effective microorganism; bokasi; organic farming; EM technology

USING A COMBINED GIS-MULTICRITERIA ANALYSIS METHODOLOGY FOR NATURAL RESOURCES PROTECTION: A CASE STUDY FOR OLIVE MILL WASTEWATER DISPOSAL SITES CHOICE

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Olive oil production industry characterized by relevant amounts of liquid and solid by-products named Olive Mill Wastewater (OMW) and olive husk, respectively. The disposal and treatment of OMW are the main problems of this activity sector because of the great quantities annually generated, their high organic content, and toxicity.In Tunisia, the OMW valorization and treatment process have not yet reach the industrial scale and utilize only few quantities. Almost one million cubic meters of OMW, is actually stored in evaporation ponds. However, their uncontrolled and massive disposal induces the soil and groundwater contamination. Optimized siting decisions have gained considerable importance in order to ensure minimum damage to the various natural resources and environmental components as well as respond to the need of more disposal sites. This paper reports on an integration of multi-criteria decision analysis and overlay analysis using information system (GIS) to support selection of new OMW disposal sites. The use of thematic maps in geographical information system in conjunction with environmental, geological, climatic, economic and social variables leads to eliminate unsuitable land. The purpose of multi-criteria analysis (AHP) was to identify the most suitable sites using the information provided by experts with reference to chosen factors.

Keywords: Olive Mill Wastewater (OMW), soil and groundwater contamination, evaporation pond siting, GIS, AHP.

THE INTERPLAY BETWEEN ARTS AND WASTE MANAGEMENT: A PHENOMENOLOGICAL STUDY

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Many economically developing countries produced more waste for as a country develops, the level of consumption also increases which causes the diminution of proper waste control because of the continuous production of wastes. Waste management liabilities stated that waste management practices, knowledge and awareness differ by sex, class, and age of the students. In general, the cooperation of communities and government is really important to minimize the effects of poor waste management of our community which encouraged the government implementing rules which creates creating necessary institutional mechanisms and incentives, declaring certain acts prohibited and providing penalties and appropriating funds. Our main research problem is; What are the challenges in the implementation of proper waste management. This research is a phenomenological research. Our participants are the artists of the Ililikha Artist village. Baguio experienced waste management problems because some people did not cooperate with the laws because of use of technology and their level of participation. People can contribute in creating a sustainable environment by creating advocacies that can help minimize waste or by understanding the concept of upcycling. The artists of the said village recycled waste to create something more beautiful that could lessen wastes. Our research could serve as a basis for the future researches so that they would not have much trouble in understanding waste management. It could also give the future researchers a head starts on what to do and serve as a convenient guide. It could give them a clearer comprehension of Waste Management.

Keywords: waste, education, liability, upcycling, utilization

FISH PROCESSING WASTEWATER TREATMENT USING MEMBRANE BIOREACTOR (MBR) WITH ONLINE MONITORING SYSTEM

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The main environmental problem of fishery industries are high water consumption and high organic matter, oil, grease and salt content in their wastewater. This work aims to analyze the possibility of membrane bioreactor (MBR) for fish processing wastewater treatment in Ba Ria–Vung Tau province, Vietnam. One small MBR system with 100 liters volume was used to test the treatment efficiency on site with the online monitoring system based on Labview. A web service has been built for online monitoring and controlling, system data could be collected online in the most convenient way. Online tracking program is wastewater treatment in fish processing industry using membrane bioreactor (MBR) while machine is running to control all system parameters. Collected data is updated to cloud storage server for more convenience in accessing and handling while in emergency case. After five months trial, the effluent mostly passed the Vietnamese wastewater discharge standard with Chemical Oxygen Demand (COD) value is lower than 50 mg/l, total Nitrogen (TN) is also lower than 35 mg/l. Additionally, also the energy consumption and the operating cost were calculated. MBR with online monitoring system seem very promise in treatment of fish processing wastewater in Viet Nam.

Keywords: Seafood processing wastewater, MBR, online monitoring system, Nitrogen

PRELIMINARY STUDY OF PHOSPHORUS REMOVAL USING AERATED AND UNAERATED STEEL SLAG FILTER IN PRIMARY AND SECONDARY TEXTILE EFFLUENT

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Phosphorus is the element that promotes growth in plant. However, over loading of phosphorus onto the surface water leads to severe environmental problems known as eutrophication. Improper treatments of phosphorus removal prior discharges from industrial effluent are one of the contributions to eutrophication. Textile effluent is one of the sources of phosphorus loading in surface water with concentration of 1-9 mg/L P. Since attentions are given in removing the color from the effluent, phosphorus are commonly ignored in wastewater treatment system. Thus, the study of phosphorus removal in textile wastewater is conducted using steel slag filter system under aerated and unaerated condition. To compare the performance of the filter, synthetic wastewater (25 mg/L P) also was used to compare the efficiency removal. The filter was set up for ph range of 5,7 and 9 for synthetic wastewater while ph range of 5.30-7.00(primary treated wastewater) and 6.67-9.00(secondary treated wastewater) for textile wastewater. After 5 weeks of study, the unaerated filter shows better removal at each filter. In synthetic wastewater, ph 9 remove phosphorus better with removal percentage of 93.59-97.52% in unaerated filter. In textile wastewater, ph range of 5.30-7.00 removed 5.26-39.60% of phosphorus in unaerated filter. This shows that steel slag filter provides promising result in phosphorus removal.

Keywords: Eutrophication, phosphorus removal, steel slag, textile wastewater

MECHANICAL PROPERTIES AND TOXICITY CHARACTERISTIC OF PETROLEUM SLUDGE INCORPORATED WITH PALM OIL FUEL ASH AND QUARRY DUST IN SOLIDIFICATION/STABILIZATION MATRICES

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This paper discussed on treatment of Malaysian petroleum sludge by incorporation of palm oil fuel ash (POFA) to replace Portland cement and quarry dust (QD) to replace sand in the solidification/stabilization (S/S) method. The reuse of these wastes is highly encouraged since it yields to a low cost of S/S method in one side and minimizes the huge amounts of waste from the environment on the other side. Preliminaries studies including chemical composition, heavy metal characterization, density test, compressive strength test, and toxicity characteristic leaching procedure (TCLP) were done to evaluate the suitability of POFA and QD in S/S matrices. Then, an actual series of testing involving petroleum sludge in the developed S/S matrices were evaluated to determine the effectiveness of the method. The 10% replacement of POFA recorded a considerable value of density ranging from 1500 kg/m3 to 1660 kg/m3. Meanwhile the compressive strength 10% of POFA achieved the strength of 22.60 MPa. Besides that, 20% replacement of quarry dust in natural sand recorded a value of density ranging from 2080 kg/m3 to 2147 kg/m3 with the highest strength is 24.91MPa. As for S/S matrices containing petroleum sludge, the results indicate the possibility to encapsulate the sludge in the matrices up to 10%. The highest strength of S/S matrices with petroleum is from PS5% samples with 15.61 MPa at 28 days and the second highest is from sample PS10% with 12.39MPa. The toxicity characteristic of heavy metals from the S/S matrices were below the permissible limit set by USEPA. This investigation could be an alternative solution for petroleum sludge, POFA and QD disposal and has great potential for replacing other treatment approaches employed at the advanced treatment stage for petroleum refinery effluents.

Keywords: Petroleum sludge, solidification/stabilization, palm oil fuel ash, quarry dust, waste utilization

COPING PRACTICES OF PEOPLE LIVING NEARBY LANDFILLS

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The life of people living nearby a landfill is different from the life outside of it. The horrors of the life provided by the situation is inevitable, for the people involved has limited choice. In each difficulty in life, there's a way to conquer it. This study focuses on the coping practices of the locals alongside landfills. This study sought to answer the challenges encountered by the residents living near the landfill and the coping practices of the residents near the landfill in terms of sanitation, personal hygiene, and health. Descriptive type of research, qualitative in nature was utilized in the study and a semi-structured interview tool place wherein the gathered data was analysed through the use of Thematization. Consequently, researchers found out that the problem regarding their source of water is one of the main challenges they encountered as they lived. They are exposed to dirt, but they still do their best to maintain their sanitation their personal hygiene and their health. It is concluded that these people, neglecting their status in life, always find a way to surpass these challenges they encounter. A proposed livelihood project will be introduced to the Municipality of San Fernando which comprises job opportunities for the residents nearby landfills.

Keywords: Coping Practices, Landfill, Challenges, Garbage, Thermatization

THE APPLICATION OF DIRECT CONTACT MEMBRANE DISTILLATION TECHNOLOGY TO TREAT ANAEROBIC EFFLUENT FROM RUBBER INDUSTRY

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Direct contact membrane distillation (DCMD) was investigated as possible means to reduce the contaminants from rubber effluent in Malaysia. The rubber effluent sample was collected from an anaerobic tank and tested using polyvinylidene fluoride hollow fibre membrane as the separation media. The membrane was fabricated using dry jet-wet spinning system and characterized for several analyses. In this work, the water quality of the permeate solution was compared with the final discharge point at the factory based on water quality parameters set by the Department of Environmental in Malaysia. Interestingly, the clean water obtained after the treatment using DCMD is much better than the water quality collected at the final discharge point. Our system recorded a minimum of 90% reductions of Chemical Oxygen Demand (COD), Total Suspended Solid (TSS), Total Dissolved Solid (TDS), turbidity, ammonia nitrogen, nitrate nitrogen and colour. Although the system only rejects 71 % Biological Oxygen Demand (BOD) content in the anaerobic effluent, the final BOD concentration in the permeate tank is still less than the final discharge point which shows that the water quality of the treated rubber effluent is reliable and can be discharged to water bodies.

Keywords: Membrane distillation, rubber industry, anaerobic effluent, wastewater treatment, polyvinylidene fluoride

REMOVAL OF METHYLENE BLUE FROM AQUEOUS SOLUTION USING SUSTAINABLE ADSORBENT PREPARED FROM H3PO4 ACTIVATION OF BANANA PEEL WASTE

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This work demonstrates a simple preparation of banana peel waste adsorbent by activation through phosphoric acid (H3PO4) and carbonization treatment. Resulted adsorbent was then examined for the adsorption capability for methylene blue (MB) from aqueous solution. Batch mode experiments were carried out to study the effect of initial MB concentration, adsorbent dosage, contact time, solution temperature and solution pH on MB adsorption. It was found that the activated adsorbent showed remarkable adsorption efficiency while completely decolorizing the MB solution within 60 min of contact time in room temperature by using 0.1 g of adsorbent. The morphology and the structure of banana peel waste adsorbent was characterized by scanning electron microscopy (SEM), whereas the functional groups contain in the adsorbent was analysed through Fourier transform infrared spectroscopy (FTIR) and the surface area as well as the pore size of the adsorbent was determine by N2 physisorption analysis. In addition, the prepared adsorbent could be an efficient and sustainable adsorbent for treatment of synthetic dyes in wastewater treatment.

Keywords: Activation, Adsorption, Biomass waste, Carbonization, Methylene Blue

MODIFIED NANO FILTRATION MEMBRANE TREATMENT OF SALINE WATER: A REVIEW

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Nanoparticles have received much attention recently due to their unique properties in terms of photoemission, antimicrobial and catalytic activity. NPs incorporated membranes have gained attention due to their ability to increase membrane permeability, mechanical properties, hydrophilicity, and selectivity in some cases. This review is focuses on the modification on Zeolite and Carbon nanotube (CNTs) membranes in treatment of Saline Water, and factors affecting desalination process during this modification and how to control and mitigate them. Therefore, the objective of the research is to evaluate the effectiveness of desalination technology based on the modified Zeolite and CNTs membranes, the focus point will be the energy efficient, greener approaches to synthesis and modification of a variety of nanomaterials to meet the present and future challenges. It will help the material scientist to have a comprehensive overview of the current situation and will provide decision makers a guide for future planning in the treatment of saline water in closed and open systems on larger scales.

Keywords: Water treatment, modified nano filtration, nanotechnology, saline water, water quality, zeolite membrane, Carbon nanotubes (CNT)

TOXICITY ASSESSMENT OF MARINE CLAY STABILISED WITH POLYURETHANE

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The application of polyurethane in improving the physical and engineering properties of weak soils is attracting the attention of numerous researchers. However, little is known about the environmental consequence of using polyurethane to improve weak soil. This research proposes to use toxicity leachate characteristics procedure (TCLP), long term leaching test (MTCLP) test and Field Emission Scanning Electron Microscopy (FESEM) to assess the possible ground contamination and changes on the structure due to the application of polyurethane to stabilise marine clay. Unconfined compressive stress test (UCS) was performed to determine the optimum amount of polyurethane that can be used to improve the marine clay. The marine clay improved with the optimum amount of polyurethane will be tested for FESEM, TCLP and M TCLP to identify and evaluate the leaching behaviour of the heavy metal in the treated marine clay. The results will be analysed, compared with the relevant regulatory standard and discussed. The preliminary result shows that 8 % of polyurethane content is the optimum amount of polyurethane for stabilising the marine clay

Keywords: marine clay, polyurethane, toxicity, structure, contamination

IMPACT OF OCEAN ACIDIFICATION ON TACHYPLEUS GIGAS EGGS AND INSTAR DURING GROWTH, MOLTING SUCCESS, SURVIVAL AND CONDITION INDEX

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Estuarine and coastal waters are constantly exposed to pH fluctuation driven by various biological and chemical factors. Understanding the acclimation and adaptability of intertidal biota towards fluctuations of water parameters requires laboratory experiments to prove the biological impact on sensitive forms. Ambient water pH at the nesting grounds of horseshoe crabs usually varies from 6.1 to 8.6. Hence, in this paper, we aimed to determine the effect of pH on growth, molting success, survival and condition index (calcium, chitin concentration vs dry mass) on newly released eggs and instar stages (1st and 2nd) of horseshoe crab Tachypleus gigas collected from their spawning grounds in Pahang. Eggs and 1st instar stage of T.gigas were reared in individual containers filled with filtered seawater for the period of 5weeks in pH 5.5, 6.0, 6.5, 7.0, 7.5 and 8.0 at constant water temperature (29.6±1 0C) and dissolved oxygen (5.9-6.0 mg/L). Overall, reducing pH has profound negative impact on hatching success of eggs with highest hatching rate (75% in pH 6.5 and 71.79% in pH 8.0: $p<0.05$) and lowest in pH 5.5 (42%). While, the percentage of Lysinibacillus fusiformis infection rates were lower in pH 8.0 (zero %), it begun to increase with acidic waters (pH 5.5 ~ 52.63%). On the other hand, mortality of instar stages were noted to increase, from 8.57% to 17.6 % when water pH was increased from pH 5.5 to pH 8.0. Though morphometric measures (total length, inter-ocular width, prosomal with, length and opisthosoma length) were not affected by the treatment, some developing eggs and molted stages (2nd instar) had developmental abnormalities. In terms of molting from 1st to 2nd instar, the treatment pH 6.5 had highest molting rate (97.06 %) followed by pH 7 (86.67 %) and pH 6.5 & 8.0 (85%), while the lowest molting rate was recorded in pH 5.5 (54.29%). Condition index analysis has demonstrated the maintenance of calcification, chitin rate by the instar stages at high energy cost at low pH while it is opposite in control pH 8.0, indicating the impact of ocean acidification on their survival fitness in the absence of other factors such as evolutionary adaptation and acclimation to the ambient environment.

Keywords: Horseshoe crabs, Instar stages, Lysinibacillus fusiformis, ocean acidification, Tachypleus gigas.

INTEGRATED MEMBRANE BIOREACTOR FOR EFFECTIVE TREATMENT OF INDUSTRIAL WASTEWATER

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Membrane Bioreactor (MBR) is an emerging and resourceful biological treatment process which utilizes both activated sludge process and membrane filtration, it increases the efficiency of treatment by concentrating the biomass1. The treated water obtained from the membrane bioreactor will be in superior quality than the water obtained from conventional treatment process2. The principle behind the MBR is membrane filtration rather than settling process in the conventional process. So conventional technologies are predicted to be replaced by MBR systems in the upcoming years, owing to low operation and maintenance costs. Now there is a demand in global market for this technology at a compound annual growth rate (CAGR) of 13.2%. Basically, high capital, operation & maintenance costs (CAPEX & OPMEX) and limited membrane life are barriers in broad application of MBR. But studies conducted in recent years and advances have been helped to overcome such obstacles3. The permeate flux decline in the microfiltration membrane is mainly due to the formation of cake over the membrane results in pore blocking. Since the membrane fouling develops a major threat in the membrane bioreactor, it can be controlled by observing the interaction between the particles and membrane layer. Higher concentration of soluble microbial products results in the formation of gel layer over the membrane layer4. Owing to occurrence of fouling on the membrane, pre-treatment such as physio-chemical processes is required for the industrial wastewater with higher organic loading rates which has been the limitations of biological reactors. Electrons are the main reagents generated by electrochemical technique, which leads to degrade the organic pollutants and convert them to inorganic substance without evolving any secondary pollutants5. Electrochemical oxidation process enhances the biodegradability of wastewater containing inhibitory compounds by their decomposition resulting easily degradation of the rest in subsequent biological treatment6. This work mainly concerns with the treatment of industrial wastewater at lower current density and to mitigate the fouling rate of membrane. Electrochemical oxidation process is integrated with the MBR in order to reduce the capital cost and operating time.

Keywords: electrochemical, biodegradability, organic, wastewater, gel layer

SETTLEMENT OF SOFT SOIL TREATED WITH GROUP OF FLOATING BOTTOM ASH COLUMNS

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The granular column is one of the ground improvement techniques that can be employed successfully in soft soil to improve its strength and deformation behavior. In order to avoid the consumption of natural materials and to achieve sustainable development, alternative material is needed. From the published literature, bottom ash as the waste of coal burning possesses quite similar geotechnical properties to those of sand, therefore it can be used as a replacement of sand in a granular column since it has been considered as non – detrimental material. The laboratory investigations conducted on bottom ash columns installed in soft soil have been focused on aspects of shear strength and bearing capacity but there's no published research on the settlement. This paper presents an experimental study performed on soft soil reinforced by a group of floating bottom ash columns through a small-scale physical model. The laboratory tests were carried out on the unreinforced ground and reinforced with floating bottom ash columns. For treated cases, bottom ash columns of 25mm diameter and 150mm length were installed in soft ground with an area replacement ratio of 13%. The experimental test results revealed that the inclusion of bottom ash columns in soft soil ground accelerates the settlement compared to untreated ground.

Keywords: Foundation, Floating column, Ground improvement, Soft soil, Bottom ash

THE APPLICATION OF CENTRIFUGE TEST TO ANALYSE SURFACE GROUND AROUND TUNNEL

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Accurately estimating tunnelling-induced deformation is important in assessing the effects of tunnelling on nearby structures and facilities. The consequences of inaccurate estimates can also be costly. Any methods that provide greater accuracy in the assessment of tunnelling-induced ground movements, thereby providing a design tool to mitigate potential risk to third party property, has the potential to reduce the number of unwarranted incidents and insurance claims. At present, there are no well-accepted methods available to tunnel designers to calculate tunnelling induced ground loss values and ground deformations from the first principles. Instead, designers are required to rely on empirical assumptions derived from past experience and the outcomes of similar projects. However, tunnelling projects are not the same, the complexity and risk estimations and the consequences of failure seem to increase with every new project. This article describes the application of centrifuge test to assess the deformation of surface ground due to tunnelling.

Keywords: centrifuge test, deformation, tunnel face, ground, two-layer soils

ADVANCED TEACHING AND LEARNING MEDTHOD FOR ENGINEERING AND TECHNOLOGY STUDENTS AIMING AT THE STRATEGIC DEVELOPMENT OF THE INDUSTRY 4.0.

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In recent years, job candidates are currently required not only professional knowledge and skills but also English specifically implemented in particular occupations. Since then English for specific purposes (ESP) is the latest trend which has exponentially developed. The majority of universities have deployed diverse ESP courses in order to help learners to address communicative needs as well as practices of particular professions. Ho Chi Minh City University of Transport has also provided interesting ESP courses supposed to assist engineering and technology students in their future careers. Not only inspired by the need to enable the learners of these courses to increase their knowledge of terminology in their fields but also the integrating technology in language teaching and learning, this paper aims to suggest Quizlet a mobile and web-based study application as a tool to facilitate specialized vocabulary acquisition for learners of English for engineering and technology as well as for those who are learners of English for specific purposes in general. Thanks to Quizlet, both teachers and students will take full advantages from this innovative method that is probably proliferating their new learning and teaching experiences. Although the merits outweigh in this sphere, it is obvious that Quizlet should not be compulsory, but combined with other strategies to eventually give fruitful assistance to meet learners' increasing demands on the verge of the industrial revolution 4.0.

Keywords: ESP, specialized vocabulary acquisition, Quizlet, integrating technology, revolution

CASSAVA PEEL AS COAGULANT AID FOR ORGANIC REMOVAL IN INSTITUTIONAL WASTEWATER

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The quality of water is superior for the stability of the ecosystem. Institutional wastewater contains pollutants that exceed the level of contaminants beyond standards. Applications of natural coagulants are widely in practice due to abundant source, low price, environment-friendly and rapid biodegradable as compared to inorganic based coagulants. This study traces the potential removal of pollutants from institutional wastewater by coagulation-flocculation processes. Alum as primary coagulant and Cassava Peel Starch (CPS) as coagulant aid was used for removal of pollutants. A series of experiments were performed to study the removal mechanism to achieve optimum pH, dosage, and settling time, to premeditated institutional wastewater removal efficiency (%) of COD, TSS & Turbidity. Institutional wastewater physicochemical characteristics were analyzed by pH, temperature, turbidity, COD, TSS, BOD, Characteristics of CPS were characterized by SEM-EDX, FTIR, XRF, XRD, particle size and zeta potential. Removal efficiency of dual coagulant (alum+CPS) were achieved at optimum dosage of 40:60 mg/L at pH 8 with 60 mins settling time with removal efficiency of COD (41%), TSS (86%) and Turbidity (91%). Selected parameters study showed a significant reduction ($P<0.05$) for wastewater treatment. After coagulation and flocculation process, produced sludge was further characterized with SEM-EDX, FTIR and Zeta potential. However, zeta potential results revealed that stability of alum+CPS at pH 8 was proven in removal efficiency and mechanism study. Due to high removal achieved in the reduction of pollutants, therefore, the CPS as coagulant aid has potential for the treatment of institutional wastewater.

Keywords: biocoagulant, coagulation, flocculation, wastewater treatment, pollution, CPS

SIMULATION STUDY ON DIESEL ENGINE FUELED BY DIMETHYL ETHER (DME) AND DIESEL BLEND

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Internal combustion engines are used in most of vehicles due to their high eficiency and performance. However, fossil fuel is being depleted currently, and emissions from diesel engine contains many toxic substances such as CO, HC, NOx, PM…which effect adversely on environment and human health. Therefore, investigation and application of renewable alternative fuels are under consideration in many countries. In recent times, Dimethyl ether (DME) has been the same as a potential substitutionary fuel for internal combustion engine. DME can be manufacture from a variety of raw materials such as biomass, coal and natural gas. DME is easy to liquefy and appropriate to use in internal combustion diesel engines. DME is not a nature product but a synthetic product is produced either through the dehydration of methanol or a direct synthesis from syngas. When DME is used for internal combustion engine may reduce not only dependence on fossil fuel but also environmental pollution. Certain amounts of DME have been commercially produced as a propellant for spray cans because of its non-toxicity and suitable solubility and vapor pressure at room temperature. Some experimental investigations were conducted on diesel engine to clarify how DME injection characteristics affect the engine performance and exhaust emissions. Most of the results showed that emissions when fueled DME reduced significantly, especially CO and soot. The paper investigates the characteristics of internal combustion engine fueled by DME and diesel blend. Investigating to use DME and diesel blend for internal combustion engine, which is modeled by AVL Boost software, with 0%, 25%, 50%, 75% DME energy. The results show that the moment is not change when used 0%, 25%, 50%, 75% DME, the maximum difference in 1700 rpm is 4,42%. The fuel consumption is raising according to percent of DME, the fuel consumption is lowest when 25% DME blend 75% diesel. NOx emissions decrease with percent of DME decrease. CO and soot are minimum with 100% DME.

Keywords: Dimethyl ether, AVL Boost, energy, emission, diesel

INVESTIGATING THE DIMETHYL ETHER (DME) FUEL SUPPLY SYSTEMS FOR SMALL DIESEL ENGINE

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When exploiting and operating a forklift machine, may occur in the event of an instability that causes the machine to overturn when moving, which is one of the incidents that cause dangerous accidents and accounts for a large proportion when operate the machine. General lifting machines, forklift machines in particular, usually for loading and unloading, transporting all kinds of barrels, cargo boxes, packing goods in warehouses and yards in river ports, seaports, railway stations, airports, factories of factories, so the working status is quite complicated, bulky goods, narrow terrain in the process of exploitation and operation will cause problems. Stabilizing machines can cause dangerous accidents for people and equipment. At the accident caused by this incident, there are many causes: such as the operator's level, the sense of compliance with labor safety, the reality of the terrain at the mining site, the technical status and structure of the machine- device; actual situation of the terrain at the place of exploitation; type of transport goods; the working states of the machine . The working states have a great influence on the stability of the machine. This article deals with the effects of the machine's working states on the vertical stability of the forklift.

Keywords: A forklift machine, stability, the working status, airports, dangerous accidents

EFFECTS OF TEMPERARURE IN THREE PHASE REGIONS ON THE PROEUTECTOID FERRITE FRACTION OF AUSTEMPRING DUCTILE IRON WITH DUAL MATRIX

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Austempered Ductile Iron (ADI) with Dual Matrix Structure has exhibited the best combination of high strength and ductility, good wear resistance and machinability. Microstructure of this iron consists of proeutectic ferrite and ausferrite. Ausferite is a mixture of acicular ferrite and high carbon austenite. For this purpose, ductile iron specimens were heated to fully the austenitizing temperature in the range of 870 to 930oC for 90-120 minutes, following by annealing in three phase region for 90 minuts and then austempered at 360oC for 120 minutes. This treatment was aimed to induce a dual structure constitued of proeutectoid ferrite and ausferrite. Mechanical properties of materials depend on ferrite volum fraction in the structure, in other words, they depend on the heat treatment operations in three phase region. This paper investigated the influence of temperatures and times in three phase region on ferrite and ausferite volum fration in dual matrix ADI.

Keywords: ADI, Dual Matrix, volum fration, machinability, iron

A BRIEF REVIEW OF EMERGING TECHNOLOGY IN BALLAST WATER TREATMENT FOR SHIPS BUILDING IN VIETNAM

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Ballast water is taken on-board vessels into ballast water tanks to maintain vessel draft, buoyancy, and stability. Unmanaged ballast water contains aquatic organisms that, when transported and discharged to non-native waters, may establish as invasive species. Technologies capable of achieving regulatory limits designed to decrease the likelihood of invasion include onboard ballast water management systems. Invasive aquatic species discharged through ballast water is one of the most serious problems posed nowadays in the marine environment. This review paper summarizes the emerging available technologies applied for ballast water treatment. These technologies can be either port-based or ship-based, with the latter being easier to implement. Special emphasis was given to onboard treatment methods, which can be categorized as physical separation, mechanical or chemical methods. The efficiency of the methods, as well as the capacity of application and the target microorganisms were compiled and are presented in this review.

Keywords: Ballast water treatment, emerging technology, ballast water technologies, non-indigenous species, inactivation.

A STUDY ON THE READINESS AMONG MALAYSIAN TO ADOPT FOOD WASTE COMPOSTING METHOD

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Currently, Malaysia as a developing country generates highly consumption of food waste that represents almost half of the total municipal solid waste disposed in the landfill. This problem was occurred due to the lack knowledge and exposure of food waste recycling practice. Therefore, this study was an attempted to investigate the readiness of Malaysian to adopt composting method which are the most profitable solution based on Japanese sustainable food waste management model. The quantitative research has been conducted in Kuala Lumpur and Johor Bahru which includes 419 respondents in the survey questionnaire for data collection and analysis. The collected data from the survey was analyse using Statistical Package for Social Science (SPSS) version 21.0. As a result, it was found that the behavioural pattern of current waste management practice and psychological factors for motivation to recycle among the respondents were at medium level. Meanwhile, awareness, acceptance and readiness for composting method was low. From the gathered primary data, it was found that behavioural pattern has a strong positive relationship between awareness and psychological where the significant value is p = 0.000 and the correlation coefficient were 0.289 (awareness) and 0.181 (psychological) respectively. The relationship between awareness and psychological has found there is no significant relations between the variables. As a conclusion, a good understanding about home food composting among communities is the key indicator for excellent food waste management practices at home. Nevertheless, the composting method has been successfully implemented in Japan as demonstrated by Kitakyushu city and this method are recommended to be exposed widely in Malaysia as it could reduce the reliance on landfill as a disposal route whilst establishing more sustainable material-cycle society.

Keywords: food waste, composting, readiness, alternative disposal method

WASTE TO WONDERS: SAWDUST AND CORNCOB AS A FERTILIZER IN PLANT GROWTH

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The Philippines that relies heavily on agriculture is among the major consumers of fertilizers, most of which are inorganic and have a negative impact on the environment. Moreover, tons of fertilizer are often imported in the country and contributes to the price hike in the market. This prompted the researchers to conduct an experiment to find an alternative that is affordable and organic at the same time. This study aims to answer the following questions: a) How long does Sawdust and Corncob is as effective as the ordinary fertilizer? b) What components of Sawdust and Corncob make it a suitable fertilizer? c) What combination yields the most favorable results? Four (4) samples were planted and observed in order to determine the sawdust and corncob's feasibility as a fertilizer. After observation, the samples were examined and the outcome of the nutrients in the soil showed in the growth of the plants. Among all of the treatments, T2 yielded the most favorable results in terms of the days to germination and plant height with a mean of 3.05 and 13.55, respectively. The difference of the samples in the number of leaves were undetermined as a result of the ten (10) days of observation to be lacking. In conclusion, sawdust and Corn cob are feasible and can be used as fertilizer.

Keywords: organic fertilizer, sawdust, corn cob, agriculture

BISPHENOL A AND PHTHALATES (BIS 2-ETHYLHEXYL PHTHALATE, DIBUTYL PHTHALATE AND BUTYL BENZYL PHTHALATE) BY ULTRA HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY COUPLED WITH MASS SPECTROMETRY IN TASIK CHINI LAKE, PENINSULAR MALAYSIA

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Endocrine Disruption is the disruption of the communication systems that make up the body's major signaling pathways. Endocrine Disrupting Chemicals (EDCs) also called endocrine disruptors interfere adversely in several aspects of a living organism's life causing a multitude of illnesses or disorders vis neurological, reproductive, developmental, cancer, even the immune systems and this could be directly or indirectly, through point or diffuse sources and they are both natural and man-made. Their ability to mimic natural occurring hormonal messages in addition to the fact that effects are noticed even at very low, almost insignificant doses, shows there is greater need for them to be understood as they are capable of tricking the body. Phthalates (Plasticizers) and Bisphenol A (BPA) found in almost everything soft and flexible from plastics, food packaging, to even water bottles and how they end up in our waters is the focus of this study. Work will be done using ultra high-performance liquid chromatography (UHPLC) and Mass Spectrometry (MS). There is widespread concern about the contamination of source waters, this contamination is clearly noticeable in aquatic organisms and as such further analysis needs to do.

Keywords: Endocrine Disrupting Chemicals, UHPLC-MS, Bisphenol A, Phthalates, Endocrine System, Tasik Chini

APPLICATION OF SURFACE WATER QUALITY CLASSIFICATION MODELS USING PRINCIPAL COMPONENTS ANALYSIS AND CLUSTER ANALYSIS

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Water quality monitoring has one of the highest priorities in surface water protection policy. Many techniques and methods focus in analyzing the concealing parameters that determine the variance of observed water quality of various source points. A considerable proportion of them mainly depend on statistical methods, multivariate statistical techniques in particular. In the present study, the use of multivariate techniques is required to reduce the large variables number of Nile River water quality upstream Cairo Drinking Water Plants (CDWPs) and determination of relationships among them for easy and robust evaluation. By means of multivariate statistics of principal components analysis (PCA), Fuzzy C-Means (FCM) and K-means algorithm for clustering analysis, this study attempted to determine the major dominant factors responsible for the variations of Nile River water quality upstream Cairo Drinking Water Plants (CDWPs). Furthermore, cluster analysis classified 21sampling stations into three clusters based on similarities of water quality features. The result of PCA shows that 6 principal components contain the key variables and account for 75.82% of total variance of the study area surface water quality and the dominant water quality parameters were: Conductivity, Iron, Biological Oxygen Demand (BOD), Total Coliform (TC), Ammonia (NH3), and pH. However, the results from both of FCM clustering and K-means algorithm, based on the dominant parameters concentrations, determined 3 cluster groups and produced cluster centers (prototypes). Based on clustering classification, a noted water quality deteriorating as the cluster number increased from one to three, thus the cluster grouping can be used to identify the physical, chemical and biological processes creating the variations in the water quality parameters. This study revealed that multivariate analysis techniques, as the extracted water quality dominant parameters and clustered information can be used in reducing the number of sampling parameters on the Nile River in a cost effective and efficient way instead of using a large set of parameters without missing much information.

Keyword: Surface water, Principal component analysis, Cluster analysis, sampling parameters, algorithm

INVESTIGATING THE DIMETHYL ETHER (DME) FUEL SUPPLY SYSTEMS FOR INTERNAL COMBUSTION ENGINE

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The combustion engines are used in most of heavy-duty vehicles becasuse their high effect and performance. Althought, fossil fuel is being depleted currently, and emissions from diesel engine contains many toxic substances such as CO, HC, NOx, PM…which effect adversely on environment and human health. Therefore, research and application of renewable alternative fuels are under consideration in many countries and Vietnam as well. Recently, Dimethyl Ether (DME) is a friendly environment fuel, easy to liquefy and suitable for use in diesel engines. DME can be produced from a variety of raw materials such as biomass, coal and natural gas. It is also easy to liquefy and suitable to use in diesel engines. DME is not a nature product but a synthetic product is produced either through the dehydration of methanol or a direct synthesis from syngas. Using DME for diesel engine may reduce not only dependence on fossil fuel but also environmental pollution. Certain amounts of DME have been commercially produced as a propellant for spray cans because of its non-toxicity and suitable solubility and vapor pressure at room temperature.

Dimethyl Ether (DME) is a friendly environment fuel, easy to liquefy and suitable for use in diesel engines. DME has some different properties compared to diesel fuel, so that it needs to modify the engine, especially the fuel system, to be suitable for DME fuel. This paper presents to investigate the best fuel supply system when using DME for diesel engine.

Keyword: Dimethyl Ether, diesel engine, fuel supply system.

TECHNICAL MEASURES TO ENSURE SAFETY IN OPERATING LOAD COMBINATION

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Technical measures to ensure safety in operating two port cranes together might be applied in cargo handling in seaport, river port, and warehouse. The article has investigated two technical measures: proper load balance between cranes before lifting, and optimal weight allocation to ensure the compliance of the crane's maximum lifting capacity regulation. These two cranes work alternately, one working, one stop. In this case, it is also necessary to appropriately arrange the distance between the two planes and the cargo lifting steps. The distance between the two planes and loading should be based on the slant angle of the cargo slings of the cranes and never exceed the allowed limit. Under this condition, the distance between the two planes should be lower than the difference of the yoke length and the horizontal projection of the cable. The movement distance of the cargos (moving step) is determined according to the allowable angle of the cable. At that time, the movement distance of the cargos is the distance between the two positions when a crane changes the reach and the second crane does not work provided that the yoke is parallel to the ground. The article has investigated about the determination and selection of crane yoke along with the lifting and moving cargo, it will be a solution to ensure safety when using crane two port crane to lift cargos that are heavier than lifting capacity of the cranes.

Keyword: load combination, lifting, port crane, lifting capacity

RESEARCH USING COMPOSITE MATERIALS IN MANUFACTURING PRESSURE-RESISTANT CIRCULAR DETAILS WITH THE TWO SPHERICAL BOTTOMS BY WINDING TECHNOLOGY

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This paper presents the results of research about the using of composite materials to make circular rotating parts with two spherical ends. From the analysis of the working characteristics of these details, the article selected the winding technology and using composite materials to produce details with cylindrical and spherical shape characteristics. The material group that the article presents is a composite unidirectional glass fiber reinforced composite with polymer matrix. This material is characterized by a specific density of 2.02g/cm3; tensile strength is 1750MPa; elastic module is 55GPa; elongation reached 3.18%. With properties of such materials, it is suitable for working conditions of details.

Keyword: Compozit Pressure Vessels, Stress analysis, composite materials, glass fiber, polymer matrix

COMBUSTION CHARACTERISTICS OF SI ENGINE FUELED WITH 2,5-DIMETHYLFURAN AND GASOLINE BLENDS USING AVL-BOOST SIMULATION

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Currently, 2,5-dimethylfuran (DMF) has shown that it is a potential alternative fuel source to replace the traditional fuels such as gasoline and diesel. However, the combustion and emission properties of DMF have been rarely characterized, especially the using of DMF-gasoline blends in SI engines. This article presents how the fuel properties and loads affected the combustion of DMF-gasoline blends in a four-cylinder SI engine using AVL-Boost simulation. The simulation conditions were that the throttle valves opening at 75% and 100%, and speed from 1000 to 6000 rpm with the using blends is DMF10, DMF20, DMF30, DMF40 and DMF 50 (corresponding with the DMF ratio in DMF-gasoline blends is 10%, 20%, 30%, 40% and 50%). The simulation result is that when adjusting the amount of fuel supplied to a cycle of engine to ensure that λ=1(λ: relative Air to Fuel ratio) when we change the DMF fuel ratio in the blends with gasoline in almost the same power and torque as pure gasoline without changing any structure of the engine. In addition, to remains the engine power when using from DMF10 to DMF50, its need to be increased the average amount of fuel to 9.27% compare to the pure gasoline over the full speed range of 1000÷6000 rpm.

Keyword: DMF, Gasoline blends, SI Engine, Fuel, Combustion

ECOLOGY AND OCCURRENCE OF PUGILINA(HEMIFUSUS) SPECIES CLASS: GASTROPODA: FAMILY: MELONGENIDAE FROM THONDI COAST–PALK BAY IN TAMIL NADU

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The changes in the temperature have been proved to have meagre influence in the distribution of the two species as the temperature variation was not sufficient enough to affect their distribution. Water temperature varies in accordance with ambient air temperature. In Thondi maximum temperature was recorded 34.2ºC during summer and the minimum of 29.3ºC during monsoon. Salinity varied over a narrow range of 30.2 -34.3‰. In the study area, salinity recorded the minimum (30.2‰) and maximum (34.3‰) during monsoon and summer months. The distribution of salinity is more prominent in the Palk Bay region. Since the animals are capable of withstanding salinity fluctuation in the above range, the population of two species was not affected in the littoral area. pH, Variations in pH were very meager during the study period. The minimum pH (8.0) was recorded during post monsoon and maximum pH (8.2) during summer seasons. As the hydrogen ion concentration variation did not affect their distribution and abundance of the animal population. Dissolved oxygen, In Thondi the minimum value of DO 3.96 mg/l was recorded during monsoon and maximum value of DO 4.68 mg/l during post monsoon. The high oxygen content especially during north east monsoon could be attributed to low temperature and low salinity values which might help to enhance the level of dissolved oxygen content in water. Turbidity, In the study area, turbidity varied between 16 – 49 (NTU). The minimum value of 16 (NTU) was recorded during post monsoon and the maximum value of 49 (NTU) was recorded during monsoon. TSS, In the study area, TSS varied from 45.82 – 75.01(mg/l). The minimum value of 45.82 (mg/l) was recorded during post monsoon and the maximum value of 75.01(mg/l) was recorded during monsoon. Transparency, In the study area, transparency of water varied from 1.12-1.51 (m). The minimum transparency was recorded 1.12m during monsoon and the maximum value of 1.51 was recorded during summer. In the present study the distribution and abundance of two species of ***Pugilina (Hemifusus) cochlidium and Pugilina erecta*** along the coast of Thondi are influenced by the environmental factors with less significance. As these animals are bottom living, they were not much affected by changes in the environmental factors. In the present study the maximum temperature was recorded during summer season and the minimum during monsoon. The animals can thrive well in the salinity range of 30.1‰ to

34.5‰. Since the animals are capable of withstanding salinity fluctuation in the above range, the population of two species was not affected in the littoral area.

Keyword: Litoral Area, Animal Population, Bottom Living, Environmental Factors, Hydrogen

CLOSED-LOOP COMBUSTION CONTROL IN PPCI ENGINE

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Low -temperature combustion (LTC) is a method which describes extremely low NOx and soot concentrations in an internal combustion engine. Absolutely, the element that mainly affects to mixture fuel-air premixed and combustion in PPCI engines is chemical kinetics. In PPCI combustion, the pressure, and temperature of the mixture inside the cylinder influence the duration of combustion. This study describes closed-loop combustion control in PPCI engines. Initially, control variables are necessary for this method. Secondly, it considers the combustion feedback sensors and control drives burn. The final section presents the PPCI closed-loop combustion control method.

Keyword: Closed-loop control, Control, Combustion, LTC, PPCI

RARE ACTINOMYCETES FROM KUANTAN MANGROVE FOREST SEDIMENT

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Actinomycetes are prolific secondary metabolites producer and they are sought after for their unparalled capability. Mangrove forests are among the underexplored locations in search of new resources of actinomycetes. Bioprospecting of actinomycetes in Kuantan mangrove forests have revealed a highly diverse actinomycetes with high antimicrobial properties. Although, genus Streptomyces dominated the actinomycetes recovery population from mangrove forest sediment, members of the rare genera including Micromonospora sp., Pseudonocardia sp., Verrucosispora sp., Nocardiopsis sp., Actinophytocola sp., Dietzia sp., Gordonia sp., Micrococcus sp., Mycobacterium sp., Nocardia sp., Saccharopolyspora sp. and Rhodococcus sp. can also be added to the list of genera isolated from this ecological niche, providing a solid evidence that considerable diversity of actinomycetes are distributed within Kuantan mangrove forest. Some of these rare genera displayed antimicrobial potential and some produced coloured compounds released into the medium. Interestingly, most of these rare actinomycetes showed the presence of PKS-I and NRPS genes, both of which are usually related to the ability of producing secondary metabolites. Further studies conducted on these rare actinomycetes may revealed their true potentials that can be exploited for natural product discovery.

Keyword: Mangrove, rare actinomycetes, PKS-I and NRPS, diversity

EFFECTS OF PLANTING JATROPHA CURCAS ON THE PHYSICOCHEMICAL PROPERTIES OF BAUXITE MINED SOIL

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Extensive and uncontrolled bauxite mining have been associated with environmental quality degradation and potential health risks. Revegetation with Jatropha curcas, a non-edible yet biodiesel-producing plant could potentially mitigate environmental problems and remediate and restore the soil quality of the barren post-bauxite mining site. Data collected on the growth performance showed that J. curcas could survive on bauxite mined soil with significant difference in number of leaves and plant height compared to topsoil. Physicochemical properties of both topsoil and bauxite mined soil were analyzed before and after planting with J. curcas. The results indicated that both soils were acidic, ranging from pH 4.5 to 5.3. Bauxite mined soil has lower moisture content, with an average of 17.42%, but contained higher coarse sand, 37.44%. The colour of both soils was significantly distinct. No significant difference was detected in Al, Ni, Cu, Zn and Cd concentration between top and bauxite mined soils. However, after J. curcas planting, a decreased in Al ($P < 0.05$) and Cd ($P < 0.05$) was detected in bauxite mined soil. Topsoil contained higher N content (0.09 to 0.105%), whereas bauxite mined soil contained higher H (2.43 to 2.75%) and S (0.267 to 0.3%) concentrations. The carbon to nitrogen ratio also increased after planting with J. curcas. Planting of J. curcas on bauxite mined soil could potentially improve soil quality and provide an alternative energy fuel.

Keyword: Bauxite, revegetation, Jatropha curcas, physicochemical

CROPPING PATTERN EFFECTS ON CARBON SEQUESTRATION AND AGGREGATE STABILITY OF SOIL IN LONG TERM AGRICULTURAL FIELD

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Soil Organic Carbon (SOC) can be improved through the addition of organic manure and return of crop residues. The efficiency of Soil carbon sequestration might differ among cropping pattern. An experiment was carried out in 2018 to investigate the effects of cropping pattern on soil carbon sequestration and their aggregate stability in long term agricultural field. The major objectives were to determine (i) the response of SOC stock to C input under different cropping pattern (ii) C sequestration efficiency in different cropping pattern and (iii) the response of aggregate stability with increasing SOC stock in different cropping pattern. Four cropping patterns were selected (Rice-Fallow-Rice, Rice-Rice-Vegetable, Rice-Wheat-Fallow, Vegetable-Vegetable-Vegetable) that are being cultivated for the last ten years. In the experiment, SOC value was improved for vegetable field from 4.06 gkg-1 to 9.11 gkg-1 and carbon stock was also the highest for vegetable field (20.14 Mg C ha-1yr-1). The soil carbon sequestration rate was also the best for vegetable field (1.12 Mg C ha-1yr-1) and only showed the positive value. The logarithmic relationship between the C input rate and C sequestration rate in four cropping patterns showed that C sequestration rate increased with increase of C input and they were strongly correlated ($r=0.72$, $p<0.05$). All other cropping pattern showed the negative values in soil carbon sequestration rate (-0.73 to -1.29 Mg C ha-1yr-1). Intensive agriculture as well as not adding organic fertilizers could be the reason for decreasing SOC of these three cropping patterns. In terms of aggregate stability, vegetable field showed the best result (0.41 mm) where as Rice-Fallow-Rice and Rice-Wheat-Fallow cropping pattern showed the insignificant aggregate stability among them ($p>0.05$). The straight-line relation between aggregate stability and C-stock showed that they are strongly correlated ($r=0.81$, $p<0.05$). Results indicate that Vegetable-Vegetable-Vegetable cropping pattern is the best soil carbon sequester among them and also showed the best aggregate stability.

Keyword: Soil Carbon Sequestration, Soil Organic Carbon, Aggregate Stability, Carbon Input, Carbon Stock

EVALUATION OF INDOOR AIR POLLUTANTS IN LIVESTOCK BUILDING: A PRELIMENARY STUDY

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In modern livestock farmhouse systems, proper air quality management is essential for maintaining the health and productivity of workers and animals. In this paper, we catalogued the pollutants concentration in livestock buildings, whereby the sources of information are mainly in the Ladang UniSZA Pasir Akar, Terengganu, Malaysia but the conclusions can be applied in whichever country livestock are housed. This study was performed in broiler poultry and beef cattle house at Ladang UniSZA, Pasir Akar, Terengganu, Malaysia. The measurement of air quality was recorded twice a week for two months, where ten air parameters in five points per each livestock area were measured during this study including: PM10 and PM2.5 (µg/m3) as well as NH3, SO2, CO, O3, NO2, CH2O, H2S and CO2 (ppm) using the AeroqualTM series 500. The descriptive statistics and principal component analysis (PCA) were used for all parameters to summarize data set and to analyse the most significant pollutant that contribute to the environment pollution. The finding from descriptive analysis shows the concentration of CO2 and NH3 in the broiler poultry (33.16 ppm and 16.26 ppm, respectively) has contributed to the highest concentration level compared to the concentration in the cattle house (23.33 ppm and 3.74 ppm, respectively). PCA identify PM10 > NO2 > H2S > NH3 > SO2 > CH2O > CO2, while H2S > NH3 > NO2 > SO2 > CH2O > PM2.5 > PM10 as the most significant pollutants that contributed in indoor beef cattle and broiler poultry house, respectively. In conclusion, all parameters were below exposure limit values. However, reducing ammonia and carbon monoxide emissions from the operation's activities are critical to achieving environmentally sustainable animal production that will benefit producers and society at large.

Keyword: Livestock farm, indoor air quality, emission, PCA

TREND STUDY AND ASSESSMENT OF HEAVY METAL CONTAMINATION IN SURFACE WATER OF THE KLANG ESTUARY AREA, SELANGOR, MALAYSIA

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The Klang estuary is an important economic zone where the major commercial port is situated at this heavily urbanized and industrialized area. This study presents the trends of heavy metals (As, Cd, Cr, Cu, Pb, Hg, and Zn) over the period of 10 years (2007-2017). The 2007–2017 data was also carried out by trend analysis (the nonparametric Mann-Kendall statistical test) and unsupervised pattern recognition (Principal Component Analysis). The result shows the main sources of heavy metal contamination in Port Klang were industrial wastewater and port activities. Further study should be carried out in monitoring surface marine water qualities of the Klang estuary to preserve the quality of estuarine ecosystem.

Keywords: heavy metals, estuary, trend analysis, long-term monitoring, principal component analysis, mann-kendall

STUDY ON EFFECTS OF IIUM FOOD WASTE COMPOST AND INORGANIC FERTILIZER ON GROWTH PERFOMANCE OF MUSTARD (*Brassica juncea*)

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This study aims to determine the effects of IIUM food waste compost and inorganic fertilizer on the growth performance of mustard (Brassica juncea). The application of fertilizers were divided into four treatments, T1 (control without any fertilizer), T2 (100 % food waste compost), T3 (100 % inorganic fertilizer) and T4 (50 % food waste compost + 50 % inorganic fertilizer). The study was carried out at the Glasshouse Nursery Complex, International Islamic University Malaysia from 9th January 2019 to 20th February 2019. Thus, based on the findings of this study, it can be concluded that the combination of food waste compost and inorganic fertilizer (T4) was the best treatment on promoting the growth of mustard.

Keywords: inorganic fertilizer, waste compost, Brassica juncea, mustard, food waste, promoting

OPTIMIZATION, COSMO-RS AND DFT STUDIES ON DEVELOPMENT OF 1,5-DIPHENYLCARBOZONE AS A CHEMOSENSOR AGAINTS Hg2+ ION RECOGNITION IN AQUEOUS MEDIA

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Mercury is a toxic metal that exist and can be found everywhere in the surrounding as it is used in many products of our daily life and mercury contamination usually cannot be observed by human five senses. Continuous exposure to mercury can cause severe implication to neurologic, gastrointestinal and renal organ systems. This study was conducted to develop a portable and easy to use chemosensor using Diphenylcarbazone (DPCO) for detecting Hg2+ ions in an aqueous system. The sensitivity of DPCO to act as a chemosensor was optimized based on solvent/co-solvent ratio and pH. The result showed that DPCO has a highly sensitivity against Hg2+ in DMSO/citrate buffer (8/2, v/v, pH=4.0). The LOD of DPCO against Hg2+ ions calculated was 13 ppm. The stoichiometric ratio of DPCO-Hg2+ was 1:1, as determined from the Job's plots analysis. The chemical properties such as sigma profile, MEP, Fukui function and HOMO-LUMO energy of DPCO as a chemosensor were studied using COSMO-RS and DFT methods respectively. The result from the sigma profile calculation showed that DPCO formed stronger hydrogen bonds with the DMSO solvent. From DFT calculation, the HOMO-LUMO energy gap of DPCO and DPCO-Hg2+ were -4.2759 eV and -2.1769 eV, respectively. Test strips of DPCO chemosensor was developed and it showed color change that proved the ability of the DPCO chemosensor to detect Hg2+ in an aqueous medium.

Keywords: Chemosensor, DPCO, Hg2+ ions, COSMO-RS, D

PRELIMINARY STUDY IN DISCOVERING 2-PROPEN-1-ONE, 1-(2,4-DIHYDROXYPHENYL)-3-(4-METHOXYPHENYL)- FROM Syzygium aqueum LEAVES AS A TYROSINASE INHIBITOR IN FOOD PRODUCT: EXPERIMENTAL AND THEORETICAL APPROACH

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In this study, response surface methodology (RSM) in combination with central composite rotatable design (CCRD) were performed to optimize the extraction parameters for total phenolic content (TPC) on Syzygium aqueum (S. aqueum) leaves. The effect of operational conditions on the extraction of S. aqueum leaves using carbon dioxide (CO2) on TPC was investigated. The conditions used in the supercritical extraction with CO2 included temperatures of (40-70 °C), pressures (2200-4500 psi) and extraction time (40-100 min). The highest TPC (3.5893 mg GAE/mg) was obtained at optimum conditions of 55 °C, 3350 psi and 70 min. The major compound in the optimized crude extract was2-propen-1-one,1-(2,4-Dihydroxyphenyl)-3-(4-methoxyphenyl)- (82.65 %) which was identified by GC-MS. COSMO-RS was introduced to study the σ-profile between CO2 and 2-propen-1-one,1-(2,4-Dihydroxyphenyl)-3-(4-methoxyphenyl)-. Principal component analysis (PCA) was performed to classify major compound which exhibit similar chemical properties with selected control. 2-propen-1-one,1-(2,4-Dihydroxyphenyl)-3-(4-methoxyphenyl)- has similar chemical properties with kaempferol as tyrosinase inhibitor. Molecular electrostatic potential (MEP) and molecular docking were plotted to investigate a recognition manner of 2-propen-1-one,1-(2,4-Dihydroxyphenyl)-3-(4-methoxyphenyl)-upon tyrosinase receptor.

Keywords: Response Surface Methodology (RSM), Principal Component Analysis (PCA), COSMO RS, and Molecular Docking

MICROBES FROM WASTEWATER TREATED MANGROVE SOIL AND THEIR HEAVY METAL ACCUMULATION AND ZN SOLUBILIZATION

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The present study isolated and identified six species of bacteria and fungi from the rhizosphere soil of mangroves species (Avicennia marina) treated for 60 days with artificial wastewater, and further tested for their potential in heavy metal accumulation and Zn solubilization.The wastewater treated mangrove soil had higher microbial counts, porewater salinity and nutrients (N,P,K, total organic carbon), but lower soil bulk density, pH and temperature. The predominant bacterial strains isolatedfrom the treated soil were identified asBacillus altitudinis,B. anthracisand B.marisflavi, and the fungal strains as Penicillium citrinum, Aspergillus quadrilineatus and Gibberella intermedia. The microbial accumulation of heavy metals was determined after cultured them with concentrated wastewater under shaker culture by incubating at 280C at 100 rpm for seven days. The accumulation was the highest for Zn (70%), Cu (62%), Pb (62%)in the bacterium, B. marisflavi and Mn (50%) in the fungus, P. citrinum in wastewater treated over control. The B. marisflavi was further tested for Zn solublization in terms of pH decline, after ten days of incubation with the insoluble Zn sources (ZnO, ZnSO4 and ZnCO3) and found the highest activity of 31.6% pH drop with ZnO.This study suggested the potential of B. marisflavi in removal of heavy metals and Zn solubilization.

Keywords: potential, temperature, microbial counts, and mangroves species

ECONOMIC DEVELOPMENT OF BIOMASS ENERGY INDUSTRY IN HEILONGJIANG PROVINCE BASED ON ANALYTIC HIERARCHY PROCESS

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In order to study the comprehensive evaluation index system of biomass energy industry economy in Heilongjiang Province, a hierarchical analysis is made from four aspects: society and technology, energy supply and demand, economy and environment. By analytic hierarchy process (AHP) and expert scoring method, various comprehensive evaluation values affecting the economy of biomass energy industry are calculated. The results show that in the economic development of biomass energy industry in Heilongjiang Province, biomass biogas industry > biomass power generation industry > biomass briquette fuel industry > biomass gasification industry > biomass liquid fuel industry. Finally, in view of the actual situation of Heilongjiang Province, relevant suggestions are proposed for the economic development of biomass energy industry.

Keyword: biomass energy, AHP, industrial economy, fuel, liquid

CARBON EMISSION FROM MODERN COAL CHEMICAL INDUSTRY AND ITS ECONOMIC IMPACT IN THE REBUILDING OF OLD INDUSTRIAL BASE IN NORTHEAST CHINA

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In order to study the relationship between economic growth and carbon emissions in Northeast China, Tapio decoupling model can be introduced to help analyze the elastic relationship between energy saving and emission reduction and economic benefits in Northeast China. The results show that in recent years, especially in the past 10 years, the economy of Northeast China has not developed rapidly. However, the carbon emissions remain high, which means energy saving has been achieved, but the effect of emission reduction is not good, and the relationship between economic growth and carbon emissions is weak decoupling. Through the gradual improvement of the influencing factors and the establishment of a complete data model for analysis and comparison, it is found that among a series of influencing factors, large-scale enterprises and enterprises with deep opening-up often achieve the decoupling of economic growth and carbon emissions. The larger the scale of enterprises is, the more obvious the decoupling effect is, which is the most important factor

Keyword: Old industrial base in northeast China, carbon emission from coal chemical industry, Tapio decoupling model, economic impact, decoupling effect

DECOLORIZATION AND STABILITY OF OZONE OXIDATION IN MUNICIPAL WASTEWATER REGENERATION

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In order to understand the decolorization effect and stability of ozone oxidation in municipal wastewater regeneration process, ozone oxidation experiment and related index analysis method are used. The results show that ozone oxidation treatment can effectively reduce the color and true color of secondary effluent. During the simulation of natural conditions, the true color of water samples with different ozone dosage doesn't change significantly after 22 days, and the changes of surface color and chlorophyll a show good consistency. When the ozone dosage is less than 6 mg·L-1, the color of water samples increases slowly within 12 days, then rise rapidly until the maximum is reached after 22 days. Low dose ozone treatment (less than 6 mg·L-1) can promote algae reproduction and increase the instability of water colour. However, when the dosage of ozone is more than 8mg·L-1, it can obviously prolong the time of colour repetition of civilian water samples. The colour and turbidity of water samples increase slightly after 18 days. The changes of colour and turbidity are mainly caused by the living and reproduction of algae. High ozone dosage can maintain the stability of colour of water. Therefore, the ozone dosage of 8 mg·L-1 is recommended for municipal wastewater regeneration treatment

Keyword: reclaimed water, ozone oxidation, chromaticity, civilian, ozone

GEOTECHNICAL SLOPE PROTECTION MODEL BASED ON GENETIC ALGORITHM

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In order to study the rock slope protection model based on genetic algorithm, the theory of slope stability and evaluation theory were introduced. Slope engineering geological model framework, slope safety and stability mathematical mechanics model and slope evolution bifurcation model were studied. The application of artificial intelligence in slope stability was analyzed. Based on the theoretical results at home and abroad, a FCM clustering analysis based on genetic algorithm was obtained. Soft set theory and fuzzy soft set theory were introduced. An algorithm model for evaluating decision-making in slope management was proposed. An example analysis was carried out in combination with the developed system. The results showed that the evaluation system had obvious advantages. The model provides an effective reference for engineering decision-making.

Keyword: slope stability, genetic algorithm, soft set, fuzzy, decision making

FACTORS AFFECTING SLOPE REINFORCEMENT BASED ON DATA MINING ALGORITHM

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To change the design complexity of the conventional pile anchored bolt retaining wall, a method based on genetic algorithm was proposed to optimize the design of the retaining wall of the soil slope. According to the basic principle of genetic algorithm, a mathematical model for the optimization of double fulcrum pile anchor retaining wall was established. Taking the comprehensive cost per meter of anchor retaining wall as objective function, various strength and structural requirements of pile-anchor retaining wall were taken as constraints. Through the engineering example analysis, it was proved that the genetic algorithm can better solve the partial solution problem of traditional optimization. The design results show that this method can not only optimize the design variables intelligently, but also get a safe, reliable and cost-effective design. It is concluded that the slope reinforcement method based on data mining algorithm has some guiding significance for the optimization design of the whole bolt support structure.

Keyword: pile anchored bolt retaining wall, genetic algorithm, optimal design, structure, soil slope

RESEARCH ON GREEN TRANSITION DEVELOPMENT MODEL OF ENERGY ENTERPRISES--TAKING MINING INDUSTRY AS AN EXAMPLE

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To fully understand the development models of the green mining economy, this paper, based on the western externality theory, focused on a green mining construction case in China. Results haves shown that the green mining concept has early emerged in the mining industry and currently has reached a relatively high target, indicating the application value of the concept of green mining development. It is then concluded that the green mining development model is valid and effective verified by the green mining construction case.

Keyword: Green Transition Development, Energy Enterprises, Mining, Theory, Western

MATHEMATICAL MODEL FOR DETERMINING THE ECONOMIC WELL DEPTH IN MINE LOTS

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In order to better determine the economic depth of deep wells and improve the safety of exploitation in mine lot, this paper introduces the integration of the fuzzy mathematical model with the cost analysis into the mining process. The economic exploitation depth in the mine lot is determined by substituting the model test, providing the clues to the study. The findings show that the production situation of the coal mine S at a mining depth of 780 meters has reached a reasonable critical limit in the economy, and the economic exploitation depth can hit upon 900 ~ 1000 m. It is thus clear that the increase of mining depth will improve the probability of occurrence of production accidents; the economic exploitation depth of the mine can reach 900 ~1000 meters, if the mining continues to extend downward, a heavy loss will be suffered.

Keyword: Mathematical Model, Mine lots, Fuzzy, Depth, Economic

ANALYSIS OF DEEP FOUNDATION TREATMENT OF SOFT SOIL UNDER STRONG CORROSION CONDITIONS

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In the design and construction process of the foundation treatment of an example power plant, the content of chloride and sulfate ions in the groundwater in this area is tens to hundreds of times the content of other normal areas, which makes the corrosion damage more rapid. The residual strength of concrete after 8-20 years is only 5% to 10% of the original design strength, which will be a terrible consequence, meanwhile making it no longer possible to use concrete drilled cast-in-place piles for foundation treatment. For the dynamic compaction-soil replacement foundation treatment method, first, dynamic compaction is applied for the treatment of foundation, then the soil under the foundation with a thickness of 2m is excavated, and backfilled with graded crushed stones, layered rolling is conducted so as to ensure the compactness. With this method, the requirement for the quality of the bearing capacity of the foundation can be met, and the cost is economical and reasonable. The overall construction period is not too long, the destructive effect of the saline soil is avoided, and there is no need to worry about the corrosion effect of chloride ions and sulfate ions.

Keyword: Soft Soil, Strong Corrosion Conditions, Construction, Treatment, Sulfate

STUDY ON NETWORK PERFORMANCE OPTIMIZATION OF MINE GEOLOGICAL HAZARD MONITORING SYSTEM

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The rapid progress in sensor design, information technology and wireless network has paved the way for the development of wireless sensor network (WSN). WSN combines the virtual world with the real world on an unprecedented scale and develops a large number of practical applications, including civilian infrastructure protection, residential monitoring, precision agriculture, toxic gas detection and supply chain management. The wide application of WSN makes network performance optimization become a hot topic. Through the study of network coverage optimization algorithm and the improvement of routing protocol, the performance of WSN network for geological hazard monitoring is optimized.

Keyword: Geological Hazards, Monitoring, Performance Optimization, Protocol, Infrastructure

EXPERIMENTS ON HEAT TRANSFER CHARACTERISTICS OF SOIL-SOURCE HEAT PUMP SYSTEM IN WET ROCK AND SOIL

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Soil source heat pump system, the performance of ground heat exchanger directly affect the efficiency of heat pump system, the unsaturated soil and groundwater seepage and geological conditions, such as the influence on the performance of the buried pipe heat exchanger, the effect is more obvious in the group, the well through the micro test bench, ground-source heat pump system for double buried pipe system consisting of simple well group of system in heat transfer characteristics and to study the influencing factors of dry soil, intermittent operation when U on the heat exchange is higher than continuous running about 5%;When the operation time is 4h, 4h is a more suitable intermittent mode. The theoretical basis is provided for the design and optimization of the soil-source heat pump system.

Keyword: Soil source; Heat transfer characteristics; Moisture in geotechnical, Groundwater, Pipe

NUMERICAL SIMULATION AND STABILITY ANALYSIS OF GROUTING IN HYDRAULIC ENGINEERING

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Grouting, as a widely used foundation reinforcement technology in water conservancy projects, is an important engineering measure to solve problems such as dam foundation leakage and subsidence of goaf under long-distance water transfer engineering.At present, the grouting simulation and stability analysis of hydraulic engineering are faced with key problems such as concealed geological conditions, complex slurry diffusion rules, comprehensive evaluation of grouting effect and analysis of grouting stability.Based on the dam foundation grouting engineering of hydropower station and the grouting engineering of the goaf in the long-distance water transfer project across the basin, the theory and method of numerical simulation and stability analysis of hydraulic engineering grouting based on three-dimensional fine geological model are proposed, and the above problems are further developed. The research and analysis, using ANSYS software to simulate it, discussed the influence of drilling pressure, grouting hole design apex angle, hole wall clearance and other factors on the borehole inclination, and proposed the drilling anti-slope scheme which can be used in engineering practice.The experimental results show that the quality of the installation and the diameter of the installation should be smooth and solid before the installation of the equipment. The filling part should not exceed 1/3, and the hole should be drilled according to the design direction and the diameter of the drill should be straight. The length is gradually increased to about 10m. The hole wall gap is an important factor causing the bending of the borehole.When designing the grouting hole, the shape of the grouting hole should be designed as a vertical hole or a straight hole with a small apex angle as much as possible, so as to ensure that the drilling tool has a good anti-slanting effect; the use of a multi-drilling tool can be greatly reduced. The contact between the drill and the well wall reduces the phenomenon of stuck stuck or differential pressure stuck.

Keyword: Grouting Simulation, Bingham Fluid, Fuzzy Comprehensive Evaluation Of Grouting Effect, Fluid-Solid Coupling, Installation

RESEARCH ON AUTOMATIC ANALYSIS TECHNOLOGY OF REMOTE SENSING MONITORING BASED ON GIS

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GIS remote sensing technology provides a new generation of observation methods, description languages and thinking tools for scientific research, government management and social production. Therefore, we need to increase research and development of GIS. This paper proposes relevant methods, key points and problems to be solved through the combination of GIS remote sensing automation integration and integrated application. The remote sensing monitoring is the main data source and data updating method of GIS. At the same time, this paper is the automatic development and application of GIS. The research further supports the comprehensive development and utilization of remote sensing information.

Keyword: GIS, Remote sensing monitoring (RS), Automation, Information, Comprehensive

STUDY ON CALCULATION METHOD OF ECOLOGICAL ENVIRONMENT FLOW RATE OF WATER CONSERVANCY AND HYDROPOWER PROJECT IN COAL MINING AREA

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The ecological environment is the basic natural condition related to human survival and development. Protecting and improving the ecological environment is the basis for ensuring social and economic sustainable development and a virtuous cycle of water resources, especially coal mining areas.This paper hopes to understand and master all kinds of calculation methods for the discharge of ecological flow in water conservancy and hydropower projects at home and abroad, analyze the advantages and disadvantages and application scope of various methods, and propose a more reasonable quantitative calculation method of ecological flow in combination with typical water conservancy and hydropower engineering research.The calculations show that most of the aquatic organisms have excellent to excellent habitat conditions when the river's inner diameter flow is 60% of the average annual river flow.It is hoped that it will play a reference role for other similar water conservancy and hydropower projects in China, realize the coordination of water resources development and river ecological protection, implement ecological water conservancy and ecological hydropower model, and solve the ecological problems that restrict the development of water conservancy and hydropower in China to a certain extent.

Keyword: Ecological Environment, Water Conservancy, Hydropower, Coal Mining Area, Flow Calculation

APPLICATION RESEARCH ON FOREST CULTURE GROWTH AND HARVEST SIMULATION SYSTEM

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The rapid development of plantations has alleviated and met human needs to a certain extent, slowed the destruction of natural forests, and played an important role in the protection of the ecological environment. This paper establishes a model based on improved genetic algorithm for DBH growth. According to the parameters such as the initial DBH, age and density of trees, a growth model suitable for plantation in mountainous areas was established, after the competitive pressure classification and thinning selection, the DBH growth equation was used to simulate and calculate the DBH after n years. According to the anti-competitive pressure index, the number of thinning trees was 42, and the maximum total harvest in the sample plot was 17.036m3. The accumulation calculation model was used to simulate and predict the stand accumulation harvest.

Keyword: Growth and harvest simulation, Forest culture, Forest management, Simulate, Competitive

STUDY ON THE INDEX SYSTEM OF ENVIRONMENTAL IMPACT ASSESSMENT OF WATER CONSERVANCY PROJECTS

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The post-evaluation of the impact of water conservancy projects on the ecological environment provides scientific decision-making basis for the ecological and environmental management of water conservancy projects, which has important scientific significance and application value. The post-evaluation index system of the impact of the water conservancy project on the ecological environment was constructed, and the FME-AHP evaluation model was used to evaluate the ecological environment impact of the stone reservoir. AHP weighting method was used to determine the weight of each level, and the normal membership function was used to calculate the membership value of each level index to the next level. It can be seen from the membership degree of each grade of the ecological environment system that the maximum membership degree of the third grade is 0.4332, followed by the membership degree of the second grade, which is 0.3453. This indicates that the influence of stone river reservoir on the ecological environment is at the third grade (no influence) and tends to the second grade (with relatively adverse influence).

Keyword: Water conservancy project, Environment, Indicator, Degree, Ecological

ATMOSPHERIC QUALITY TESTING BASED ON DEEP LEARNING

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The purpose of this research is to apply the deep learning algorithm to the research of atmospheric quality detection. In this study, firstly, based on genetic algorithm and artificial neural network, the training process of genetic algorithm is optimized and improved, and a new hybrid accelerated genetic algorithm is proposed. Then combined with these algorithms, a universal air quality evaluation method for a variety of air pollutants is proposed. Taking the atmospheric quality inspection report of Dalian city for two months as the research sample, the hybrid accelerated genetic algorithm combined with the artificial neural network algorithm are applied to the BP neural network, which is optimized and improved to predict the atmospheric quality of the next month, and the prediction results are compared with the actual situation. The results show that the new algorithm is excellent in convergence speed and prediction accuracy and has certain value and prospect in the practical application of atmospheric quality prediction in the future.

Keyword: Deep learning, Neural network, Atmospheric quality, Genetic algorithm, Accuracy

SYSTEM SIMULATION OPTIMIZATION OF RESOURCE AND ENVIRONMENT EFFECTS OF CIRCULAR ECONOMY

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In order to study the system simulation optimization of resource and environment effects of circular economy, based on the theory of composite ecosystem, the dynamic model of composite ecosystem is established by using the method of system dynamics and software tools, and the development trend of future system status and main ecological risks are simulated by using the model. Based on the mechanism and characteristics of the ecosystem revealed by the dynamic model and the results of ecological security assessment, the countermeasures and measures for management and protection are put forward. The results show that GDP growth is very fast in the forecast, while net GDP growth lags far behind GDP. This shows that the loss of environment and resources and natural disasters is also increasing in the process of rapid economic development. Therefore, this kind of economic development is at the cost of excessive pollution of the environment and consumption of resources. Economic development has become a threat to the pressure and security of the entire urban ecosystem. It is necessary to find ways of energy recycling and sustainable economic development.

Keyword: Circular economy resources, GDP, System dynamics, System simulation and Optimization

EFFECT OF LIME-BONE RATIO ON COMPRESSIVE STRENGTH AND VOID FRACTION OF RECYCLED GREEN ECOLOGICAL CONCRETE

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In order to study the influence of ash-aggregate ratio on compressive strength and void fraction of recycled green eco-concrete, the green eco-concrete prepared with recycled aggregate is selected in this study, which conforms to the concept of sustainable development. The effective porosity, compressive strength and permeability coefficient of concrete are studied, so as to determine the impact of different lime-aggregate ratio and water-cement ratio on recycled green ecological concrete. It is found that with the increase of the ash-bone ratio, the compressive strength decreases, and the ash-bone ratio is negatively correlated with the compressive strength. With the increase of the ash-bone ratio, the effective porosity increases, and the ash-bone ratio is positively correlated with the effective porosity. The compressive strength increases with the increase of water cement ratio. The water cement ratio is positively correlated with compressive strength, and the influence of water cement ratio on effective porosity shows a complex trend of rising first and then decreasing. This study lays a foundation for choosing suitable green ecological concrete, applies green ecological concrete to practical projects, and verifies the feasibility of engineering application.

Keyword: Ash-Aggregate Ratio, Water-Cement Ratio, Green Ecological Concrete, Compressive Strength, Porosity

ENVIRONMENTAL MONITORING AND MANAGEMENT SYSTEM BASED ON K-MEANS ALGORITHMS

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In order to build a resource-saving and environment-friendly society, adjust the economic structure, change the mode of growth and improve the quality of people's lives, it is proposed that advanced network video surveillance system technology should be integrated into the related fields of environmental protection, and the comprehensive management of polluting enterprises and ecological environment should be closely monitored and managed. The work content and process of environmental protection standard management are sorted out, the difficulties and problems to be solved in the management of environmental protection standards are summarized, and the data and technical support needed for the informatization of environmental protection standards are discussed. The application technology of data mining is studied and combed, and K-Means algorithm is selected and improved to enable it to apply in the management of environmental protection standards. The demonstration system of environmental standard information management is constructed to provide reference for the construction of environmental standard information management system. The results show that through in-depth study on the framework of environmental video surveillance system, the system design scheme is formed, and the project implementation and operation maintenance management mechanism of environmental video surveillance system is established, which provides an effective overall solution for system implementation, optimization, improvement and application promotion.

Keyword: Environmental Monitoring, Management System, K-Means Algorithm, Video Monitoring, Application Promotion

THEME II

WATER CONSERVATION & MANAGEMENT

SEWAGE DISCHARGE MONITORING AND MANAGEMENT SYSTEM BASED ON K-MEANS ALGORITHMS

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In order to effectively monitor and manage the discharge behavior of enterprises to avoid water pollution and improve environmental quality, it is proposed to develop and design a sewage discharge monitoring and management system which meets the practical needs. The sewage discharge data management module, monitoring and management module, early warning management module, data statistical analysis module and system query function module are designed and developed. In addition, the development and design process of the functional module of the system is described by means of example diagram and time sequence diagram. On the basis of system function design, language and database technology are applied to realize the functional modules of the system. The function test and performance test of the system are discussed and analyzed, and a sewage discharge monitoring and management system that meets the actual needs of the sewage discharge monitoring department is developed. The results show that the sewage online monitoring and management system has the functions of real-time reception, treatment, analysis and early warning. Therefore, the system can help to make up for the loopholes in the sewage discharge monitoring and management of enterprises, effectively standardize the sewage discharge behavior of enterprises, and then improve the environmental pollution caused by excessive sewage discharge.

Keyword: Sewage Discharge, Monitoring Management, System Design, Management Module, Environmental Pollution

SEWAGE MONITORING SYSTEM BASED ON ARTIFICIAL INTELLIGENCE

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In order to avoid the problems of unstable water quality and high treatment cost caused by manual control of operators in wastewater treatment process, it is proposed to design and develop an intelligent wastewater monitoring system. According to the characteristics of numerous sewage treatment devices and unstable control indexes, the soft sensing technology of dissolved oxygen (DO) concentration is combined with computer automatic control technology to design intelligent monitoring scheme of sewage treatment process. The overall structure and function of the system are given, the control software, DO concentration soft measurement module and operation guidance are introduced, which lays a foundation for the concrete implementation of the system. The results show that the intelligent monitoring scheme and the aeration control method based on DO concentration soft measurement are applied to the sewage treatment field, and the hardware integration design and software configuration development are completed. The man-machine interface designed is intuitive and friendly, and the operation is convenient. After field installation and debugging, it is successfully operated in a sewage treatment plant, making the removal rate of effluent impurities reach the expected goal and achieve obvious economic benefits. Therefore, it is of great scientific significance and application value to strengthen the research and application of intelligent control of sewage treatment system in China.

Keyword: Sewage Treatment, Artificial Intelligence, Detection System, Intelligent Monitoring, Friendly

GROUNDWATER POLLUTION DIFFUSION MODEL BASED ON PARTIAL DIFFERENTIAL EQUATION

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The objective of the paper is to solve the problems of groundwater partial differential equation (PDE). The finite element method is one of the most important solutions to the problems, which is applied to obtain the approximate solution of functions. The paper has applied the toolbox method to solve the problems of groundwater in the engineering of the planar two-dimensional (2D) steady flow and the planar 2D unsteady flow. In addition, the planar 2D steady flow includes the specific problems of fully penetrating well with the preset depth of the confined aquifer and the steady flow of the unconfined aquifer. Besides, the PDE toolbox has been applied to solve the practical groundwater problems in engineering, the results have shown that in terms of solving the groundwater problems, the MATLAB PDE toolbox is more convenient, simple, and accurate compared with the method of directly programming the original program. Therefore, in case of problems that cannot be solved by the graphical user interface of the PDE toolbox, the command functions in the MATLAB toolbox could be applied to perform numerical calculations on the problems.

Keyword: Groundwater Pollution, PDE Toolbox, Steady Flow, Unsteady Flow, Numerical Calculations

OBJECTIVE FUNCTION OF WATER POLLUTION CONTROL MEASURES COST - EFFECTIVENESS OPTIMIZATION MODEL

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From the perspective of cost effect, raise the scientific nature of the sewage discharge standard, and discusses the practical use of pollution census data, through the construction of the sewage disposal investment and operation objective function calculated under different processing size and discharge standard of sewage treatment investment and operating cost, at the national level to improve sewage discharge standard cost and pollutants emission reduction effect. The research shows that the increase of investment and operation cost of sewage treatment plant decreases with the increase of sewage treatment scale. Based on the normal operation rate of sewage treatment plant (70%), the daily treatment capacity is 2.0×103～5. 0×105 t·d－1. For a sewage treatment plant of about 0 105 t·d-1, it is estimated that if the emission reduction effect is promoted to level I B according to the emission standard, each additional 10,000 yuan of investment can add 1.21 ~ 2.25t of COD and 0. 51 ~ 0. 95t, the displacement reduction of the newly added total phosphorus is 60.3 ~ 112.3 kg.

Keyword: Sewage treatment, Emission standards, Objective function, Cost effective, Reduction

RESEARCH ON UNDERGROUND SEWAGE MONITORING SYSTEM BASED ON INTELLIGENT ALGORITHM

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Using 4G network intelligence as the data transmission channel of field and monitoring center, a sewage treatment monitoring system with simple structure, stable performance, fast transmission rate and high accuracy is established.In this paper, USR-G780 DTU is selected as the transceiver of network equipment.PLC was initialized through ladder diagram programming, and information such as water quality parameters in sewage treatment and online operation status of each equipment was transmitted to the monitoring center, and remote connection between S7-1200 and the monitoring center was completed.In addition, Modbus RTU communication protocol is used to complete the communication between the field PLC and the slave station, as well as TCP/IP to complete the data network transmission, and finally complete the design of the whole communication process.The experiment proves that the data based on 4G intelligence is more accurate, the transmission efficiency is greatly improved, and the feasibility, accuracy and security of the system design scheme are also verified.

Keyword: 4G Intelligence, Underground Sewage, Monitoring System, Structure, Feasibility

RESEARCH ON THE GREEN DESIGN OF MODERN RANCHING SHANGHE PASTURE

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The design and construction of green pasture is of great significance to the development of China's dairy industry and even the country. It can not only save resources and protect the environment, but also provide high-quality milk for the Chinese people.Based on green design, green building, and grazing, on the basis of the relevant theoretical knowledge in modern animal husbandry shanghe farm as a case, through literature reading, field investigation, case analysis and the analysis of the interdisciplinary research, from two aspects: planning design and architecture design of studies to analyze the shanghe ranch pasture construction Q = 66.7 belong to the second star standard.The contents and methods of green pasture design are summarized, and the deficiencies of this paper are pointed out, and the future design and construction of green pasture are prospected.

Keyword: Modern Pasture, Green, High-quality Milk Source, Outlook, Design

COMPREHENSIVE PROCESSING OF MULTI-SOURCE GEOLOGICAL INFORMATION AND RESEARCH ON THREE-DIMENSIONAL METHODS

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In order to improve the productivity of human society, the research and exploration of geoscience can promote the harmonious development of human-earth relations and find a way to develop and utilize the earth resources under the premise of reasonable protection. In this paper, under the condition of not changing the earth projection mode and graphic content, the traditional 2d geological data is used to generate the map with positive stereovision effect through digital elevation model DEM, and then the data is fused with the corrected remote sensing image image to make the 2d geological map have significant positive stereovision effect. Research results show that by using light height is 45 °, 45 ° Angle, 0.05, and set up relief set at 3.2 degree when making the 3 d geological map spatial location and the traditional geological maps are accurate, no distortion, can output with geographic information encoding format of the maps, facilitate figure on any position of the spatial location, is to reduce working intensity, improve the efficiency of geological research, one of the effective methods of great use value.

Keyword: Multi-Source Information, Three-Dimensional, Data Fusion, Remote Sensing Image, Spatial Information

PREPARATION AND APPLICATION OF GREEN PERVIOUS CONCRETE

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With the rapid development of urbanization, construction projects are also moving forward rapidly. The research and promotion of green permeable concrete can not only meet the bearing capacity of People's Daily pavement, but also be a new type of concrete with environmental protection and energy conservation, which has very important practical significance for its research and application.Three different kinds of coarse aggregate are made up of waste concrete and waste brick after they are broken, their material properties are studied, three different materials are made according to their material characteristics, and their mechanical properties and physical properties are analyzed step by step: the relationship between water-cement ratio, effective void ratio and water permeability coefficient is obtained. Finally, according to the actual situation in nanning, a simulation of a processing plant for economic benefit analysis. The experimental results show that: the developed pervious concrete products have a pervious coefficient of 4 mm/s, a compressive strength of 25MPa, a water-cement ratio of 0.25 or 0.30 and an effective porosity of 13%. Therefore, it can meet the application requirements under different conditions in terms of pressure resistance and water permeability and has great advantages in terms of economy and environment.

Keyword: Recycled Pervious Concrete, Water Cement Ratio, Permeability Coefficient, Effective Porosity, Environment

RESEARCH ON FARMLAND SOIL ENVIRONMENT DETECTION TECHNOLOGY BASED ON PASSIVE RFID SENSOR

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In order to improve the long-term, environmental protection and traceability of the existing farmland environment wireless sensor network, a kind of farmland soil environment monitoring technology based on passive radio frequency identification (RFID) sensing tag was proposed to improve the situation. The communication performance and temperature and humidity measurement performance of the designed temperature and humidity sensor label were tested through experiments. The experimental results show that the temperature and humidity tested based on the passive RFID sensor tag are basically consistent with the traditional test results, with the temperature test error not exceeding 1.5% and the humidity test error not exceeding 1%.Compared with the existing methods of soil environmental monitoring in farmland, it has the advantages of convenience, low cost, long life and easy tracking and positioning of sensing data.

Keyword: Soil Environmental Testing, Wireless Sensor Network, RFID Sensor, Experiments, Humidity

WATER POLLUTION IN OLD TOWNS AFFECTS THE ENVIRONMENT AND ECOLOGICAL RESTORATION

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In order to solve the problem that the traditional activated sludge method is not effective in recovering the ecological process of water pollution in urban areas, the membrane bioreactor based sewage treatment process was studied experimentally.Two flat-plate ultrafiltration membranes were used to form the ultrafilter tank in the experimental device sampled, and the processes of nitrate cycle and sludge cycle were adopted. Ozonation and granular activated carbon filtration were adopted to treat the micropollutants.After repeated experiments in 17 experimental cycles, the obtained experimental data were analyzed, and it was found that under different sewage treatment loads, the treatment quality of the device could reach p concentration < 0.2mg /L and n concentration < 6mg /L.Compared with the traditional sewage treatment process, the experimental device can better remove the common nutrient rich substances and micro-pollutants in urban sewage, better control the greenhouse gas emissions, and meet the demand for efficient ecological recovery of urban sewage.

Keyword: Water Pollution, Surrounding Residents, Governance Measures, Water Ecological Restoration, Demand

COAL - ROCK INTERFACE RECOGNITION METHOD BASED ON IMAGE RECOGNITION

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In view of the existing problems of coal and rock recognition, the key technologies of coal and rock recognition based on image were studied. To improve the error of BP neural network, it is proposed to use wavelet transform to extract the characteristic values of coal and rock image and build a wavelet neural network with neural network to realize the recognition of coal and rock. Simulation results show that the improved wavelet neural network has a better recognition rate for coal and rock classification. When the number of hidden layer nodes is 30 and the number of iterations is 800, the recognition rate is ideal and stable, even reaching 100%. It can be widely used in specific underground coal mine conditions.

Keyword: Coal And Rock Image Recognition, Texture Features, Pattern Recognition, The Neural Network, Underground

RESEARCH ON THE EARLY WARNING MODEL OF ENVIRONMENTAL DESERTIFICATION BASED ON GRID SCALE

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Based on the causes of environmental desertification in the three aspects of climate, surface and human culture, the early-warning index system of desertification was constructed, and the early-warning model was established. ArCGis was used to quantify and rasterize the data of each factor. In the past 60 years, the area of desertification increased from 53,000 km2 to 114,000 km2, bringing great harm to the ecological environment and social economy. The early warning model was used to realize the desertification degree distribution on the raster scale (30m 30m) in the three periods in the research area. The results of the first two periods and the third period were respectively used for parameter correction and verification. On this basis, the development trend of desertification in the study area in 2021 under the condition of "intermittent water transfer" and "no water transfer" is predicted. The simulation accuracy of desertification degree distribution in the study area is over 90% through parameter correction and early warning model, and the early warning model has good applicability.

Keyword: Desertification, Early Warning Model, Grid Scale, Lower Tarim River, Applicability

RESEARCH ON GREEN BUILDING ENERGY MANAGEMENT BASED ON BIM&FM

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Aiming at the problem of Building energy consumption, based on the conceptual model of BIM (Building Information Modelling) and FM (Facility Management) and the concept of green Building, this paper expounds the advantages of BIM in energy Management and Building performance evaluation. Optimize from the strategic aspect through FM concept. Research shows that building information modelling (BIM) can play a key role in achieving close cooperation between customers and the construction industry, minimizing building energy consumption and achieving low-carbon and environmental goals.

Keyword: BIM&FM, Conceptual Model, Energy Management, Building Performance, Environmental Goals

STUDY ON MATHEMATICAL MODELING OF GEOLOGICAL HAZARD ASSESSMENT

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Zhijin county is one of the areas with fragile geological environment and frequent natural disasters in China. In recent years, with the intensification of human activities, the geological environment has been continuously damaged, causing geological disasters of different scales and serious life threats and property losses to people. Therefore, the purpose of introducing this mathematical model is to make the data more intelligent and professional by combining the data of geological disasters in mathematics. Based on the geological disaster monitoring, warning and decision support system of Guizhou province, this paper takes Zhijin county as the research object and USES Oracle database to manage the data by building and designing data structure and data model. The results show that geological hazard assessment can not only provide reliable data for analysis and research, but also provide reference value for similar database construction: (1) to construct spatial data model to realize effective correlation between spatial data and business data.(2) spatial entity objects have the characteristics of multi-dimension and polysemy, and "relational-object" mathematical modelling is adopted.

Keyword: Geological Disaster, Spatial Database, Data Model, Mathematical Model, Zhijin County

EFFECTS OF DRIP IRRIGATION ON WATER SAVING, FERTILIZATION AND GAS EMISSION IN ARID REGIONS

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Drip irrigation under membrane is a new agricultural technology that can achieve high yield and high efficiency. Through research, it can give full play to its potential of increasing yield and increasing efficiency in current practical production. This paper analyzed and summarized the yield limiting factors in current drip irrigation production by studying the yield potential and yield difference. Through model simulation and field experiments, the high-yielding and high-efficiency crop system was designed and verified. The effects of film mulching on greenhouse gas emissions were studied in a small ecosystem. Based on the experimental results show that nitrogen requirement for target yield and the regularity of nitrogen requirement of high-yielding maize optimized nitrogen management compared with farmers 80 kgNha nitrogen management to reduce nitrogen input, from 350 kgNhai 'down to about 270 kgNha' output from 11.7 Mgha 'increased to 13.8 Mgha', nitrogen partial productivity increased to 51.0 from 33.3 kg/kg , while apparent nitrogen loss decreased to 64.5 from 171.5 kgha , showed that optimized nitrogen management is feasible in practice. Mulching can reduce the ecological respiration rate, nitrogen fertilizer can promote the ecological respiration rate

Keyword: Mulch Drip Irrigation, Water-Saving Fertilizer, Gas Emission, Impact, Nitrogen Management, Designed

APPLICATION OF RB/SR RATIO IN PALEOCLIMATE INVERSION

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In order to study the intensity of chemical weathering during the formation of sedimentary strata in the site profile, the evolution of climatic environment in the region where the site profile is located was revealed. The rubidium (Rb) and strontium (Sr) values in the rubidium (Rb) and strontium (Sr) were tested and analysed Rb/Sr ratio has become an ideal alternative indicator in the study of regional environmental evolution. The Rb value in the strata section of zhongba site is low, and the average value (calculated based on 202 sample values, the same below) is only 80 g/g.The Sr value was higher, averaging 866 g/g.The average Rb/Sr ratio is 0.19.

Keyword: Rb/Sr Ratio, The Ancient Climate, The Inversion, Revealed, Chemical Weathering

DYNAMIC EVALUATION OF THE SUSTAINABLE DEVELOPMENT OF THE COMPLEX SYSTEM OF FOREST RESOURCES, ENVIRONMENT AND ECONOMY

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In order to solve the "resource crisis and economic crisis" of forestry resources and improve the ecological environment, the sustainable development of forest system is extremely urgent. Under the guidance of the sustainable development evaluation principle of FEES and the design principle of the index system, a quantitative and operable comprehensive evaluation index system is developed. Then, this evaluation method is applied to the evaluation of the sustainable development of FEES. Consistent matrix based on the model of analytic hierarchy process (ahp) to draw the following conclusion: feeds the sustainable development of Jiangsu province level value of 0.657, between 0.6 to 0.7, according to the feeds development sustainability evaluation standard, determine the feeds in the weak sustainable development state, in addition to the sustainable development of economy subsystem in medium weak state, forest resources subsystem, environment subsystem is in a weak sustainable development level, the results showed that the three subsystems development problems, and the system between the coordinated development degree is obviously insufficient.

Keyword: Sustainable Development, Forest Resources, FEES, Coordination, Development

APPLICATION OF FUZZY MATHEMATICAL EVALUATION METHOD IN CLASSIFICATION AND EVALUATION OF CONDENSATE GAS RESERVOIR

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In order to comprehensively reflect the influence of seven parameters, such as permeability, porosity, reserves abundance, reservoir depth, condensate oil content, edge and bottom water energy, and development mode, on the development effect of condensate gas reservoirs, fuzzy mathematics method was applied to classify and evaluate typical condensate gas reservoirs in China. The classification of condensate gas reservoirs considering the content of condensate oil and other single factors cannot objectively and accurately characterize the quality of condensate gas reservoirs. By selecting the relevant parameters of 18 condensate gas reservoirs in China, the comprehensive evaluation value B is obtained by using fuzzy mathematical evaluation method on the basis of single factor evaluation, and then the condensate gas reservoirs are divided into four categories: B 0.6, which is a type of condensate gas reservoir;0.5 B < 0.6 is a type ii condensate gas reservoir;0.4 B < 0.5, three types of condensate gas reservoirs ;B < 0.4 is four types of condensate gas reservoirs. The practice shows that the factors considered in this classification and evaluation method are more comprehensive and the evaluation results are more scientific, so the evaluation results can lay a theoretical foundation for the evaluation of the development effect of condensate gas reservoirs in China.

Keyword: Fuzzy Mathematics Evaluation Method, Condensate Gas Reservoir, Classification Evaluation, Depth, Oil

RESEARCH ON ENVIRONMENT MONITORING SYSTEM BASED ON DATA MINING

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In order to meet the requirement of intelligent and digital Marine engine room equipment monitoring, a set of data mining based Marine engine room monitoring system has been developed for the conventional engine room monitoring system. This system can not only realize the monitoring function of the conventional engine room monitoring system, but also integrate the intelligent data mining technology to realize the online data mining and analysis, and expand the connotation of the monitoring system. Design a ship engine room monitor and control system based on data mining parts of hardware and software, suitable for ship engine room is given the clustering algorithm of data mining, and mining is studied by using the algorithm combined with testing result data analysis: the host load SMCR interval in 100% to 30% SMCR, contains 44915 valid data, shows that the host in the range. The results show that the system is stable and reliable, the interface is friendly, and the mining method is reasonable.

Keyword: Ship, Engine room monitoring, Data mining, Clustering algorithm, Interface

STUDY ON ENVIRONMENTAL PROTECTION HYBRID ELECTRIC VEHICLE BATTERY FAULT DIAGNOSIS AND HEALTH INNOVATION MANAGEMENT

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For the study of fault diagnosis in a hybrid car maintenance and repair in the actual use of the importance of using Matlab/Simulink software for the simulation platform, establishing simulation model of hybrid electric vehicle battery management system as the core, and take the battery management system fault diagnosis simulation of hybrid electric vehicle battery management system of different fault conditions, the response of the system are analysed be seen from the simulation results, the establishment of the system model can control the error within 5%, meet the research of battery management system for battery SOC estimation precision, achieve the estimation precision of the true features of battery, battery management system and the ontology can also get a better match, for common battery failure can also make more accurate judgment.

Keyword: Hybrid Electric Vehicle, Battery Management System, Fault Diagnosis, Health Management, Ontology

STUDY ON THE INDICATION OF ORE BODY VARIABILITY BASED ON VARIOGRAM

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In order to determine the variation of ore body and the degree of variation is the key factor to determine the exploration network, the reasonable study on the variation of exploration network of ore body. The variogram has been proved to be one of the best methods to characterize the ore body variability. Therefore, based on the variogram, this paper studies the ore body, analyzes the influencing factors from three aspects of the shape, thickness and taste change of the ore body, and then puts forward that the anticlinal fold, interlayer structure, magmatic rock and surrounding rock lithology affect the ore body form. Structure, fluid and chemistry affect the thickness of ore body; Tips on how space affects taste.

Keyword: Variation Function, Exploration Network, Ore Body Change, Chemistry, Fluid

RESEARCH ON SEWAGE TREATMENT COMPUTER SYSTEM BASED ON ADP ITERATIVE ALGORITHM

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In order to solve the problem of wastewater treatment control, a computer system based on ADP iterative algorithm is proposed. Sewage treatment system is a highly nonlinear industrial process control system, because of the uncertainty of the water into the water, into the component, and the surrounding environment such as weather, temperature and PH influence factors such as mixture, the sewage treatment process is extremely complex, present a big time delay, strong coupling, time-varying and serious interference, etc. Therefore, this paper aims to control and optimize the concentration of dissolved oxygen and nitrate nitrogen in the process of sewage treatment, proposes an optimal control strategy for sewage treatment based on the iterative ADP algorithm, and realizes the online control and optimization of sewage treatment by combining the basic principle of adaptive dynamic programming and the characteristics of neural network.

Keyword: Sewage treatment, ADP Iterative Algorithm, Network, Strategy, Programming

RESEARCH ON SEWAGE MONITORING SYSTEM BASED ON INTERNET OF THINGS

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In order to protect the environment and optimize the human living environment, the research on the Internet of things of sewage monitoring system has achieved this goal.In recent years, with the rapid development of the Internet of things and network technology, the application of network monitoring technology in the Internet of things to achieve unattended has become a trend of future development. Based on the Internet of things, the sewage control system with remote monitoring function is studied. The monitoring system adopts a simple, efficient and easy-to-operate B/S mode. Apache server, HPH language and MySQL database are selected as the necessary materials to build the development environment. Because the system USES AJAX technology to realize the display without refreshing information, users can browse the data and running information of the site through the browser Web page and realize real-time monitoring. The camera records the field information, and the user can realize video monitoring on the Web page.

Keyword: Internet of Things, Remote Monitoring, B/S, Apache, HPH, MySQL

STUDY ON ANCIENT CHU TOWN URBAN GREEN SPACE EVOLUTION AND ECOLOGICAL AND ENVIRONMENTAL BENEFITS

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In order to deeply analyze the law of urban green space evolution, this paper discusses the change of urban ecological environment effect brought by green space evolution and its interaction and mechanism. Grind Gui, based on 2007-2018, four remote sensing image, the application of remote sensing and GIS spatial information technology, the basic data and sample plot survey, realized based on green space classification diagram, the landscape index, gradient analysis, spatial dynamic analysis methods, such as statistics, quantitative analysis of the urban green space landscape spatial structure evolution and its law of development, with the urban development of green space change of gradient explicit study can be a deeper understanding of the process of landscape pattern, provides the basis for the research of function. The experimental results show that from 2,031 square kilometers in 2007 to 1,364 square kilometers in 2018, the proportion of farmland in urban suburbs decreased by more than 50%. Urban green space has a rising trend in the core urban areas, but changes in the fringe urban areas and suburban areas are complex. With the advancement of urbanization, the total vegetation coverage has decreased by more than 50%, in which the area with high and full vegetation coverage levels has decreased significantly, while the area with no, low and medium vegetation coverage levels has increased.

Keyword: Green space, Evolution, Ecological and Environmental Benefits, Vegetation, Farmland

ENVIRONMENTAL MONITORING WIRELESS SENSOR NETWORK NODE ENERGY TECHNOLOGY ANALYSIS

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At present, the energy problem has become one of the hotspots in the research of wireless sensor networks. In this paper, the design scheme of low-power technology is adopted by using real-time clock to control the on-off power supply, so that the dormancy power consumption of sensor nodes can be reduced to uA level, and the energy consumption of sensor nodes can be solved to the maximum extent. At the same time, the sensor interface of the sensor node designed in this paper has universality and is very suitable for environmental monitoring applications. After systematic test, it can be proved that the maximum working current of sensor nodes can reach 34.75mA and 0.0008mA in the system sleep state. If the acquisition is carried out every half hour, each time only needs 150s, and the power consumed by the sensor node every half hour is 1.4454mAh. The capacity of lithium battery is calculated according to the nominal value of 3800mAh. Without considering the self-discharge of the battery, the sensor node can work for 55 days without energy supplement. It is further verified that the wireless sensor network nodes can meet the requirements of long-term environmental data acquisition tasks in the field.

Keyword: Environmental Monitoring, Wireless Sensor, Node Energy, Acquisition, System Sleep State

SUSTAINABLE AND ADAPTABLE MEASURES TO ADDRESS CLIMATE CHANGE IN CHINA：A STRATEGIC ANALYSIS IN URBAN PLANNING

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Climate change is a global phenomenon impacting on all countries. In order to mitigate against the impacts of climate change, it is necessary to take measures to minimise the impacts that will affect the human habitat especially the built environment in the future. In the light of the inequality of development over the world, including varying rates of economic growth, it will be difficult for developing countries to combat the effects of climate change due to the limited capital investment, varying levels of leadership and political commitment and technology levels. All the countries have to share responsibility for the historical and current global emissions of greenhouse gases originating from both developed and undeveloped countries.

Keyword: Climate Change, Sustainable, Adaptable, Measures, Global Emissions, Greenhouse Gases

ANALYSIS OF THE COMPLEMENTARY PROPERTY OF SOLAR ENERGY AND THERMAL POWER BASED ON COUPLING MODEL

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To further improve the traditional coal-fired power generation, lower the pollutant emission, and comprehensively implement the energy saving and emission reduction policy, the view that the solar-assisted coal-fired power generation system is the complementary and integrated power system of clean energy and traditional fossil energy has been put forward in the paper. Due to the complexity of solar-assisted coal-fired power generation system, the unified integration principles of the system haven't been established yet. On the basis of the energy conversion happened in the solar-assisted coal-fired power generation system and the simple coal-fired power generation system, a physical model of two different power input of the power generation system is established, the instantaneous photoelectric efficiency expression of solar-assisted coal-fired power generation system is obtained, and the major factors that affect the solar-assisted coal-fired power generation system are concluded. The results provide the practical in-progress solar-assisted coal-fired power generation system with a basic theoretical basis. Therefore, on the one hand, the solar-assisted coal-fired power generation system helps the large-scale and low-cost development and exploitation of solar thermal power systems; on the other hand, it accelerates the implementation of energy saving and emission reduction policy in traditional coal-fired power plants. It is an effective solution to the problems of ever-increasing environmental pollutions and the limited traditional fossil energy supplies.

Keyword: Solar Power, Photo-Coal Complementary Power Generation System, Point-Line Coupled Focusing Solar Energy Collector System, Thermal Performance, Fossil Energy

CARBON REGULATION AND TRADING SUPPLY CHAIN FACTORY PRODUCTION AND EMISSION REDUCTION DECISION SYSTEM

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In order to optimize the carbon tax constraints and consumer business strategy under the influence of the environmental protection consciousness, this article into the time factor, by means of differential game, based on supply chain upstream enterprise R&D subsidy object under long-term carbon tax policy when there is a R&D subsidy within no cooperation between the manufacturers in emission reduction technology research and development, and cooperation and complete cooperation research and development of three cases of decision making and a carbon tax, R&D subsidy levels of environmental effects, research and development effect and economic effect, the carbon tax policy, for manufacturers to choose development strategy to provide advice.

Keyword: Supply Chain, Carbon Tax Policy, Emission Reduction Strategy, Decision-Making Optimization, Economic Effect

AIR TREATMENT EFFECT ASSESSMENT FOR IMPROVING VEHICLE EMISSION STANDARDS COUNTERFACTUAL ANALYSIS BASED ON MACHINE LEARNING

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Automobile exhaust has become an important source of urban air pollution. Improving vehicle emission standards is one of the key measures to control air pollution. This paper takes Tianjin's implementation of the “National V” motor vehicle emission standard as an example. The study found that this policy is an indispensable condition for improving air quality, which helps to reduce carbon monoxide (CO) and nitrogen dioxide in the atmosphere (no2.), but the effect on the treatment of atmospheric pollutants such as particulate matter (pm2.5) and respirable particulate matter (pm10) is not significant. It can be seen that while continuously improving the emission standards of motor vehicles, it should also cooperate with the improvement of public transportation systems, the development of new energy vehicles and alternative fuels, and the targeted regulation of air pollution control measures in other high-energy-consuming industries.

Keyword: Motor Vehicle Emission Standards, Co, No2, Pm2. 5, Counterfactual Analysis

STUDY ON DYE-SENSITIZED SOLAR CELLS BASED ON TIO_2 COMPOSITE NANOMATERIALS

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With the continuous development of nanomaterials, how to improve the conversion efficiency of DSSCs has been the focus of scholars. Nano-TiO2 material is a wide bandgap semiconductor with a band gap of 3.2e V. It exhibits good performance in dye adsorption, charge separation, electron transport, etc., and has good chemical stability and strong acid and alkali resistance. Sex, therefore, it was always the material of choice for the preparation of photoanodes. In this paper, different thicknesses of TiO2NRs barrier layers were prepared on FTO substrates by solvothermal method and two-step spin coating method, and their electrochemical and photoelectric properties were tested by using relevant test instruments. The effects of barrier layers with different thicknesses of TiO2NRs on the performance of DSSCs were analyzed. The anatase TiO2NRs with an average length of 28±10nm and a diameter of 2±1nm were obtained. The concentration of TiO2NRs was 0.245mol·L-1 (TiO2NRs-12). When the thickness is 88.58nm, DSSCs exhibit the best photoelectric.

Keyword: Dye-Sensitized Solar Cell, Tio2 Nanomaterial, Photoanode, Photoelectric, Properties

EFFECTS OF DIFFERENT MICROBIAL TREATMENTS ON THE REMOVAL OF PETROLEUM HYDROCARBONS FROM SOIL

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In order to study the effect of different microbial treatment methods on the removal of petroleum hydrocarbons in soil, microbial remediation of zichang oil-polluted soil in northern shaanxi province was studied by means of bacterial inoculation and biological stimulation. By using infrared spectrophotometry to determine the removal effect of different treatment methods on petroleum hydrocarbon, the best scheme for remediation of oil-polluted soil in northern shaanxi province was determined. In the restoration process, the maximum possible count method (MPN), PCR-agar-electrophoresis, and PCR - DGGE were used to determine the number of oil-hydrocarbon degrading bacteria, catalytic genes, and soil microbial diversity to study the ecological effects of soil microorganisms. The results showed that the remediation effects of different biological treatments on oil-contaminated soil were as follows: biological stimulation (N and P nutrients were added), > biological enhancement (degradation bacteria were added), > and others. There was a positive correlation between the degradation rate of petroleum hydrocarbon in soil and the catalytic gene content of degradable petroleum hydrocarbon. During the restoration process, the number of petroleum hydrocarbon and alkane degrading bacteria in soil was significantly higher than that of pahs degrading bacteria. The addition of exogenous degrading bacteria sz-1 could significantly improve the diversity of soil bacterial community. The results are helpful to understand the change of microbial ecological effect in bioremediation of petroleum soil.

Keyword: Petroleum Contaminated Soil, Microbial Remediation, Maximum Possible Count Method (MPN), Degradation, Hydrocarbon

THEME III

GEOLOGY, ECOLOGY & LANDSCAPES

PHYTOTOXIC EFFECTS OF BIOLOGICALLY TREATED AND UNTREATED WASTEWATER FROM PULP-AND-PAPER INDUSTRY ON GERMINATION AND GROWTH OF BRASSICA CAMPESTRIS

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Pulp-and-paper industry consumes large quantities of fresh water during pulp processing and results in the release of highly contaminated wastewater with higher biological and chemical oxygen demand (BOD and COD) and color. Different treatment processes like physicochemical, biological and integrated ones have been employed with each having advantages and disadvantages. No study has reported comparative efficacy of individual and/or sequential biological treatment and subsequent effect of treated wastewater on crop growth. Present study was conducted to elucidate the effect of three biological treatments viz. aerobic, anaerobic and sequential i.e. anaerobic and aerobic in alleviating detrimental effects of wastewater, checked through comparative phytotoxic effects of treated and untreated wastewater on germination and growth of mustard (Brassica compestris). Electric air diffuser and minimal salts medium in sealed plastic bottles at control temperature were used for aerobic and anaerobic treatments, respectively. During sequential (anaerobic and aerobic) treatment, significant reduction in COD (81%), total suspended (65%) and dissolved solids (60%) and turbidity (68%). TSS removal efficiency of aerobic treatment was found to be higher than anaerobic treatment while COD, TDS, and turbidity were effectively removed by anaerobic process. Sequential treatment greatly reduced phytotoxity of wastewater and showed the highest germination percentage (90%) compared to aerobic (60%) and anaerobic (70%) alone and from untreated wastewater which showed only 30% germination. In conclusion, the sequential treatment could be a more effective strategy in removing contaminants from pulp-and-paper industrial wastewater compared to aerobic and anaerobic treatments alone as clear from improved germination and growth of mustard.

Keywords: Wastewater, Pulp-and-paper industry, COD, TSS, TDS, Phytotoxity, Mustard (Brassica compestris), Turbidity

EVALUATION VARIABILITY OF SALINITY AREA IN KIEN GIANG PROVINCE

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In recent years, the Kien Giang provincial production has changed on the production structure with the transition from rice cultivation to brackish water shrimp farming with high profits, leading to many conflicts. While some areas have stabilized with the rice production for 2 or 3 crops, the Southwest part of Kien Giang province (Ha Tien Quadrangle) has conflicting of the water sources for rice cultivation and brackish shrimp farming. Besides, the operation of existing irrigation works (with the main task of preventing salinity and keeping fresh) is complicated with satisfying many different demands on water quality. Research on the variation of saline intrusion area has assessed the fluctuation of saline intrusion according to agricultural and people's impacts on Kien Giang province. The study results show a significant increase in saline area with the extending into fresh land (rice field), when priority is given to increasing the area of brackish water shrimp farming with longer opening times for taking more saline water. At the same time, the research results showed the increase of salinity intrusion level when took into account the upstream water use, climate change and sea level rise. These researches are the basis for the adjustment of the province's production and land use development planning.

Keywords: Carbon nanotubes risk assessment risk perception constraints workers

COTTON (Gossypium hirsutum L.) RESPONSES TO EXOGENOUSLY APPLIED KAOLIN AND JASMONIC ACID UNDER DROUGHT STRESS

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Increasing population has created a great pressure on food security and agricultural productivity. Increase in population is causing a competition for land, water, energy and other resources that contribute in food production. Present water shortage is one of the primary world issues and according to climate change projections. Climate change will significantly impact agriculture by increasing water demand, limiting crop productivity and by reducing water availability in areas where irrigation is most needed or has comparative advantage. Cotton is considered as world's most valuable fiber crop. It can tolerate drought stress, but growth, yield and quality is drastically affected. Plant growth regulators technique can be helpful in alleviating the adverse effects of abiotic stress including drought. A field experiment was conducted at MNS-University of Agriculture Multan to investigate the role of exogenous application of kaolin and Jasmonic acid under water deficit condition. Seeds of two cotton genotypes viz. NIAB-878 and SLH-19, characterized as drought tolerant and sensitive, respectively was be used for this study. Skipped Irrigation were used at flower stage under both normal and water stressed conditions using water spray as a control for 21 days. The application of kaolin and jasmonic acid was applied in Individual or combined foliar spray of kaolin (5%, w/v) and jasmonic acid (100 µM) under both normal and water stressed conditions using water spray as a control. Field experiment were Randomized complete block design under split split arrangement with thrice replications. Kaolin (5%, w/v) and jasmonic acid (100 µM) was applied through foliar application to 21 days stress condition. The final results showed that the 21-days were skipped Irrigation significantly decreased relative water content, SPAD value, photosynthetic rate, the quantity of cotton, cotton yield and its related traits including boll number per plant, the 1,000-seed weight and seed cotton yield. Foliar application of kaolin and jasmonic acid improved vegetative and reproductive development of both cotton varieties in normal and water deficit stress. Among the treatment's exogenous application of jasmonic acid @ 100 µM performed better both under normal and water deficit stress conditions. Negative effects of water deficit stress may be minimized by the foliar application of jasmonic acid. These results are of practical applica¬tion for farmers in arid- and semiarid regions with low water supply when irrigating cotton lands in order to reach an acceptable cotton yield. The collected data was analyzed statistically and the means for water stress levels and varieties were compared by applying Tukey's HSD. The treatments comparison was done by using LSD by applying Fisher's analysis of variance technique. Least significance difference test was applied α 5% level of comparison.

Keywords: Anti-transparent, Gossypium hirsutum, Growth, Gaseous exchange, Growth regulator, Skip Irrigation and Water Relat

PERFORMANCE BENEFITS OF INTEGRATED OPERATION FOR MULTIPURPOSE RESERVOIRS SYSTEM

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This study aims to explore the potential performance benefits of integrated operation of multiple reservoir systems. For this, the Pong and Bhakra reservoirs in the Indus Basin of northern India which provide irrigation, hydropower, and flood control for Punjab, Haryana, and Rajasthan states were used as case studies. The total demand from both reservoirs were allocated to each reservoir using the space rule. Using genetic algorithms, zone-based optimised rule curves were developed for the reservoirs based on multipurpose benefits of irrigation, hydropower generation and flood control. The results of extensive reservoir simulations using these rule curves showed that integrated operation would improve time-and volume-based reliability of each reservoirs, when compared to standalone operation. However, the most significant impact found was that vulnerability reduced from 40% to 20% at Pong while in Bhakra vulnerability reduced from 54% to 51%. These represent major reductions when compared to individual operation. Also, as expected, flood control was substantially enhanced during the flood season. Evidence from the flood freeboards suggests that reservoir levels were reduced by -12 m at Bhakra and -3 m at Pong all of which are beneficial for the safety of the reservoirs and their watershed areas. Based on the findings, it is surmised that integrated operation could provide more synergistic gains with the reservoir system than standalone operations. These results can potentially serve as tools for designing adaptive mechanisms for water security challenges during e.g. climate change.

Keywords: Reservoir, integrated operation, GA, space rule, optimisation, multipurpose reservoirs

REUSE POTENTIAL OF LAUNDRY WATER IN PRODUCING LIQUID ORGANO-MINERAL FERTILIZER USING VEGETABLE WASTE

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Over the years, the increase of greywater disposal coincides with the rapidly growing world's population. Current literature shows a high valuable fertilizing potential for laundry greywater owing to its salts and nutrients contents. Thus, the objective of this research is to determine the reuse potential of laundry greywater in producing a liquid organo-mineral fertilizer using vegetable waste. Vegetable waste was dissolved in both laundry water and tap water at a ratio of 1:10 with three replications each before being subjected to an incubation period of 15 days. The experimental design was Completely Randomized Design (CRD). Data on pH, electric conductivity (EC), concentration of nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sodium (Na), manganese (Mn), copper (Cu), zinc (Zn) and iron (Fe) of each sample were analysed by using Atomic Absorption Spectroscopy (AAS) at the end of the experiment. Results were analysed using SAS and the treatment means were compared by using Tukey test at 5% significant level. Significantly, the overall data revealed that fertilizer produced by tap water contained higher concentration of N, P and Na nutrients while fertilizer produced by laundry water contained higher Ca nutrient. Hence, fertilizer produced from laundry water can be suggested as a liming source meanwhile provide certain level of main nutrients to replenish nutrients in soil which are needed by plants. Further studies on the effects of the laundry water fertilizer on plants growth and possible microorganism contamination are needed.

Keywords: Laundry greywater, vegetable waste, organo-mineral fertilizer, electric conductivity, iron

DETECTION OF MICROFIBER PLASTIC ON THE BODIES OF WATER IN SAN JUAN, LA UNION

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Microfiber plastics are very small threadlike fibers that come from synthetic fabrics like polyester, acrylic, nylon and rayon which are forms of plastics and produced from chemicals. These make up most of the clothing worldwide because it is cheap. Generally, having microfiber plastic in bodies of water is a pollution which can poison the food chain. Microfiber plastics are non-biodegradable, it can be swallowed by marine creatures and these contaminated fish or marine foods could be consumed by humans. Specifically, the presence of microfiber plastic in the marine waters of San Juan, La Union can be harmful to the marine animals and the residents in the area. With this concern, the researchers aimed to detect the presence of microfiber in the marine bodies and marine organisms of San Juan, La Union. This study employed scientific research, investigative and descriptive types of research were made in order to detect the presence microfiber plastic. The researchers conducted filtering of saltwater from the shores of Urbiztondo, San Juan and discovered the presence of 5mm to 10mm microfibers at a degree of 0.6gms in 100m. They also dissected a number of marine organisms but there were no traces of microfibers in the intestines of the samples. Therefore, concluding that microfiber is present in the marine waters of San Jaun La Union due to improper disposal of garbage, but absent from its marine organisms because the degree of microfiber plastic contamination is somehow still not enough to cause harm in the marine life.

Keywords: microfiber plastics, food chain, worldwide, saltwater, marine organisms

BIOLOGICAL OXYGEN DEMAND WASTEWATER ANALYSIS OF LORMA COLLEGES BASIC EDUCATION SCHOOLS

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Wastewater has been a global problem for some quite a time now and people do not give much enough attention regarding this issue. Humans have a high dependence on water and clean water is becoming a scarce commodity in many populated areas of the world. Thus, this study aimed to determine the Biological Oxygen Demand of LORMA Colleges Basic Education Schools. Specifically, it sought to answer the following questions: (a) What is the current status of the wastewater in LORMA Colleges Basic Education Schools? (b) What wastewater school-based program could be implemented? This observational research study will not be having any respondents since it only focuses on testing wastewater. The data was analyzed through the 5-Day BOD test. The current wastewater exceeded the parameters mandated by the Department of Environment and Natural Resources. Thus, the researchers recommend the implementation of the Aqua Care: Washing Wastewater Program. The researchers concluded that the wastewater failed the parameters and intervention needs to be enforced.

Keywords: wastewater, Biological Oxygen Demand, wastewater analysis

SYNTHESIS AND CONTROL 3-DOF PLANAR PARTLY DECOUPLED PARALLEL MANIPULATOR

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This paper deals with a new planar parallel manipulator, kinetic energy of this mechanism, designing controller. The translation movements are decoupled from rotation. The control algorithm of parallel robot satisfying partial decoupling between translation and orientation degrees of freedom is synthesized. Simulation result of control algorithm in desired trajectory of end-effector of robot is shown. Here parallel manipulator control algorithm while intersecting singular zones is considered.

Keywords: Degree of freedom, Singualrity, Decoupled manipulator, Kinetic energy, Control algorithm

STUDYING THE FORMATION OF THE ENVIRONMENT FOR GASEOUS CARBONIZING WHEN USING SOME DIFFERENT GASES

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In this paper, the results of an overview of the formation of carbon permeability when using a number of different permeable gases are presented. The most common permeable gases are “endo” gas and methanol. However, with conditions in Vietnam with an extremely abundant gas source, the use of imported gases will cause enormous waste. Therefore, in this study, we introduce the formation of the permeability medium of two “endo” and methanol gases. In addition, the authors also presented an analysis of the formation of seepage environments from Vietnamese gas sources. Research results show that the formation of permeability medium is suitable for imported gases. Experimental results show that the use of Vietnamese gas for permeability is of the same quality as imported gases.

Keywords: Laser Technology, Application Technology, The Machine Manufacturing Industry, An Overview Study

OPPORTUNITIES AND CHALLENGES FOR VIETNAM EDUCATION BACKGROUND TOWARD EDUCATION 4.0

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In society 4.0, the living, learning, and doing environment is no longer as separate as it is today but will integrate to cater to the individual and work needs 24/7/365. The geographical boundaries between people and work will gradually be erased when humans can control the system as well as robots by remote thinking. Talking in meetings between real people and holograms (3D images) deletes geographical and psychological boundaries in human interaction. In the industrial phase 4.0, competition in the labor market will be global and borderless. The 4th industrial revolution is directly affecting individuals, families, and businesses. Especially, the biggest influence is the educational environment - the place to directly train human resources for industrial 4.0. Industry 4.0, as well as people in society 4.0, are bringing many challenges to education to meet the development needs of every nation. Education in advanced countries is currently at 3.0 and is building infrastructure as well as a mechanism to move through 4.0. Countries in Southeast Asia are drastically improving national education to welcome industry 4.0. Meanwhile, in Vietnam, the majority of education has not passed 2.0. The article focused on highlighting opportunities and challenges for Vietnamese education in the trend of the fourth industrial revolution. In addition, the paper also proposes orientations for Vietnamese education to adapt to changes in world education on education 4.0.

Keywords: Opportunities and challenges, Vietnam education, education 4.0, industry 4.0

STUDY ON COASTAL EROSION SIGNS THROUGH LANDSCAPE SURVEY APPLYING UNMANNED AERIAL VEHICLE (UAV) AERIAL PHOTOGRAPHY - A CASE STUDY ON COASTAL SETTLEMENTS IN HUALIEN, EAST TAIWAN

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Under the combined effects of sea level rise due to global climate change, increased intensity and frequency of rainfall patterns in the context of extreme climate, as well as human efforts in coastal development, protection, and other factors, in this study, for the purpose of establishing a comprehensive costal erosion sign evaluation model, the current landscape conditions of several settlements on the east coast of Taiwan have been acquired one by one through UAV side photography, orthorectification, and establishing a digital terrain model, for interpretation of the indices of erosion signs and evaluation of disaster inducing risks in coastal settlements. The research results show that collecting landscape data in a quick, comprehensive, and effective manner by applying UAV could be helpful for identifying accident inducing risks in coastal settlements, in order to collect information about highly sensitive, fragile, and unstable coastal areas, which would have important influence and provide an administrative basis for overall coastal policies.

Keywords: UAV, landscape survey, coastal erosion sign, accident inducing risk in coastal settlements

GEOLOGICAL, HISTORICAL, CULTURAL AND CONTEMPORARY SIGNIFICANCE OF BRINE SEEPAGE IN ARUNACHAL PRADESH, INDIA

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Arunachal Pradesh is largest state in the Northeast India. Geologically it is mainly a part of Himalayan Mountain system besides Naga-Patkai Range system and recent plain formed by Brahmaputra. Naga-Patkai range covers Longding, Tirap, Changlang districts of Arunachal Pradesh. In these areas there are records of historical importance of brine seepage. In Tirap, kingship and territorial control flourished due to trade of salt with neighboring Assam and other adjoining areas. Salt making industry prospered till arrival of cheap sea salt from coastal areas through good transport system. There is no record of amount or estimates of production of salt from this Patkai hill region. Occurrence of brine water as connate water in the marine sediments is significant in the realm of geological investigation in Arunachal Pradesh. Brine seepage points in Tirap district have been located in the Disang series belong to Upper Cretaceous to Middle Eocene Age. A study on the depositional mechanism of these sediments suggests that deposition occurred in near shore-shallow marine environments through transportation of sediments from various directions through suspension, in a fluctuating energy regime. These ophiolite slices of oceanic crust and upper mantle obducted into the Indian continental margin and a form part of tectonic history of the Indo Burman orogenic belt. Deposition of the Disang sediments followed by formation of an island arc separating the sedimentary basin into eastern and western sub-basins is the source of brine seepage in various parts of Tirap district. Present preliminary study in the district of Tirap, Arunachal Pradesh is aimed in establishing the coherence between historical records and ground reality. Ten field sites were visited in by taking assistance of senior persons of each locality. The sites shown by the local guide have legends of their own. Britishers had put rims of tree trunk to maintain the sites. Some of those are still present and in some cases there is no sign of it, as the sites are buried. The exact locations could be pointed out with the help of portable EC meter. Some of the sites have no significance due to low salinity but could be located with EC meter. These sites have link to heritage of native communities. These spots can be developed as geoheritage sites and used for tourism. Secondly, small scale production with traditional technique by using bamboo fire and packaged with generic label on it for the tourists as memorabilia will enhance the value of tourist spots.

Keywords: Salt making, buried, bamboo, tourist spots, memorabilia

GREEN SUSTAINABLE AIRPORTS: THE DEPLOYMENT OF RENEWABLE ENERGY AT VIETNAM AIRPORTS. IS THAT FEASIBLE?

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The aviation industry is responsible for up to 2.5 per cent of global CO2 emissions, according to the UN Intergovernmental Panel on Climate Change. Although the aviation sector will not transform to an environmentally friendly industry overnight, airports have the ability, the means and the opportunities to invest in sustainable development. Particularly, renewable energy could be an alternative scenario to escape the dilemma between the urge of high growth and the concern on environmental damage in air transport. The benefit is that renewable energy increases the options available to airports for their energy needs. There also provides with other advantages, i.e. producing fewer emissions and reducing the environmental footprint. In addition, installing renewable energy generation technologies on site at an airport can lower the carbon footprint with minimal impact to airport operations. The question is whether the deployment of renewable energy in Vietnam airports for becoming more "green (eco-friendly), sustainable" airports could become feasible when taking into account both prospects and challenges in such field. So as to answer, this paper will summarise the deployment of renewable energy in airports worldwide, then critically assess both prospects and constraints of renewable energy projects in Vietnam. Some experiences from the Europe airports, through applying the "Green Sustainable Airports (GSA)" and "Airport Carbon Accreditation" programmes to establish and boost strategies and solutions for more eco-friendly and efficient regional airports should be useful to provide suggestions.

Keywords: airports, renewable energy, Vietnam, operations, green, sustainable

HOTWATER SPRINGS: GEOLOGICAL AND LANDSCAPE CORRELATES IN TAWANG, ARUNACHAL PRADESH, INDIA

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Arunachal Himalaya, the easternmost part of Himalayan Range has many stratigraphic successions that make the whole of Arunachal Pradesh a complex and perplexing geological setup for investigation. West Kameng and Tawang districts located in the western part of Arunachal Pradesh have hot-water springs that makes it unique within the geologically dynamic Himalayan range. The western Arunachal Himalaya exposes six regionally extensive and laterally continuous north-dipping thrusts. From north to south, they are the Zimithang thrust, the Dirang thrust (correlative with the Main Central thrust in the central Himalaya), the Bome thrust (BT; also known as the upper Main Boundary thrust), the Main Boundary thrust, the Tipi thrust (TT), and the Main Frontal thrust zone. The continued northward movement and NNE-SSW horizontal compression of the Indian plate against the rigid Eurasian plate is responsible for pushing back the rock masses southwards in the form of thrust slices either as imbricate thrust, schuppen zone, duplexes or multiplexes. Distribution of earthquake around Tawang area is plotted with depth of focus according to size to understand relation between tectonics and earthquake in the area with the occurrence of hot water spring. However, the area is found to be devoid of focus of earthquake. Hot-water springs are major attractions for religious and medicinal in a picturesque landscape. Landscape association of hotwater springs is found to be closer to channel on steep slopes facets. Sample collected have been analyzed for pH and EC and temperature was measured on point source. Sample test result shows pH of water in the hot-water spring is higher than normal up to 8.45. Temperature of spring water is high at Thingbu and Tsachu indicates presence of deep fracture and pipe flow of water.

Keywords: Hotwater spring, Arunachal Himalaya, Mountain Landscape, Thingbu, Tsachu

AN OVERVIEW STUDY ON THE LASER TECHNOLOGY AND APPLICATIONS IN THE MECHANICAL AND MACHINE MANUFACTURING INDUSTRY

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Laser is considered one of the most influential inventions in the twentieth century and laser technology has been contributing in many areas of life. Today, in any field of manufacturing, manufacturing, laser technology also presents value and brings a range of specific benefits to the field such as machine manufacturing and mechanical tools. Thanks to the cutting-edge cleaning ability, delicate welding lines, strong etching strokes, high power operation, accurate distance measurement capability, laser technology has gradually conquered and dominated the mechanical market, especially in the field of material handling, metal parts. Using lasers to cut metal creates highly detailed and continuous details, lines, shapes, patterns ... that open new avenues for the mechanical and machine-building industry. Using laser engraving machines, it will process complex and sophisticated details, saving time and manpower costs. High processing speed, smooth cutting surface and easy programming are the advantages that laser cutting technology offers to this industry. Lasers can be cut on different sheet metal or tubular surfaces at extremely fast speeds on tools, machine parts and even small-sized cutting workpieces. This paper will present an overview of laser technology and its common applications in the mechanical and machine-building industry. The analysis and evaluation in this paper will provide an update on the level of development of laser technology in the current industry age 4.0. In addition, it is a common picture and achievements of the machine manufacturing industry achieved with the support of "Light Amplification by Stimulated Emission of Radiation".

Keywords: Laser Technology, Application Technology, The Machine Manufacturing Industry, An Overview Study

THERMOPHILIC ANAEROBIC GRANULAR MEMBRANE DISTILLATION BIOREACTOR FOR WASTEWATER REUSE

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Abstract

Membrane distillation (MD) is actually claimed to be a cost-effective separation process when waste heat, alternative energy sources, or wastewater are used. To the best of our knowledge, this is the first study that a thermophilic anaerobic granular bioreactor is integrated with membrane distillation (ThAnMDB) was investigated. In this study, the laboratory scale anaerobic bioreactor (1.2 litter) was set-up. The bioreactor was maintained at temperature 55±2 ^{0}C, hydraulic retention time = 0.5 days, organic loading rates of 7 and 10 kg Chemical oxygen demand (COD) m^3/day. Side-stream direct contact membrane distillation with the polytetrafluoroethylene membrane area was 150 cm^2. The temperature of the distillate was kept at 25 ^{0}C. Results show that distillate flux was 19.6 LMH (Liters per square meter per hour) on the first day and gradually decreased to 6.9 LMH after 10 days, and the membrane was not wet. Notably, by directly using the heat from the thermophilic anaerobic for MD separation process, all distilled water from wastewater was reuse as fresh water (Electrical conductivity < 120 µs/cm). The ThAnMDB system showed its high pollutant removal performance: Chemical oxygen demand (COD) from 99.6 to 99.9%, NH_4^+ from 60 to 95% and PO_4^{3-} complete removal. In addition, methane yield was from 0.28 to 0.34 lit CH_4/gram $COD_{removal}$ (80 – 97% of the theoretical) demonstrated that the ThAnMDB system was quite stable. The achievement of the ThAnMDB is not only in removing pollutants and reusing wastewater but also in absolutely unnecessarily adding alkaline to the anaerobic bioreactor system.

Keywords: High rate anaerobic digestion, Membrane distillation, Thermophilic anaerobic, Wastewater reuse

THEME IV

POSTER COLORS

GAMMA SPECTROMETRY ANALYTICAL DETERMINATION OF RADIATION LEVELS IN TWO SELECTED AREAS OF SRI LANKA

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This study compares radiation levels in water and soil in Norochcholai (closest to nuclear power plant, Kundankulam India) and Ragama (control) in Sri Lanka. 51 soil samples (25 from Norochcholai and 26 from Ragama) and 54 water samples (26 from Norochcholai and 28 from Ragama) were analysed by gamma spectrometry. No radioactivity was detected in water samples. Activity concentrations of 232Th in both areas were higher than the world average of 30Bq/kg with Norochcholai having a significantly higher concentration. 226Ra was significantly higher in Norochcholai and 40K was significantly higher in Ragama, both values being lower than the recommended limits. Mean annual effective dose of Norochcholai was significantly higher than that of Ragama but was within the safe limit of 1mSv/y. The median radium equivalent activity (Raeq) in Norochcholai was significantly higher; all soil samples had a Raeq below 370Bq/kg (NEA) except two samples from Norochcholai. In all soil samples, the external hazardous index was below 1 with a criteria formula less than one. The gamma ray absorbed dose rate in both areas was below the global average (57nGyh-1). The Annual Gonadal Equivalent Dose (AGED) of Norochcholai was significantly higher than in Ragama; AGED of all samples were below the permissible level. The Gamma representative index of both areas was less than 1. Soil from this area is safe for human health. The baseline findings of this study are important for monitoring of potential radiation leaks in the future.

ADSORPTION OF TMA AND H2S BY POROUS DIATOMITE CERAMIC FILTER

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In this work, the diatomite ceramic filter was synthesized using diatomite powder mixed with polyethylene glycol (PEG) at different sintering temperature of 900, 1000, 1100, 1200, 1300 and 1400 ℃ for adsorption of air pollutants such as TMA and H2S. The diatomite powder was characterized by SEM, TGA, XRD and EDS analysis, the results showed that diatomite powder with several good properties (numerous microporosity, thermal stability and impurities of metal oxides) is very suitable for applications such as water and air filtration. The compressive strength, density and adsorption capacity of prepared diatomite ceramic filter was tested through a series of related experiments. The results indicated that the sintering temperature is most significant parameter for the sintering of diatomite powder compared to other parameters such as the content of PEG and molding pressure. When the content of PEG is 18.6 wt.%, molding pressure is 2 MPa, and the sintering temperature is 1100 ℃, the sample exhibited excellent adsorption performance of air pollutants due to its sufficient strength (around 20 MPa) and appropriate porosity. Adsorption capacities of diatomite ceramic filter for TMA and H2S were 61.58 mg/g and 35.56 mg/g, respectively. Thus, the current study showed that diatomite powder is a cost-effective and promising adsorbent material for adsorption of air pollutants.

Keywords: Diatomite, Adsorption, TMA, H2S, air pollutants

ADVANCED TECHNOLOGY SOLUTIONS FOR TREATMENT AND CONTROL NOXIOUS EMISSION OF LARGE MARINE DIESEL ENGINES: A LARGE BRIEF REVIEW

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Large marine diesel engines use low quality fuel, large sulfur content, when conducting combustion with air in the combustion chamber will emit different combustion products. The main components of air pollution in diesel exhaust include NOx, SOx, CO, HC and PM. The amount of NOx, CO, SOx and HC in the emission from the internal combustion engine up to 50%. These pollutants directly affect human health and the environment. The World Maritime Organization (IMO) has introduced the mandatory standards in Annex VI of MARPOL 73/78, to regulate the standard of toxic substances in diesel emissions. Many technology solutions are being applied by Man B&W, Wartsila, Mitsubishi, Yanmar, Weichai, MTU, Carterpillar ... to treat and control toxic gases from marine diesel engines. The article provides an overview of environmental pollution caused by NOx, SOx and HC in exhaust emissions from marine diesel engines, and also provides advanced technology solutions by major engine manufacturers in the world that have used to minimize noxious emissions of marine diesel engines. Moreover, the author provides and evaluates the solutions applied to Vietnam's inland waterway fleet to enhance the control of toxic emissions, ensuring the mandatory standards in Annex VI of the MARPOL Convention.

Keywords: NOx, Sox, PM, HC, advanced technology solutions

THE ATMOSPHERE CONSTITUENTS FOR GAS CARBONITRIDING ANCHORAGE WEDGE

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Carbonitriding is a case-hardening proces sin which carbon and nitrogien are increased in the surface layer of a low-carbon parts at a temperature sifficient to render austenitenic steel. The folowed by quenching and tempering to form martensite microstructure. In the comparision with carburizing, Carbonitriding is caried out at a lower temperture, for a shorter time and resultion finer microstructure. However, in our Industy, this method is not developed. The reason that the carbonitiding atmosphere is constituented unreasonably. On this paper, carbonitriding is prepared by mixture of Industial gas, CO2; N2, NH3, with different ratio. The tresonable ratios is selected. Mirostructure, microhardness is tested. This atmosphere is applied for carboniriding for anchorage wedges, shows good result.

Keyword: carbonitriding process, anchorage wedges, Microstructure, martensite microstructure

PREDICTION OF SOIL AND NUTRIENT LOSSES FROM LIANGZI LAKE WATERSHED, HUBEI, CHINA

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The revised universal soil loss equation (RUSLE) and geographic information system/remote sensing (GIS/RS) criteria were used to predict possible soil and nutrient losses in the Liangzi watershed. Nutrient losses and soil erosion within the watershed observed to be varied spatially during this study. Spatial distributions of different erosion-vulnerable zones were identified within the watershed using the RUSLE criteria. The potential rate of soil loss was high in the bare land areas. In these areas, soil erosion was higher because of high potential for soil erodibility and the absence of conservation practices. The spatial and quantitative soil loss evidence obtained through simulation of RUSLE parameters by GIS and RS techniques in Liangzi lake watershed making spatial variable data easy and effective in usage whereby ground based observations are difficult. This method can therefore be simulated in other places for assessment and delineation of erosion prone zones, prioritization of conservation practices, and evaluation of different land management practices. The outcomes of this study integrate spatially distributed soil loss rate, and erosion risk map of Liangzi Lake watershed. The annual soil loss of the watershed ranged from about 482.63-ton ha-1 year-1 to about 488.20 ton ha-1 year-1, with an estimated average loss of about 485.42 ton ha-1 year-1. Also, the estimated annual losses of N, P, and K were 6.49 kg ha-1 year-1, 2.83 kg ha-1 year-1, and 1.39 kg ha-1 year-1, respectively. Furthermore, the slope length and gradient (LS) factor was the primary significant RUSLE parameter followed by soil erodibility (K) factor.

Keyword: Soil erosion, Nutrient losses, RUSLE, GIS, RS, Water quality

CHECKLIST OF COMMERCIALLY IMPORTANT FISHES OF COASTAL WATERS OF PEKAN, PAHANG MALAYSIA

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A checklist of commercially important fishes of coastal waters of Pekan, Pahang Malaysia (3.40155 ^{o}N to 3.34894 ^{o}N and 103.21174 ^{o}E to 103.25089 ^{o}E: ~16 km stretch) is presented. Stratified random sampling method was adopted to sample fishes from two sampling locations (Cherok Paloh and Pantai Sepat, Pahang Malaysia) during selected months in the year 2017 and 2019. Species Identified to the lowest possible taxon includes 38 species belong 31 genera in 25 families were recorded during the sampling in the year 2019. While 31 species belong to 26 genera in 18 families were recorded during the year 2017. Data generated in this study could be instrumental for long term monitoring studies for sustainable fishery practice in the selected fishing grounds in Pekan coastal waters.

Keyword: Fish diversity, Fish checklist, Fish taxonomy, sustainable fishery

DUST CONTROL SOLUTION IN CEMENT PRODUCTION LINE IN VIETNAM

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Controlling dust in industrial production environment is always a urgent issue for plants, industries and levels of government. The document of the 12th National Party Congress 2016 again demonstrates the Party's consistent viewpoint on environmental protection is to limit and eventually overcome the situation of environmental damage and pollution, production establishments and industrial parks, proceeding to end the situation of environmental pollution, enhance prevention and control of sources of environmental pollution . In our country, there are up to hundreds of cement factories with new and old technology applied. Dust in the production and transportation environment of cement and materials is particularly dangerous to human health and surrounding ecosystems. Knowing so many recommendations, calling from the realities of people's lives, but because of economic pressure, for the livelihood of living, sustainable development is exchanged. The contribution of the community from the understanding of the situation, propagating and disseminating knowledge, planning appropriate investment, construction, production, and contributing to providing solutions to solve problems pollution is an important goal of coming up with the root of the problem. This paper presents a number of studies on technical issues in the design of plant transport chains, new solutions for dust control

Keywords: environmental, construction, transport, dust, solution

STUDYING THE EFFECT OF WORKING STABILITY TO STABILITY OF FORTLIFT MACHINE

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The combustion engines are used in most of heavy-duty vehicles because their high effect and performance. Although, fossil fuel is being depleted currently, and emissions from diesel engine contains many toxic substances such as CO, HC, NOx, PM…which effect adversely on environment and human health. Therefore, research and application of renewable alternative fuels are under consideration in many countries and Vietnam as well. Recently, Dimethyl Ether (DME) is a friendly environment fuel, easy to liquefy and suitable for use in diesel engines. DME can be produced from a variety of raw materials such as biomass, coal and natural gas. It is also easy to liquefy and suitable to use in diesel engines. DME is not a nature product but a synthetic product is produced either through the dehydration of methanol or a direct synthesis from syngas. Using DME for diesel engine may reduce not only dependence on fossil fuel but also environmental pollution. Certain amounts of DME have been commercially produced as a propellant for spray cans because of its non-toxicity and suitable solubility and vapor pressure at room temperature. Dimethyl Ether (DME) is a friendly environment fuel, easy to liquefy and suitable for use in diesel engines. DME has some different properties compared to diesel fuel, so that it needs to modify the engine, especially the fuel system, to be suitable for DME fuel. This paper presents to investigate the fuel supply system when using DME for diesel engine.

Keywords: Dimethyl Ether, diesel engine, fuel supply system, raw materials, room temperature

A TEMPERATURE AND HUMIDITY EFFECTS COMPENSATION SOLUTION FOR METAL OXIDE SENSOR IN MEASURING TOXIC GAS CONCENTRATION

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Metal Oxide based sensors are popular in gas concentration measurement. They have high sensitivity, but their disadvantage is the variation due to environment conditions, especially the temperature and the humidity. This paper presents a solution using a feedforward neural networkfor the temperature and humidity effects compensation for a selected metal oxide sensor. As an example, this paper will consider the MQ136 sensor in measuring H2S gas concentrations. The simulation results will show the accuracy of the proposed solution.

Keyword: oxide metal sensors, gas concentrations measurement, temperature effect, humidity effect, artificial neural network

BUILDING THE PROGRAM OF CALCULATION FOR THE THICKNESS AND REASONABLE LANDSCAPE APPLYING THE SHAFT LINERS

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This paper presents the theoretical basis of the process of building programming to calculate the reasonable thickness and thickness of the shaft liners. Through this calculation program, it is possible to calculate and select the shaft liners for shaft system. The content can be calculated as thickness; shaft torque and reasonable residual. The program results were calculated for the vessel with the load of 950 tons. This result completely complies with the design requirements of the shaft liners.

Keywords: shaft liners, reasonable landscape, thickness, calculation, design

THE BREAKTHROUGH TECHNOLOGY SOLUTIONS FOR CONTROL AND TREATMENT OIL SPILL ON THE SEA: A SHORT REVIEW

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In recent years, all countries in the world are very interested in the effects of pollutants affecting human health, the living environment in general and especially pollution of water sources and oceans on the earth's surface. The cause of this pollution is largely due to human use of chemicals and fuels from many different sources, especially oil. The exploitation and transportation of crude oil is increasing according to the common development of humanity. Since people discovered and exploited oil, the oil spill at sea began to appear. Since ancient times, oil spills on the sea have been a threat to the marine environment in general, coastal ecosystems in particular and damage to economic activities. It is the concern of all humanity. Every year, we still have to witness a lot of accidents from tankers making millions of tons of oil spilled into the sea, causing great consequences for the natural resources and environment on the earth. In order to overcome the oil spills on the sea, people have also found a way to deal with them and there are many processing methods that were created to overcome the above problems such as mechanical methods, chemical methods, biological methods. The application of scientific and technological advances in information technology and biotechnology has been creating breakthroughs in forecasting and controlling oil spills at sea. The paper focuses on an overview of pollution problems from ships, especially oil pollution from tankers and the consequences of oil pollution on the marine environment. Moreover, the authors learn and evaluate some specific advanced technology solutions to prevent oil pollution from ships, effective feasible solutions that need to be applied in practice.

Keywords: Oil spill, breakthrough technology solutions, tanker, marine environment, oil pollution

APPLICATION CONNECTING BETWEEN BOOST AND MATLAB SIMULINK SURVEY TRANSFER PROCESS OF PPCI ENGINE

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In general, each software has its own advantage in a certain field, BOOST software is capable of calculating detailed parameters inside the engine in a detailed and reliable way but not flexible, not flexible, but must run separately for each case then reconnect. The MATLAB SIMULINK software has the ability to control and be flexible in all activities, in a more detailed way, it is to control the elements of BOOST to make the BOOST software work more accurately and softly. more flexible. But with MATLAB SIMULINK alone, it is impossible to accurately calculate the processes that take place inside the engine. Therefore, combining this two software is essential, it can help us take advantage of this software to compensate for the weaknesses of the other software, it helps to simulate more accurate and intuitive, more flexible, can study both internal and external engine parameters, making it easier for researchers to take time.

Keyword: Matlab Simulink, AVL Boost, Combustion, LTC, PPCI

CURRENT SITUATION AND SOLUTIONS FOR THE ENVIRONMENTAL POLLUTION IN VIETNAM

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The ocean covers about 71% of the Earth's surface and is considered a system to sustain Earth's life. In particular, the ocean functions to regulate heat balance and have positive effects on weather - climate on Earth. The ocean ensures food security and human energy security when these resources are running out on the continents. However, recent decades have raised the issue of increasing the human impact on marine ecosystems as a result of polluting the sea and the ocean. The spread of many pollutants has reached local, regional and even global scale. Therefore, pollution of the sea and the world has become an important international issue and the necessity to protect the marine environment from pollution is due to the requirements of rational use of natural resources. The problem of exploiting natural resources and protecting the marine environment in many countries is facing many challenges. The depleted resources and polluted marine environment have caused serious damage, hindering the socio-economic development of many countries. Environmental issues are increasingly alarming when Vietnam ranks 4th in the list of the world's most polluting countries. This article assesses the current situation and causes of marine environmental pollution in Vietnam and proposes solutions to improve the marine environment and towards a sustainable marine economy development strategy.

Keywords: Marine environment, Environmental pollution, Protect marine environment, Vietnam, Sustainability

INVESTIGATING TO USE DIMETHYL ETHER (DME) AND DIESEL BLEND FOR INTERNAL COMBUSTION ENGINE BY AVL BOOST SOFTWARE

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Internal combustion engines are used in most of vehicles due to their high eficiency and performance. However, fossil fuel is being depleted currently, and emissions from diesel engine contains many toxic substances such as CO, HC, NOx, PM…which effect adversely on environment and human health. Therefore, investigation and application of renewable alternative fuels are under consideration in many countries. In recent times, Dimethyl ether (DME) has been the same as a potential substitutionary fuel for internal combustion engine. DME can be manufacture from a variety of raw materials such as biomass, coal and natural gas. DME is easy to liquefy and appropriate to use in internal combustion diesel engines. DME is not a nature product but a synthetic product is produced either through the dehydration of methanol or a direct synthesis from syngas. When DME is used for internal combustion engine may reduce not only dependence on fossil fuel but also environmental pollution. Certain amounts of DME have been commercially produced as a propellant for spray cans because of its non-toxicity and suitable solubility and vapor pressure at room temperature. Some experimental investigations were conducted on diesel engine to clarify how DME injection characteristics affect the engine performance and exhaust emissions. Most of the results showed that emissions when fueled DME reduced significantly, especially CO and soot.

The paper investigates the characteristics of internal combustion engine fueled by DME and diesel blend. Investigating to use DME and diesel blend for internal combustion engine, which is modeled by AVL Boost software, with 0%, 25%, 50%, 75% DME energy. The results show that the moment is not change when used 0%, 25%, 50%, 75% DME, the maximum difference in 1700 rpm is 4,42%. The fuel consumption is raising according to percent of DME, the fuel consumption is lowest when 25% DME blend 75% diesel. NOx emissions decrease with percent of DME decrease. CO and soot are minimum with 100% DME.

Keyword: Dimethyl ether, AVL Boost, energy, emission.

RESEARCH USING COMPOSITE MATERIALS IN MANUFACTURING PRESSURE-RESISTANT CIRCULAR DETAILS WITH THE TWO SPHERICAL BOTTOMS BY WINDING TECHNOLOGY

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This paper presents the results of research about the using of composite materials to make circular rotating parts with two spherical ends. From the analysis of the working characteristics of these details, the article selected the winding technology and using composite materials to produce details with cylindrical and spherical shape characteristics. The material group that the article presents is a composite unidirectional glass fiber reinforced composite with polymer matrix. This material is characterized by a specific density of 2.02g/cm3; tensile strength is 1750MPa; elastic module is 55GPa; elongation reached 3.18%. With properties of such materials, it is suitable for working conditions of details

Keywords: Compozit Pressure Vessels, Stress analysis, composite materials, glass fiber, polymer matrix

THE FORMATION OF THE ENVIRONMENT FOR GASEOUS CARBONIZING WHEN USING SOME DIFFERENT GASES

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In this paper, the results of an overview of the formation of carbon permeability when using a number of different permeable gases are presented. The most common permeable gases are “endo” gas and methanol. However, with conditions in Vietnam with an extremely abundant gas source, the use of imported gases will cause enormous waste. Therefore, in this study, we introduce the formation of the permeability medium of two “endo” and methanol gases. In addition, the authors also presented an analysis of the formation of seepage environments from Vietnamese gas sources. Research results show that the formation of permeability medium is suitable for imported gases. Experimental results show that the use of Vietnamese gas for permeability is of the same quality as imported gases.

Keyword: laser technology, application technology, the machine manufacturing industry, an overview study.

AN OVERVIEW STUDY ON THE LASER TECHNOLOGY AND APPLICATIONS IN THE MECHANICAL AND MACHINE MANUFACTURING INDUSTRY

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Laser is considered one of the most influential inventions in the twentieth century and laser technology has been contributing in many areas of life. Today, in any field of manufacturing, laser technology also presents value and brings a range of specific benefits to the field such as machine manufacturing and mechanical tools. Thanks to the cutting-edge cleaning ability, delicate welding lines, strong etching strokes, high power operation, accurate distance measurement capability, laser technology has gradually conquered and dominated the mechanical market, especially in the field of material handling, metal parts. Using lasers to cut metal creates highly detailed and continuous details, lines, shapes, patterns ... that open new avenues for the mechanical and machine-building industry. Using laser engraving machines, it will process complex and sophisticated details, saving time and manpower costs. High processing speed, smooth cutting surface and easy programming are the advantages that laser cutting technology offers to this industry. Lasers can be cut on different sheet metal or tubular surfaces at extremely fast speeds on tools, machine parts and even small-sized cutting workpieces. This paper will present an overview of laser technology and its common applications in the mechanical and machine-building industry. The analysis and evaluation in this paper will provide an update on the level of development of laser technology in the current industry age 4.0. In addition, it is a common picture and achievements of the machine manufacturing industry achieved with the support of "Light Amplification by Stimulated Emission of Radiation".

Keywords: Laser technology, application technology, the machine manufacturing industry, laser cutting, laser distance measurement.

EFFICIENT OPERATION SOLUTIONS FOR MARINE ENGINE SERIES OF MAN B&W S46ME-B8.5 IN LOW STEAMING

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It should be determined that the marine engine operation at a low load operation (especially 40% or less) is not conducive to the operation of the engine and related equipment. However, manufacturers accept and allow the engine to operate continuously at such a low load condition. The mode operates at a low load of marine engines that drive the propeller is used quite recently in various reasons. The S46 ME-B8.5 engine concept consists of a hydraulic-mechanical system for activation of the fuel injection. The fuel pressure booster consists of a simple plunger powered by a hydraulic piston activated by oil pressure. An electronically controlled proportional valve controls the oil pressure. The exhaust valve is activated by a light camshaft, driven by a chain drive placed in the aft end of the engine. However, at low load operation, the MAN B&W S46ME-B8.5 engines have generated several incidents that greatly affect the operation of the ship including a malfunction on the exhaust valve and troubles of jamming plungers of the high-pressure pump during engine acceleration and start-up. Therefore, it is essential to learn and identify structural and operational characteristics of the S46 ME-B8.5 engines. Moreover, it is necessary to analyze the effects on the process of low-load operation as sailing. The paper focuses on studying the operating characteristics of engines in low load mode, assessing the effects of this mode on engines and related machines. Besides, this study also developed the operation process for S46ME-B8.5 engines. In this paper, the authors propose solutions to effectively operate the S46 ME-B8.5 engines in low load mode when traveling on the sea.

Keywords: Efficient operation solutions, low load operation, MAN B&W S46ME-B8.5, exhaust valve, high-pressure pump

STUDYING SIMULATION FUZZY BASED-PID CONTROLLER TO CONTROL WATER LEVELS IN MARINE BOILERS

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On ships, boilers are used for many purposes: Supplying steam to the main steam turbine to drive the propeller to create thrust, drive generators, drive pumps and winches. Also, it has a role to drive trouble equipment, provide steam for heating lubricants, fuel, steam supply for air conditioning systems for crew members ... With so many important uses, ensuring good operation of the boiler is a matter of primary concern for operators. In the operation of the boiler, controlling the water levels ensures not only good steam generation but also operator safety as well as the boiler itself. Automatic control of the water supply process is an important part of the boiler control system. This system has the function of maintaining a stable water level in the boiler. Currently, fuzzy control theory, whose mathematical tool is the fuzzy set theory of L.A Zadeh is being developed strongly. Different from the old control technique that relies purely on the absolute accuracy of the information that many applications cannot, the fuzzy control can handle unclear information. Information that their accuracy is only recognized by their relations with each other and can only be described in the control language. Fuzzy control allows copying personal information processing and control methods to solve complex control problems. The paper focuses on research to use fuzzy control theory combined with traditional PID controller to achieve optimal quality control for the process of adjusting the boiler water level. Construct a fuzzy controller to adjust parameters of the PID water level controller to optimize the process of adjusting the boiler water level. Simulation of water level control of fuzzy PID control on Matlab-Simulink software.

Keywords: fuzzy PID control, marine boiler, boiler water levels, studying simulation.

SOLUTIONS FOR THE UNSTABLE WORKING OF A TURBOCHARGER IN MARINE DIESEL ENGINES

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We know the development trend of industries in general and the shipbuilding industry, in particular, is the increase in energy efficiency to contribute to global emissions reduction, especially CO2 emissions. It is not difficult to realize that gas turbines utilize exhaust gas energy to increase the intake air pressure. Exhaust gas turbines are convenient enough to complete the shipbuilding industry in line with the norms of the world maritime organization, including EEDI (energy efficiency design index) and SEEMP (ship energy efficiency management plan). Thus, satisfying IMO's EEDI and SEEMP criteria under MARPOL Annex VI, the completion of the design and exploitation of turbocharged exhaust turbines should be a top priority. Exhaust gas turbines increase the intake air pressure to improve the performance of diesel engines, so it is almost present on most diesel engines. Mastering the structure and working principles to improve the efficiency of turbines continuously is an urgent requirement. Besides, it is necessary to follow the manufacturer's instructions and research to effectively exploit turbines that will contribute to increasing economic efficiency and contributing to reducing environmental pollution emissions. The article focuses on analyzing measures to overcome the causes of working instability of the main diesel engine's exhaust gas turbine, which will contribute a small part in completing exhaust gas turbines. Based on mastering the knowledge of exhaust gas turbine, we can choose the turbine layout to utilize exhaust gas heat suitable for diesel engines. Moreover, mastering the factors that affect the working of turbines and compressors, thereby improving the quality of turbine extraction and maintenance to ensure they always work in the best conditions.

Keywords: Marine diesel engines, exhaust gas turbines, unstable working

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