UNIVERSITI TEKNOLOGI MARA

2nd CITES FACULTY OF ENGINEERING UNIVERSITAS ANDALAS 2020

PROGRAM BOOK

2nd CONFERENCE ON INNOVATION IN TECHNOLOGY AND ENGINEERING SCIENCE (CITES 2)

Padang, 4th - 5th November 2020

2nd Conference on Innovation in Technology and Engineering Science (CITES 2020)

http://conference.ft.unand.ac.id/index.php/cites2020

4-5 November 2020

Topic :

"Sustainable Innovation in Engineering and Business For Better Future"

The 2nd Conference on Innovation in Technology and Engineering Science (CITES) is a biennial International conference held by Faculty of Engineering, Universitas Andalas. This conference opens opportuinity for experts and professionals to exchange new ideas in technology, engineering, science and industry. The 1st CITES was run in 2018 and successfully attended by six international keynote speakers and participated by more than 120 articles. The 2nd CITES invites original submissions in the areas of engineerin from various countries.

The 2nd CITES will be held on 4-5 November 2020 in Padang, Indonesia, the capitak city of West Sumatera Province. Padang City is well known for its Minangkabau culture, delicious cuisine and beautiful sunset beaches. Visitors can spend time for diving, snorkeling or boat travelling at many beautiful island such as Sikuai, Mandeh, and Mentawai. About 2 hours driving from this city, there is Pagaruyuang palace, a beautiful historical object that introduce visitors about Minangkabau traditions.

WELCOME MESSAGE

First of all, I would like to thank Allah because of His Mercy, we can have this online conference today. Secondly, I would like to send salam for our beloved prophet Muhammad SAW.

Ladies and gentlemen, we are very pleased to welcome you at the 2nd Conference on Innovation in Technology and Engineering Science (CITES 2), held on November 4th-5th 2020. This conference is organized by the faculty of Engineering Universitas Andalas and supported by Universitas Andalas.

This conference gives an exciting opportunity for engineers and scientists to enhance their knowledge. There are more than 80 presentations in 5 research fields that contribute to important roles for the success of this meeting.

Finally, we wish that all the participants find this event is beneficial which can stimulate creative exchanges of idea and will be personally rewarding. The big thanks to all committee for their excellent work. We believe that this event will not happen without supports of all participants and the organizing of committees. Hopefully, you will have a fruitful discussion with colleagues and please enjoy this event.

Dr. Oknovia Susanti
Conference Chair

WELCOME MESSAGE

We are happy and honored to welcome all respected speakers and participants to the 2nd Conference on Innovation in Technology and Engineering Science (CITES).

The Faculty of Engineering at Universitas Andalas, as the host of this conference, proudly presents this international event to scientists and engineers to share knowledge and disseminate research findings and innovation. Hosting this conference is our contribution to international efforts to support and boost innovation in technology and engineering science. In line with our global vision, it is a great pleasure for us to mention at this moment that three of our bachelor programs have just been ABET-accredited: Mechanical, Industrial, and Environmental Engineering. We wish in the future for more contributions and innovation from our academics, students, and alumni, along with international researchers, to solve global challenges.

We want to raise a high appreciation to five distinguished keynote speakers: Dr. Bernardi Pranggono from Sheffield Hallam University, United Kingdom; Prof. Minoru Sasaki from Gifu University, Japan; Prof. Dr. Mohd. Nasir Tamin from Universiti Teknologi Malaysia, Malaysia; Prof. Masami Furuuchi from Kanazawa University, Japan; and Prof. Dr.Eng. Gunawarman from our own Universitas Andalas, Indonesia. We send them many thanks for sharing their thought, knowledge, and experience. A big thank you also goes to all persons, institutions, and industries that have helped and supported us in hosting this event during a hard-pandemic time.

We hope that all authors, presenters, and audience would get a massive benefit from this international conference. Hopefully, everyone enjoys every talk. Once again, thank you to all who have contributed to supporting this international conference's success

Prof. Ikhwana Elfitri
Dean of Faculty of Engineering, Universitas Andalas

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Keynote Speakers

Prof. Minoru Sasaki
(Gifu University, Japan)

He received M. Eng. and D. Eng. Degrees in mechanical engineering from Tohoku University in 1983 and 1985, respectively. He was a research associate at Tohoku University in 1985 and a lecturer at Miyagi National College of Technology, and a visiting professor at the University of California, Los Angeles. Since 1991, he has been with the Faculty of Engineering, Gifu University and is currently a professor.

Prof. Mohd. Nasir Tamin
(UTM, Malaysia)

Prof. Mohd Nasir Tamin earned his doctoral degree in Mechanical Engineering and Applied Mechanics from the University of Rhode Island, USA in 1997. He has been with the Faculty of Mechanical Engineering, Universiti Teknologi Malaysia since 1984. Prof. Tamin's research team activities focus on the development of constitutive and damage models for ductile metals and fibrous composite laminates. He leads his research team on few successful research collaborations with industries including Intel Technology on the development of a validated methodology for reliability prediction of microelectronic BGA packages and through-silicon via (TSV) interconnects, with Kiswire (Korea) for fatigue life improvement of steel wire ropes, and with Airbus and Aerospace Malaysia Innovation Center (AMIC) for damage detection in FRP composite laminates using the digital image correlation technique (DIC). Prof. Tamin has been invited as a visiting researcher at Sophia University, Tokyo (Japan), a visiting professor at the InstitutSupérieurde l'Automobileet desTransport, Nevers (France) and Dongguk University, Seoul (Korea), and currently a visiting research professor at the University of Southampton (Malaysia Campus). He is keen in promoting the university-industry collaboration, and the academic and research collaboration among colleagues across the globe.

Bernardi Pranggono
(Heffield Hallam University, UK)

Bernardi Pranggono is a Senior Lecturer at the Department of Engineering and Mathematics, Sheffield Hallam University (SHU). Prior to joining SHU he was a lecturer at Glasgow Caledonian University. He held post-doctoral researcher at the Queen's University Belfast, where he worked on a range of EU and EPSRC projects in the Centre for Secure Information Technologies (CSIT). Previously, he held industrial positions at Telstra, Accenture, and PricewaterhouseCoopers. Dr. Pranggono received his B. Eng degree in Electronics and Telecommunication Engineering from Waseda University, Japan, M.DigComms degree in Digital Communications from Monash University, Australia and a Ph.D. degree in Electronics and Electrical Engineering from the University of Leeds, UK. His current research interests include cybersecurity, Internet of Things, cloud computing, and green ICT. Dr. Pranggono has co-authored over two-dozen papers in leading international conferences and journals and contributed to four book chapters. He has served as Vice-Chair and Technical Program Committee member in numerous international conferences, such as IEEE HPCC and GLOBECOM. He also serves as referee of some renowned journals and conferences, such as IEEE Transaction on Industrial Informatics, IEEE Transaction on Power Delivery, IEEE Communication Magazine, IEEE Computer, IEEE Access, IEEE GLOBECOM, IEEE ICC, Computer & Security (Elsevier), Wireless Networks (Springer), and Sensors (MDPI). Dr. Pranggono is a Senior Member of the IEEE

Prof. Gunawarman,
(Universitas Andalas, Indonesia)

Prof. Dr. Eng. Gunawarman M.T, has established research on the innovation of material engineering. As a lecturer majoring in mechanical engineering and Dean of Faculty of Engineering at Andalas University, he is also researching materials based on metal and ceramic applied for biomedical applications. He completed his doctoral studies on Functional Materials from Toyohashi University of Technology (TUT) Japan in 2002 and earned postdoctoral about Production Technology in 2003. He has invited as speaker at the conference at Montreal, Quebec Canada (2016), invited guest in the Accreditation Board for Engineering and Technology (ABET) at Arizona State University, Phoenix USA (2017), and visiting researcher at the Institute of Biomaterials, Germany (2018). Some of his and colleague's research has been published in indexed international journals.

Prof. Masami Furuuchi

Research Field : Assessment of atmospheric environment, aerosol, nano-particles, air pollution control technology, assessment of occupational exposures

Faculty of Science and Engineering Global Social Infrastructure Studies, Kanazawa University”

Conference Program

4 November 2020 (Online)

TIME	AGENDA	SPEAKER/MODERATOR
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08.30-09.20	**OPENING CEREMONY** 1. National Anthem 2. Prayer 3. Welcome Remark from Organizing Committee 4. Welcome Remark from Dean of Engineering 5. Opening Remark from Rector of Universitas	MC Dr. Eng. Desto Jumeno Dr. Oknovia Susanti Prof Ikhwana Elfitri, PhD Prof. Dr. Yuliandri
09.20-09.30	**SESSION BREAK**	**(traditional dance video)**
09.30-09.50	Keynote Speaker I: **Effect of Hydroxyapatite Coating on Surface Properties of Titanium Alloys for Biomedical Applications** **Prof. Dr. Eng. Gunawarman** *Universitas Andalas, Indonesia*	Moderator: Feri Afrinaldi, PhD
09:50-10:20	**Discussion**	
10.20-10.40	Keynote Speaker II: **Structural Reliability Assessment Framework with Damage-based Material Models** **Prof. Mohd. Nasir Tamin** *Universiti Teknologi Malaysia*	Moderator: Ismet Hari Mulyadi, PhD
10:40-11:10	**Discussion**	
11.10-11.30	Keynote Speaker III: **Robot control systems based on electrooculography (EOG)** **Prof. Minoru Sasaki** *Gifu University, Japan*	Moderator: Dr. Eng. M. Ilhamdi Rusydi
11:30-12:00	**Discussion**	
12.00 – 13.10	**LUNCH BREAK**	**(profile videos of Engineering Faculty and departments)**
13.10-13.30	Keynote Speaker IV: **Internet of Things and Smart Grid Cybersecurity** **Dr. Bernardi Pranggono** *Sheffiield Hallam University, United Kingdom*	Moderator: Aulia PhD
13.30-14.00	**Discussion**	
14.00-14.20	Keynote Speaker V: **Prof. Masami Furuuchi** *Kanazawa University, Japan*	Moderator: Dr. Eng. Zulkarnaini
14.20-14:50	**Discussion**	
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Abstracts

ID 1281*
Comparison of Classification of Shallow Soils from The Muara Baru Area Using CPT Data and Laboratory Data

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Many semi-empiric correlations have been developed to estimate geotechnical parameters based on Cone Penetration Test (CPT) data for various types of soils. This paper aims to classify soil types based on CPT data and compare the results with laboratory test. In this study the field CPT and the laboratory test were carried out on soil from two points in the estuary area of Muara Baru, Padang city in Indonesia. The CPT data was used to determine the soil type using non normalized CPT Soil Behaviour Type (SBT) data based on the cone resistance and sleeve friction according to the method of Robertson et al (1986) then updated by Robertson in 2010. The Unified Soil Classification System (USCS) be used to soil classification with using sieve analysis test. The results showed that the two methods gave incompatible results for the shallow depth (0-60 cm) samples from the Muara Baru area.

Keywords :

Link :

ID 1282*
Effect of Liquefaction on the Bearing Capacity of Piles Foundations

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During earthquakes the shaking of ground may cause a loss of strength or stiffness (liquefaction) that results in the settlement of buildings, landslides, the failure of earth dams or other hazards. When the soil supporting a building or other structures liquefies and loses strength, large soil deformation can occurs. Liquefaction weakens the soil, reducing the foundation's support and causing the building to settle and tilt. In this paper, evaluating the soil liquefaction potential is used correlation charts with the standard penetration resistance. For estimates of bearing capacity of pile for cohesionless soils can be used Standard Penetration Test (SPT) results. The analysis results show that the effects of liquefaction include reduced axial bearing capacity of pile foundation. Soil settlement due to densification of liquefied soils can cause downdrag on pile.

Keywords : Cohesionless soils, SPT, Setlement, Downdrag

Link :

ID 1284*
Comparison Of Physical And Mechanical Properties Of Antifouling PVDF Membranes By Titanium Dioxide and PES Membrane By Titanium Dioxide

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The main factor to support daily life is water. but the fact is there are approximately 2.1 billion people currently threatened with a shortage of clean water. Polyethersulfone (PES) and Polyvinylidene Fluoride (PVDF) are polymers that are commonly used for membrane fabrication because they have extraordinary properties in the screening process. The addition of addictive substances into the membrane formation process is no less important as supporting the ability to be even better in membranes, in this case Titanium Dioxide (TiO2) has properties that are relevant to both polymers and also as a cover for the deficiencies of both. The printing process using the flat sheet method was also modified, a copper plate was prepared for printing purposes but the plate was ready to receive a 15000V DC electric field flow. The results of surface morphology by Scanning Electron Microscopy (SEM) both show remarkable changes compared without the modification of the printing process as in existing research. Tensile strength test results showed uniformity with the results of membrane morphology and an increase in the maximum membrane stress value to 3.86 MPa. Surface roughness values can help identify membrane impurity properties which are also relevant to the results of water treatment performance tests and contact angles. Finally, the process of forming membranes with the additional modification of the printing process can open new avenues in order to maximize water treatment performance and service life on the membrane.

Keywords :

Link : https://youtu.be/36UyVbAqwg8

ID 1286*
ATTITUDES OF CYCLING ENTHUSIASTS TO "CYCLE TO WORK" POLICY IN PADANG CITY, INDONESIA

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Sustainability issues is a primary concern of the Padang City nowadays. With an annual traffic growth reaching 10% at some main roads, Padang should be aware of the air pollution and congestion problems. Therefore, an initiative such as the "Cycle to Work" policy should be promoted to enhanced the sustainability of the city. "Cycle to Work" was chosen because, many informal cycling enthusiast groups were voluntarily established in the society, recently. With many townspeople getting used to cycling, it is expected that the "Cycle to Work" Policy will work well in Padang. This paper assess the attitude of cycling enthusiasts to the "Cycle to Work" policy if it is implemented in Padang. A Likert-type questionnaire was distributed to 300 members of cycling enthusiast groups around the city. The respondents were asked to show their preferences about "Cycle to Work" policy concerning situation and condition when the cycling about to conduct, including the weather, number of luggage, body fit, security, the existence of cycle line facilities. Data were analyzed using structural equation model (SEM). The study found that most of the respondents are happy with the policy and will support it and encourage more people to do it.

Keywords : attitude; Cycle to Work; cycling enthusiast; sustainable city, SEM

Link : https://youtu.be/BQQmaOtMMxQ

ID 1289
Visitors' Preferences Toward Public Spaces' Element in Kota Lama Tangerang

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Kota Lama Tangerang is the initial point of development of the city of Tangerang. Chinese migrants came to Tangerang and built their community there. Nowadays, Kota Lama Tangerang has become one of Tangerang's tourist spots, and this might impact the type of visitors. In this study, referring to the Revitalization Index, 15 elements have been identified in Kota Lama Tangerang. About 116 responses to a questionnaire were collected. The results showed visitor preference toward public spaces in Kota Lama Tangerang. The results were categorized into 4 quadrants, based on the mean and r value. This study found significant elements analyzed by using the Pearson Product-Moment Correlation (in SPSS), where if r = around 0.7, it means that the element has a strong relationship to its performance. These elements' performance might help decision-makers to develop the revitalization concept and preserve the historical areas and environment health in Kota Lama Tangerang.

Keywords : preferences, public spaces' element, quadrant, environment health

Link :

ID 1291
Steady-State Analysis of Hybrid Solar-Wind Power Integration in 20kV Distribution System

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This paper reports the steady-state performance of a grid-connected photovoltaic-wind power system in a 20 kV active distribution system. The system was initially designed to meet a typical of State Electricity Company (Perusahaan Listrik Negara, PLN) primary feeder in Indonesia. In this study, 200 kWp solar power capacity and 200 kW wind power capacitywere selected in the simulation of power flow analysis to evaluate the better system states. The results of the study using four cases show that the better voltage profile is obtained in conditions where the hybrid system is placed on the bus, which has the lowest voltage and on the load bus, which farthest from the source. The presence of power injection from solar andwind power plants on low voltage (LV) buses has reduced the active power flow from the grid utility. All load bus voltages have above 0.95 p.u in these cases, already within PLN standard. The lowest level of losses of 11 kW and 50 kVAr are obtained in the case where hybrid Photovoltaic (PV) and Wind Turbine (WT) with capacitor integration in the distribution network. Power losses are secured far below 10% as the losses permitted according to the PLN standard. Therefore, the integration of PV and wind turbine into a 20 kV distribution network can improve the voltage profile and reduce total system losses. Keywords: Steady-state analysis, Solar and wind power generation and Active distribution network.

Keywords : Steady-state analysis, Solar and wind power generation and Active distribution network

Link :

ID 1292
Performance Analysis of Diversity Selection Combining Technique in Rayleigh Rading Channel

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This paper discussed a performance analysis of diversity selection combining technique in Rayleigh fading channel, in wavelet domain. It proposed diversity selection combining (DSC) method to combat errors during image transmission on wireless channels. The aims of using DSC in the system is to improve the performance of the system. The test of the system is done by conducting experiments. The experiment is done by testing BER and PSNR. The result showed that BER was decrease to 13.4% in average compared to without DSC. PSNR increased to 2.2 dB in average. The result of this simulation shows that system with DSC in the image transmission system improves the system performance significantly compare to the system without DSC.

Keywords :

Link : https://youtu.be/Z9NcNIqanNw

ID 1293*
CARRYING CAPACITY OF TOTAL PHOSPHATE FROM AQUACULTURE CAGE IN LAKE MANINJAU

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This study aims to determine the total phosphate (TP) capacity in Lake Maninjau using the Beveridge Model. Pollutant sources taken into account in this model are settlements, hotels, agriculture, and animal husbandry. Sampling was carried out in 10 locations around Lake Maninjau that refer to SNI 6989.57: 2008, which are lake inlet, lake outlet, hydropower, aquaculture cage, and the middle of the lake. TP capacity limit used is oligotrophic and mesotrophic status, which refers to Minister of the Environment Regulation No. 28 of 2009. Lake Maninjau's status is currently in a hypertrophic condition with an index of 72.49. TP capacity in mesotrophic conditions is 220,063,878 kg / year, fish production 9,019 tons/year, feed production 16,955.74 tons/year with the number of KJA 5651.91 plot. Based on this condition, it is necessary to reduce the amount of aquaculture cage up to 67%. In oligotrophic conditions, TP capacity of 73,320.13 kg/year was obtained, fish production 3,004.92 tons/year, fish feed 5,649.25 tons/year, and the number of KJA 1,883.08 plots with a reduction in the number of aquaculture cage up to 89%.

Keywords :

Link :

ID 1454

The role of surfactants in CNT modification to enhanced photocatalyst performance of TiO_2 -CNT composites on phenol degradation

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The TiO_2 -CNT nanocomposites photocatalyst material were successfully prepared using a mixing and evaporation method which previously modified the CNT with the surfactant (CTAB). The addition of a surfactant (CTAB) is one way to increase the stable dispersion between CNT and TiO_2 so that it is expected to form a TiO_2 and CNT composite bond. The performance of photocatalyst TiO_2 -CNT to photodegradation of phenol was investigated. The composites material was characterized by Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), Fourier Transform Infrared absorption spectroscopy (FTIR), and Breneur Emmet Teller (BET). Nanocomposites TiO_2 -CNT with modified CNT obtained is discussed in detail. The highest performance effectiveness of photocatalyst material composites for degrading phenol was obtained on phenol concentration 10 mg/L and degradation temperature at 50°C was 98,74 %.

Keywords :

Link : https://youtu.be/BMtVRfsbPdM

ID 1481

The sublethal effects of tannery wastewater exposure on oxygen consumption levels and movement operculum of Indonesia mahseer fish

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This study aimed to analyze the effect of tannery wastewater exposure of Padang Panjang, Indonesia, on the level of oxygen consumption (OC) and the operculum movement of the Mahseer fish (Tor tambra CV). Mahseer is an endemic fish in the Batang Anai River in West Sumatra Province. The study is started by determining the acute toxicity value of LC 50 - 96h using a static method within 96 hours of observation. Based on the results of the Probit Method, the LC 50 -96h amount of mahseer was 15.41%. Furthermore, variations in the wastewater concentration were 0%, 10%, 20%, and 30% of the LC 50 -96h value. Observations were carried out for 30 days in triplicate. Based on OC value, the concentration of 10%, 20% and 30% has decreased by 0.13 mg O_2 /g.hours ; 0.18 mg O_2 /g.hours, and 0.27 mg O_2 /g.hours consecutively otherwise in control, treatment increased by 0.05 mg O_2 /g. While the operculum movement, the concentration of 10%, 20%, and 30% have increased by 90 times/minute, 108 times/minute, and 116 times/minute, respectively. In control, treatment has risen by 44 times/minute. OC's correlation value and mahseer's operculum movement ranged from 0.94 to 0.97, which means the correlation was reliable. The significance value obtained $p < 0.05$, which means that there were significant differences in OC values and movements of the mahseer's operculum.

Keywords :

Link : https://youtu.be/DVbFu6aAU7M

ID 1483

Analysis of Particulate Matter 2.5, Carbon Monoxide, Carbon Dioxide, CO/CO_2 Ratio and Rate of Fuel Consumption from the Use of Biomass Stoves Fueled by Corncob and Rice Husk

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This study was conducted to analyze PM 2.5, CO and CO_2 concentrations, CO/CO_2 ratio, and the rate of fuel consumption due to the use of a biomass stove. Water Boiling Test Method was used to simulate cooking activities, which consisted of three phases, i.e., cold start (CS), hot start (HS), and simmering (SM). Biomass wastes used in this research were corn cobs and rice husks. Based on the measurement results, for the corn cob, PM 2.5 concentrations were 239.823±60.83, 262.962±79.17, and 120.75±45.20µg/Nm 3 at CM, HS, and SM phases, respectively. While for CO concentrations during the CM, HS, and SM phases were 36.984 ±3.67, 35.918±1.74, and 37.959±5.56 ppm, correspondingly. Moreover, 595,468±13.25, 611,492±7.73, and 565,205±18.50 ppm CO_2 concentrations were detected during the CM, HS, and SM phases, respectively. Furthermore, for the rice husk biomass waste, PM 2.5 concentrations of 158.579±14.07, 115.014±16.08, and 69.603±17.11 µg/Nm 3 were observed during the CS, HS, and SM phases. While for CO concentrations during the CS, HS, and SM phases, the measured values were, in turn, 38.152±2.73, 38.152±5.02, and 36.422±4.72 ppm. Lastly, the measured CO_2 concentrations were 593,647±8.28, 589,241±12.45, and 556,886±13.06 ppm for the CS, HS, and SM phases, respectively. PM 2.5 and CO concentrations did not meet the air quality standards for both biomass wastes, while CO_2 meets the air quality standard according to Indonesian Minister of Health Regulation No. 1077/2011. The CO/CO_2 ratio of the biomass stove is above 0.02, while the specific fuel consumption rate, for corncob were 0.186, 0.135, and 0.238g/g, while for the rice husk were 0.238, 0.305, and 0.335g/g, during the cold start, hot start, and simmering phases.

Keywords :

Link : https://youtu.be/uOnU7bHdroM

ID 1487
Performance Analysis of Diversity Selection Combining On Radio Frequency for Image Transmission

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This paper describes a simulation of the image transmission system with diversity selection combining (DSC) method on radio frequency. DSC is used to obtain multiple data streams corresponding to the transmitted image at the receiver in order to combat errors during image transmission on wireless channels. These individual image data streams are combined to form a composite image with higher perceptual quality. When DSC is used, it is expected that it can affect the number of errors, so that the signal transmitted to the wireless channels becomes more robust against interference caused by transmission channels. By using DSC technique, it can increase the quality of image transmission at the receiver. The result of the experiment which was carried out to test bit error rate (BER) and peak signal to noise ratio (PSNR) on Lena image with rate 0.8 bpp by using DSC on radio frequency in Rayleigh fading channel showed that there was a decrease in BER at the average of 0.0152 or 3.39%, while for PSNR there was an increase at the average of 1.6737 dB or 6.73% when comparing to the system without DSC.

Keywords :

Link : https://youtu.be/2Q6SH5S_4Wg

ID 1489
Optimization Signal Quality on Cellular Network Based on Tilting-Antenna

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The Difference of Strength and Quality Signal on cellular networks is affected by the traffic on cell and the shape of the region topology. One of the problems encountered in- service performance is overshoot caused by poor signal quality. Overshoot is a condition where a range of power exceeds the specified limits, till the MS (Mobile Station) is served by a distant cell and not from the closest cell. Overshoot occurs due to boosting power which aims to improve service quality when there is an increase in customer activity in the network cell. The antenna tilting method is an effective and responsive method to resolve overshoot problem since it can form cell coverage, cells identification, measure Rx and C/I (Carrier to Interference) levels.). The results showed that after tilting there was a change in cell identification from 5 cells to 3 cells. The value of Rx level increased from -92.8 dBm to -82.03 dBm for the 726-sector and -72.13 dBm to -70.27 dBm for the 727-sector, while the 725-sector remained unchanged. C / I value for <13 dB decreased from 47.20% to 13.68%, for a range of 13 dB values ≤ C / I ≤ 16 dB decreased from 17.63% to 12.73%, and for> 16 dB increased from 35.17% to 73.59%.

Keywords :

Link :

ID 1490*

Applying System Dynamic for Predicting the Strengths, Weaknesses, Opportunities, and Threats of Patchouli Oil Agroindustry in West Sumatra

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The patchouli oil agroindustry is one industry that has the potential to be developed in West Sumatera. This study aims to analyze the future condition of the patchouli oil agroindustry in West Sumatera. As an initial step of the formulation strategy for developing patchouli oil agroindustry in West Sumatra. This study conducted a SWOT analysis using a dynamic system approach. The system dynamic is very suitable for the patchouli oil agroindustry's design development model because of the complex system. Other studies that have been conducted with SWOT analysis uses qualitative data obtained from corporate informants. In this study, SWOT data is collected based on the output derived from the dynamic system model. The system dynamics model run by using Powersim software with graphical output. Graphics can present internal and external conditions and the patchouli oil industry. Graphic trends that tend to increase will be categorized as strengths, while declining trends are classified as weaknesses. Based on the simulation results, there are six strengths, six weaknesses, two opportunities, and three threats of patchouli oil agroindustry forces in West Sumatra.

Keywords : SWOT analysis, patchouli oil production, system dynamics

Link :

ID 1491
Analysis of Quality Function Deployment (QFD) and Analytical Network Process (ANP) methods at PT. XYZ

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The product under study is a mattress product. The problem at hand is a mismatch with consumer desires. To minimize this mismatch, an analysis was carried out using the Quality Function Deployment (QFD) and Analytical Network Process (ANP) methods. Where QFD is used to determine customer technical desires and then weighting is carried out using the ANP method. From the calculation results, the highest to the lowest technical characteristics are cutting speed, cutting accuracy, product dimensions, component composition, machine capacity, and durability. The value of the difficulty level of cutting speed is 4 and the importance level is 23% and the estimated cost is 20%. Then from these results, the company must pay more attention to these characteristics because it can have a direct effect on the product. The wrong cutting speed will result in reject products so that it can reduce profits for the company or harm the company.

Keywords :

Link : https://youtu.be/9DNBZDfE7Bc

ID 1492
Application Of Life Cycle Assessment (LCA) On Green Tea Product (Case Study in The X Company)

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The X Company production capacity reaches 60 tons per day. This study analyses the environmental impact of 1 ton green tea 50 gr canned using the Life Cycle Assessment (LCA) method. A cradle to gate approach was used to scope the study, from plantations to packaging. SimaPro version 9 software is used as a tool for assessing LCA. The evaluation step refers to ISO 14044 of 2006, which determines the objectives and scope, inventory analysis, impact, and interpretation. The method used to assess the environmental impacts is the CML- IA Baseline. The classification results of the dominant and significant impact characterization on the environment are global warming with 475.557,7 kg CO_2 eq. Drying process II, drying process I, PLN electricity, and transportation contribute to the environmental impact. The recommendation for technical improvement based on the sensitivity analysis results is using PLN electricity with renewable energy, namely micro hydro (PLTMH). The combination of wood biomass with other biomass is rice husks, then changing the truck fuel from diesel to fuel that is more environmentally friendly Pertamina Dex.

Keywords :

Link : https://youtu.be/o2KVhINcPFs

ID 1493

Bearing remaining useful life prediction and fault classification based on simplified fuzzy adaptive resonance theory map neural network and discrete wavelet transform

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Remaining useful life (RUL) prediction and malfunction detection are a challenge in condition based maintenance (CBM) implementation to minimize uncertainty and cost in maintenance activity. This study proposes a model that combines simplified fuzzy adaptive resonance theory map neural network (SFAM-NN) and discrete wavelet transform (DWT) to conduct CBM for bearing malfunctions. SFAM-NN uses time domain features, such as RMS, kurtosis, RMSEE, and AC Power of vibration signal and AC power of autocorrelation of wavelet coefficient from each subband, as inputs. The model provides 22 output categories: one is for healthy condition and the other 21 are for a varying degree of bearing degradation and malfunction type. A smoothing and voting algorithm is proposed to find optimal RUL prediction and malfunction classfification. Experimental results show that the proposed model can reliably predict bearing RUL and malfunction type.

Keywords :

Link : https://youtu.be/FekOdmI91s0

ID 1494

The effect of the core material of the Rogowski coil sensor on the sensitivity of the magnitude of partial discharge

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The Rogowski Coil sensor is one of the sensors used to detect aging insulation, which is marked by the occurrence of Partial Discharge. Aging is damaged, which fails power tools when operated. If the insulation is aging and even causing damage, the distribution of electrical energy will be disrupted. This research presents two types of Rogowski Coil sensor core materials to detect Partial Discharge with the same number of turns. The number of turns is 5. The first sensor is a sensor with a ferromagnetic core and the second sensor is a sensor with a non ferromagnetic core. The test of the sensor is carried out by using a magnitude test using a charge calibrator as an imitation of Partial Discharge. The magnitude of the Partial Discharge read by the sensor uses a digital oscilloscope with an impedance of 50 Ohm. Measurement results compared to commercial sensors. The measurement results read by the oscilloscope found that the type of sensor core influences the magnitude value of Partial Discharge. The magnitude of the Partial Discharge sensor with a ferromagnetic core is greater than that of a sensor with a non ferromagnetic core. However, both results are much smaller than the commercial sensor even though the digital oscilloscope can read them.

Keywords :

Link : https://youtu.be/25Rzb4iGJCA

ID 1496
Quality Improvement of Pillow Product Using Quality Function Deployment (QFD) Methods at PT. XYZ

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PT XYZ is a company engaged in the manufacturing of bedding goods. One of the products from this company that will be the object of research is the pillow. The number of disability pillow products that occurred during 2018 amounted to 21.69%, which could cause a decrease in company productivity and the shift of consumers of these companies to competing companies. The method used to improve the quality of pillow products is Quality Function Deployment. In QFD Phase I, consumer desires are translated into technical characteristics. The results of QFD Phase I, show that the highest priority technical characteristics are machine capacity with a difficulty level of 4, importance of 20% and estimated cost of 19%. Determination of product critical parts using QFD Phase II. The results of QFD Phase II show the highest priority of critical parts based on the level of difficulty, degree of importance and estimated cost is durability of 20%, measurement accuracy of 15% and fabric dimensions of 15%.

Keywords :

Link :

ID 1497

Two Dimensional Warranties cost analysis for a multi-component product protected by lemon laws

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We study warranties cost analysis for a multi-component product protected by the lemon laws. The product is repairable and consists of critical and non-critical components. The failed product under warranty due to failure of any critical or non-critical component is minimally repaired. It is considered that the product turns to be a lemon when either the number of critical or noncritical component failures reaches k. We obtain the expected warranty cost and the optimal period of lemon laws which are of interest to the manufacturer when the product is protected by the lemon laws, and provide numerical examples to illustrate the expected warranty cost and the optimal lemon law period.

Keywords : lemon laws, two dimensional warranty, refund, replacement, expected warranty cost

Link :

ID 1498

Performance Analysis of Trellis Coded Modulation and Diversity Combining on Wireless Channel

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The use of trellis coded modulation (TCM) and diversity maximal ratio combining (MRC) are applied in this research in order to overcome the impairment of information signals caused by fading and noise. TCM is chosen due to its ability to correct error without increasing the transmit power and channel bandwidth. MRC is used to obtain multiple data streams corresponding to the transmitted image at the receiver. The testing of the system is carried out by calculating peak signal to noise ratio (PSNR) and bit error rate (BER). The result of this simulation shows that the use of TCM and MRC in the image transmission system improves significantly compare to the system which only use TCM without MRC.

Keywords :

Link : https://youtu.be/urmyBhjYwH0

ID 1499
Preliminary Study on the Basic Characteristics of Isopropyl Esters Used As Insulating Liquid

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The paper presents the basic properties evaluation of isopropyl esters for use as insulating liquid in oil-filled transformator. Two kinds of isopropyl esters, namely, isopropyl- palmitate and stearate were synthesized from isopropyl alcohol and palmitate and stearate acids. The resulted isopropyl esters were then evaluated for their basic properties such as breakdown voltage, viscosity, density, acidity, and water based on the ASTM D 6871 standard specification. The investigation results show that viscosity and density of all both isopropyl esters meet well the values specified by the standard. The breakdown voltage isopropyl stearate is higher than the standard specification, whereas that of isopropyl palmitate is less than the standard value. The water content of both liquids are still much higher than the value specified by the standard.

Keywords : Insulating liquid, monoester, mineral oil, power transformer

Link : https://youtu.be/eeriGAjn_Ko

ID 1500*

Analysis Impact and Mitigation of Landslide Disaster using The Analytical Hierarchy Process (AHP) Method

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Landslides are the third most disasters in the last ten years in Indonesia. Indonesia's natural conditions such as topography, geology, and climatology are the dominant factors causing disasters so that the Indonesian state is prone to experiencing movement of land masses. The impact of landslides has resulted in many material and non-material losses. The impacts due to landslides are classified into four types, namely casualties (life), physical impacts, environmental health impacts, and socio-economic impacts. Mitigation efforts are needed to reduce and even eliminate losses due to landslides. The Analytical Hierarchy Process (AHP) method is a decision-making using an organized framework that simplifies complex problems into parts arranged in a hierarchical structure. In decision making, the AHP method uses a hierarchical arrangement where the main input is human perception. Data obtained from distributing questionnaires conducted in two ways, namely direct and google form. The questionnaire was filled out by experts who have experience in the field of landslide disasters for more than 10 years and come from universities in Indonesia. The Likert scale is used as an additional method to obtain the weight of the indicators contained in the last level of landslide disaster mitigation. The results showed that the dominant impact of landslides was the impact of the affected victims (15.35%). Mitigation efforts before landslides include making maps of landslide locations and easy-to-reach evacuation routes (11.29%) and installing early warning systems and rainfall monitoring devices (11.29%). This action is considered as community preparedness for landslides that come unexpectedly. The relationship between the dominant impact and the most important mitigation of landslides, namely the main mitigation that needs to be done is mitigation that focuses on the dominant impact due to landslides, namely the impact of casualties.

Keywords : Landslides, Impacts, Mitigation, AHP, Likert Scale

Link : https://youtu.be/CCfozUEd8Jc

ID 1502

Numerical simulation to determine the effectiveness of groynes and breakwaters as protective structures for Gandoriah Beach, Pariaman City

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This research is about numerical simulation to determine the effectiveness of groynes and breakwaters as protective structures for Gandoriah Beach in Pariaman City (West Sumatra - Indonesia) using an existing program. The effectiveness of the protective structure can be seen based on the bathymetry that is formed as a result of this structure performance. In the simulation of the present research, the direction of the incoming waves at the offshore boundary condition is the dominant direction, namely the west direction, with two wave conditions, namely during normal and stormy times. Simulations of morphological changes are carried out in six scenarios. The first three scenarios are for wave simulations under normal conditions with no shore protective structures (scenario 1), with groynes (scenario 2) and with breakwaters (scenario 3). Meanwhile, the second three scenarios are for wave simulation in storm conditions with no shore protective structures (scenario 4), with groynes (scenario 5) and with breakwaters (scenario 6). The simulation results for the 20 days state show that in normal wave conditions, the breakwaters have a fairly good performance for the formation of sedimentation behind the structures so that it is estimated that the formation formed is tembolo. Meanwhile, groyne is only effective to restrain the sedimentation rate along the structures. In the wave simulation during stormy time, there is a dominant current along the nearshore. In this case the performance of the groynes is better than the breakwaters because the groynes can inhibit the rate of erosion along the shore. Due to the use of breakwaters there is erosion behind the structures. Based on the simulation results without shore protective structures, both in normal and storm waves, abrasion and erosion processes occur, so that Gandoriah Beach needs handling.

Keywords :

Link : https://youtu.be/0VABOrneapo

ID 1503

Defect Analysis on PVC Pipe Using Statistical Quality Control (SQC) Approach to Reduce Defects (Case Study: PT. XYZ)

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Product quality is an important factor affecting the level of development and progress of a company. Statistic Quality Control (SQC) as a quality control tool for production can help companies whether the products produced are still under control or not from the initial process or the final product. The research was conducted at PT. XYZ to find out the causes of defects that occur in the PVC pipe production process. In the research, it is known that the defects that occur are melt, crack and hollow with the majority of defects that occur are melt and crack. By using a Cause and Effect diagram, it is known that the cause of defects occurs due to human, machine, materials and method factors. Solutions for defects that occur are given in the hope that the company will implement the solutions offered to reduce the number of defects that occur in the production process..

Keywords :

Link : https://youtu.be/TPnHXvs2fns

ID 1508*
Product Design of Carbondioxide Absorbent and Detectors

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Global warming is defined as an increase in the average temperature of the earth's surface caused by an increase in the amount of greenhouse gases in the earth's atmosphere. The largest contributor to greenhouse gases on earth is carbon dioxide (CO2). It is hoped that this CO2 detector and absorber tool can solve the problem of harmful gases generated from existing industries. This tool has an additional function in the form of cable reels, this is made so that the cables can be neatly arranged. This tool is used with brainstorming techniques to determine the characteristics of the product to be made, and the sampling technique is done by distributing open and closed questionnaires to determine the type of product. After that, a market survey is conducted using sampling techniques, and determining the validity and reliability of the main product with the products of competitors I, competitors II and competitors III. The stages from problem to sub problem are determined to classify the goals that will be made in designing the product. Sub-problem to sub-solution steps are carried out to determine the Quality Function Deployment (QFD) of the product.

Keywords :

Link : https://youtu.be/N8-El6ie_7I

ID 1510

Effect of rock sugar as a pore-forming material on the physical and mechanical properties of hydroxyapatite scaffold

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Hydroxyapatite (HA) ceramic scaffold had been made using the pressureless sintering method for bone scaffold applications. Micron- and nano-sized HA as the primary material with the addition of polyvinyl alcohol (PVA) as a binder and rock sugar (RS) sized 298-420 μm as pore-forming material had been prepared. RS was applied to produce interconnecting pores in the HA scaffold. The green body was made by uniaxial pressing method at a pressure of 200 MPa. Preheating was carried out at a temperature of 700 o C with a holding time of 1 h, aimed at eliminating PVA and RS, and then the temperature was increased to 1200 o C with a holding time of 2 h. During the sintering process, the heating rate and cooling rate were maintained at 3 o C/min. Physical and mechanical properties were tested respectively, including porosity and compressive strength testing. The results showed that the 23.0% porosity obtained a compressive strength value of 15.6 MPa at a ratio of HA:RS of 65:35 wt%. The highest porosity of 48.4% was obtained with a compressive strength of 4.9 MPa at a ratio of 55:45 wt%. In this study, the maximum addition of RS was only at 45 wt%, while the addition of RS reaching 50 wt% or more could affect the tangential bonding between HA powders during the sintering process.

Keywords : bio-ceramics, nano-hydroxyapatite, high porosity, compressive strength

Link :

ID 1511
Evaluation of e-commerce services quality using Fuzzy AHP and TOPSIS

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Rapid technological developments require people to use information and communication technology to transact goods/services. Based on a survey by the Central Statistics Agency (BPS), of all data collection efforts, only 15.08% are e-commerce entrepreneurs. This shows that business conducted via the internet in Indonesia is still low. The low utilization of e-commerce can be caused by several obstacles, one of which is the customer trust that is built when customer satisfaction is met. This research was conducted to evaluate the quality of e-commerce services using Fuzzy AHP and TOPSIS. The determination of sub-criteria is done using the Delphi method. After that, the calculation of consistency is carried out using the AHP method. The results of calculations using Fuzzy AHP-TOPSIS show that the best e-commerce orders are Tokopedia (0.6206), Bukalapak (0.5208), Elevenia (0.2094) and Shopee (0.1910). Based on the research results, the recommendation for e-commerce with the best service quality is Tokopedia, this is because Tokopedia has the highest weight on the sub-criteria for product return services compared to other e-commerce. The results of this study can be used by other e-commerce companies to improve service quality based on criteria and sub-criteria that are considered important according to expert opinion.

Keywords :

Link :

ID 1512
Effect of occupational noise exposure to work-fatigue of indonesian crumb rubber plants

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The purpose of this research was to analyze the effect of noise on the level of work-fatigue in the production area of three crumb rubber plants at Padang City, Indonesia. It also examines the impact of age, period work, marital status, and education level on work-fatigue. Occupational noise in the working area was measured using a Sound Level Meter, while work fatigue was measured using the Indonesian fatigue measurement questionnaire (KAPUK2). The respondents of this study were workers in these plants, 213 people in the wet-area, and 135 people in the dry-area. Results showed that the average noise of the production area had exceeded the threshold value, which was 90.98 dB. There were 26.19% experienced mild-fatigue, 71.43% moderate-fatigue, and 2.38% heavy-fatigue. Noise, age, and working experience were a related and significant influence on work-fatigue, where the probability value was respectively 0.046, 0.001, and 0.000 ($p \leq 0.05$). The results of multiple regressions showed that occupational noise was the most influential factor in the occurrence of work- fatigue with an odds ratio of 3.92.

Keywords :

Link : https://youtu.be/AOu6bc5bN2I

ID 1520*

Nitrate Adsorption onto the Physically and Chemically Modified Pumice

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Nitrate adsorption onto the physically and chemically modified pumice was investigated and compared with the adsorption capacity of the natural pumice. The treatments were heating at temperatures of 300°C, 450°C, and 600°C for physical and soaking in acid solutions (HCl, H_2SO_4 , and HNO_3) for chemical treatments. The adsorption was performed in a batch system at room temperature (25±1°C) with the optimum condition (pH 4; 0.3 g/L of adsorbent dose; <63 μm of adsorbent diameters and 30 minutes of contact time). The results indicated that the physically and chemically modified pumice resulted in increasing removal efficiency and nitrate uptake compared to the natural pumice. The highest removal efficiency and nitrate uptake were achieved from 300°C of heating temperatures (62.04% and 155.09 mg/g) and H_2SO_4 for the acid solution (83.30% and 208.25 mg/g), while by using the natural pumice only reached 57.02 % and 142.55 mg/g. The SEM images of the modified pumice confirmed the change in the surface morphology of pumice including the pore structure and surface area which can be proper sites for adsorption of pollutants. This study demonstrated that the physical and chemical modification could be the potential treatment to increase the removal efficiency and nitrate uptake of the natural pumice.

Keywords : adsorption, nitrate, physical and chemical modification, pumice

Link :

ID 1523
Sustainable Plastic Waste Management Strategy: Optimization of Plastic Manufacturing Plant Waste (Gas and Product Transition)

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Production waste management has become the key to a sustainable manufacturing operation strategy. This study aims to analyse the waste gas and production waste from the polymerization process, especially the residual exhaust gas from the degassing unit and the final product from the product transition process that does not meet the requirements. Research using qualitative and quantitative methods. The analysis is done by calculating the amount of gas removed from the sweeping or degassing process and calculating the material balance of the production process to analyse the process loss. The results show that the largest contributor to the waste gas is from the degassing process and the pellets from the transition products. In addition, an optimization process is needed to recover exhaust gas with a recovery system and perform a trimming process or a mixing process to reduce the transition product to become prime product.

Keywords : Waste, plastic, sustainable, production, degassing, trimming, recovery

Link : https://youtu.be/MzjN-ZozA14

ID 1525

Techno-Economic Analysis in Application of Glass Solar Cell on Storey Building: A Case Study of Office Building

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Urban area populated by edifice and storey building can complicate process of electric energy distribution to the middle of city. Citizen reluctance if their settlement passed by transmission network or being built substation, and bigger cost of underground cable than overhead line increases such difficulty level. If there is problem in delivering electric energy, so the city will face electric energy crisis and disrupt society life. One of solution in overcoming that issue is by installation the glass solar cell (transparent solar cell) with thin film material (CdTe) on storey building, which located in the middle of city and its electric energy supplied by PLN. In this study, glass solar cell will be installed in existing building "W" with solar cell area about 6,916 m 2 . Glass transparency level of study object building is 30%, so by installing same transparency level of solar cell can supply maximum electric energy 897,184 kWh/year or equal to 35% electric energy demand of building. Economic feasibility analysis applied in this study, where NPV is IDR 398,961,738, IRR is 7.47% and the payback period is 11 years, so this technology is feasible to be implemented economically. If considering the tilt and azimuth angle of solar cell installation, instalment in B and C side of building generates smaller electric energy than A and D side. This condition caused by bigger reduction on solar irradiation energy that accepted by B and C site, namely 61.7% for B side and 62.7% for C side. The usage of glass solar cell contributes to deduct greenhouse gas emission, maximum 732,999 kg/year..

Keywords : Glass solar cell, Transparent solar cell, Thin Film, CdTe, Greenhouse gas emission

Link : https://youtu.be/j87HxiSLk7o

ID 1526
Identification of Safety Leadership Implementation in Construction Projects

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Safety leadership is one of the critical factors in the success of construction safety. Various safety policies and advanced construction methods have been developed to improve safety quality in construction projects. However, the project team's involvement in executing the system also plays a vital role in the outcome of the result. In this paper, the identification of safety leadership implementation is referred from 7-5-9 Safety Leadership theory by assessing the involvement of the project leaders, namely the General Manager and Project Manager, in applying safety leadership manifestations in their respective construction project. This study uses a quantitative approach which requires validity and reliability test, and the analysis was processed by using Rank Analysis and ANOVA. The questionnaires were filled out by the construction project team; Project Manager, Site Engineering Manager, Site Operations Manager, and Health, Safety, & Environment Manager, from two companies and anonymous individuals. The result of this research shows that the manifestation of safety leadership is well-implemented and meet the average standards. However, there is a notable difference between the results of General Manager and Project Manager index scores, with General Managers always score higher than Project Manager on the five aspects measured.

Keywords :

Link :

ID 1528

An Estimation of Electrical Energy Saving for Lecture Building at Universitas Andalas using Daily Electric Needed Pattern

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Electrical energy is a mandatory requirement for carrying out various kinds of human activities. Nowadays, electrical energy must be used efficiently, that is, as needed. However, in use, it is often done excessively and inefficiently, which causes energy waste. It has an impact on the high spent on electricity costs. This research was conducted using an analytical method to obtain a pattern of ideal daily energy consumption needs for various kinds of academic activities in the Universitas Andalas lecture building, namely during the lecture period, exam period, and lecture holidays. The ideal pattern of needs is obtained by considering electrical equipment data, lecture schedules, the questionnaire results on electricity users' behavior, and the value of lighting intensity. The pattern is plotted on a graph every 30 minutes for 24 hours. The pattern results are then compared with current electrical energy usage to evaluate everyday electrical energy use to improve future use. Based on testing the pattern of ideal electrical energy needs with current, it is found that electrical energy is the least efficient during the lecture holidays with a percentage value of 55% to 75%.

Keywords :

Link :

ID 1529
Analysis the Potential of Fire and Explosion at Ammonia Storage

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The increase in fertilizer industry in the world made the growth up of the ammonia industry as well. Ammonia was used as a nitrogen source in fertilizer industry and stored in ammonia storage tank. This industry had two ammonia storage tanks with capacity 10,000 MT and 5,000 MT, respectively. This study aimed to analyze the impact of fire/explosion at ammonia storage tank and find the root cause of ammonia released from ammonia storage tank. The impact of fire/explosion was analyzed using Dow's Fire & Explosion Index (DFEI), which resulted in the radius effect due to the ammonia storage tank explosion of 10,2 meters. The actual probable property damage was US$ 144,405 and US$ 62,576 for each ammonia storage tank. Possible daily outage for this fire/explosion was at least 2 days. The root cause of ammonia released from tank was conducted by using Fault Tree Analysis (FTA) that could be grouped into technical and non-technical aspects. Non-technical aspects had 57% possibility of fire/explosion at ammonia storage tank. Software ALOHA (Arial Location of Hazardous Atmospheres) resulted in the toxic area radius up to 3700 meters if ammonia was released from the tank. Moreover, the explosive area for this condition up to 118 meters.

Keywords :

Link :

ID 1531
Comparison of Natural Fiber Types as Reinforcement Material on Composite Mechanical Properties via Carbon Nanotubes Addition

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Composites with natural fiber reinforcement have been widely used in various field. Natural fibers have the advantages of easy recycling, environmentally-friendly characters, renewable, non-toxic, inexpensive, high toughness, good insulation against heat and noise, and good thermal properties. The aim of this paper is compare natural fibers used as reinforcing material on composite with an epoxy matrix and the addition of carbon nanotubes (CNT). The natural fibers used are oil palm empty fruit bunches (OPEFB), bagasse, and hemp fiber. Alkalization treatment with NaOH was carried out on natural fibers to remove impurities on the fiber surface and activate hydroxyl groups. CNTs need to be functionalized to achieve the desired compatibility. Functionalization is carried out by the mild acid oxidation method using nitric acid and added hydrogen peroxide. Silane coupling agent treatment is carried out on natural fibers and CNTs to improve compatibility with the matrix. The result of the bending strength test of OPEFB, bagasse, and hemp fiber was 509.94 MPa, 36.22 MPa, and 18.12, respectively, in addition to CNT 0.5% mass. The bending strength of OPEFB fiber more significant than bagasse and hemp fiber, so that it has the opportunity to be developed in the automotive industry.

Keywords :

Link : https://youtu.be/KK6VucsDXfQ

ID 1532

Cleaner Production Analysis at Hospital Wastewater Treatment Plant

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The construction of WWTP (Wastewater Treatment Process) hospital should prioritize the environmental aspect and apply the principle of sustainable development so that the environmental impact can be minimized and optimize its management. The wastewater management strategy used in Hospital X uses an end of pipe strategy that focuses only on sewage treatment and disposal, so as not to completely solve existing environmental problems. Cleaner production analysis is applied to improve wastewater management and WWTP performance thus improving WWTP's operational cost efficiency. The implementation of cleaner production can be one of the alternatives to reduce management costs through the identification of opportunities also inefficiencies found in WWTP management in hospitals. The analysis was carried out using descriptive analysis through the depiction of the water balance in WWTP treatment, the analysis then continued using fish bone diagrams to see the efficiency opportunities that can be applied. The results showed wastewater produced from the hospital met the standard requirements of wastewater quality so that it can be reused as one of the raw water sources for the hospital's operational activities.

Keywords : Cleaner production, Wastewater, efficiency, environmental

Link : https://youtu.be/XnHLtXQSMto

ID 1534*

RELATIONSHIP OF GARDENING ACTIVITIES TO ELDERLY STRESS LEVELS IN KURANJI DISTRICT OF PADANG CITY

Aging and physical decline in the elderly due to the degenerative process that causes stress in the elderly. Gardening is one of the alternatives that can reduce the stress of the elderly. This research aims to find out the effect of gardening on elderly stress. The design of this study used purposive sampling techniques with the dissemination of questionnaires as many as 237 seniors in Kuranji Sub-district of Padang City. The measuring instrument used to measure stress is PSS 10 and compares the frequency and duration of elderly gardening. The results were tested with the Wallis Kruskal statistical test with a value of p=0.034, with moderate stress levels and strength associated with the Spearman Rho test, with a correlation value of -0.236**. The conclusion of this study is that gardening effectively changes the stress levels of the elderly, so it is expected that the elderly do gardening as one of the nonpharmacology alternatives conducted independently without causing side effects.

Keywords :

Link :

ID 1537

Study of Retention and Infiltration Wells as a Result of Resettlement of The Batang Kuranji Upper Watershed

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Padang City is one of the metropolitan cities in West Sumatra Province and has six (6) watersheds, one of which is the Batang Kuranji watershed. Over the last few years Batang Kuranji watershed has experienced significant infrastructure and urban development which began with the massive earthquake of 30 September, 2009 with coastal communities, afraid of being affected by larger aftershocks having the potential of a tsunami, moving to the upper watershed. As a result, the type of land cover that was originally an infiltration area has been changing into a runoff area. The Batang Kuranji channel with a discharge (Q25) 870 m 3 /s may not be able to accommodate the change in discharge which can lead to flooding. This paper aims to determine changes in discharge that occur due to changes in land cover and to analyse whether the use infiltration wells and retention pond can reduce the flooding volume. Two methods to calculate runoff discharge were adopted, HEC-HMS 4.1 Modeling and Nakayasu. It was found that the peak discharged increases to (Q25) 1,037.60 m 3 /s. Thus, creating retention pond with a dimension of 35 hectare with a depth of 5 m and 34,246 infiltration wells can reduce the flood risk. The percentage of runoff discharge they can accommodate is 90.98% and 9.02% respectively.

Keywords :

Link :

ID 1538*

Effect of changes in the regeneration temperature and the regeneration airflow velocity on the system performance of the solid desiccant air conditioning

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This paper presents the effect of changes in operating parameters on system performance of the solid desiccant air conditioning system, which is consisted of the regeneration temperature and the regeneration airflow velocity. These parameters were examined in two operation modes, the former ranging from 2 m/s–0.83 m/s at constant regeneration temperature, and the latter ranging from 75°C–46.4°C at constant regeneration airflow rate. The results indicate a smaller decline in dehumidification performance for the constant regeneration temperature operating mode than the constant airflow velocity operating mode. On the contrary, the system performance and the recovery energy ratio at the latter operating mode gives a higher value than the former operating mode. These results suggest that when the dehumidification performance becomes the main function of the system, the control strategy in the regeneration airflow velocity should be considered to avoid a significant reduction in the system performance.

Keywords : Regeneration temperature; Regeneration airflow velocity; Solid desiccant air conditioning; Dehumidification performance; System performance

Link :

ID 1539

Improvement in the accuracy of the dynamic behaviour prediction of a bolted structure using a simplified FE model and model updating

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Bolted joints in assembled structures contribute to the dynamic behaviour of the structures but also increase uncertainties in modelling and prediction of the dynamic behaviour. This paper presents a modelling scheme able to reduce uncertainties and increase accuracy of the prediction. An FE model of a bolted joint structure was developed using CBUSH, CBEAM and 3D elements representing the bolts, contacting interfaces, and structural components, respectively. Normal modes analysis was performed on the FE model to calculate the natural frequencies and mode shapes. Sensitivity analysis was formulated and used in identifying the highly sensitive design parameters of the FE model. Model updating was adopted in correlating the FE model with experimental modal analysis (EMA) and producing an updated FE model. It was found that the updated FE model is capable of predicting the dynamic behaviour of the bolted joint structure with 95 percent accuracy. This proposed scheme demonstrated potential for applicability to the dynamic behaviour analysis of complex bolted structures.

Keywords :

Link :

ID 1543*

An improved method for dynamic behaviour prediction of carbon fibre reinforced epoxy (CFRE) using finite element model updating

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The dynamic behaviour prediction scheme of carbon fibre composite structures are extremely challenging to be performed due to the geometrical ply-by-ply properties and the ply orientation issues. In this paper, a laminated carbon fibre reinforced epoxy plate with elastic and linear layers was used with aim to investigate the dynamic behaviour of the carbon fibre reinforced epoxy using practical modelling scheme via finite element modelling and updating method. A simplified FE model of the CFRE plate was developed using shell element properties known as PSHELL to represent geometrical laminated properties. Subsequently, the dynamic behaviour of the FE model was calculated using Nastran SOL103. Potential updating parameters of the FE model was analysed and identified using the sensitivity analysis. The model updating method was then used to update the initial FE model of the CFRE plate based on the experimental modal analysis (EMA) result. The comparison of the results were used in verifying the accuracy of the updated FE model of the CFRE plate. The result suggested that the PSHELL properties can be used efficiently to represent the geometrical laminated properties of the CFRE plate without considering the geometrical effect of ply-by-ply properties.

Keywords :

Link :

ID 1544

Assessment of Rotational Accelerometer Mountings for Rotational Frequency Response Function Measurement

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Kistler Kshear 8840 piezoelectric rotational accelerometer is designed with an M5 bolt type of mounting and a 5mm diameter of through or pre-tapped hole is required in a structure under test. However, the mounting is not applicable for some cases, and other types of mounting need to be used. This work investigates the applicability and accuracy of five different configurations of mounting for Kistler Ksher 8840 piezoelectric rotational accelerometer for the measurement of the rotational FRFs of a steel plate. The mounting configurations consist of 3D printed PLA and ABS mounting, bee's wax, steel, and bolt mounting. The rotational FRF of the steel plate was measured by using impact testing method. The applicability and accuracy of the mountings were evaluated by comparing the measured FRFs with the finite element (FE) FRFs counterparts. The comparisons of the results revealed that using the bee's wax mounting had produced the most accurate and least noisy FRF. It was also found that using the 3D printed PLA mounting had contributed to the highest contamination of noise and several spurious peaks in the measured FRFs. These findings provide useful information for selecting the appropriate types and designs of mounting for the Kistler 8840 rotational accelerometer.

Keywords : Direct Rotational Accelerometer, Mounting, Frequency Response Function (FRF), Experimental Modal Analysis (EMA), Finite Element Method (FEM)

Link :

ID 1545

Effect of lumped mass on the structural dynamic modifications of a structure

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The identification of the effect due to structural changes using modal data is very challenging in the structural dynamic modifications (SDM) study. In this paper, the aim of this study is to identify the effect of physical changes of a structural system based on the natural frequencies and mode shapes. A mild steel thin plate structure was used in the study. A mass was attached to the thin plate to alter the dynamic characteristics of the thin plate structure. Experimental modal analysis (EMA) and the normal modes analysis were performed in two stages to the thin plate structure, without mass and the mass is attached to the thin plate structure. The normal modes of the thin plate structure were obtained using finite element (FE) analysis. The results of the natural frequencies and mode shapes between the thin plate and thin plate with SDM were compared. It is concluded that the impact of structural changes due to SDM will change the modal parameters of the structure.

Keywords :

Link :

ID 1549
Lift Study of a Flapping MAV Wing Design Based on Bat Wings

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Bio-inspiration is a design ideation method that uses observations found in nature to solve a mechanical problem. In this study, a simulation study of a micro air vehicle (MAV) wing design that is based on bat wings was done and validated experimentally. The wing model was generated using an in vivo observation where the margin wing shape was traced and then used to generate a flat wing with a margin shape of a batwing. The lift of the wing was studied at 4m/s wind speed with a flapping angle of 55^0, and at the angle of attack from 0^0 to 35^0. The simulation was done using ANSYS V1.6 software and the experimental study was done using an open circuit subsonic wind tunnel. It was observed that the wing has a stall angle of 25^0 and a CLmax of 3.2. The result also shows that the difference between the simulation and the observation result to be small with 0.2% at the smallest point and 5% at the largest point. This shows that the simulation model was valid and can be used for future wing design.

Keywords :

Link :

ID 1550
Solid Waste Management System Model of Village Tourism Area of Nagari Tuo Pariangan, Indonesia

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Nagari Tuo Pariangan is one of the three leading tourist attractions in Tanah Datar Regency. The increase of tourists visits Nagari Tuo Pariangan Area has resulted in increased waste generation, improperly managed existing solid waste management endanger the environment, and sustainable development. This study aims to develop a solid waste management system model of Nagari Tuo Pariangan as an effort to preserve the environment and support tourism development. The generation of solid waste of this area was 786,803 kg/day, with the largest were food waste as 35% and plastic waste of 32% of total waste. The solid waste management system model considers three categories of sorting types (compostable, recyclable, and residue), while the storage use of individual type (trash bags and bin) and communal (bin 40 L, 6 m 3 containers). The collection system uses a 1.5 m 3 motorized pedicab. The processing method applies composting, enumerating plastic waste, selling paper, and metal waste to the collectors. Moreover, the residue transport using a 6 m 3 arm roll truck from the recycling center (TPS 3R) to Bukit Sangkiang Landfill. Meanwhile, the non-technical aspects planned for regulation on waste management by Wali Nagari, the formation of Non-Governmental Organizations, adjusting funding according to applicable regulations, and increasing the participation of traders, communities, and visitors.

Keywords :

Link : https://youtu.be/qA2JelGDqc0

ID 1552*

EXPERIMENTAL STUDIES OF APPLICATION PASSIVE MOMENTUM EXCHANGE IMPACT DAMPER (PMEID) ON UAV'S LANDING GEAR

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Unmanned aircraft or UAV (Unmanned Aerial Vehicle) is a future technology that continues to be developing. This research examines the structural vibration acceleration response of the aircraft's nose landing gear. The landing gear is the part of the aircraft that receives the most significant shock load during landing. This is due to the magnitude of the maximum acceleration of the landing gear vibration when experiencing shock loads. This phenomenon causes the landing gear damaged due to excessive vibration. Therefore, uncontrolled shock loads can damage the landing gear structure and even pierce its frame structure. A momentum transfer method was applied to the landing gear design to reduce the maximum acceleration amplitude of vibration due to experiencing shock loads during landing. The research experiment was carried out using the principle of passive momentum transfer; the test was carried out by dropping the landing gear at a certain height. When the landing gear experiences a shock load, kinetic energy and momentum will be transferred to the PMEID system so that the landing gear remains in a stable condition. The experiment gives an output in the form of the vibration acceleration amplitude of the landing gear measured by the accelerometer sensor on the landing gear's main mass. The vibration response will then be sent to the voltage amplifier and forwarded to the digital signal processing and displayed on a computer monitor. The test results prove the application of the momentum transfer method in the landing gear design can reduce the maximum amplitude of vibration acceleration when landing.

Keywords : Unmanned Aerial Vehicle, landing gear, maximum vibration acceleration amplitude, passive momentum transfer

Link : https://youtu.be/gX38bdTjJUY

ID 1555
Crack Analysis on Ti-6Al-4V ELI Implant Material coated with Commercial Hydroxyapatite: Literature Review

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Ti-6Al-4V Extra Low Intertitial (ELI), a type of titanium alloy that is widely used for implant materials. However, use of Ti-6Al-4V ELI as an implant material still causes problems. When the implant is placed, the oxide layer on the surface can be detached due to corrosion, making it toxic to the body. To improve this condition, it is necessary to modify the surface of the material, namely the coating method. A good coating material for orthopedic implants comes from ceramics, namely hydroxyapatite (HA). However, there are also obstacles. HA coating on titanium, sometimes not evenly across the surface, causing cracks on the surface of the coating. There are two methods that are often used in coating materials, namely Electro Phoretic Deposition (EPD) and dip coating. This study analyzed a number of literature review using a database search of international reputable journals Science Direct, Pubmed on biomaterials and biomedicine, using the keywords Ti-6Al-4V ELI, hydroxyapatite, cracks, EPD method and Dip Coating. The results of this literature review are useful as a reference source for researchers who will conduct research, in order to choose which method is good for crack reduction in the coating of the Ti-6Al-4V ELI implant material using hydroxyapatite. From the literature review, Dip Coating method is better than the EPD method. The surface layer of the implant is evenly distributed, there is no buildup of HA in several surface areas, so that cracks on the surface are minimal.

Keywords : Ti-6Al-4V ELI, hydroxyapatite, cracks, EPD method, Dip Coating method

Link :

ID 1556*
Study on solid waste generation in Toba Lake area

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Girsang Sipangan Bolon and Merek do not have basic data for solid waste management design. This research aimed to analyze the generation, composition of domestic and non-domestic waste. Sampling methods are determined based on SNI 19-3962-1994. The average amount of waste generation in units of volume for the area divider factor and the number of inhabitants for Girsang Sipangan Bolon and Merek are 92,771 and 87,227 m3/day, respectively. This study found the composition of domestic waste in Girsang Sipangan Bolon consists of 65% organic waste; 7% paper; 17% plastic; textiles 6%; rubber 0%; wood 0%; glass 2%; 0% metal and 3% other waste. The composition of non-domestic waste consists of 61% organic waste; 12% paper; 15% plastic; textile 1%; rubber / leather 0%; wood 1%; glass 0%; metal 1% and other waste 9%. In Merek, the composition of domestic waste consists of 69% organic waste; paper 14%; 8% plastic; textile 1%; rubber / leather 0%; wood 0%; glass 2%; 0% metal and 6% other waste. The composition of non-domestic waste consists of 55% organic waste; paper 14%; plastics 21%; textile 0%; rubber / leather 0%; wood 1%; glass 3%; 0% metal and 6% other waste.

Keywords :

Link :

ID 1557*

Food Waste Composting with The Addition Of Cow Rumen Using The Takakura Method And Identification Of Bacteria That Role In Composting

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The purpouse of research to measure and analyze the quality and quantity of food waste composting by adding cow rumen activator and efective microorganisme (EM4). This research do to identify the dominant bacteria that play a role in composting. The composting method applied in this research is Takakura composting. The method for bacterial identification was referred to as the Bergey's manual which consisted of a gram stain test and a biochemical test. Three types of composter variation are being use in this composting, variation 1 consist of (food waste and maturecompost), variation 2 consist (food waste, mature compost and EM4 activator) and variation 3 consist (food waste, mature compost and cow rumen activator). The parameter which include maturity, quality (moisture content, temperature, pH, texture, color, C/N ratio, P and K), and the quantity of compost. The results showed that not all variations met the compost maturity and compost quality based on the SNI 19-7030-2004 standart such as organc carbon in variation 1B and C/N ratio in variations 1A and 1B. The affects of addition activators to composter give short time and good quality of compost. Composting with the addition of cow rumen activator is the fastest composting for 7 days with C/N ratio is 19.22%, P is 0.34%, K is 2.08%. Composting with EM 4 activator occurred for 8 days with C/N ratio is 20.53%, P is 0.30%, K is 1.82%. Composting without the addition of activator is the longest composting which is 11 days with C/N ratio is 23.74%, P is 0.21%, K is 1.76%. The results show variation 3 with the addition of cow's rumen is the best composting with a score of 15. The results of the identification of dominant bacteria that a role play in composting are some Bacillus sp bacteria which are bacteria that degrade organic matter.

Keywords : Bacillus sp, Compost of maturity, Quality of compost, Quantity of compost, Food waste

Link :

ID 1558*

Behaviour of Cold-formed Steel Back-to-Back Channel Built-Up Sections under Bending

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Cold-formed steel (CFS) structures have been widely constructed as main elements in light structures. In terms of increasing capacity, the built-up sections of cold-formed steel are used regarding larger span structure. In this study, nine cold-formed steel with back-to-back built-up section specimens with various thicknesses were experimentally investigated under three points bending scheme to obtain their capacity and failure type. Each specimen was assembled by using self-drilling screws in web of two built-up channels. Experimental results show that three various web thicknesses (1.3 mm, 1.5 mm, and 2.00 mm) in cold-formed steel of built-up section give the different moment capacity up to 22%. Then, failure types in all specimens are similar where local buckling is generated in compression flange around loading area and lateral-torsional buckling occurred along span. It is found that web thicknesses in back-to-back section have contribution to increase the stiffness and torsional rigidity. However, there is phenomenon when the load capacity decreased, the back-to-back sections act non-composite. Then, the failure apparently observed on that section is one-side twisting and web crippling in mid-span.

Keywords :

Link :

ID 1559

STRUCTURE MODELING AND ANALYSIS FOR IMPROVING THE STRENGTH OF HORIZONTAL PUMP SYSTEM

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Generally, pumps are used as equipment to move liquids from one place to another, such as in power plants, petroleum companies, etc. One of the kinds of the pump is the Horizontal Pumping System which consists of a motor, trust room, cradle, pump, and base. This study is motivated by the problem appearing of load increase at the suction and discharge nozzle so that it exceeds the allowable load. That load surges cause the pump structure to receive large vibrations, which results in damage to some Horizontal Pump System structures. Therefore, structural analysis on the Horizontal Pumping System to determine the displacement and durability of each cradle are necessary. The purpose of this study is to determine the strength of the pump structure and design additional tools to strengthen the pump structure. In this study, SOLIDWORKS is used for 3D modeling of the Horizontal Pump System structure. Meanwhile, the strength analysis of the structure is conducted using ANSYS Static Structural. Based on the analysis results, there is a quite large displacement in the pump section associated with the suction nozzle. On the other hand, the cradle resistance is still in the elastic deformation area with a maximum value of 24881.97 psi (σy = 3.01x104 psi). Therefore, development is needed by adding a cradle in the pump section associated with a suction nozzle. By adding this cradle there is a reduction in displacement experienced by the pump. Pump displacement changes to 0.036 - 0.097 inches in x-axis, 0.009 - 0.021 inches in y-axis, and 0.001 - 0.005 inches in z-axis.

Keywords : stiffness, structural analysis, horizontal pumping system

Link : https://youtu.be/Qi-QbcN5JWw

ID 1560
Design Analysis of Solar Panel Structure LAPAN- Constellation Satellite Using Finite Element Method

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Satellite Technology Center (Pusteksat) of LAPAN currently develops a satellite constellation with communication mission. This satellite will implement a deployable solar array to perform its missions. The objective of this research is to find solar panel structure with natural frequency in accordance with the requirements of the launcher and have the minimum mass. This method starts by determining the requirement of solar panel structure and then designing the solar panel into three models as follow: solar panel structure with solid aluminium sheet model, isogrid and orthogrid model, and honeycomb model. The material used for solar panel structure for aluminium sheet and isogrid and orthogrid model is Al 7075-T6 because the material is light in weight and has a high stiffness to withstand loading conditions. Meanwhile, for solar panel structure honeycomb use aluminium alloy 5052 for both face and core follow the previous satellite. The next step is analyzing the natural frequency of three models solar panel structure with modal analysis. This study shows that solar panel with honeycomb model give the best option as a solar panel structure on a constellation satellite. The result can also predict the modal shapes that can be used as a place to lay the accelerometer when testing and measuring natural frequency on vibration test machines.

Keywords :

Link :

ID 1563*
Solid waste management in Toba Lake area

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Lake Toba is a tourist area that continues to be developed, attracting local and foreign tourists. The increase in tourists visiting lake Toba affects the social and economic aspects and impacts the environment, one of which is the increase in waste generation. On the other hand, waste in the Tourist area is not well managed. This study determines the condition of existing waste management in the Lake Toba tourism area, especially in Girsang Sipangan Bolong and Merek sub-districts. Waste management in both regions is not sustainable. The sources of waste come from residential and non-residential areas. The two regions manage waste independently. Some of the community's waste handling includes burning, composting, separating kitchen waste for animal feed, and recycling. The two regions' government is still trying to provide the best service in solid waste management, such as providing communal waste containers in public facilities and waste transportation to landfills. However, it was found that there are still many deficiencies that need to be fixed. Solid waste management in these two regions is still far from Indonesia's standard.

Keywords :

Link :

ID 1566*
Integration regenerative braking system with ABS in electric

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Due to improvement of energy storage and electric drive, electric vehicles regain their popularity. One way to extent drive range is to utilise regenerative braking system. While in conventional vehicle, friction brake will dissipates kinetic energy into heat. But, Anti-lock Braking System (ABS) is still adopted in electric vehicle for safety reasons. This paper aims to investigate cooperation regenerative braking system with ABS. the idea is, ABS always monitor wheels as they approach lock condition when the regenerative brakes are in duty. When the ABS is initiated, the regenerative braking system is disabled to slow the vehicle down safely. From the simulations, it is concluded that but it is suggested that there is the possibility of maintain some regenerative braking with friction braking during ABS intervention rather than cutting it out altogether.

Keywords : kinetic energy, regenerative braking system, ABS, lock condition, simulation

Link :

ID 1568*

Design a Stethoscope Digital to Give a Distance to Medical Practitioner While Examining Patients

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A stethoscope is an instrument in medicine used to listen to the sounds produced in the body or auscultation, primarily to listen to the sound from the lungs and heartbeat. Medical practitioners usually use the sound from a stethoscope as an indicator to diagnose a patient's illness. Regular stethoscope with earpiece is less effective to use nowadays. Medical practitioners have difficulty attaching the conventional stethoscope to ear because they have to use personal protective equipment, including head covering, to deal with coronavirus patients and patients with other medical complaints. This research designs a digital stethoscope that can be used even the head of medical practitioners covered by safety clothes. This stethoscope has a sound sensor, OLED, a microprocessor and a speaker. The sound of lungs and heartbeat from 30 volunteers was recorded to investigate the frequency of noise, lung, and heartbeat. A bandpass filter was designed to get the signal with an upper cut off frequency 50 Hz to 80 Hz and a lower cut off frequency 5 Hz. The result shows that this stethoscope can detect the number of heartbeats and give a clear sound of lungs. This device can help medical practitioners examine patients while keeping distance from patients.

Keywords :

Link :

ID 1569*

Interpretation of Soil Types in Lowlands Area using the Normalized Difference Soil Index (NDSI) and Tasseled Caps Wetness (TCW) methods

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Soil is the most important parameter in planning regional development. Soil characteristics are strongly influenced by texture, mineral content, organic matter content, water content, and others. The remote sensing approach can be used to determine the distribution of land over a large area. In this study, remote sensing methods will be used to interpret soil types using the Normalized Difference Soil Index (NDSI) and Tasseled Caps Wetness (TCW) methods. The results showed that based on the NDSI method, most of the Tanjung Api-Api area consisted of densely vegetated areas while the open area was still very few. Based on the level of moisture with the TCW method, the results show that the soil type in the Tanjung Api-Api area consists of fine-textured soil with a high level of moisture and water content, this is because the soil has a low capacity to drain water.

Keywords : soil, lowland, NDSI, TCW

Link :

ID 1570*

Effect of missing rainfall data on uncertainty of design floods

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Hydrological data is a collection of information or facts about the hydrological phenomenon. Mistakes in hydrological analysis have a fatal effect on the accuracy or accuracy of hydraulic building planning, whether in the form of planning for irrigation buildings, flood control structures, drainage systems, weirs, and so on. As we already know, rainfall data is the most important data in hydrological analysis. The minimum amount of rainfall data required in the hydrological statistical analysis is 10 years. To obtain this 10-year data, it is often encountered incompleteness in recording the rainfall data. Meanwhile, hydrological analysis is always required in any water construction planning. Based on the above statement, an analysis is carried out on how much influence the completeness of data and availability of rainfall data in an area of accuracy in predicting the discharge plan in different times and make a Rating Curve. In determining the unit hydrograph the Nakayasu method is used. The results of this study indicate that the completeness of the data is not very influential. This is evidenced by obtaining the discharge value at a certain return period which is not so different. From the unit hydrograph curve it can be seen that in the first condition with a return period of 100 years, a discharge of 801.775 m3 / s is obtained, for the second condition consisting of 11 rainfall data, a discharge of 833.848 m3 / s is obtained, and for the third condition, ignoring the rainfall data. the lost rain obtained a discharge of 816,489 m3 / s. Where the difference in accuracy in the first condition is 3.846% against the second condition and the difference in accuracy in the third condition is 2.082% for the second condition. In the rating curve section of Batang Kuranji, the normal water level discharge is 169.948 m3 / s with an elevation of 2.89 m. While the maximum discharge at the cross section of Batang Kuranji is 748,260 m3 / s with an elevation of 6.99 m.

Keywords : rainfall, missing data, floods discharge, unit hydrograph, rating curve

Link :

ID 1571*

The Use of Edge Cut on Microstrip Antenna Patch with The Modified Partial Ground Plane for Bandwidth Enhancement

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This research proposes the use of edge cut on the antenna patch with a modified partial ground plane to overcome the inherent characteristic of the microstrip antenna, which is narrowband. The antenna has to cover all of the LTE frequency bands, which is from 0.824 – 2.4 GHz. FR4 epoxy with a dielectric constant of 4.4 and a thickness of 1.67 mm is used as a substrate for the antenna. The proposed antenna is simulated by an EM Simulator. The simulated results show that the return loss of -18.82 dB and the VSWR of 1.25. These parameters confirms that the antenna is well-matched along with the LTE bands. This wideband antenna has a directional radiation pattern with a maximum gain of 4.65 dB.

Keywords :

Link :

ID 1572

The effect of chopping raw material on composting result with the biopore infiltration hole method

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This research aims to analyze the effect of chopping raw material on compost quality and quantity that was made with the biopore infiltration hole method. The composting was done in duplo on the backyard with clay soil type, and the water infiltration rate was 0.3 cm/hour. The holes were made with 10 cm of diameter, 100 cm of depth, and the distance between holes were 50 cm. There were four composition variations on this research i.e 50% yard waste and 50% food waste with and without chopping, 70% food waste and 30% yard waste with and without chopping. The chopping was using an organic waste chopping machine so that the waste size became 0.3-1.5 cm, while the size waste without chopping was ≥ 3 cm. The compost analysis was done toward maturity, compost quality (physical elements and macro elements), and compost quantity. The composting process took 65-80 days to get riped. The best variation was chosen by the scoring method. The result showed that compost with 50% yard waste and 50% food waste was the best variation because the compost quality has met the standard [10] for physical elements and macro elements, it produced more compost quantity. The chopping process could speed up the composting time until 15 days.

Keywords : biopore infiltration hole, chopping, compost, quality, quantity

Link : https://youtu.be/HwcZyMHNX5I

ID 1573*

Identification of Safety Leadership Implementation in Construction Projects

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Safety leadership is one of the key factors in influencing the success of construction safety. Even though safety policies and precise methods for engineering calculation have been developed to improve the quality of safety in construction projects, the involvement of the project team in executing the system also plays an important role in the outcome of the result. In this paper, the identification of safety leadership implementation is done by using the 8-5-9 Safety Leadership theory by assessing the involvement of the project leaders, namely the General Manager and Project Manager, in applying safety leadership aspects in their respective construction project. This study uses a quantitative approach which requires validity and reliability test, and the analysis was processed by using Rank Analysis and ANOVA. The questionnaires were filled out by the project team; PM, SEM, SOM, and HSEM from two companies and anonymous individuals. The result of this research shows that the safety leadership aspects are well-implemented and meet the average standards. However, there is a notable difference between the results of General Manager and Project Manager index scores, with the General Manager always scores higher than Project Manager on the five aspects measured.

Keywords :

Link :

ID 1574

Effect of Particle Size on Adhesion Strength of Bovine Hydroxyapatite Layer on Ti-12Cr coated by using Electrophoretic Deposition (EPD) method

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Hydroxyapatite (HA) extracted from bovine bones (called as natural HA) was used to coat Ti-12Cr titanium alloys by using the electrophoretic deposition (EPD) method. This is to improve biocompatibility and bioactivity properties of the material to achieve optimal osseointegration in orthopedic implant applications. There are three particle sizes of HA used in this study (25 μm, 63 μm, and 125 μm) which aims to determine their effect on morphology, structure, and the strength of the resulting coating adhesion. The coating process was carried out at a voltage of five volts for five minutes. The resulting layer morphology and surface coverage were observed using an optical microscope, the increase in sample mass was measured using digital scales to determine the amount of the particles deposition. The coating thickness was measured using coating thickness gauges, and the resulting coating adhesion strength was measured by using the cross-cut tape test method. The results of this study indicate that the HA particle size influence significantly on the quality of the coating produced after the EPD process. It is found that Ti-12Cr with a small particle size produces a stronger HA layer and, therefore, more potential in the future orthopedic implant applications.

Keywords : Natural Hydroxyapatite; Ti-12Cr; Bovine; Particle Size; EPD; Adhesion Strength

Link :

ID 1575*

Food Waste Composting With The Addition Of Cow Rumen Using The Takakura Method And Identification Of Bacteria That Role In Composting

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The purpouse of research to measure and analyze the quality and quantity of food waste composting by adding cow rumen activator and effective microorganism (EM4). This research do to identify the dominant bacteria that play a role in composting. The composting method applied in this research is Takakura composting. The method for bacterial identification was referred to as the Bergey's manual which consisted of a gram stain test and a biochemical test. Three types of composter variation are being use in this composting, variation 1 consist of (food waste and maturecompost), variation 2 consist (food waste, mature compost and EM4 activator) and variation 3 consist (food waste, mature compost and cow rumen activator). The parameter which include maturity, quality (moisture content, temperature, pH, texture, color, C/N ratio, P and K), and the quantity of compost. The results showed that not all variations met the compost maturity and compost quality based on the SNI 19-7030-2004 standart such as organc carbon in variation 1B and C/N ratio in variations 1A and 1B. The affects of addition activators to composter give short time and good quality of compost. Composting with the addition of cow rumen activator is the fastest composting for 7 days with C/N ratio is 19.22%, P is 0.34%, K is 2.08%. Composting with EM 4 activator occurred for 8 days with C/N ratio is 20.53%, P is 0.30%, K is 1.82%. Composting without the addition of activator is the longest composting which is 11 days with C/N ratio is 23.74%, P is 0.21%, K is 1.76%. The results show variation 3 with the addition of cow's rumen is the best composting with a score of 15. The results of the identification of dominant bacteria that a role play in composting are some Bacillus sp bacteria which are bacteria that degrade organic
matter.

Keywords : Bacillus sp, Compost of maturity, Quality of compost, Quantity of compost, Food waste

Link :

ID 1576
The Economics Comparison of Power Plants Fuelled by Wellhead Gas and Liquefied Natural Gas in Aceh Province

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The Aceh Province Electricity System is supplied by Gas Engine Power Plant (GEPP) fuelled by Liquefied Natural Gas (LNG), Coal-fired power plant and Diesel Engine with Diesel fuel and transfers from the North Sumatra system during peak loads. LNG fuel is sent by ship from the Tangguh Papua Refinery which is regasification in Perta Arun Gas, Lhokseumawe, Aceh Province, so the production costs are expensive due to the distance from the gas supply sources. To get cheaper electricity production costs, it can be done by using the gas potential in Aceh province. In this study, the economic value will be calculated by comparing the use of two types of gas fuel, namely wellhead gas fuel and LNG gas for Gas Turbine and Gas Engine power plants, to determine the cost of electricity production for each power plant with the same fuel. Based on the calculation results, gas engine power plant with fuel from the Wellhead Gas has the best production costs with value of IDR 1,262.21 / kWh lower than the electricity tariff of IDR 1,467 /kWh, and has an IRR of 24.78% and a payback period of 4,88 years. By knowing the most economic value for the construction of power plant with Wellhead Gas, it can be used as a basis for policy making in choosing an economical power plant development for areas with gas potential, such as in Aceh province.

Keywords : Wellhead Gas, Liquefied Natural Gas, Gas Engine Power Plant, Gas Turbine Power Plant

Link : https://youtu.be/50vagjhWZM8

ID 1577

Spatial Variation of Electrical Conductivity, Total Suspended Solids, and Total Dissolved Solids in the Batang Arau River, West Sumatera, Indonesia.

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This study aims are to analyze the spatial variation of electrical conductivity (EC) values, total suspended solids (TSS), and total dissolved solids (TDS) concentrations along the Batang Arau River. Water samples were collected from eight stations along the river at biweekly intervals between March and May 2014. The results indicate an increasing trend in the value of three parameters from upstream to downstream, reflecting the effect of natural and anthropogenic activities along the river. The EC values were in the range of 173-5,097 μS/cm and had exceeded the water quality standard established by World Health Organisation (WHO) at the downstream. The TSS and TDS concentrations were in the range of 76-2,078 mg/L and 124-3,560 mg/L, respectively. The TSS concentrations at all stations had exceeded the river quality standard of class II established by Governor Regulation of West Sumatera, while the TDS concentrations had exceeded only at the downstream area. Significant spatial variation of the EC and TDS concentrations was observed between the upstream-midstream and the downstream but was not obtained along the river for the TSS concentrations. It indicates that the anthropogenic activities along the river affected the variability of EC and TDS, but not for TSS. Based on these results, reducing the number of sampling points into three stations could be performed for the EC and TDS, while TSS monitoring at only one station could be applied.

Keywords :

Link :

ID 1578
Performance of anammox biofilm reactor under tropical temperature

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Application of anaerobic ammonium oxidation (anammox) process for mainstream wastewater in the lower temperature is a current challenge where most of the anammox reactors planted in the sub-tropical country. The purpose of this study was to analyze the performance of nitrogen removal using anammox process at room temperature in a tropical country. The experiment was carried out using 300 mL an up-flow anaerobic sludge blanket (UASB) reactor in treating low ammonia concentration artificial wastewater at tropical temperature without any adjustment. The reactor filled with 50% in volume spiral-sheet plastic (polyethylene terephthalate) as the carrier. Anammox bacteria Candidatus Brocadia sinica as seeding acclimatized in room temperature for three months before the experiment. The reactor fed with 70 mg-N/L for both ammonium and nitrite with variations in hydraulic retention time (HRT) 24 hours and 12 hours. The maximum nitrogen removal rate (NRR) achieved 0.12 kg-N/(m 3 ·d) at nitrogen loading rate (NLR) 0.14 kg- N/(m 3 ·d) and NRR 0.25 kg-N/(m 3 ·d) at NLR 0.28 kg-N/(m 3 ·d). The anammox process was stable at room temperatures (15-28 o C) in a tropical country for nitrogen removal and anammox bacteria grown on plastic media.

Keywords :

Link :

ID 1579

HEAVY METALS POLLUTION ASSESSMENT IN WATERS AND SEDIMENTS OF LAKE MANINJAU, INDONESIA

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This study analyzes the content of heavy metals in waters and sediments and the pollution index value in Lake Maninjau. The research was conducted in floating net cages, endemic fisheries, near settlements, hydropower plants, and seven rivers as the lake's inlet and outlet at a depth of 0-1.5 meters. The determination of the pollution index is carried out based on heavy metals and environmental parameters. The concentration of Cd, Hg, Pb, Cu in the waters in all locations exceed the quality standard except for. The Hg metal in sediments in all areas has exceeded the quality standard of contaminated soil. The concentration of heavy metals in sediments is higher than that of heavy metals in water. Eight of the 11 sampling locations were in the medium polluted category, with the highest pollution index (PI) value was found at the fish cage location. The surrounding activity affected the lake waters and sediments, indicating that heavy metals have contaminated almost the entire lake area. It is necessary to continuously monitor the lake's quality and improve wastewater management from activities around the lake to control heavy metal contamination. It is required to evaluate further the Hg contamination originating from anthropogenic activities and natural sources.

Keywords :

Link : https://youtu.be/xnsMycMthBg

ID 1580
Preparation of Avocado Leaf Simplicia macro/nano particles by Using High Energy Ball Mill

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Taguchi method was used to examine high energy ball mill characteristic when producing micro/nano particle of simplicia powder using Orthogonal Array (OA) L25. Two factors and five levels are selected for the smallest diameter. The average fineness of the powder produced by high energy ball mill was calculated using the ASTM E11 standard Retsch vibrating sieve machine. The fineness value of the smoothest was obtained at a working time of 30 minutes and a shaft rotation speed of 578 rpm with a powder fineness of 181μm. The coarsest fineness value was obtained at 10 minutes working time and 488 rpm rotating speed with 336μm powder fineness. Obtained the smallest particle diameter has the potential for better absorption of nutrients into the body.

Keywords :

Link : https://youtu.be/kNYrw9U4UFs

ID 1581*

Circular Economy Practices by the Informal Sector: An Implementation of Green Manufacturing in Urban Area

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A large amount of household e-waste and their recovery activities by the informal sector positively impact the economic, social, and environmental in the urban area because they strongly support sustainable and green manufacturing principles. This research aims to observe the household e-waste collecting model in Padang city, Indonesia. Furthermore, it also wants to find several retain values of the Circular Economy practices by the informal sector for household e-waste when recycled, reused, or remanufactured. The e-waste from the refrigerator, air conditioner, and washing machine is taken as sample cases in this research. The result shows at least two collecting models: the reverse e-waste flow with and without the repair or service shop's involvement. These models include some actors such as (1) end-users, (2) household collectors, (3) repair shops, (4) intermediary collectors, (5) final collectors, and (6) recycling plants. Most of the collectors and repair shops involved are in the informal sector. The result also shows that remanufacturing through rebuilding its functional status as a new performance by reusing e-waste obtains the highest recovery value. Such remanufactured products in the secondary market can reach up to 40% from their first price. Recycling of household e-waste products has the lowest recovery value. However, copper (Cu) from e-waste products has the highest market value, and it follows aluminum and ferrous metals, among other metals, when recycled or reused.

Keywords :

Link :

ID 1582

Preparation smallest PVA/Binahong Leaf nanofiber for wound dressing applications by varying electrospinning variable using Taguchi method

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Binahong leaf is one of the herbal plants which is known to have interesting properties such as accelerating wound healing, anti-bacterial, etc. Converting binahong leaves into fiber will increase their effectiveness because they are easier to absorb. The electrospinning method is used to convert Binahong polymers into Binahong fibers. The Taguchi method is used for experimental design with 3 factors and 3 levels. The resulting fiber properties vary with each variation factor. The smallest fiber obtained was 459,993 nm with tip and collector distance, voltage and weight% PVA, respectively, 8 cm, 20 kV and 8% (98.6922 P). Wound dressing by using Binahong nanofiber is possible.

Keywords :

Link : https://youtu.be/ByJU9IOeNQw

ID 1583
Andalas Medical Robot Assistance

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The world is currently alert to the spread of a virus known as the corona virus. Corona Virus or Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a collection of viruses that can infect the human respiratory system until death. The spread of the virus is very fast and easy just by coming in contact with sufferers until it has infected almost all countries. For places prone to being exposed to viruses, especially in isolation rooms for Covid sufferers, the medical staffs are very scared so that they are always on their toes, moreover, dozens of medical workers have died in the task of handling patients. For this reason, innovation is needed to reduce contact between medical personnel and Covid-19 patients by replacing the duty of humans with robots so that the risk of infected medical workers decreases and avoids the level of work fatigue on the medical worker. The team from Andalas University created and designed a robot that could solve these problems. The robot was designed to be able to perform activities carried out by nurses in serving patient's needs. This robot has the necessary features among others; food delivery, the smart position of the patient room, protecting certain areas with disinfectants, reading the patient's body temperature, a reminder of the patient's medication schedule, anti-collision and providing other smart features which needed by the hospital. This robot is called Andalas Medical Robot Assistant or abbreviated as AMIRA.

Keywords :

Link : https://youtu.be/169rToGvWgE

ID 1584

Production Schedule Optimization to Minimize Makespan and the Number of Machine with Mixed Integer Linear Programming

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In production management field, production efficiency can be improved through minimizing machine downtime, optimizing production scheduling, minimizing inventory of raw materials and finished products. In this research, the production efficiency is improved through optimizing production schedule that has two goals; not only minimizing production makespan but also minimizing the number of machines used. For the purpose, a mixed integer linear programming (MILP) model was developed. The model was used to solve a problem producing 6 products with 4 production lines. In this study, product demand was first forecasted with Autoregressive Integrated Moving Average (ARIMA) method. Optimization results comes up with makespan of 295.4 hours using only one production line. As addition, this research is also dealing with three production scenarios that represented real life setting.

Keywords :

Link : https://youtu.be/7W0wgTfNPRk

ID 1585*

Optimizing inventory control system of crumb rubber raw material: a case study

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Rubber companies often face problems with raw material inventory because obtained from nature. To anticipate shortages of inventory, companies usually buy raw materials in excess quantities. This will result in large inventory costs. This study aims to optimize the inventory control system of crumb rubber raw material in a case rubber company. It started with the demand forecasting of crumb rubber raw material. The fixed order quantity model is then applied to determine the optimal inventory control of crumb rubber raw material. The results show the optimal inventory level of crumb rubber raw material is 988,881 Kg, with a reorder point is 526,570 Kg, and a safety stock is 342,302 Kg. It obtained the total inventory cost is Rp 1,843,689,421 per year. The findings hope to aid the rubber company to improve inventory control and minimize inventory costs.

Keywords :

Link :

ID 1586
Impact of traffic management implementation on road users

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Basically, risk is the threat of danger or consequences that can occur as a result of an ongoing process or an upcoming event. When viewed from this perspective, it is important for transportation planners and traffic management to find ways to identify situations, and develop actions to reduce or avoid negative risks. Traffic smoothness and safety is the desire of every road user in his daily life. The purpose of this research is to get a negative impact, the priority that must be done and the level of satisfaction of road users based on the applied traffic management. The data were obtained by conducting an online survey of respondents in cities in Indonesia that experienced traffic management changes. The results of the data analysis were 64% of respondents thought that the implementation of traffic management had an impact. There were several traffic management that had a negative impact including the application of one-way roads, the application of odd-even, setting traffic lights at road junctions, the 3 in 1 policy, special bus lanes, road diversion, U-turn too far, and others. The order of priority that should be handled immediately in traffic regulation is speed, safety, regularity, density, air pollution, socio-economy and others. The dominant road users (61%) feel less and dissatisfied with the implementation of the traffic regulation implemented by the government. This becomes the basis for carrying out further research in determining the points that become traffic variables to carry out risk analysis before traffic management is implemented, so as to minimize any negative impacts that may arise.

Keywords : Traffic management, Risk (negative impact)

Link : https://youtu.be/4-apvFWfy6w

ID 1587*

Experimental Study on Lateritic Soil Stabilization with Natural Lime and OPC using wet UCS test

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The world wide concern for cleanup, protection and enhancement of the environment has development of a sub discipline within the field of geotechnical engineering; namely Geo-environmental, which is concerned with the application of geotechnical engineering to environmental control. It is within this area that the concepts of stabilization, solidification and reuse of waste lime in geotechnical engineering works are popularly encountered. The cost of the construction materials has rapidly increased and hence stabilization of soil using admixtures becomes Cost effective and eco-friendly blocks. Thus waste natural lime (egg/sea shell) considerably promise to reduce the cost of construction or alternative material that would be suitable for construction activities and also reduces the disposal problem and hence reduces contamination of soil and water.

Keywords : Geoenvironmental, Natural Lime, Laterite Soil Stabilization, OPC.

Link :

ID 1588*

The dynamic load test of two seismic resistance of steel structures EBF and RBS

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The non-destructive dynamic loading test has been conducted on two seismic resistance of steel structures, reduced beam section (RBS) and eccentric braced frame (EBF). Eccentric mass shaker was used to excite the 1-storey 1-bay steel structure. Two dynamics parameters were obtained which were the natural frequency and the damping ratio. A finite element analysis was performed using OpenSees software to get a comparison result. Similar natural frequency and displacement response were obtained from the test and the FE Analysis. The Natural frequency of RBS and EBF was around 3.614 Hz which is similar to the FE analysis as 3,623 Hz. Meanwhile the damping ratio is 3.149%. The natural frequency of the EBF structure is around 6.0 to 6.13 Hz, while the FE analysis result is 6.13 Hz. The damping ratio from test results is between 2.04 – 2.06%.

Keywords : Reduced Beam Section, Eccentrically Braced Frame; Eccentric Mass Shaker; Dynamic Test

Link :

ID 1589*

Performance of Various Down-Mixing Schemes for Encoding 22.2 Multi-Channel Audio Signals Using MPEG Surround

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This paper investigates five different down-mixing schemes that can efficiently encode 22.2 multi-channel audio signals using MPEG Surround. Three audio excerpts were included in the investigation. Recommendation ITU-R BS.13b7-1 is considered suitable as the method of audio quality assessment. The results of experiments show that various down-mixing schemes perform well with MPEG Surround. Almost all of schemes can reproduce excellent audio quality, with Objective Difference Grade (ODG) higher than -1, when the overall operating bit-rates more than 1600 kb/s. This finding suggests that MPEG Surround can be more attractive for encoding 22.2 multi-channel audio signals as opposed to MPEG Advanced Audio Coding (AAC), which is previously assumed to be appropriate.

Keywords :

Link :

ID 1590*

LCA Analysis on Improving Scenario of Domestic Waste Management Quality in Padang City based on Kitakyushu City Case Study

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The practice of domestic waste management in Padang City by the government still uses a collect-transport-dispose system with only about 5% of the achievements for waste recycling. Kitakyushu City in Japan has applied waste management practices by utilizing waste processing technology based on waste types and reaches almost 100% for treatment. By conducting a preliminary analysis between Kitakyushu City and Padang City, the shortcomings of Padang City and the improving technical strategies were obtained. The technical strategies used to arrange four scenarios for improving solid waste management quality in Padang City. Scenario 0 for existing, scenario 1, 2, and 3 develops scenario 0 successively by composting, by incineration, and by anaerobic digestion. Life Cycle Assessment (LCA) analysis results the score for normalization of Global Warming Potential, Acidification Potential, and Eutrophication Potential, scenario 0 has the greatest score of 1.58 x 10 -9 , scenario 1 has the smallest score 5.81 x 10 -10 , scenario 2 has score of 5.97 x 10 -10 , and scenario 3 has score of 1.21 x 10 -10 . Base on this study, scenario 1 is the best scenario to recommend for improving domestic waste management quality in Padang City.

Keywords :

Link :

ID 1591*

Behaviour of Suspension Bridge due to Multi Support Excitation

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This paper describes the behaviour of suspension bridge when suffered from multi support excitation. Multi support excitation occurs realistically to super long span bridges such as suspension or cable stayed bridges, because their supports should have a long distance for each other. Thus, the condition of the soil around the supports is also different, so that the earthquake excitations on the support are distinctive as well. A three spans super long suspension bridge, 920 meter total length, is analysed by using structural analysis software to obtain its response after applying different excitations to its supports. Results then are compared to single support excitation analysis. The results show that there are a big discrepancy between single support excitation and multi support excitation, therefore it is recommended for bridges designer to consider the use of multi support excitation when analyse or design super long span bridges.

Keywords : Suspension Bridge, Multi Support Excitation, Dynamic Analysis, Earthquake

Link :

ID 1592*
Perceptions and Readiness of Padang City Community Against Disasters

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The city of Padang is the capital of the province of West Sumatra in Indonesia. The city of Padang has a high vulnerability to disasters, in the form of earthquakes, tsunamis and floods. In 2009 there was a big earthquake in the city of Padang; This earthquake caused 739 people to become victims, 121,679 houses were severely damaged, and part of the infrastructure was also heavily damaged. After more than 10 years, a major earthquake has yet to occur again, but there are predictions that it will occur because the city of Padang is located near the main fault, so it is necessary to study the perceptions and readiness of the Padang city community against disasters. This activity is a research which is part of the Building Universities in Leading Disaster Resilience (BUILD) activity, which has members from several universities from Indonesia and Europe funded by Eramus +. To find out people's perceptions and readiness for disasters, several series of Focused Discussion Groups (FGD) were held with several stakeholder groups, such as practitioners in the field of disaster, communities, academies, and students. The results of this study indicate a different focus, different perceptions between groups and indicate the need for even closer cooperation between these groups for better preparedness for future disasters.

Keywords :

Link :

ID 1593*

Design a Mechanical Ventilator with Air Volume and Frequency Control to Support Lack of Medical Equipment

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The SARS-CoV-2 a virus that attacks the respiratory system has some symptoms such as difficulty breathing and chest pain. Breathing or respiratory support can be provided by noninvasive tools, such as delivering oxygen-rich air through a face mask. Mechanical ventilator is a simple version of ventilator and most used to support patient breathing because it easy to use. This machine is used to treat patients suffering from conditions including pneumonia, brain injury and stroke. This research design a mechanical ventilator operate based on frequency and air volume of inspiration. Operator can set the ventilator using a potentiometer and choose menu on a LCD. A couple of suppressor push a bag valve mask in the desired frequency. The motor speed has important role to perform the number pushing based on the desired setting. The amount of air flow out form this bag is depend on the duration and the depth of pushing. Some standard frequencies of human breathing were investigated in range 12 to 20 times of inspiration in a minute. The acceleration of ventilator based on calculation was implemented to the machine and it reduced number frequency 4 inspiration/minute in average. An error compensator is used to improve the accuracy of ventilator. It compensate by multiply calculated acceleration by two times. It success improve the performance and resulted ventilator work in desired frequency and volume.

Keywords :

Link :

ID 1594*

PWM Controling the Plasma Dielectric Barrier Discharge Reactor and Its Effect to the Concentration of CO 2 from the Organic Waste Burning

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Organic waste has the largest percentage of waste produced in Indonesia. The long duration of decomposition of organic waste in large quantities will cause air pollution, groundwater and even become a source of disease. One popular way of destroying organic waste is by using an incinerator. The incinerator is able to reduce waste quickly but it has several disadvantages including the exhaust gas containing a high concentration of CO gas which causes air pollution and humans and animals health problem. To reduce the CO gas content released into the air, it is necessary to filter it both mechanically and electrically. In this study, plasma dielectric barrier discharge (DBD) technology was introduced to convert CO gas into harmless gas. This research has produced a plasma rector design that is controlled by the SSR duty cycle. The aim is to see the performance of the reactor in reducing CO gas after plasma application. Plasma application is carried out for 3 minutes with a duty cycle of 25%, 50%, and 75% of the gas produced by burning 100 grams of waste paper which is flowed into the plasma DBD reactor tube. The results showed that CO gas would decrease if the duty cycle given was greater for 100 second plasma applications. However, a 75% duty cycle caused damage to the Pyrex glass dielectric and testing could not continue. Thus, for the 3 minute test, the 50% duty cycle was most effectively used to break down CO gas with a CO gas concentration reduced by 353.24 ppm from the CO concentration without being applied to plasma and without experiencing barrier damage.

Keywords :

Link :

ID 1595*
The Partial Discharge Characteristics of Nanoalumina Biopolymer as The Electrical Insulation in Different Temperature

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The dielectric properties of LDPE-NR biopolymeric insulation materials can be improved by adding the alumina nanoparticles in a certain percentage weight into the composite. In the present study, four types of bionanopolymeric samples were prepared. To each sample, the nanoalumina particles with a weight percentage of 1.5%, 3%, 4.5% and 6% a were added to LDPE-NR. To see the partial discharge characteristics, the LDPE-NR-Alumina samples has been tested for 1 hour with 6.5 kV AC voltage. Results shows that the number of positive and negative PD pulses for each alumina sample varied for all samples in a different temperatures and the samples with a higher percentage of nanoalumina had fewer PD pulses. The PD pulses increase in line with temperature increased and the average PD charge is less for samples with lower alumina content. This indicates that nanoalumina particles can improve the performance of LDPE-NR insulation materials.

Keywords :

Link :

ID 1596*

On the Experimental Study of a Composite Plate of Cold-Formed Steel and Concrete

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This paper presents an experimental study of a composite of cold-formed steel and concrete of a plate structure. The cold-formed steel is used as an alternative material to replace longitudinal reinforcement near the bottom surface of the concrete plate. The cold-formed steel is a channel section with a size of 75 mm x 35 mm and a thickness of 0.75 mm. All specimens had a width of 300 mm and a clear span of 2000 mm. There were six specimens observed in this experiment: three specimens were reinforced concrete plates, and the other three were composite of cold-formed steel and concrete plates. Each reinforced concrete plate and the composite had three different section depths, i.e., 80 mm, 100 mm, and 120 mm. The specimen was placed on simple support. Two-point loads were subjected to the specimen, and the loads increased monotonically until the ultimate condition reached. It was found that the delayed first crack was observed on the composite of cold-formed steel and concrete; the first crack occurred at about 36-54 % of the ultimate load. On the reinforced concrete plates, the first crack occurred at lower points, i.e., 14-22 % of the ultimate load. The composite of cold-formed steel and concrete specimens showed better performances than the reinforced concrete in terms of structural stiffness, strength, and ductility for the same section depths. Furthermore, the specimen of 80 mm depth of the composite of cold-formed steel and concrete was comparable with the specimen of 120 mm depth of reinforced concrete.

Keywords : composite plate, cold-formed steel, first crack, ultimate load

Link :

ID 1597*

Design of Polarimetric-based Optical Current Sensor for Electric Power System Application

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Many problems arise in the electric power protection system due to applying a ferrous core current transformer (CT). One of the most crucial problems is a magnetic saturation issue, which can reduce the performance of the protection system that tends to cause a measurement error on the secondary side of the CT. An alternative approach that needs to be developed is to focus on electric current sensors using optical materials. A polarimetric-based optical current sensor (POCS) is a technique considered to be compatible with the future smart grid environment. The POCS principles are based on the magneto-optic Faraday effect that could produce linear and circular birefringences in the optical fiber medium when a polarized light propagates in those materials. In this paper, the POCS and its associated elements are modelled by considering birefringence effect in the sensor and optical fiber links in the sensor system. Then, the POCS model is translated to a computer simulation program using a computer application software. The POCS model is verified by dynamic method by comparing simulation results to the analytical calculation. Two fiber optic types which are single mode and polarization maintaining fiber optic are utilized in the POCS model and the simulation results are presented. Performance assessment of the POCS model is also presented using various variables to investigate the presence or absence of the saturation effect that may arise in the polarimetric based optical current sensor model.

Keywords : ferrous core current transformer, Faraday effect, magneto optic material, polarimetric method, linear and circular birefringence model, singe mode fibre, polarization maintaining fiber

Link :

ID 1598

E-Commerce Design for Coconut Commodities in Padang Pariaman

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Coconut commodities are the potential commodity of Padang Pariaman. However, there are several problems in marketing coconut products, (1) the small value-added for the farmers, (2) inadequate marketing strategy, and (3) lack of information dissemination of coconut-based products, especially Virgin Coconut Oil (VCO). One approach to resolve those problems is using e-commerce. E-commerce is a modern marketing strategy that utilizes the internet. E-commerce can connect people directly, shortening the coconut commodity value chain, and increasing value-added for farmers and SMEs. This study aims to develop a coconut commodity marketplace with E-Commerce using the System Development Life Cycle (SDLC) method with PHP programming language. The result of this research is a coconut and VCO marketplace, which shortens the value chain. With this marketplace, the farmers and SMEs sell their products directly to customers. It also makes it easier to access the records on stock and sales data of coconut and VCO. E-Commerce also provides information and promotions online with blogging features. Information on products that are on sale appears with a slider banner featured on the main page. This research concludes that E-Commerce design will increase value-added for farmers and SME in the coconut and VCO value chains in Padang Pariaman.

Keywords :

Link : https://youtu.be/G2k8e1pv5hA