ICGTD 2020

it's good start

BOOK OF ABSTRACT

INTERNATIONAL CONFERENCE ON GREEN TECHNOLOGY AND DESIGN 2020

A Smart Deliberation in Green Technology and Design Towards New Normal Mitigation

Bandung 2 - 3 December 2020

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Institut Teknologi Nasional

HUAWEI

The Climate Reality Project
INDONESIA

BOOK OF ABSTRACT

INTERNATIONAL CONFERENCE ON GREEN TECHNOLOGY AND DESIGN 2020

Bandung, 2 – 3 December 2020

Institut Teknologi Nasional Bandung
West Java - Indonesia

penerbit itenas

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ISBN:
First Print: December 2020

Publisher:
Penerbit Itenas

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CONFERENCE PROGRAM

Time	PROGRAM	
Day 1 (2nd December 2020, Wednesday) ***Link:*** **https://bit.ly/ICGTD2020** **Meeting ID: 942 8505 6144** **Passcode: ICGTD2020**		
08:30 – 08:40	**Opening Ceremony (zoom plenary session)** Welcome remark by master of ceremony	
08:40 – 08:50	**Opening remark (zoom plenary session)** Rector of Insitut Teknologi Nasional Bandung (Itenas) Prof. Meilinda Nurbanasari, Ph.D.	
08:50 – 09:30	**Panel 1 (zoom plenary session)** **Keynote speaker 1: Dr Abdul Salam** (AIT, Thailand) Moderator: Dr. Eng. DIDin Agustian Permadi	
09:30 – 10:10	**Panel 2 (zoom plenary session)** **Keynote speaker 2: Amanda Katili Niode, Ph.D** (Climate Reality Project Indonesia) Moderator: Dr. Eng. Chandra Nugraha	
10:10 – 10:20	**Break Session**	
	PARALLEL SESSION	
Zoom Link	***Link Room 1:*** **https://bit.ly/ICGTDParallel1** **Meeting ID: 958 4648 1102** **Passcode: ICGTD2020**	***Link Room 2:*** **https://bit.ly/ICGTDParallel2** **Meeting ID: 976 1232 2146** **Passcode: ICGTD2020**
10:20 – 10:50	**Parallel session 1 (**zoom room PES-1**)** **Moderator:** Vibianti Dwi Pratiwi, M.T. Power and Energy Storage 1 (PES-	**Parallel sesson 2 (**zoom room GHB-1**)** **Moderator:** *Wahyu* Buana Putra, S.T., MSc. Green hollistic building 1 (GHB-1)
10:50 – 12:00	**Parallel session 3 (**zoom room GSA-1**)** **Moderator:** Febrian Hadiatna, M.T. Green and smart automation 1 (GSA-1)	**Paralllel sesson 4 (**zoom room ST-1**)** **Moderator:** Kurnia Ramadhan Putra, M.T. Smart Transportation 1 (ST-1)
12:00 – 13:00	**BREAK**	
13:00 – 14:30	**Parallel session 3 (**zoom room GSA-1**)** **(Continue)** **Moderator:** Lita LIdyawati, M.T. Green and smart automation 1 (GSA-1)	**Paralllel sesson 4 (**zoom room ST-1**)** **(Continue)** **Moderator:** Fery HIdayat, M.T. Smart Transportation 1 (ST-1)
14:30 – 16:00	**Parallel session 5 (**zoom room IEP-1**)** **Moderator:** Alif Ulfa Afifah, S.T., M.T Infrastructure and Environmental Planning 1 (IEP-1)	**Paralllel sesson 6 (**zoom room IICT-1**)** **Moderator:** Irma Amelia Dewi, M.T. Intelligent Information and Communication Technology 1 (IICT-1)
16:00 – 17:00	**Parallel session 7 (**zoom room GID-1**)** **Moderator:** Maharani Dian P, Ph.D Green Innovation Design 1 (GID-1)	

Day 2 (3rd December 2020, Thursday)

Link:
https://bit.ly/ICGTD2020
Meeting ID: 942 8505 6144
Passcode: ICGTD2020

08:25 – 08:30	**Registration and Opening Day 2**	
08:30 – 09:10	**Panel 1** **Keynote speaker 3: Maharani Dian P, Ph.D** (ITENAS, Indonesia) Moderator: Maugina Havier, M.Ds.	
09:10 – 9:50	**Panel 2** **Keynote speaker 4: Herman Zhu** (Huawei, Indonesia) Moderator: Lisa Kristiana, Ph.D.	
9:50 – 10:15	**Break Session (VIDeo Itenas dan Huawei)**	
	Parallel session	
	Link Room 1: **https://bit.ly/ICGTD2020Parallel1Day2** **Meeting ID: 914 2131 3313** **Passcode: ICGTD2020**	***Link Room 2:*** **https://bit.ly/Parallel2ICGTD2020day2** **Meeting ID: 927 2582 5390** **Passcode: ICGTD2020**
10:15 – 12:00	**Parallel session 1 (**zoom room IEP-2 A**)** **Moderator:** Nico Halomoan, M.T. Infrastructure and Environmental Planning 2A (IEP-2)	**Parallel session 2 (**zoom room IEP-2 B**)** **Moderator:** Dr. Eng. DIDin Agustian Permadi Infrastructure and Environmental Planning 2B (IEP-2)
12:00 – 13:00	**BREAK**	
13:00 – 14:00	**Paralllel sesson 3 (**zoom room IICT-2 **Moderator:** Lisa Kristiana, Ph.D. Intelligent Information and Communication Technology 1 (IICT-2)	**Parallel session 4 (**zoom room GID-1**)** **Moderator:** Maugina Havier, M.Ds. Green Innovation Design 1 (GID-1)
14.00 – 15.00	**Plenary session & Closing** ***Link:*** **https://bit.ly/ICGTD2020** **Meeting ID: 942 8505 6144** **Passcode: ICGTD2020** **Award announcement** **1. Best Paper** **2. Best Presenter** **3. Best Participant** **4. Best Selfie Unique** **5. Lucky Draw**	

PRESENTATION SCHEDULE

Session name	Presenter / paper title	Time	Insititution
DAY 1			
LINK PES-1: https://bit.ly/ICGTDParallel1 ; Meeting ID: 958 4648 1102; Passcode: ICGTD2020			
Power and Energy Storage 1 (PES-1)	ID51 - Waluyo Et Al. - Iot-Based Control System Implementation For Air Conditioning Electrical Energy Saving	10.20	Institut Teknologi Nasional Bandung
	ID60 - Dini Fauziah - HybrID Lighting System For Room Without Light Ventilation As Energy Saving Using Solatube	10.35	Institut Teknologi Nasional Bandung
Link Ghb-1: https://bit.Ly/ICGTDParallel2 ; Meeting ID: 976 1232 2146; Passcode: ICGTD2020			
Green Holistic building 1 (GHB-1)	ID65 – Erwin Yuniar Rahadian Et Al. – Digital Documentation Of Heritage Buildings Using The Principles Of Heritage Building Information Modeling : Case Study: Cirebon City Hall	10.20	Institut Teknologi Nasional Bandung & Sekolah Tinggi Teknologi Cirebon
	ID58 – Putra – IDentification And Analysis Of Community Household Structure Components In Jalur Sesar Lembang	10.35	Institut Teknologi Nasional Bandung
Link Gsa-1: https://bit.ly/ICGTDParallel1 ; Meeting ID: 958 4648 1102; Passcode: ICGTD2020			
Green and Smart Automation 1 (GSA-1)	ID5 – Daulay Et Al. – Implementation Of Wireless Sensor Network In Taekwondo Sport Branch Kyorugi Kategory	10.50	Institut Teknologi Nasional Bandung
	ID35 – Saraswati – Particulate Emissions Characteristics Of Mixed Coal-Biomass Derived Fuel Burned In An Industrial Boiler	11.05	Institut Teknologi Nasional Bandung & Indonesian Institute of Sciences (LIPI)
	ID32 – Nurhayati – Gas Emissions From Mixed Coal-Biomass Derived Fuel Burned In An Industrial Boilers	11.20	Institut Teknologi Nasional Bandung & Indonesian Institute of Sciences (LIPI)
	Break		
	ID18 – Manurung – Modeling Of A Small Educational Thermal Device	13.00	Universitas Pertamina & Institut Teknologi Nasional Bandung
	ID7 – Husada – Fuzzy Logic Implementation In Water Quality Monitoring And Controlling System For Fishwater Cultivation	13.15	Institut Teknologi Nasional Bandung
	ID66 – Suciaty Et Al. – Hydrodynamics Modelling For Dock Layout Planning In Fish Landing Port (Ppi) Api-Api, East Kalimantan	13.30	Institut Teknologi Nasional Bandung & Institut Teknologi Bandung
Link St-1: https://bit.Ly/ICGTDParallel2 ; Meeting ID: 976 1232 2146; Passcode: ICGTD2020			
Smart Transportation 1 (ST-1)	ID59 – Maulana – Dependency Freight Transportation On Roadway	10.50	Institut Teknologi Nasional Bandung
	ID42 – Kristyadi Et Al. – Development Of LiquID Cooled Axial Bldc Motor	11.05	Institut Teknologi Nasional Bandung

Session name	Presenter / paper title	Time	Insititution
	ID41 – Kristyadi – Analysis Of Electric Car Front Chassis In Crash Test Using Fea Software	11.20	Institut Teknologi Nasional Bandung
	ID36 – Muhamad Et Al. – Collecting IndivIDuals' Intention Of Travel-Activity Changes During New Normal Period In Indonesia	11.35	Institut Teknologi Nasional Bandung
	ID28 – Kharis Rahman – Behavior Study Of Motorcyclist On RIDing Safety Based On Gender In City Of Bandung	11.50	Institut Teknologi Nasional Bandung
	Break		
	ID26 – Saputra – Motorized Or Non-Motorized: Potential Of Bicycles Use For Daily Transportation: Motorized Or Non-Motorized: Potential Of Bicycles Use For Daily Transportation	13.00	Institut Teknologi Nasional Bandung
	ID9 – Muhammad Fajar Rahman – Analysis Due To The Traffic Noise Level Of Motor Vehicles And Trains And Mitigation Recommendations For The Coming Time (Case Study: Sd Negeri 001 Merdeka, Bandung City)	13.15	Institut Teknologi Nasional Bandung
	ID3 – Lisa Kristiana – The Implementation Of Visible Light Communication On Two-Wheeled Vehicle	13.30	Institut Teknologi Nasional Bandung
	ID77 – Suteja – Analysis Of The Characteristics Of Young RIDe-Sourcing Users Based On Previous Modes: Case Of Bandung City	13.45	Institut Teknologi Nasional Bandung
	ID76 – Pribadi Et Al. – RigID, Semi RigID, And Flexible Diaphragms For Horizontally Asymmetric Building	14.00	Institut Teknologi Nasional Bandung
Link Iep-1: https://bit.ly/ICGTDParallel1; Meeting ID: 958 4648 1102; Passcode: ICGTD2020			
Infrastructure and Environmental Planning 1 (IEP-1)	ID1 – Zulri – A Strategy For Improving 3r-Based SolID Waste Services In Jatihandap Village Through The Application Of The Contingent Valuation Method "Cvm"	14.30	Institut Teknologi Nasional Bandung
	ID67 – Hernawati Et Al. – The Impact Of Built-Up Area On Land Surface Temperature Derived From Cloud-Computing Landsat 8 Imagery	14.45	Institut Teknologi Nasional Bandung
	ID62 – Darmawan – Investigation Of Classification Algorithm For IDentification Of Oil Palm Plantation Using Multiscatter And Multiresolution Sar Data	15.00	Institut Teknologi Nasional Bandung
	ID63 – Halomoan - The Potential For Implementing Zero Waste Practices Based On The Composition Of Domestic Waste In The Hospital (Case Study: Bandung Adventist Hospital).	15.15	Institut Teknologi Nasional Bandung
	ID56 – Nugraha – Characterization Study Of Coal-Combustion Ash For AcID Mine Drainage Prevention	15.30	Institut Teknologi Nasional Bandung
	ID55 -Kameswara Et Al. – Relationship Between Changes In Agricultural Land Use Land Cover Change And Sustainable Agricultural Land Control Policy In Magelang Area	15.45	Institut Teknologi Nasional Bandung
Link Iict-1: https://bit.Ly/ICGTDParallel2 ; Meeting ID: 976 1232 2146; Passcode: ICGTD2020			
Intelligent Information and Communication Technology 1 (IICT-1)	ID16 – Lita Lidyawati – Bi-Directional Data Communication Using Visible Light Technology For Underwater Environment	14.30	Institut Teknologi Nasional Bandung
	ID49 – Irma Amelia Dewi Et Al. – Feature Extraction Of Ground Marshall Hand Gestures Using HIDden Markov Model On Aircraft Parking Process	14.45	Institut Teknologi Nasional Bandung

Session name	Presenter / paper title	Time	Insititution
	ID19 – Umaroh – An Evaluating Academic Information System Success: An Empirical Study	15.00	Institut Teknologi Nasional Bandung
	ID17 – Jodi Raina Et Al. – Segmentation-Based Fractal Texture Analysis (Sfta) To Detect Mass In Mammogram Images	15.15	Institut Teknologi Nasional Bandung
	ID57 – Yusup Miftahuddin Et Al. – Implementation Of Mfcc And Lvq Methods For Learning English Pronounciation	15.30	Institut Teknologi Nasional Bandung
	ID70 – Rosmala – Transfer Learning With Vgg16 And Inceptionv3 Model For Classification Of Potato Leaf Disease	15.45	Institut Teknologi Nasional Bandung
Link GID-1: https://bit.ly/ICGTDParallel1 ; Meeting ID: 958 4648 1102; Passcode: ICGTD2020			
Green Innovation Design 1 (GID-1)	ID46 – Fitriany Et Al. – Ethnic-Modern Furniture Design Innovations With Use Of Ntt Ikat Woven Fabrics	16.00	Institut Teknologi Nasional Bandung
	ID44 – Rahim Et Al. – Overview Of Signage At The Itenas Bandung	16.15	Institut Teknologi Nasional Bandung
	ID23 – Agustina Kusuma Dewi Et Al. – Motion Feature In Advertising And Audience' Perception Based On Aio Concept In Digitizing' Era	16.30	Institut Teknologi Nasional Bandung
	ID13 – Rahim - Design of Visual Graphic System for the Itenas Campus Direction Signs	16.45	Institut Teknologi Nasional Bandung
Day 2			
Link Iep-2-A : Https://Bit.Ly/ICGTD2020Parallel1Day2 ; Meeting ID: 914 2131 3313 ; Passcode: ICGTD2020			
Infrastructure and Environmental Planning 2A (IEP-2 A)	ID20 – Nguyen Et Al. – Current And Future Emission Of Air Pollutants And Greenhouse Gases From Thermal Power Plants In Vietnam	10.15	**Asian Institute of Technology**
	ID15 – Ocktafiani Et Al. – A Cassava Peels Waste Becomes Activated Carbon – A Literature Review	10.30	Politeknik Negeri Bandung
	ID14 – Nur Arafah Et Al. – Non Edible Moringa Oleifera Seeds For Environmentally Friendly Biodiesel – A Review	10.45	Politeknik Negeri Bandung
	ID6 – Soni Pratama Et Al. – Methane Emission Estimation And Dispersion Modeling For A Landfill In West Java, Indonesia	11.00	Institut Teknologi Nasional Bandung
	ID4 – Dwi Pratiwi – The Influence Of Amount And Types Of Adhesive On Biobriquettes From Coffee Pulp By Torrefaction	11.00	Institut Teknologi Nasional Bandung
	ID2 – Elvira Rizqita Utami – Drainage City Management Strategies Planning Of Cimahi City Based On 2018 City Sanitation Strategy GuIDeline	11.15	Institut Teknologi Nasional Bandung
	ID64 – Darmawan – IDentification Of Mangrove Forest Area Using Support Vector Machine Algorithm	11.30	Institut Teknologi Nasional Bandung & Universitas Lampung
	ID74 – Aszahra Karimah Astari Putri Et Al. - C.I. Reactive Navy Blue Dye Waste Treatment Using Pvdf/Nanomaterial Membranes: Dye Waste Treatment	11.45	Institut Teknologi Nasional Bandung
	ID75 – Annisaa Hanifah Et Al. – Ozon/Uv Technology Ozon/Uv Technology For Textile Industry Wastewater Treatment: Wastewater Treatment	12.00	Institut Teknologi Nasional Bandung

Session name	Presenter / paper title	Time	Insititution
Link Iep-2-B: Https://Bit.Ly/Parallel2ICGTD2020day2 ; Meeting ID: 927 2582 5390 ; Passcode: ICGTD2020			
Infrastructure and Environmental Planning 2B (IEP-2 B)	ID38 – Dirgawati – An IDentification Of Fluorescence Dissolved Organic Matter In Tropical Raw Water Sources By Parafac Analysis	10.15	Institut Teknologi Nasional Bandung & Institut Teknologi Bandung
	ID43 – Santos – Performance Of Electro-Chemical (Ec) Disinfection In The Treatment Of Septic Tank Effluent Under Plug Flow Condition	10.30	**Unit of Planning, Monitoring and Monitoring and Evaluation Unit (UPMA), Office of Prime Minister, Timor Leste, & Asian Institute of Technology (AIT), Thailand**
	ID80 – Maulana – Satisfaction And Importance Level Of The Ministry Of Environment And Forestry Officer	10.45	Institut Teknologi Nasional Bandung
	ID79 – Yustiana Et Al. – Three R's Aplication Of Domestic Water Consumption In West Antapani District: Three R's Aplication Of Domestic Water Consumption In West Antapani District	11.00	Institut Teknologi Nasional Bandung
	ID54 – Aschuri Et Al. – The Effect Of Compaction Temperatures Of Asphalt Concrete Mixture On Axle Load Repetition	11.00	Institut Teknologi Nasional Bandung
	ID53 – Salafudin – The Indonesia Lithium Resources : Indonesia Lithium Resources	11.15	Institut Teknologi Nasional Bandung
	ID50 – Suryadini Et Al. – Penilaian Kualitas Pergerakan Dan Konektivitas Kecamatan Antapani Berdasarkan Greenship Rating Tools	11.30	Institut Teknologi Nasional Bandung
	ID48 – Parapat - Plant Design For A Production Process Of Nanoasphalt Emulsion From Asbuton Rock	11.45	**Institut Teknologi Nasional Bandung & Technische Universitat Berlin (TUB) Berlin, Germany**
	ID81 – Pratiwi – Mapping Of Land Drought Potential In Cirebon Regency-West Java Based On Geographic Information System And Remote Sensing	12.00	Institut Teknologi Nasional Bandung
Link Iict-2 : Https://Bit.Ly/ICGTD2020Parallel1Day2 ; Meeting ID: 914 2131 3313 ; Passcode: ICGTD2020			
Intelligent Information and Communication Technology 2 (IICT-2)	ID68 – Hermana – Database Shoe Design With 3d Anthropometric Parameters	13.00	Institut Teknologi Nasional Bandung
	ID22 – Premitasari – Multi Criteria Decision Making To Forecast Number Of User On Ip Network	13.15	Institut Teknologi Nasional Bandung
	ID47 – Hermana – An Implementation Of Vgg 16 For Modeling Color Descriptor In Fruit Maturity Classification	13.30	Institut Teknologi Nasional Bandung
Link GID-2: Https://Bit.Ly/Parallel2ICGTD2020day2 ; Meeting ID: 927 2582 5390 ; Passcode: ICGTD2020			
Green Innovation Design 2 (GID-2)	ID12 – Permanasari – Smart Materials In Design And Technology: Study Case: Banana Bark	12.45	Institut Teknologi Nasional Bandung
	ID11 – Anggraeni – Injection Molding Hand-Press Design And Analysis Using SolIDwork	13.00	Institut Teknologi Nasional Bandung

Session name	Presenter / paper title	Time	Insititution
	ID10 – Sumirat – Effect Of Tempering At 500 ºc Temperature With 1 Hour Holding Time On White Cast Iron Material Properties Applied To Grinding Ball On Ball Mills For Cement Production	13.15	Universitas Pendidikan Indonesia & Institut Teknologi Nasional Bandung
	ID71 – Sulistyo Setiawan - The The Learning Medium Design Of Language Intelligence For Elementary Students Based On Used Oil Bottle Upcycling: The Learning Medium Design Of Language Intelligence For Elementary Students Based On Used Oil Bottle Upcycling	13.30	Institut Teknologi Nasional Bandung
	ID85 – Waskito - A Utilization Of Digital Modeling Techniques To Improve Shape Quality And Ergonomics On Shoe Last	13.45	Institut Teknologi Nasional Bandung

OPENING REMARK

Assalamualaikum wr wb
Ladies and gentlements, colleagues, and students,

It is our privilege to welcome you all to our 2nd International Conference on Green Technology and Design (ICGTD2020) hosted by Institut Teknologi Nasional Bandung (ITENAS), Bandung, Indonesia. We would like to thank our 4 keynote speakers and more than 65 presenters who made their efforts to contribute to this conference. Last year, we hosted the first edition of ICGTD 2019 in a business as usual way, but this year we encounter an un-usual, unique and difficult moment due to a world-wide COVID-19 pandemic. This situation brings us here to meet each other virtually. This year conference topic of "A Smart Deliberation of Green Technology and Design Towards New Normal Mitigation" is delivered with a big hope to rebuild strength to face post-pandemic period by enhancing collaborative research and outreach.

We appreciate the hard work of the organizing committee to bring in of more than 70 articles to be presented in this conference, submitted by our international and domestic participants. All articles were then divided into 7 parallel session themes: power and energy storage, green holistic building, green and smart automation, smart transportation, infrastructure and environmental planning, intelligent information and communication technology, and green innovation design. Several of them were selected to be published in our national accredited journals: Elkomika and Rekayasa Hijau, and the rests will be published in the international conference proceeding of ICGTD 2020.

Ladies and gentlements,

We realize current difficult situation and at the same time we prepare our readiness to welcome awakening era for better future through increasing research quantity and quality as well as catalizing more collaborative efforts.

I sincerely hope you will enjoy all of the conference sessions, and hope that we can continue learning each other. Someday, we hope to host you all directly in our beautiful campus and city.

Thank you all for your presence and participation. And you are the very important part of the Conference success.

Wassalamualaikum wr wb,

Rector of Itenas

FOREWARD

On behalf of the organizing committee, it is our great pleasure to welcome you all to the 2nd International Conference in Green Technology and Design (ICGTD) 2020 which is held here, in the Institut Teknologi Nasional (Itenas) Bandung, Indonesia. ICGTD is an annual conference organized by the Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) Institut Teknologi Nasional Bandung. Currently, this is the second time we hold ICGDT .

The 2nd ICGTD 2020 aims to provide a platform for all researchers, academics and industries to exchange and collaborate multidisciplinary ideas and knowledge and push them further into actions. The outreach of this collaboration is the smart deliberation in Green Technologies and Design towards the New Normal Mitigation during the pandemic era.

Acknowledging all these excellent works of all committee members, we would like to express our gratitude to the all authors, the international reviewers, the keynote speakers from the Asian Institute of Technology (AIT) Thailand, the Indonesia Climate Reality Project, Huawei, and Itenas that are willing to share the valuable knowledge and experiences in this conference.

We strongly hope that this event brings the inspiring atmosphere for finding new ideas and contacts for future co-operations.

Chair,

Lisa Kristiana S.T., M.T., Ph.D

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Intelligent Information and Communication Technology

Green Innovation Design

1. **IoT-Based Control System Implementation for Air Conditioning Electrical Energy Saving (Waluyo et al.)**

This paper presents the IoT-based monitoring part of air conditioning electrical energy-saving. The system design consisted of a temperature sensor, motion sensor, and Blynk of the Android application, as the system input. While, the system output were relay module, infrared LED and LCD, and the Arduino ESP32 microcontroller and a BC547 transistor were as the controller. The running of the Board Manager and the internet-connected Arduino would download data from the URL repository address that entered to the menu of Preferences. The application could send the unique infra-red signal using Arduino ESP32. The Arduino was connected to IR receiver TSOP1738 and PC to make the reading program of the unique pattern. The unique buttons were 20oC up to 32oC with the unit step. The results showed that ESP32 was circuited to all necessary components, such as a temperature sensor, a motion sensor (PIR), dc power supply, relay, infra-red LED, I2C, and the 20x4 LCD. The temperature was displayed on the LCD. While, the Blynk Android application could display the monitored temperature and control the temperature setting, automatic and off buttons. The system operated properly.

Keywords: IoT, LCD, LED microcontroller, temperature sensor.

2. **Hybrid Lighting System for Room Without Light Ventilation as Energy Saving Using Solatube (Dini Fauziah et al.)**

Lighting is a support for a room so that it can function properly. In practice, many rooms do not have light ventilation so they use light sources even for 24 hours. This study aims to design a system that can minimize the use of electricity for lighting using solatube system. Solatube will give a signal to the dimmer that regulates the light capacity of the lamp so it doesn't always require full performance. Based on the test results, the solatube system can produce light intensity maximum value 353 Lux at midday. So that the results of the measurement of room light intensity as a whole can meet the standards for the reading room, that is more than 350 Lux with the percentage of lighting from morning to evening experiencing a decrease in load usage between 1% - 78%, especially during the daytime load usage is almost close to 0%. This shows that with the hybrid system of lighting the use of power for lighting can be reduced, thereby increasing energy and cost savings. Then this tool is equipped with a data logger that can be accessed via the internet to monitor realtime electricity usage so that it can be evaluated for further development.

Keywords: Solatube, Energy Saving, Lighting System

3. **Digital Documentation of Heritage Buildings using the Principles of Heritage Building Information Modeling : Case Study: Cirebon City Hall (Erwin Yuniar Rahadian et al.)**

Cirebon City is an old city which is rich in heritage buildings from the Dutch colonial era which still survive today, one of which is the Cirebon City Hall building. As a cultural heritage building, based on the results of field visits, the

City Hall building does not have complete drawing documents and material specifications. This is thought to be experienced by most other cultural heritage buildings. In answering the above problems, along with the development of Architecture, Engineering and Construction technology, the planning process to building maintenance and repair can be managed digitally using a variety of Building Information Modeling (BIM) based tools. In the case of cultural heritage buildings, the principle of BIM technology used is Heritage / Historical Building Information Modeling or H-BIM. H-BIM is used for the purposes of heritage and archeology, documentation, research, conservation, renovation and asset management as digital information data on cultural heritage buildings. This research begins by conducting a survey of building geometry measurements and identifying building materials, then compiling the information based on the principles of Heritage-Building Information Modeling (H-BIM). The documentation resulted in a digital model of building reconstruction complete with other non-geometric information of more than 1500 building elements. This information is organized based on the classification of building elements in the BIM. The data in the BIM format is used as a cultural heritage building document asset which can then be used in making maintenance and restoration plans for the building. Besides that, the 3-dimensional geometry model of the building can be used as a virtual museum for cultural heritage buildings (Abstract)

Keywords: documentation, BIM, heritage, conservation, reconstruction, virtual building (key words)

4. Identification And Analysis Of Community Household Structure Components In Jalur Sesar Lembang (Wahyu Buana Putra)

The Lembang Fault is a major fault in West Java, around the northern edge of Bandung. The existence of this fault has the potential for earthquakes on the MMI Earthquake Intensity Scale VIII. The impact of the earthquake on this scale was that the walls of a simple building had partially collapsed, there were many cracks, broken glass, partial removal of plastering on the walls, shifting of most of the tiles downward or falling, damage to the structure of the building experienced mild to moderate. Building vulnerability is technically causing fatalities. Factors of building vulnerability caused by the use of building materials and forms that are not suitable, inadequate quality and building systems. Buildings that are often damaged when an earthquake occurs is a simple building or non-engineering building. Buildings located in earthquake prone areas are mostly dominated by non-engineering buildings that do not have earthquake resistant structure considerations. The focus of this research is to identify the structural components of residential buildings or non-engineering buildings affected by the earthquake with the epicenter of the lembang fault in terms of earthquake-friendly housing requirements, as a disaster mitigation measure to take steps to improve the structure of houses in the lembang fault line. This research uses descriptive quantitative method based on field observations with data collection techniques using purposive sampling method. Field surveys include observing components of residential structures, documentation with sketches and photographs of research objects. The purpose of this study is to provide information for making the right decision regarding the preparation of greater damage prevention as a precautionary measure to deal with the movement of lembang faults as well as an estimated step in restoration of affected areas.

Keywords: Disaster Mitigation, Non-engineering Houses, Earthquake Friendly Buildings

5. Hydrodynamics Modelling for Dock Layout Planning in Fish Landing Port (PPI) Api-Api, East Kalimantan (Fitri Suciaty et al.)

The issue of relocating the national capital city to Penajam Paser Utara is one of the reasons why the Fish Landing Port (PPI) Api-Api needs to be developed. The maritime and fisheries sector in East Kalimantan is also known to have huge potential in supporting the economy, but it is still constrained by inadequate facilities so that it still needs the development of fishing vessels and fish landing port (PPI). Marine transportation infrastructure for loading and unloading fish needs to be developed. In this research, the dock layout of PPI Api-Api planned for three alternative designs, namely; jetty, wharf, and pier type. Hydrodynamics modeling and erosion and sedimentation analysis were carried out using Delft3d for three alternative designs layout. The scoring recapitulation results of wave height, current velocity, and sedimentation/erosion which obtained from modeling, show that the percentage of feasibility in terms of hydrodynamic parameters for the layout of the jetty, wharf, and pier is 59%, 78%, and 67%, respectively. From these results, it can be stated that the most feasible dock layout to be chosen is the wharf type.

Keywords: Hydrodynamic Modeling, Sedimentation, Dock Layout

6. Particulate Emissions Characteristics of Mixed Coal-Biomass Derived Fuel Burned in an Industrial Boiler (Ines Saraswati Rudianto et al.)

PT. X is a textile industry that consumed a massive amount of coal for the boiler operation. This required substantial costs to obtain coal from Sumatra and Kalimantan Island. An alternative solid biofuel was developed to combine bottom ash and compost made from municipal solid waste, which is called Biomass Coal Fuel (BCF). BCF was further processed into briquette and was burned in a boiler to substitute coal consumption. The purpose of this study is to measure the total concentration of particulate matter (PM) emitted from only coal (100%) and mixed coal fuel with 10% of BCF. Mixed of coal and BCF burning carried out in the Fire-tube boiler where the PM emission is released through the stack. Measurement of particulate emission was carried out by the Badan Besar Pulp and Kertas Laboratory with methodology referring to SNI 7117.17-2009. Particulate matter concentration emitted from only coal-burning was 12.1 mg/Nm3 but when mixed BCF and coal were used the higher concentration was emitted of 70.9 mg/Nm3. The addition of BCF briquettes affects the particulate matter emission, even though the emitted emission does not exceed the quality standard in the regulation governing particulate emission of 230 mg/Nm3. The increase of particulate concentration is due to the characteristics of the BCF briquette, which has a low heating value and high ash content. Note that, the boiler has already been equipped with cyclone and wet scrubber therefore PM emissions presented here are treated emissions.

Keywords: Briquette, Bottom Ash, Coal, Industrial Boiler, Particulate emission

7. Gas Emissions from Mixed Coal-Biomass Derived Fuel Burned in an Industrial Boilers (Annita Nurhayati et al.)

PT. X is a textile industry that consumed significant amount of coal to operate its industrial boiler. The company generated huge amount of bottom ash from the boiler operation and it is considered as hazardous waste. It has been attempted to reuse bottom ash mixed with solid waste compost to generate biofuel named as biomass coal fuel (BFF) briquettes as co-fuel for boiler combustion. This study conducted two boiler combustion experiments: i) boiler operation with 90% of coal mixed with 10% of BCF, and ii) 100% of coal. The SO2 and NO2 emissions were measured from the two experiments. The emission test was carried out using the MRU Optima 7 which is equipped by an electrochemical sensor, combined with an extraction probe to be inserted into the stack. From the emission test results, the SO2 concentration of 100% of coal burning was 150 mg/Nm3 While the SO2 concentration of coal fuel with the addition of 10% BCF (Biomass Coal Fermented) was 498.8 mg/Nm3. The NO2 concentration from 100% coal combustion was 174.2 mg/Nm3 while from mixed fuel combustion was 370.3 mg/Nm3. Using BCF as an aggregate for coal combustion did not bring in lower emissions of SO2 and NO2.

Keywords: briquettes, coal, boilers, stack, SO2, NO2

8. Modeling of a Small Educational Thermal Device (Auralius Manurung et al.)

This paper presents a small thermal device that has been developed for college-level teaching purposes. The developed device is equipped with one heater and one fan. An energy balance model is used to calculate the device parameters, such as heat capacity, emissivity and heat transfer coefficient. Additionally, we also quantify how the speed of the fan affects the heat transfer coefficient of the system by using a two-stage optimization method to identify all unknown parameters of the model. The first stage considers the system as a single-inputsingle-output (SISO) system and the second stage considers the system as a multiple-input-single-output (MISO) system. The results show that an energy balance model, which includes convection and radiation only, can already fit the dynamics of the device very well with a maximum absolute error of about 9 °C. However, during the validation process, the derived model gives a maximum absolute error of about 16 °C, which happens at high temperatures. Here, we also calculate how the heat transfer coefficient is affected by the fan and we find that its heat transfer coefficient is likely to be related to the speed of the fan linearly.

Keywords: Thermal system, MISO system, energy balance equation, system modeling, take-home laboratory

9. Fuzzy logic implementation in water quality monitoring and controlling system for fishwater cultivation (Milda Gustian Husada et al.)

Freshwater fish cultivation is determined by the water quality of temperature and acidity, which are 26oC - 30oC and pH of 6 - 8, respectively, based on research by Balai Pengembangan Benih Ikan Air Tawar (BPBIAT)[1], and turbidity level at 128 NTU maximum[3]. In this paper, water quality, in term of temperatue, acidity and turbidity, monitoring and controlling are carried out by applying the Mamdani

method of fuzzy logic to a microcontroller-based system as data acquisition which is interconnected with a computer device as a processing device. The reading error rate of the temperature sensor and acidity (pH) sensor are compared with standard measuring instruments are 0.67% and 2.48%, respectively. The results of the turbidity level test ranged from 55, as not turbid, and 300 as turbid.The test was carried out to the hatching of goldfish eggs, which the result showed that the number of hatching was 96%.

Keywords: Fuzzy logic, Mamdani method, water quality

10. Implementation of Wireless Sensor Network In Taekwondo Sport Branch Kyorugi Kategory (Maruli Ibrahim Batara Daulay et al.)

The Wireless Sensor Network (WSN) has been implemented in several ways to improve quality of living in terms of environment sustainability. WSN in sports such as Taekwondo is applied to validate the points especially in competition. WSN system uses a sensor node (Piezoelectric Sensor) to detect a punch or kick on the body protector of a Taekwondo athlete, then sent by a sink node (ESP8266) to the Web Server. WSN architecture uses a Point to Point Topology that connects two nodes through an Access Point. The WSN Delivery Method uses the Message Queue Telemetry Transport (MQTT) Protocol with the publish / subscribe communication type and the Hypertext Transfer Protocol (HTTP) Protocol with the client-server communication type. The results of the MQTT Protocol test using Round Trip Time (RTT) and Quality of Service (QoS) parameters include Delay, Jitter, Throughput, Packet loss and memory condition parameters, resulting in stable RTT, good QoS delay, stable jitter, good throughput. continues to increase, and 0% packet loss. Then, the HTTP protocol tested the delay and transmission range of 2100 times from the sink node with a distance of 50 m to the access point resulting in an accuracy rate of 100%.

Keywords: Taekwondo, Wireless Sensor Network, Message Queue Telemetry Transport, Hypertext Transfer Protocol, Point to Point Topology

11. Dependency Freight Transportation on Roadway (Andrean Maulana)

Commodity goods need to be delivered from the place of origin to the destination of the trip. Road highway mode is the main choice chosen by the owner of the goods, whether it is used in full or only partially (first mile or last mile delivery). The use of intermodal efforts is made for certain commodities so that they can provide services. Transportation costs cover freight costs on roads, railways, and nodes. The use of intermodal operational modes of rail-road have mode split 25%-68%. Others use water transportation, especially inter island case. Palm oil, latex, containers, general cargo, pulp, cement, fuel oil (BBM), fertilizer, steel coil, gallons of mineral water and coal are commodities that can be transported by train. Other commodities in the field of agriculture, livestock and fisheries are used by rail, so that transportation costs can be made. Intermodal processes at the node need to be considered in more detail so that cost calculations are clearer.

Keywords: Railway, Highway, Goods, Intermodal

12. Development of Liquid Cooled Axial BLDC Motor (Tarsisius Kristyadi et al.)

Cooling the component plays an important role in maintaining the endurance of the components work. Energy loss in the form of heat will occur on each component during its operation, including on the Brushless Direct Current (BLDC) motor. If the heat cannot be dissipated, it will impact on decreasing of the BLDC motor performance, even if it is allowed to continue then the temperature will rise and cause the overheating. This paper explains the analysis of cooling system of a BLDC motor, both numerically and experimentally. The BLDC motor that being analyzed is an axial BLDC motor, which has stator that consists of an iron core and a coil while the rotor is a permanent magnet placed on the center of 2 stator windings. This motor is designed and built to achieve power of approximately 20 kW. The motor cooling system initially uses natural air cooling, and then it's modified using liquid cooling system. Numerically and experimentally method show that cooling temperature have significant effect on power and efficiency of motor. Lower of cooling temperature produce higher motor power and efficiency. Based on experimental investigation, at normal condition, maximum power of water cooled BLDC motor can generate power of 25 kW and 81.0 % efficiency, while air cooled motor produce lower power and efficiency of 19.1 kW and 65.0 % respectively. Comparative analysis of motor performance based on model and experiment were presented as well. Maximum motor power calculated by model is slightly higher than that measured by experiment.

Keywords: Axial, BLDC, rotor, stator, windings

13. Analysis Of Electric Car Front Chassis In Crash Test Using Fea Software (Tarsisius Kristyadi et al.)

Electric cars are four-wheeled vehicles that run using electric motors powered by electricity from batteries or fuel cells. One of the important components of electric cars is the chassis which is a component of the vehicle whose main function is to frame to withstand the burden of vehicles and impact loads during a collision so that it can protect passengers. The method used is the full-frontal fixed barrier method, the method is a method in the analysis of collision or collision with wall rigid barrier or rigid wall. The results of the research obtained is that the chassis of the electric car will be calculated stress, strain, deflection, and safety factor. These prices are obtained from the simulation and will be analyzed the characteristics and safety of the model and chassis in the research. The result of program that made base on the data of simulation wiich will be analyze to the model at each speed are obtained as follows: 30 Km/h speed stress obtained is 39,36 x108 N/m2, strain 0,8504 x10-2, displacement 21,04 mm, with factor of safety is 0,157. At 45 Km/h speed stress obtained is 61,61 x108 N/m2, strain 1,286 x10-2, displacement 31,38 mm, with factor of safety is 0,1. At 60 Km/h speed stress obtained is 85,24 x108 N/m2, strain 1,716 x10-2, displacement 41,65 mm, with factor of safety is 0,073. 100 Km/h speed stress obtained is 146,7 x108 N/m2, strain 2,702 x10-2, displacement 68.74 mm, with factor of safety is 0,042. Analyzed at chassis are obtained at 30 Km/h stress is 15,98 x108 N/m2 with factor of safety 0,388. At 45 Km/h stress is 23,66 x108 N/m2 with factor of safety 0,262. At 60 Km/h stress is 31,09 x108 N/m2 with factor of safety 0,199. At 100 Km/h stress is 51,29 x108 N/m2 with factor of safety 0,121. From the

result of simulation as known that material alloy steel with chemical composition C 0.1-0.5, Mn ≤ 1.00, S 0.003, Si ≤ 1.00, dan Cr 11.5-13.5 is not safe when applied to the model.

Keyword: Electric Car, Simulation Chassis, Full frontal fixed barrier, Stress, Strain, Displacement, Factor of safety

14. Collecting individuals' intention of travel-activity changes during new normal period in Indonesia (Muhamad Rizki et al.)

After more than two months of mobility restriction applied by various cities in Indonesia due to COVID-19 pandemic, some of cities has started lifted the policy to improve the economic conditions but at the same time maintaining the curve of the risk. This study described the data collection of the intention of people to changing their travel/ activity during new normal period. This study conducted an online survey and collected data during the outbreak in Indonesia (in May 2020). Data from the survey shows that there is significant change of travel-activity during the pandemic, supported by the mobility restriction policy applied by many cities. The intention to changes travel-activity during new normal is varied based on the type of activity.

Keywords: COVID-19, new-normal, travel-activity changes

15. Behavior Study of Motorcyclist on Riding Safety Based on Gender in City of Bandung (Zulfikar Kharis Rahman et al.)

Research provide evidence that riding behavior is influenced by riders' personal characteristics, including gender type. This study aims to analyze the difference factor of motorcyclists' behavior between male and female from the aspects of rider characteristics, negative experiences, and the environment and road infrastructure on driving safety. Primary data obtained from questionnaires distributed online to motorcycle users. Multivariate statistical techniques with structural equation modeling-partial least square are used to calculate the response variable and explanatory variables simultaneously. The results of the analysis show that the variable of motorcyclist behavior that affects the safety riding behavior of both male and female is similar, both in compliance and intention of safety riding, as well as the environment and road infrastructure. The value of the influence of male riders' behavior on safety riding behavior was 22.11%, while for female riders it was 43.71%, this is presumably because male riders were more careless in driving than female.

Keywords: Gender, Riding Behavior, Safety Riding, SEM-PLS Method

16. Motorized or Non-motorized: Potential of bicycles use for daily transportation (isro Saputra)

Sustainable transportation concept is currently needed to help the continuity of the urban life. One of the sustainable transportations that is used by Bandung citizen is bicycle. Most of them are using motorize vehicle, thus it creates the lack of interest on using bike to the most of citizen as transportation which is used for work, school, and any other purposes, in result create of traffic jam and pollution

issues in Bandung. This research goal is to identify the potential for bicycle use as a daily mode and the factors that influence the community in choosing bicycles as a daily mode in Bandung. The data is collected by distributing questionnaire to the active and passive bike users in Bandung in terms of knowing the user's perception of using bicycle for daily commute. The data is analyzed by using descriptive statistics, which are used to understand the correlation (crosstab and chi-square) and the influence factors (multiple linear regression). The result of crosstabulation analysis show that type of profession and the purpose of use relate to willingness for using bicycle as daily transportation. College students and private employees are dominating the varies of occupation that use bike in Bandung and the purpose to exercise is dominate the purpose of the bike use. On the other hand, in result multiple linear regression analysis, the travel time factor is the single factor which influence the potential bike use as daily transportation in Bandung.

Keywords: Non-motorized, transportation, bike, daily

17. Analysis Due To The Traffic Noise Level Of Motor Vehicles And Trains And Mitigation Recommendations For The Coming Time (Case Study: Sd Negeri 001 Merdeka, Bandung City) (Muhammad Fajar Rahman et al.)

Noise at SDN 001 Merdeka, Bandung city. influenced by the activities of motorized vehicles and trains. The activity of large and small vehicles is estimated at up to 60 thousand vehicles every day. The noise of motorized vehicles and trains can indirectly interfere with teaching activities. To minimize this problem, it is necessary to research noise levels and mitigation with the concept of green building for noise level reduction. The CoRTN method can be used in this study as a prediction of noise that occurs due to motor vehicles and trains.

Keywords: noisy, green building, and CoRTN

18. The Implementation of Visible Light Communication on Two-Wheeled Vehicle (Lisa Kristiana et al.)

Visible Light Communication (VLC) technology on Vehicle-to-Vehicle (V2V) data transmission has been considered as a practical approach in outdoor optical wireless communication. This work observes the data transmission which is generated by LED installed on the head lamps between two-wheeled vehicles. The produced light beam carries the information from transmission point to receiver point. The results show that data transmission reaches maximum value in 200 cm distance headlamp beam, on the daytime.

Keywords: Visible Light Communication, Vehicle to Vehicle Communication, Data transmission.

19. Analysis of the Characteristics of Young Ride-sourcing Users based on Previous Modes: Case of Bandung City (Titan Suteja et al.)

People are now starting to switch to using ride-sourcing with all the advantages it provides compared to using other transportation. This study aims to analyze ride-sourcing users based on the mode of origin using the discriminant analysis method. Data collection is obtained using an online questionnaire for ride-sourcing users in Bandung City. The results of the analysis show that ride-

sourcing users who have high family income tend to associate with car users compared to previous public transportation users, while ride-sourcing users those who just used ride-sourcing in the 3 to 5 month range tended to be motorbike users before rides-sourcing existed. Transportation online users who choose to use motorbikes instead of ride-sourcing tend to use motorbikes.

Keywords: ride-sourcing, young users, previous mode

20. Rigid, Semi Rigid, and Flexible Diaphragms for Horizontally Asymmetric Building (Amatulhay Pribadi et al.)

The development of architectural design has increased numerous types of irregularities in structures, one of them is a T-shape building. The asymmetrical plan structure can induce a more unstable response due to earthquake loads. Buildings are generally designed using a rigid diaphragm rather than a semi rigid and flexible diaphragm. This study aimed to analyze the effects of diaphragm flexibility on structural response such as natural period, deformation, and base shear forces. The gravity and seismic loads on the buildings were based on SNI 1727:2013 and SNI 1726:2019. The finite element software program was used for modeling and running the analysis of structure. The results reveal that the rigid diaphragm structure has higher stiffness and generates smaller story displacement and base shear force than semi rigid and flexible diaphragm structures. The flexibility on irregular structure also affects the structural mode shape significantly.

Keywords: diaphragm flexibility, structural irregularities, structural response

21. The Impact of Built-Up Area On Land Surface Temperature Derived From Cloud-Computing Landsat 8 Imagery (Rika Hernawati et al.)

Urbanization is needed to ensure a higher quality of life for the rapidly growing population worldwide. Changing the land surface is a significant effect of growth and causes an increase in the land surface temperature (LST). This research used remote sensing techniques to evaluate the impact between built-up area and LST in Bandung City, Indonesia in 2014, 2016, and 2019. The methodology includes data collection derived from Landsat 8 imagery, pre-processing, calculated the value of built-up area generated through the NDBI algorithm based on cloud-computing platform Google Earth Engine (GEE). The result showed NDBI values decreased in 2014 to 2016 by 0.5% and showed an increased of 6% in 2019 the impact is.... Moreover, NDBI and LST has strong correlation with R = 0.91 in 2014, R = 0.95 in 2016, and R = 0.91 in 2019.

Keywords: Built-up, NDBI, LST, Landsat, Cloud-computing

22. Identification of Mangrove Forest Area Using Support Vector Machine Algorithm (Soni Darmawan et al. -)

Mangrove forests provide benefits on the products and services such as provide economic and cultural values, prevent erosion and coastal abrasion, source of food

for several species of animals, and as regulator of world climate change. However, at this time the mangrove area was decreased because of human activity. The aim of this study is to identify the mangrove forest areas based on the Support Vector Machine (SVM) algorithm. Study area in Sembilang National Park, Banyuasin South Sumatra Indonesia. Methodology including collecting of Landsat imagery in 2015, collecting of training samples, preprocessing, classification using SVM, and accuracy assessment. The result found a large area of mangrove forest on the study area is 60,697.5 ha with overall accuracy is 99.5% and kappa coefficient of 0.99, that means SVM is a good algorithm for identification of mangrove forest area.

Keywords: mangrove, classification, Support Vector Machine.

23. Investigation of Classification Algorithm for Identification of Oil Palm Plantation Using Multiscatter and Multiresolution SAR Data (Soni Darmawan et al. -)

This research aims to find the best classification algorithm for determining oil palm plantations using radar satellite imagery. Methodology including collecting primary and secondary data, primary data is the radar imagery such as Sentinel-1, ALOS PALSAR 2, and TerraSAR-X images, while secondary data is a training area of oil palm plantation. Preprocessing including radiometric and geometric corrections of radar imagery. Classification methods are used the Parallelepiped, Support Vector Machine, and Maximum Likelihood. The results of this study indicate that the Support Vector Machine method has the highest accuracy value among the three methods used with 86.18% accuracy in Sentinel-1 imagery, 91.17% in ALOS PALSAR 2 imagery, and 77.57% in TerraSAR-X imagery.

Keywords: oil palm, classification, Support Vector Machine, Parallelepiped and Maximum Likelihood

24. The Potential for implementing zero waste practices based on the composition of domestic waste in the hospital (Case study: Bandung Adventist Hospital) (Nico Halomoan et al.)

Bandung Adventist Hospital as one of the private hospitals in Bandung City in its activities will produce solid waste. The hospital's domestic solid waste increases with the increase in the number of hospitals. Zero waste can reduce waste that is disposed of in the TPA. The resulting solid waste consists of various compositions that can be used to seek potential for reduction, reuse or recycling. Domestic solid waste is calculated using the SNI 19-3964-1994 approach, samples are taken from kitchens and non-kitchens. The composition of waste is sorted by type and the potential for zero waste seen from the composition. The waste generated by hospital is 0.39 kg/bed/day for kitchen, 1.08 kg/bed/day for non-kitchen and for all source of waste total 1.47 kg/bed/day. The composition of the waste were plastic (17.66%), papers (8.25%), organic waste (43.99%), metal (0,41%), cardboard (9,37%), residue (17,61%) and others (2,71%). Bandung Adventist Hospital has started several efforts to minimize waste. Zero waste application with separated waste can then be processed according to the characteristics of each type of waste. Plastic, paper and cardboard waste can be separated for recycling. Organic waste in the form of food scraps such as rice can be separated for animal feed, digested and composted.

Keywords: composition, hospital, waste, zero-waste

25. Characterization Study of Coal-Combustion Ash For Acid Mine Drainage Prevention (Chandra Nugraha et al.)

Prevention of the acid mine drainage generation is the best effort to reduce one of the environmental issues in mining activities. This effort can be done by covering sulphide-bearing rocks by suitable and available rocks or materials to prevent the oxidation reaction of sulphide minerals with water and air. One of the materials that might be utilized is coal-combustion ash from the power plants, in the form of fly ash and bottom ash. It is necessary to conduct material characteristization of the ash so that the plan to form a cover layer can be carried out optimally. The test is carried out for mineralogical analysis using XRD and XRF; static geochemical tests with Paste pH, Net Acid Generation (NAG), Acid Neutralizing Capacity (ANC), Maximum Potential Acidity (MPA); and kinetic test with the free drainage column test. The test results show that FA and BA have non acid forming (NAF) characteristics so that they have the potential to be used as cover layer for potentially acid forming (PAF) material. In addition to geochemistry, geophysically FA has the ability to reduce water infiltration because it contains a lot of clay minerals, while BA has the ability to maintain moisture in the cover layer due to sandy properties of the material.

Keywords: coal-combustion ash, geochemical, acid mine drainage

26. Relationship between Changes in Agricultural Land Use Land Cover Change and Sustainable Agricultural Land Control Policy in Magelang Area (Byna Kameswara et al.)

Java Island as the center of growth in Indonesia is experiencing intensive urbanization and industrialization. This condition puts pressure on the agricultural sector, which is closely related to the availability of sustainable food or security food. Areas with significant agricultural land use / LULC indicate the need for policy support in preserving agricultural land use from the pressures of urbanization. This condition can be seen in changes in land use / agricultural LULC, one of which is in the Magelang area which has a significant agricultural area in Java Island. Indonesia has a sustainable food agri-land protection policy from 2009. One of the objectives of this policy instrument is to reduce changes in land use / agricultural LULCC. Evaluation of this policy certainly requires the support of agricultural area data. This study evaluates this policy by looking at changes in agricultural land use using the Land use Change Modeller (LCM) approach based on the ETM + Landsat image data set and the OLI for the Magelang area in 2003, 2009, 2013, and 2018. Employing satellite image data sets can be part of policy analysis tool as an alternative to agricultural land use area / LULC data, given the limited availability of statistical data. This study aims to determine changes in land use / agricultural LULCC before and after the policy of protecting sustainable agricultural food land is implemented. The Findings of this study will be able to contribute to sustainable agricultural land management policies for stakeholders for efficient use of natural resiurces. (Abstract)

Keywords: Agriculture, Policy Evaluation, Land Use land Cover Change, Land Change Modeller

27. The Effect of Compaction Temperatures of Asphalt Concrete Mixture on Axle Load Repetition (Imam Aschuri et al.)

The problem that often occurs in the road construction process is a decrease in compaction temperature due to problems of mobilization, which have an impact on road conditions that are likely to be damaged. This research was conducted to determine the effect of mixed compaction temperature on pavement parameters such as resilient modulus, stability, axle load repetition and its effect on the design life. The Marshall sample was prepared by using the optimum asphalt content of 6% with variations of compaction temperature, 110 ° C, 120 ° C, 130 ° C, and 140 °C respectively. After that the Marshall test was carried out to obtain the Marshall stability and flow values, followed by testing using the UMATTA apparatus to obtain resilient stiffness modulus. Based on the test results, it is concluded that the decrease in compaction temperature greatly affects the performance of a road, the use of a compaction temperature that is lower than the design temperature will cause a decrease in the strength of the pavement, in terms of the stability and strength values. This will cause the total of axle load repetitions of a road pavement will be lower compared to asphalt concrete mix prepared using the design compaction temperature

Keywords: Marshall Stability, Modulus Stiffness Resilient, UMATTA, Axle Load Repetitions

28. The Indonesia Lithium Resources : Indonesia Lithium Resources (Salafudin et al.)

Lithium is one of most demanding minerals in The Fourth Industrial Revolution. Indonesia whose large Nickel natural resources, wants to become a battery producing country. Therefore an investigation of other main raw material sources in battery production is needed. The main raw material resource for batteries is Lithium. The investigation of lithium as raw material resource in Indonesia has been carried out through a literature review. Lithium natural resources are found in sea water, Brine, minerals, and clay. Mineral Lithium containing deposits are found in several places in Indonesia in small amounts and concentrations. As a country through which the ring of fire passes, Indonesia has a lot of hot spring water and Brine containing Lithium. Clay containing lithium is found in the form of slurry (brine and clay mud), such as in the Bleduk Kuwu mud and the Sidoharjo mud. Bittern as a waste of salt industries has great potential to be developed as a source of Lithium in Indonesia

Keywords: Lithium, Hot Spring Water, Brine, Clay, Bittern

29. Penilaian Kualitas Pergerakan dan Konektivitas Kecamatan Antapani Berdasarkan Greenship Rating Tools (Widya Suryadini et al.)

The quality of urban space should be measured against the way it delivers its service toward its residents. While conventional standards had been the usual tools for measuring urban service quality, recent urban environmental issues show the need to employ a different set of standards against which selected urban issues should

be evaluated, particularly services related directly to the issue of sustainability in urban growth. This study aims to measure the quality of movement and connectivity in a large residential block at the neighborhood of Antapani, Bandung. The measuring instrument is developed from the greenship rating tools issued by GBCI that uses a green neighborhood point of view. The instruments measures six variables i.e., pedestrian facilities, public transport services, public facilities and utilities, bike lane and facilities, and common parking lots. The results concludes that the quality of mobility and connectivity in Antapani fall into the bronze class category.

Keywords: Green Neighborhood, Green Building Council, Movement, Connectivity

30. Plant Design for a Production Process of Nanoasphalt Emulsion from Asbuton Rock (Riny Yolandha Parapat et al.)

The largest deposit of natural asphalt in the world is located on Buton Island, Indonesia, which is around 677 million tons. With such abundance, Indonesia should be able to supply domestic asphalt needs, even has the potential to export abroad. However, the asphalt industries in Indonesia have not been able to process effectively the natural asphalt from Asbuton rock into a better quality of asphalt. Generally, they only focuses on resizing and separating the Asbuton rock according to the specifications of filler. This situation causes Indonesia has to import asphalt from abroad. Several studies and experiments have been done previously in lab-scale to produce high yield of nanoasphalt from Asbuton by combining microemulsion technique and Ultrasonication. Here we present a conceptual plant design of nanoasphalt production to process 121.8 tons/day of Asbuton rock as the raw material and produce 190 ton/day of nanoasphalt. The economic feasibility of processes of the Plant Design is analyzed. The economic evaluation in this work involves analyzing the capital and operating costs of the process to determine the return on investment (ROI), Break Even Point (BEP), Payback Period (PP), Internal Rate of Return (IRR). The result shows that the production of nanoasphalt is relative economical with ROI, BEP, PP and IRR are 31.54%, 24.5%, 2.47%, 35.46%, respectively.

Keywords: Asbuton, nanoasphalt, microemulsion, ultra-sonication

31. Performance Of Electro-Chemical (EC) Disinfection In The Treatment Of Septic Tank Effluent Under Plug Flow Condition (Jeronimo Dos Santos et al.)

This work investigates the performance of electrochemical disinfection system in treating effluent of septic tank. The electrolysis cells employed Ti/IrO2 anodes and stainless steel cathodes. DC-power supply bench-scale were performed under 12V using actual effluent of septic tank without adding chemical reagent. More than 70% removal in TSS, and greater than 50% of TCOD and SCOD reduction, while TKN and NH 3-N where achieved within 1-4hours with the removal efficiency =10%. Additionally, lowest energy consumption for organic pollutants removal were 4.41 mA/cm2, while highest energy requirement 4.86 mA/cm2. Meanwhile, operating cost per day were in range between 0.88 – 3.86 Bath/day and average energy use per capita per day 1.25 Bath/cap/d. Tracer study was an instrument to measure hydraulic characteristics such as mean residence time, dispersion index, short circuit, hydraulic efficiency (λ), and dead space. The NaCl was used as chemical tracer in this experiment which injected into the electrochemical tank by pulse

injection. The effluent concentration of NaCl concentration were analyzed by plotting RTD curves. The mean residence time varied between 1 – 2 hours using electricity current and without electricity current. Tracer experiment using electricity current provide less mean space value (0.072) illustrated high treatment performance. Hydraulic efficiency showed higher performance (0.65 0 0.80) which is known has a good efficiency. Lower dispersion number (0.001) achieved plug flow condition.

Keywords: Blackwater, Organic pollutant removal, Pathogen Removal, electrochemical disinfection, tracer experiment

32. An Identification of Fluorescence Dissolved Organic Matter in Tropical Raw Water Sources by PARAFAC Analysis (Mila Dirgawati et al.)

Dissolved Organic Matter (DOM) is as a precursor for Trihalometans (THMs), a harmful substance produced from the chlorination process in drinking water treatment. The aims of this study are to identify the origins and FDOM compounds in tropical raw water source as such Cikapundug River, West Java Province, Indonesia. The raw water was collected from the upstream of Cikapundung River, which was surrounded by mixed land uses. DOM was measured as Fluorescence DOM (FDOM), an organic fraction that absorbs and re-emits lights. Raw water samples were collected from the outlet of the intake in the dry and rainy seasons and were analyzed using Fluorescence Exitation Emission Matrix (FEEM) spectroscopy combined with PARAFAC analysis. Fluorescence Index (FI) and Biological Index (BIX) were used to identify the origin of DOM and the contribution of autochtonous process in the raw water, respectively. The measured FI averages were 1.82 in the dry season and 1.77 in the rainy season, suggesting humic-like compound was more predominant Dissolved Organic Matter in the rainy than that of the dry season. The average BIX in the dry season was 0.88, higher than the rainy season (0.64), indicating the main sources of humic compound was from terrestrial, possibly through the rainwater runoff. However, the main compound of FDOM in the dry season was protein-like compound (tryptophan), possibly resulted from wastewater decompositions by microorganisms and thus confirmed FDOM in the upper stream of Cikapundung River was likely originated from the anthropogenic activities discharges throughout the year. The quality of the raw water in the dry season was worse than in the dry season.

Keywords: Fluorescence Dissolved Organic Matter, tropical raw water source, PARAFAC, Fluorescence Exitation Emission Matrix

33. Current and Future Emission of Air Pollutants and Greenhouse Gases from Thermal Power Plants in Vietnam (Nguyen Nhat Ha Chi et al.)

Thermal power plants (TPPs) involve the fuel combustion activities hence are the key emission sector worldwide. Particularly, the fine particulate matter pollution and acidic precipitation in many countries are strongly associated with the emissions from coal based TPPs. In Vietnam, the power generation sector still heavily relies on fossil fuel. Coal-fired TPPs contributed 42% of the national electricity production in 2018 and are projected to increase to 53% in 2030. This study uses the emission inventory tool, an important component of an integrated air quality management system, to develop a comprehensive emission database for TPPs to provide scientific evidences for policy makers to prioritize the emission control efforts. The emissions

from TPPs, including coal, oil, natural gas, and biomass based, have been quantified for 2018 and projected to 2030 taking into account the National Power Development Master Plan revised in 2016. The activity data in 2018 were collected considering the fuel and combustion technology, as well as the emission control levels of each TPP so that the appropriate emission factors can be selected from literatures for the emission calculation. The results show that out of different types of TPP, in 2018 coal-fired TPPs had the largest emission shares of all species: 95% of total 145 Gg SO2, 85% of total 145Gg of NOx, 95% of total 19Gg of PM2.5, 80% of total 29Gg of CO, 80% of total 7Gg NMVOC, 99% of 4Gg BC. The projected emissions for 2030 show large increase in total emissions as compared to 2018: four times for SO2, and three times or above for other pollutants. In the next stage, this research will use the 3D modeling approach to assess impacts of the current development plan and alternative scenarios of TPPs on air quality, human health, atmospheric deposition fluxes and associated effects on ecosystem.

34. A Cassava Peels Waste Becomes Activated Carbon - A Literature Review (Dina Ocktafiani et al.)

The purpose of this literature review is to determine the effect of acid, salt, and alkaline activators as well as the effect of activated carbon particle size on the quality of activated carbon from cassava peel waste following SNI No. 06-3730-1995. Cassava peel waste is used as raw material for making activated carbon because it has a carbon content of 59.31%. In general, the manufacture of activated carbon from cassava peels is carried out through three main stages, namely dehydration, carbonization, and activation. Activation is needed to obtain high adsorption power. The activators that are the focus of this literature review are H3PO4, ZnCl2, NaCl, Na2CO3 dan KOH. The main source of literature used is research that discusses the manufacture of activated carbon from cassava peels. The results showed that the activator used to produce the best quality activated carbon was the acid activator, namely H3PO4 with a concentration of 2.44% and a particle size of 100 mesh. The resulting activated carbon has a moisture content of 3.5%, an ash content of 7.5%, and an iodine number of 2537.71 mg / g. Based on the results of the analysis, this activated carbon fulfilled the quality of activated carbon based on SNI No. 06-3730-1995.

Keywords: cassava peels, activated carbon, activator, particle size

35. Non Edible Moringa Oleifera Seeds For Environmentally Friendly Biodiesel - A Review (Miranti Nur Arafah et al.)

The availability of fossil fuels is decreasing over time. This causes the need for an alternative fuel substitute, namely biodiesel. Moringa oleifera seeds are the raw material for making Moringa seed oil, used as raw material for making biodiesel. This is due to its high oleic acid content, which is greater than 70%. The objectives of this study are to observe the production of biodiesel from Moringa seed oil, the use of heterogeneous catalysts in the production of Moringa seed oil biodiesel, the effect of operating parameters on the yield and quality of biodiesel produced. Literature study was chosen as the method in this research, which includes the collection of journal articles, separation and analysis of journal articles, as well as the formulation of discussions and conclusions. Based on this study, there are several stages in the production of Moringa seed oil biodiesel, namely extracting oil

from the seeds, esterification-transesterification, and refining of biodiesel. Operating parameters affect the manufacture of Moringa seed oil biodiesel. The most influential operating parameters are the molar ratio of methanol and oil, catalyst concentration, reaction time, and reaction temperature. The use of heterogeneous catalysts is able to produce a high yield of Moringa seed oil biodiesel, which is on average greater than 90%. Moringa seed oil biodiesel complies with national (SNI 7182: 2015) and international (ASTM D6751 and EN 14214) standards so it is safe to use as vehicle fuel.

Keywords: Moringa Seed Oil, Biodiesel, Heterogeneous Catalyst, Operating Parameters

36. Methane emission estimation and dispersion modeling for a landfill in West Java, Indonesia (Soni Pratamayudha WIjaya et al.)

Methane gas (CH4) is a greenhouse gas that can drive global warming, which is a product of anaerobic degradation of organic matter by microbes. Methane is generally produced from the degradation of organic matter contained in waste generation. The higher waste generation in a landfill without further processing can increase (CH4) emissions. The purpose of this research is to estimate its emission and to model the dispersion of CH4 emitted from Sarimukti landfill LandGEM and IPCC methods were used to estimate the emission of CH4 while air quality dispersion model of AERMOD was employed for modeling application. The results of this study indicated that CH4 emissions had increased every year, where the highest emissions occurred in 2025 of 14104.97 Mg/year with LandGEM methods and 14740.15 Mg/year with IPCC methods. Meanwhile, the dispersion has a westerly dispersion pattern during the year which is influenced by meteorological factors in the study area. In AERMOD operation, when the wind with high speed then the spread CH4 emissions would be widely. In contrast, when the wind has low speed then it tends to make the concentration at a certain point close to the source to be high.

Keywords: Methane gas (CH4), LandGEM, IPCC, and AERMOD

37. The Influence of Amount and Types of Adhesive on Biobriquettes from Coffee Pulp by Torrefaction (Vibianti Dwi Pratiwi)

Alternative energy sources by reducing CO2 emissions have encouraged use biomass energy as substitute for fossil fuel energy. Coffee pulp are waste produced in the production process, biomass waste has the potential to be used as raw material for making biobriquettes because it has high calorific value. Biobriquette is charcoal made from organic waste which is molded with pressure and mixed with adhesive. This aims to determine the effect of the type and amount of adhesive by torrefaction. The types of adhesive used were starch and pine resin with starch's composition: 0%, 10%, and 20%, while amount of adhesive for pine resin: 0%, 10%, 20%, and 40%. The research was conducted at torrefaction temperatures: 2000C, 2500C, and 3000C. The optimal torrefaction temperature for making biobriquettes from coffee pulp is 300oC, a calorific value of 7550 cal/gram. Meanwhile, biobriquette that use pine resin has the highest calorific value of 5532 cal/gram.

Keywords: bioenergy, biobriquette, coffee pulp, pine resin, torrefaction

38. Drainage City Management Strategies Planning of Cimahi City Based on 2018 City Sanitation Strategy Guideline (Elvira Rizqita Utami et al.)

Cimahi City is one of the cities that participated in the Accelerated Habitation Sanitation Development Program in 2011. This was done because the Cimahi City Government realized that the sanitation conditions in Cimahi City were still of concern. In 2015, the coverage of drainage system services has reached 89.87%. Meanwhile, inundation and flood area in 2018 in Cimahi City reached 36.4 hectares or equal to 0.76% of the total area of Cimahi City. Although this figure can be said to be small, the percentage of inundation can cause losses, namely damage to property, economic disruption, disruption of public and social facilities, and people who have to evacuate. Based on the following problems, this study was conducted to calculate the level of risk in each urban village in Cimahi City. The level of risk is expressed in scores ranging from 1 - 4. A score of 1 means very low risk, a score of 2 means low risk, a score of 3 means high risk, and a score of 4 means very high risk. The determination of risk scores involves exposure factors and impact factors. Exposure factors consist of inundation area percentage, sanitation risk index (IRS) score based on EHRA and OPD perceptions. While the impact factors consist of population, population density, poverty rate, and urban/rural function. There is 2 urban village with a very high-risk level, 1 urban village with a high-risk level, 5 urban villages with a low-risk level, and 7 urban villages with a very low-risk level. 3 strategies aim to lower the risk score in each urban village. Two strategies have been planned by the Department of Public Housing and Residential Areas, namely the retention pool and normalization of the channel and one additional strategy, namely a combination of retention and normalization ponds.

Keywords: city drainage, inundation, risk score, exposure factors, impact factors, risk areas, retention pool, normalization of a channel.

39. A Strategy for Improving 3R-Based Solid Waste Services in Jatihandap Village through the Application of the Contingent Valuation Method "CVM" (Muhammad Dimas Zulri et al)

The increase in population in Indonesia is directly proportional to the growth of new settlements. In line with this, the growth in waste volume in Indonesia is closely related to population growth. The waste generation which increases every day is greatly influenced by the lifestyle of the community and the level of community welfare. Jatihandap is one of the areas in Mandalajati District, Bandung City that experiences the impact of the daily waste generation and wants to improve the quality of its solid waste services to reduce this impact. One method that can be applied to measure the willingness of citizens to participate in improving solid waste services is the Contingen Valuation Method (CVM). The flow of this research begins with literature study, primary and secondary data collection, hypothesis market determination, questionnaire design, determination of influential variables, analysis and discussion, then ends with recommendations and suggestions. Based on the results of this study, it was found that the Willingness to Pay (WTP) value was 138 people from the selected 153 samples. The estimated value of the WTP (EWTP) was Rp. 12,971 and the total WTP (TWTP) obtained was Rp. 80,385,000 / month. Based on multiple linear regression analysis, the WTP value of Jatihandap Village is influenced by the amount of waste contributions and gender equality from the results of the questionnaire that has been conducted.

Keywords: Contingent Valuation Method, Willingness to Pay, Improvement of Solid Waste Services, Influencing Factors, Jatihandap Village

40. C.I. Reactive Navy Blue Dye Waste Treatment using PVDF/Nanomaterial Membranes: Dye Waste Treatment (Aszahra Karimah Astari Putri et al.)

Dyes wastewater can be treated effectively with PVDF membranes. PVDF is a polymer that is preferable because it has a high-temperature resistance but also has high hydrophobicity. The hydrophobicity of PVDF will cause fouling that reduces filtration efficiency. Therefore, in the manufacture of membranes, PVDF is combined with nanomaterial consisting of Carbon Nanotubes (CNTs) impregnated with TiO2. The addition of CNTs/TiO2 impregnation on PVDF membranes can reduce hydrophobic nature and increase the permeability of the membrane itself. This research intended to reduce the C.I Reactive Navy Blue using PVDF/CNT membranes impregnated with TiO2 using N-methyl-2-pirolidon (NMP) solvent. The research was conducted to determine the differences in the types of nanotubes used,, and the pH of the feed with the specified requirements is pressure on operating conditions.

Keywords: Polyvinylidene Fluoride, Carbon Nanotubes, C.I Reactive Navy Blue, N-methyl-2pyrrolidone, TiO2.

41. Ozon/UV Technology Ozon/UV Technology for Textile Industry Wastewater Treatment: Wastewater Treatment (Nida Annisaa Hanifah et al.)

Liquid waste textile industry in general are alkaline, odorless, colorless, contain organic materials and heavy metals that are harmful to humans and the environment. Therefore, besides color, the textile industry wastewater has a high concentration of Chemical Oxygen Demand (COD) and Total Suspended Solid (TSS). Waste water treatment of textile industry can be done in various ways, one of them is by using AOPs (Advanced Oxidation Process). The method can be compared efficiency in reducing the high concentration of COD and TSS by using a method between individual UV, individual O3, or a combination of UV and O3 (UV / O3). In this study, textile industry wastewater treatment was carried out by a separation method using AOPS (Advanced Oxidation Process) with a combination of UV and Ozone (UV / O3).The process will be carried out in a semi batch with various additions of Carbon Nano Tube (CNT) catalyst types of pristine with variation 1 mg; 2 mg; 3 mg; 4 mg; 5 mg and temperature 30 0C during to 60 minutes. Analysis was carried out on the feed solution before and after processing with the method of spectrometry analysis on COD, and gravimetric analysis on TSS. The best % reduction COD concentration is 44,19% was obtained from operating conditions using 5 mg Carbon Nano Tube (CNT) pristine catalyst.

Keywords: AOP, CNT, COD, Textile Industrial waste, TSS.

42. Mapping of Land Drought Potential in Cirebon Regency-West Java Based on Geographic Information System and Remote Sensing (Natasya Inggrid Pratiwi)

Drought is a natural disaster characterized by unbalanced water conditions.Land damage caused by drought occurred in Java Island precisely in Cirebon Regency,

West Java. The lack of map data containing information on potential drought-stricken areas also serves as one of the factors hindering the resolution of drought problems.The creation of drought potential maps in a region can be done using remote sensing techniques (indraja) and Geographic Information System (SIG). As for identifying drought using tenik remote sensing can use landsat 8 imagery with NDVI and TCT methods. GIS can analyze supporting data in the form of rainfall maps and administrative limits so that it can present a map of potential land droughts. The results of this study show that drought with dry grade only occurs in Gegesik and Kapetakan sub-districts. Cirebon regency has a normal drought level in November 2019. November is the end of the dry phase in Cirebon Regency in 2019.

Keywords: Drought, Remote Sensing, SIG

43. Satisfaction and Importance Level of the Ministry of Environment and Forestry Officer (Andrean Maulana)

Jakarta is the capital of Indonesia, so the headquarters of the government is located in Jakarta. Government officials generally have residential areas outside of Jakarta. Ministry of Environment and Forestry (KLHK) provides bus pick up for employees who live outside the city of Jakarta, his employees still carry a private vehicle. In order for the bus pulled back again can be seen from the level of importance and level of satisfaction by using the method of Importance Performance Analysis (IPA) and method of Customer Satisfaction Index (CSI). And get the result of employee factor choose the mode of transportation pick up of employee based on level of importance and level of satisfaction, among others: cleanliness and tidiness of bus facilities pick up, responsiveness and speed of service officer, determination / certainty of arrival time of bus pick up, comfort and hospitality officer in serving, bus pickup. The value of all factors of interest and satisfaction level using CSI method is 86% which means very satisfied.

Keywords: satisfaction level, importance level , officer

44. Three R's Aplication Of Domestic Water Consumption In West Antapani District: Three R's Aplication Of Domestic Water Consumption In West Antapani District (Fransiska Yustiana et al.)

Water is basic human need that requires management in order to balance water consumption level and existing water resources level. Domestic water consumption greatly determines by lifestyle and habits. So that it is necessary to provide sufficient knowledge and awareness about water conservation so that it will increase effectiveness and wisdom in water consumption. The community can change behavior to more efficient and more optimal in water consumption patterns by practicing or apply three R's (Reduce, Reuse, Recycle). The research conducted by survey methodology. Survey done by asking online questionnaire that consist a set questions of behavior and habits of water consumption. The questinaire will conducted respondens charactheristic which includes performance level and importance level. The questionnaires are analized by scoring using a Likert scale. The results of the Likert scale analysis from the questionnaire are mapped in a Cartesian Importance Performance Analysis (IPA) diagram and the level of correlation is calculated. Research shows that the behavior of water users or

respondens still have many activities to improve, because the average score of the importance level is greater than the performance level, such as 3.253for the level of importance and 2.884 for the level of performance.

Keywords: domestic water, Likert Scale, Efficiency, Questionnaire, IPA

45. Database Shoe Design With 3D Anthropometric Parameters (Asep Nana Hermana et al.)

Currently, anthropometry plays an important role in industrial design, clothing design, ergonomics and architecture where statistical data on the distribution of body dimensions in a population are used to optimize products. Changes in lifestyle, nutrition, and ethnic composition of the population lead to changes in the distribution of body dimensions (eg increased obesity) and require regular updating of anthropometric data collections. In Shoe Last Design, the role of anthropometry has a significant role, five anthropometric profiles of the feet are measured, namely foot length, foot width, lateral length of the foot (Instep length), foot arch height and circumference. ankles (foot arch height). Taking three-dimensional images requires a tool that is able to take the five parameters above so that with the availability of data, a database of Shoe Last can be created according to function and convenience.

Keywords: anthropometric, Shoe Last, Dimension, fruit, function, convenience

46. Implementation of MFCC And LVQ Methods For Learning English Pronounciation (Yusup Miftahuddin et al.)

English is one of the most popular international languages spoken in various countries and is needed as a requirement in the world of work, because of its popularity, there are several different accents from each country, one of which is a British accent. The British accent is more popular than other accents because it has unique characteristics, but because of this uniqueness, this accent is difficult to learn and a learning media system is needed without the need for native speakers for learning. In the speech recognition system, the voice will be processed and matched to recognize the words spoken by the speaker so that the correct or wrong pronunciation can be known. In this study, MFCC is used as a feature extraction feature of sound and the classification method uses Learning Vector Quantization (LVQ) because it has good performance results in ideal or not ideal conditions. The system performance in the process of identifying British accents gets an average accuracy value of 80%, a precision value of 85%, and a recall value of 92%. From the precision and recall results obtained, the system gets an F-Measure value of 88%.

Keywords: Speech Recognition, British Accent, Learning Vector Quantization, Mel Frequency Cepstrum Coefficients

47. Feature Extraction of Ground Marshall Hand Gestures Using Hidden Markov Model on Aircraft Parking Process (Irma Amelia Dewi et al.)

The process of in and out of an aircraft in an airport is determined by various aspects, one of which is the process of parking the aircraft. The aircraft parking process is considered vital in an airport activity because the aircraft parking process must be done precisely, quickly and safely. The process of parking the aircraft is not separated from the importance of cooperation between ground marshall who is on the airstrip and a pilot inside the cockpit of the aircraft. Until now, the aircraft parking process is still done manually through visual communication and gestures between ground marshalls and pilots. Based on this, a system is needed that can assist the pilot in directing the fuselage during the aircraft parking process. The purpose of the study was to detect ground marshall hand movements based on marshalling signals delivered by ground marshalls to pilots during the aircraft parking process. This stage of research begins with capturing data by the Kinect sensor that captures the joint skeleton of the human body, then the data is processed to be performed by the calculation of the angle of each joint skeleton captured by the sensor. The data of the joint skeleton angle calculation is then entered into Hidden Markov Model (HMM) Modelling for training and testing. Test results from the study obtained precision scores of 45%, recalls of 45% and f1-scores of 42%.

Keywords: Ground Marshall; Marshalling Signals; Hand Gestures; Hidden Markov Model; Aircraft;

48. An Implementation of VGG 16 for modeling color descriptor in fruit maturity classification (Asep Nana Hermana)

In previously studied color descriptors (RGB, GSL, HSV, and L * a * b *), to determine the level of fruit maturity, experimentally obtained a maximum of 76% accuracy. In the current research, it is proposed to implement the use of the VGG16 model with transfer learning then modify the top layer or classification layer using the multi-SVM classifier. It is hoped that making a model from a color descriptor before being classified can improve accuracy. By using the EarlyStopping and ModelCheckpoint callback functions. Where EarlyStopping used is monitor = val_loss, patience = 100 and Model Checkpoint used is monitor = val_accuracy, mode = max. Furthermore, the optimizer used is Adaldelta with a learning rate = 1.0, rho = 0.95, epsilon = 1e-08, and metrics = ['accuracy']. Using a dropout regularization of 0.5 and an L2 Regularizers penalty of 0.01 to calculate the SVM loss. The configuration is trained using an epoch of 200. The architecture used is implemented to train the dataset built by the researchers themselves. Then split sequentially with a percentage of 70:20:10 for training data, validation data, and test data. From the test results for each class, the maximum accuracy is 93.75%, which has increased from 17.75%.

Keywords: color, deskriptor, VGG-16, Multi-SVM, fruit

49. Multi Criteria Decision Making to Forecast Number of User on IP Network (Marisa Premitasari)

Nowaadays, telecommunication Industry has arise as positive integral function. Users doing online activity with smart gadgets, notebook or desktop computer as practice as they can . There are countless activities such as sending an email and SMS, chatting, surfing, VoIP and Video calling, streaming, shopping, playing games amd also popular in this pandemic era which are online meetings. So that activities can run smoothly, users need to connect themselves to the best network. That's mean a telecommunication network is accessible, seamless and no limitation bandwidth to users. There is no such sophisticated network runs seamless as fastest as they want, infact it is only designed by a network designer. These research collected IP-Based Data Traffic that were captured from ITENAS PROXY SERVER Network by doing active and passive monitoring. Therefore such method based on Multi Criteria Decision Making (MCDM) is needed to analyze the network by breaking down the raw data to criterion and attributes , clustering it and given its weights to rank the best criterian when the network were busy or idle by forecasting the number of user . This system were calculated and analyzed based on two methods namely Simple Additive Weigthing(SAW) and Anaylitical Hierarchy Process (AHP)

Keywords: MCDM, IP-Based Traffic, Passive and Active Monitoring, SAW, AHP, Criterion

50. An Evaluating Academic Information System Success: An Empirical Study (Sofia Umaroh)

Information Systems (IS) are developed using information technology (IT) to assist organization in gaining a competitive advantage. Implementation of IS requires an expensive IT investment. However, the application of the IS not always in accordance with the expectations of the organization in both technical and non-technical aspects. This study aims to evaluate factors that influence the successful implementation of the Academic Information System (AIS) using DeLone and McLean (D&M) success models. The model has been empirically validated using data collected from 187 active users of AIS through a quantitative method of Partial Least Squares - Structural Equation Modelling (PLS-SEM). This study found that most hypotheses are significantly supported by the data except for the relationship of system quality to system use and user satisfaction. This paper concludes by discussing the limitations of the research that should be addressed in future research

Keywords: IS success, AIS, PLS-SEM, success model, net benefit, SIKAD.

51. Segmentation-Based Fractal Texture Analysis (SFTA) to Detect Mass in Mammogram Images (Jodi Raina et al.)

In Indonesia, the most common cancer case would be breast cancer with a prevalence of 58,256 cases or 16.7% from a total of 348,809 cancer cases. A system is required to assist the expert in detecting breast cancer in women. Diagnosis of breast cancer is performed by identifying mammogram images and performing a particular radiological examination using a low dose x-ray which may portray abnormalities. Abnormalities in a mammogram are identified by the site in which a pattern of texture with a certain form and limitation, which is usually called a 'mass', takes place. A system that may detect the mass in the mammogram image using texture-based extraction usually employs Segmentation-Based Fractal Texture Analysis (SFTA). This research aimed to measure the accuracy rate of SFTA in detecting the mass in mammogram images. Image acquisition would be perceived as the first step, and it would be followed by segmentation using the k-means and the thresholding. The result of image segmentation would then undergo the morphological analysis steps which were performed by using opening and masking methods. The resulting mass indication would undergo the feature extraction process called SFTA and the Support Vector Machine (SVM) classification. The obtained research result revealed an accuracy value of 90%, a precision value of 87.75%, a recall value of 93.33%, and F1-Score of 90.32% with the number of thresholds (nt) of SFTA amounting to 3.

Keywords: Breast cancer, Mammogram, Classification, SFTA

52. Bi-Directional Data Communication Using Visible Light Technology for Underwater Environment (Lita Lidyawati et al.)

The development of UVLC (underwater Visible Light Communication) can be implemented into underwater. In this research, we design a visible light communication system for two-way communication in underwater environment/ The system is designed to transmit digital signals with a distance measurement using color filter. There are two links which have transmitter and receiver part. To distinguish between those two links, data from the signal generator of 3 kHz will be given on link 1 and data from the the signal generator of 4 kHz will be given on link 2. The distance measurement system can receive the data optimally on link 1 with the distance of 50 cm, an output voltage Vout of 4.32 Vpp, and output frequency (Fout) of 3.121 kHz. The result measurement on link 2 obtains an output voltage of 5.28 Vpp and output frequency of 4.021 kHz. The measurement on link 1 which applied the blue color filter will obtain the average voltage of 5.46 Vpp and an output frequency (Fout) of 3.136 kHz. The measurement on link 2 which applied the red color filter will obtain an average voltage of 5.11 Vpp and an output frequency (Fout) of 4.054 kHz.

Keywords: color filter, frequency, link, signal generator, voltage, UVLC

53. Transfer Learning With Vgg16 And Inceptionv3 Model For Classification Of Potato Leaf Disease (Dewi Rosmala et al.)

Early diagnosis of plant diseases carried out by experts in laboratory tests is often not applicable for fast and inexpensive implementation. Using deep learning, leaf images are used as data input. Training deep learning models requires large, hard-to-come datasets to perform the task in order to achieve optimal results. In this study, the PlantVillage dataset was used totaling 2700 training data and 300 validation data. Data were trained using 100 epoch iterations using the transfer learning method with the VGG16 and InceptionV3 models. At the top layer of both models, the same MLP is applied with several parameters, namely the size of FC and the dropout rate to compare the model's performance. Based on testing using 150 IVEGRI data, the VGG16 model can generalize data better than InceptionV3. VGG16 by tuning block-3 using parameters 4096x2 and Dropout 0.4 shows the best performance with an average score of 1 precision, an average recall of 1, an average f1-score of 1, and 100% accuracy. Then with the same parameters, the Inception-v3 model with tuning in the mixed6 inception module shows the best performance with an average score of 0.93 precision, an average recall of 0.92, an average f1-score of 0.92, and an average accuracy of 92%.

Keywords: Deep Learning, Transfer Learning, VGG16, InceptionV3, Potato Leaf Diseases Classification

54. Ethnic-Modern Furniture Design Innovations with Use of NTT Ikat Woven Fabrics (Detty Fitriany et al.)

NTT Ikat Weaving is one of Indonesia's traditional cultural heritages that must be preserved. Weaving is one of the sub-sectors of the creative industry that is being promoted by the Government in supporting the Indonesian economic sector. Currently the use of weaving in interior design is only limited to the decoration function. Even though the uniqueness of the patterns, motifs, colors and textures of the woven fabrics has the opportunity to be explored into more massive water furniture materials. This research contains exploration of ethnic-modern style furniture designs using NTT woven fabrics combined with wood materials and other furniture accessories. This research is an experimental research which is divided into two stages, namely the design exploration stage and the prototype production stage. The purpose of this research is to generate innovations in the interior design and furniture industry, preserve local values in interior design and contribute to the creative economy. The output of this research is a prototype of an ethnic-modern style furniture with detailed construction of the connection between wood as the main raw material and NTT woven cloth as the supporting material.

Keywords: Ikat Woven, NTT, Furniture, Ethnic, Modern

55. Overview of Signage at the Itenas Bandung (Aldian Agusta et al.)

Departing from the condition of the signage on campus which is still not quite in line with the Itenas branding. So that research and analysis is needed, one of which is the category and function of the Itenas campus signage as an important basis for building a visual information system for directions in the Itenas campus environment that is in line with its branding. Understanding the situation and conditions of the existing signage will form the basis for the design of the ITENAS campus signage in the future.

Keywords: signage, wayshowing, wayfinding, function

56. Motion Feature in Advertising and Audience' Perception Based on AIO Concept in Digitizing' Era (Agustina Kusuma Dewi et al.)

Not only is it a real motion that can be perceived in a concrete form, there is a change in the position of the subject from one point to another by visual sensing, but it is also related to the sensation and perception of motion which is constructed as a 'Bahasa Rupa' grammar and visualized in advertising as a visual communication medium. . Perception is formed because of the attraction between the person's self-concept in the perceptual process and the tendency of human adaptive traits (polymorphs); included in interpreting 'motion' which is very likely to be perceived differently by the sensibility and sensory process of each person; especially closely related to the circulation of the meaning of signs in visual communication, one of which is in print advertisements. This research was developed from the results of research by AK.Dewi (2015-2017), and will use the Mix-Method approach within the framework of Experimental Research One-Shot Case Study, the object of research is a segmented print advertisement based on the AIO classification (Activity, Interest and Opinion). It is hoped that this research will produce a logical explanation of visual stimuli in static media that can attract the attention of the audience, especially in print advertisements that apply the Motion Feature as its 'Bahasa Rupa'; at the same time providing development in Visual Communication Design science, especially for Brand Communication as a visual communication strategy to strengthen the efficiency of using word language on static media. The object of research is a segmented print advertisement based on the AIO classification (Activity, Interest and Opinion). It is hoped that this research will produce a logical explanation of visual stimuli in static media that can attract the attention of the audience, especially in print advertisements that apply the Motion Feature as its 'Bahasa Rupa'; at the same time providing development in Visual Communication Design science, especially for Brand Communication as a visual communication strategy to strengthen the efficiency of using word language on static media. The object of research is a segmented print advertisement based on the AIO classification (Activity, Interest and Opinion). It is hoped that this research will produce a logical explanation of visual stimuli in static media that can attract the attention of the

audience, especially in print advertisements that apply the Motion Feature as its 'Bahasa Rupa'; at the same time providing development in Visual Communication Design science, especially for Brand Communication as a visual communication strategy to strengthen the efficiency of using word language on static media.

Keywords: lifestyle segmentation, motion feature, visual grammar

57. Design of Visual Graphic System for the Itenas Campus Direction Signs (Aldian Agusta et al.)

Planning and designing a sign system to become an Experiential Graphic Design for the Itenas campus by building informative signs and directions based on Itenas branding in the campus environment so that it can have a positive influence on students and the entire academic community. Utilizing Design Thinking and the Signs Pyramid Method in the process to get a more humane sign system and easy to understand for each category and function.

Keywords: signage, wayshowing, wayfinding, environmental graphic design, branding

58. Smart Materials in Design and Technology: Study Case: Banana Bark (Maharani Dian Permanasari)

The need for convenience in everyday life is increasing in various fields. This is a major concern for design and architectural scope, especially in terms of material availability and technology application systems. This paper stresses the utilization of renewable materials -particularly banana bark, how to optimize the experimentation while avoiding exploitation of the material, also how to apply the research findings outside academic sphere.

Keywords:— smart material, banana bark, design

59. Injection Molding Hand-Press Design And Analysis Using Solidwork (Nuha Desi Anggraeni)

Injection moulding is a method of forming a thermoplastic/composites material that is melted by heating and then injected into a mould so that the thermoplastic material can harden. The use of plastics is not only caused by the need for efficiency, as well as technological advances in the field of material engineering or manufacturing technology from the material itself. In this study, a hand-press injection moulding machine was planned with the working principle of the lever being applied so that the transmission would transform the force to the injector so that the molten thermoplastic and composite material would come out into the mould. When the force is applied to the hand-press injection moulding is analysed using Solid works and the mould design used refers to the dimensions of the ASTM D 3039 standard. For the tensile test, ASTM D 6110 for the impact test and ASTM D 695 for the bending test. Construction components of hand-press

injection molding machine using ST 60 material, mold for tensile testing specimens, bending testing and impact testing using Al 7075 material, heating cylinder tube using Al 7075 material, the force given to the 200kg suppressor lever transmitted on the suppressor shaft obtained 0.29MPa. The maximum voltage at construction is 332 N/mm2 with a safety factor of 2.12 and a deflection of 13.09 mm.

Keywords: injection moulding, thermoplastics, composites.

60. Effect Of Tempering At 500 ºC Temperature With 1 Hour Holding Time On White Cast Iron Material Properties Applied To Grinding Ball On Ball Mills For Cement Production (Uum Sumirat)

This study aims to determine the characteristics of grinding balls used by cement factories in Indonesia. A grinding ball is one of the components in a ball mill machine that functions to grind mineral rock into very fine particles. The characteristics of the grinding ball can be obtained by testing the chemical composition test, hardness test, impact test, and microstructure analysis. After the heat treatment process is carried out on the material from the grinding ball, namely white cast iron material. The heat treatment process that is carried out is the quenching process and the tempering process in which the heat treatment process is carried out to improve the mechanical properties of the white cast iron material. Each cement factory requires a large number of grinding balls, so it requires a large amount of money for its production. If the grinding ball can be made in Indonesia, it is expected that the price will be much cheaper than the production from abroad which will reduce cement production costs.

Keywords: grinding ball, ball mill, white cast iron, heat treatment

61. The Learning Medium Design Of Language Intelligence For Elementary Students Based On Used Oil Bottle Upcycling (Sulistyo Setiawan)

Language is an essential factor that distinguishes humans from animals. With human language, humans are able to communicate their thoughts and feelings wellorally or in writing. The development of communicating with this language occurs both in the home environment, school, and the wider community. When these environments do not pay enough attention to developing language skills or what Gardner calls Language Intelligence, then this intelligence does not develop optimally. Based on preliminary studies in elementary school, many students whose language intelligence is not developing optimally. The lack of development of Language Intelligence is partly due to the lack of media that can develop it. Departing from this, the research using the Stanford University Design Thinking research method aims to produce learning media to develop language intelligence using used oil bottles designed with the principle of upcycling.

Keywords: language intelligence, elementary school students, used oil bottles, upcycling

62. A Utilization Of Digital Modeling Techniques To Improve Shape Quality And Ergonomics On Shoe Last (Mohamad Arif Waskito)

In footwear products such as shoes, wear comfort is an important factor that must be considered at the time of manufacture. Therefore good shoes are shoes that pay attention to the quality of the size and shape that really fits the size and shape of the user's feet. The improper shape and size of the shoes worn on the feet will have the risk of causing temporary injury, even for prolonged use, it can cause deformities to the feet. In fact, the strength of the shape and size of the shoelast used in Small and Medium Enterprises (SME) of footwear does not go through a standard verification procedure, which should be adjusted to the anatomical character of the feet and the standardized “size numbering” of the user community that is the target market. The use of technology through digital modeling as a method for determining the shape and size of a shoelast can reduce the deviation of the two production aids quality parameters in the footwear industry. Through the digital experimentation method, which is supported by anthropometric data, the anatomy of the local respondents' feet is expected to produce a standard method of designing the shoe last. The shoe last product that is produced through this digital design method is expected to be useful for small footwear entrepreneurs to get products with a better and standard level of comfort.

Keywords: Digital modeling, shoe last, SME, comfort quality

Analysis Of Electric Car Front Chassis In Crash Test Using Fea Software

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***Abstract*— One of the important components of electric cars is the chassis which is a component of the vehicle whose main function is to frame to withstand the burden of vehicles and impact loads during a collision so that it can protect passengers. The properties of the electric car chassis and body is simulated using software based on full-frontal fixed barrier method where collision or collision with wall rigid barrier or rigid wall is applied. In this model, the car is crashed to rigid wall with various speed namely 30 km/h, 45km/h, 60 km/h and 100 km/h. From model analysis and result it can be concluded that the model with the initial design in this study is still in poor condition in modeling, because it is not safe which still has a value of SF < 1 causing damage to the chassis. The resulting stress is greater because the speed given is also getting bigger. The result of deflection is greater when the load or force that occurs is also getting bigger. The FOS in the drop test is not safe to operate because it has an SF value <1, while in the static test it has an SF value> 1.**

Keywords*— *Electric Car, Simulation Chassis, Full frontal fixed barrier, Stress, Strain, Displacement, Factor of safety

1. INTRODUCTION

One of the focuses in this research is the chassis on electric car that generally have several key components, namely: chassis, frame, body, suspension, motor, and auxiliary equipment of electric motors. The chassis is the most important part of the stability of a vehicle, as all components related to the stability are attached to the chassis. Some of them are suspension, wheels, steering system, braking system, and place to put machinery [1].

Therefore, there needs to be a test of vehicles, especially electric cars. One of the tests conducted was crash test at various speed. This test serves to measure the ability of the chassis of the car so that it is safe for the passengers when something is unwanted. In its testing using one of the software is Solidworks. This paper explain cassis characteristic of crash test at various speed by modelling.

2. METHODOLOGY

To perform an analysis of the characteristics of an electric car body at crash condition, it is carried out by numerical analysis with modeling using Solidwork software. In this analysis, the car model uses the actual conditions and sizes which include dimensions, materials, shapes and loads.

A. Model

A Model is an object used in this study with simple modeling using Solidworks [2,3,4]. The model developed is based on actual condition. A jeep based electric car is used as the model. Shape, dimension and load of the car is described in Figure 1, Figure 2 and Figure 3. software. The sizes used are the results of check in the field but some parts are not suitable due to difficulty in making the model because of frequent errors in the case of meshing. So in simple modeling, some small and thin dimensional sections can affect the results to be displayed.

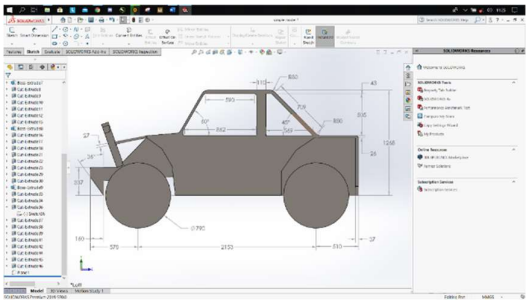

Fig 1. Side-View of Simple Model

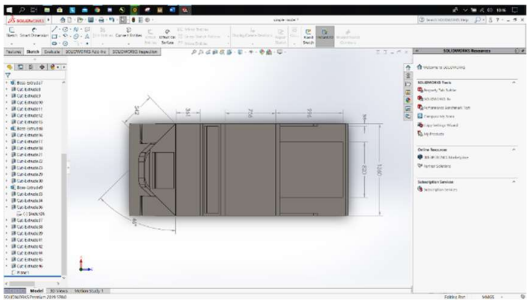

Fig 2. Up-View of Simple Model

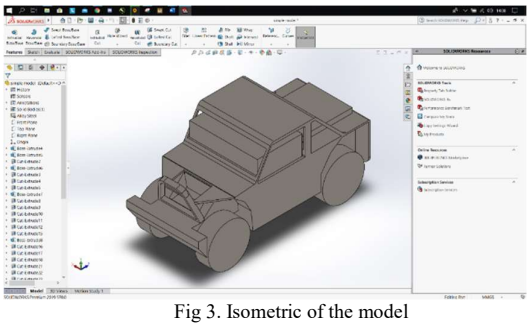

Fig 3. Isometric of the model

B. Material Properties

The electric car have been analyzed is made from alloy steel that described in Table 1 below

TABLE 1. MATERIAL PROPERTIES

Name	Alloy Steel
Model type	Linear Elastic Isotropic
Default failure criterion	Max von Mises Stress
Yield **strength**	6.20422e+008 N/m^2
Tensile strength	7.23826e+008 N/m^2
Elastic modulus	2.1e+011 N/m^2
Poisson's ratio	0.28
Mass density	7700 kg/m^3
Shear modulus	7.9e+010 N/m^2
Thermal expansion coefficient	1.3e-005 /Kelvin

C. Boundary Condition of Simulation

Boundary condition applied to this model of electric cars in general is, the first condition of the car was styled and drove in a horizontal direction, in which case the car is crashed with a rigid wall, the second condition of gravity force commonly used at 9.81 m/s, the third condition of the car is run at different speeds of 30, 45, 60, 100 $^{Km}/_{h}$. The boundary condition of the analysis is described in Figure 4, Figure 5 and Figure 6 And Figure 7.

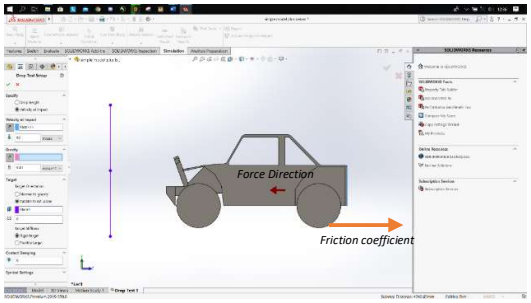

Fig 4. Speed in the horizontal direction

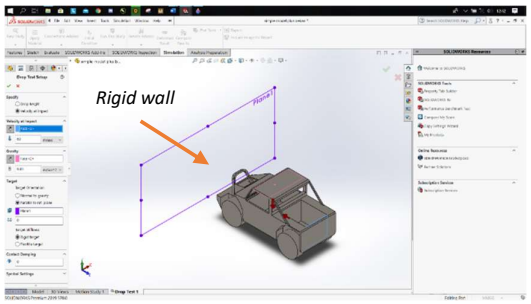

Fig 5. Rigid wall

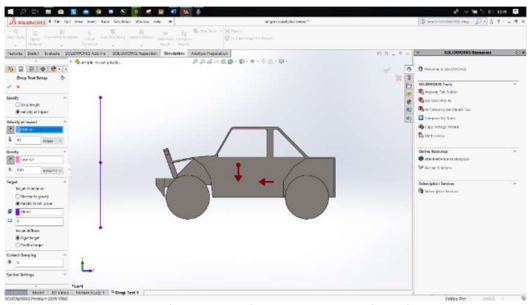

Fig 6. Gravity Force car Direction

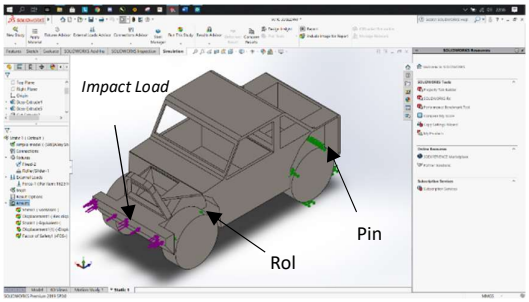

Fig 7. FOD model for static test

3. Model Calculation

Model calculation is based on Full frontal fixed barrier Method [5]. This method is a method used in one of the analyses on crashworthiness, which is a method in the analysis of collision or collision with wall rigid barrier or rigid wall. The walls used are rigid walls that cannot be deflected. The speed of permit on this method is 0-48 km/h, at the standard FMVSS 208. So that with the collision occurs maximum speed reaches a range of 53 km/h, but the speed is included in low speed [6].

In this study used this method against the collision that occurred, but the speed took a little bit with this method. The speeds taken on this method are 30, 45 km/h, and 60, 100 km/h are used as required calculation data.

4. RESULTS AND DISCUSSION

Simulation results When the car is crashed into a wall with various speeds is shown in Figure 7 to Figure 14 below. In this paper the simulation results are represented by displacement and stress figure.

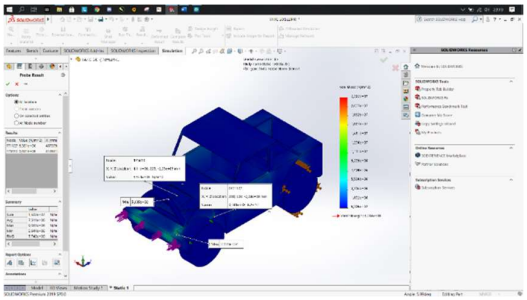

Fig 7. Stress at 30 Km/h

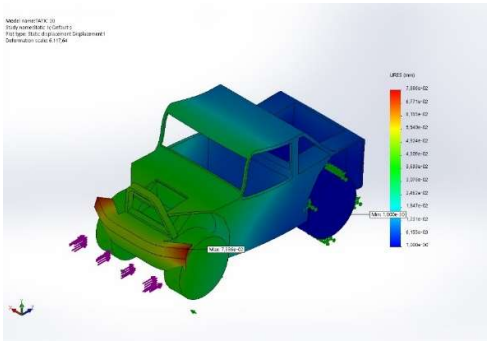

Fig 8. Displacement at 30 Km/h

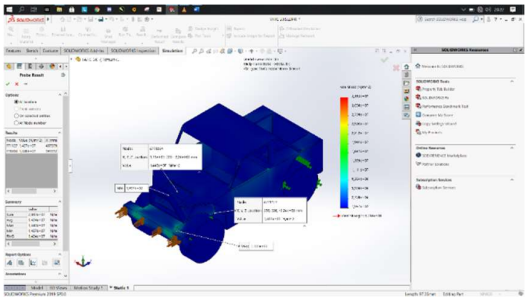

Fig 9. Stress at 45 Km/h

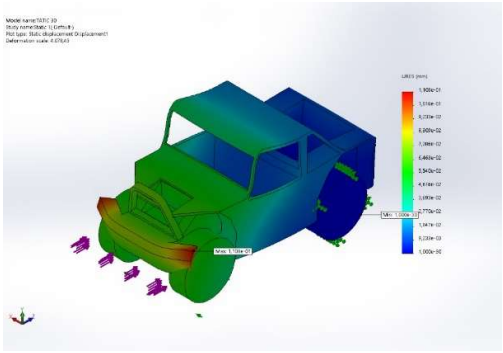

Fig 10. Displacement at 45 Km/h

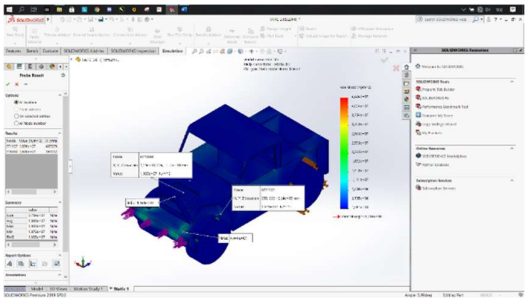

Fig 11. Stress at 60 Km/h

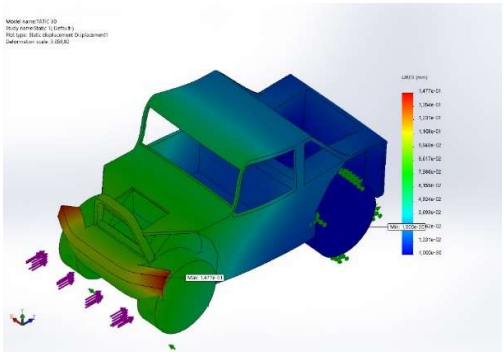

Fig 12. Displacement at 60 Km/h

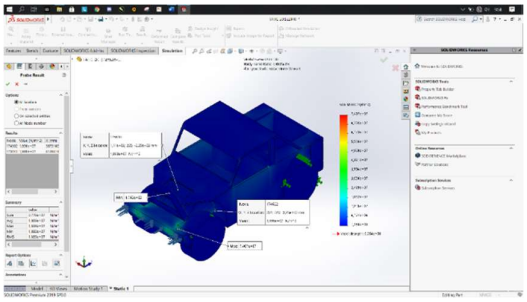

Fig 13. Stress at 100 Km/h

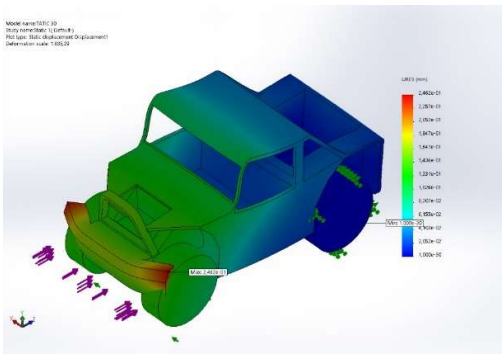

Fig14. Displacement at 100 Km/h

From the simulation results where the car was crashed into a rigid wall, it can be seen that the stress and deflection have the same pattern at various speeds. It appears that the highest stress occurs on the bumper. Meanwhile, the highest deflection also occurs in the bumper. However, what is quite interesting is that the position of the roof also occurs deflection at a speed of 30 km / h, 45 km / h, 60 km / h and 100 km / h. This is because there is a critical point that causes the roof to be very badly damaged, namely the roof supporting pillars or pillars. This should be a concern in the design of this type of electric car.

Numerically and graphically the simulation results can be seen in Table 2 and graphs in the Figure 15 and Figure 16.

TABLE 2. SIMULATED DATA ON MODELS

NO	Velocity $^{Km}/_{h}$	Stress Max Model x10^{8} ($^{N}/_{m^2}$)	Deflection Max Model (mm)	Strain Max Model x10^{-2}	SF *(Safety Factor)*
1	30	39,36	21,04	0,8504	0,1576219
2	45	61,61	31,38	1,286	0,1006979
3	60	85,24	41,65	1,716	0,0727827
4	100	146,7	68,47	2,702	0,0422904

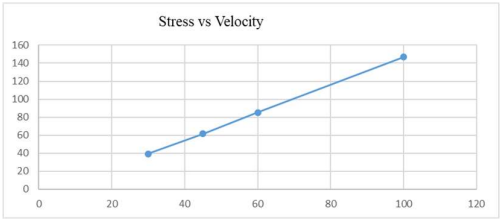

Fig 15. Stress Diagram vs Speed on model

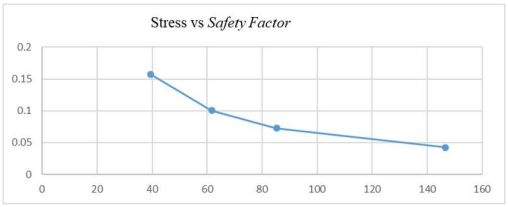

Fig 16. Stress Diagram vs. safety factor on model

In the stress diagram vs the speed that has been shown can be concluded that the stress that occurs increasingly on the model that is carried out the test, then the safety of the model used will also decrease according to the large stress that occurs at the time of the collision occurs. So it can be concluded that the stress that occurs in the body is directly proportional to the speed given.

Based on the results obtained, the stress diagram vs safety factor shows the relationship between the stress occurring against the safety factor. In the stress diagram vs. safety factor that has been described can be concluded that the stress that occurs increasingly on the model that is carried out the test, then the safety of the model used will also decrease according to the large stress that occurs at the time of collision occurs. So it can be concluded that the stress that occurs in an object is inversely proportional to the safety factor produced.

5. CONCLUSIONS

From model analysis and result it can be concluded that the model with the initial design in this study is still in poor condition in modeling, because it is not safe which still has a value of SF < 1 causing damage to the chassis. The resulting stress is greater because the speed given is also getting bigger. The result of deflection is greater when the load or force that occurs is also getting bigger.The safety factor model in the drop test simulation has a greater strain than the simulation in the static test. The FOS in the drop test is not safe to operate because it has an SF value <1, while in the static test it has an SF value> 1. This is because the modeling is not good enough that it causes a very large difference in the FOS value.

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Analysis Of Electric Car Front Chassis In Crash Test Using Fea Software

By Tarsisius K

WORD COUNT 1424
TIME SUBMITTED 19-JAN-2021 08:23AM
PAPER ID 68016225

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1. INTRODUCTION

One of the focuses in this research is the chassis on electric car that generally have several key components, namely: chassis, frame, body, suspension, motor, and auxiliary equipment of electric motors. The chassis is the most important part of the stability of a vehicle, as all components related to the stability are attached to the chassis. Some of them are suspension, wheels, steering system, braking system, and place to put machinery [1].

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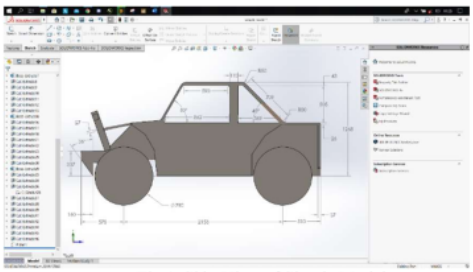

Fig 1. Side-View of Simple Model

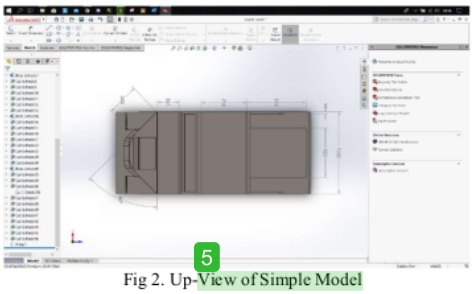

Fig 2. Up-View of Simple Model

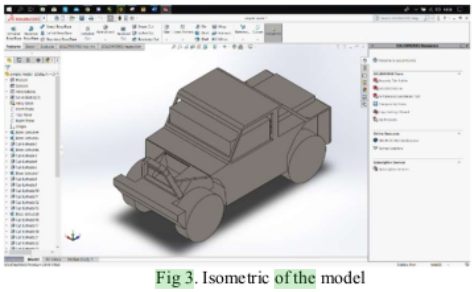

Fig 3. Isometric of the model

B. Material Properties

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Thermal expansion coefficient	1.3e-005 /Kelvin

C. Boundary Condition of Simulation

Boundary condition applied to this model of electric cars in general is, the first condition of the car was styled and drove in a horizontal direction, in which case the car is crashed with a rigid wall, the second condition of gravity force commonly used at 9.81 m/s, the third condition of the car is run at different speeds of 30, 45, 60, 100 $^{Km}/_{h}$. The boundary condition of the analysis is described in Figure 4, Figure 5 and Figure 6 And Figure 7.

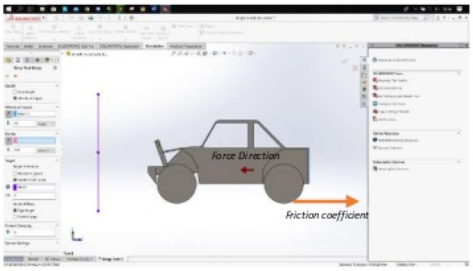

Fig 4. Speed in the horizontal direction

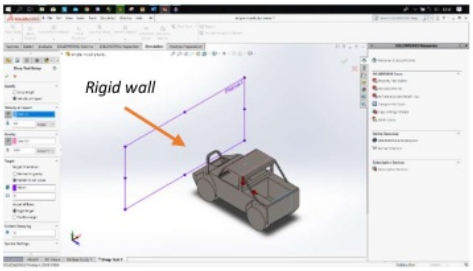

Fig 5. Rigid wall

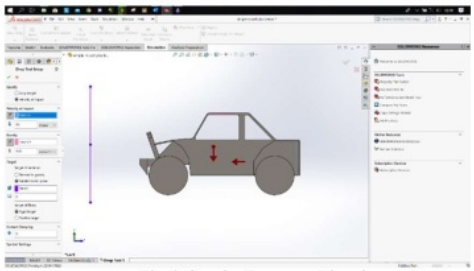

Fig 6. Gravity Force car Direction

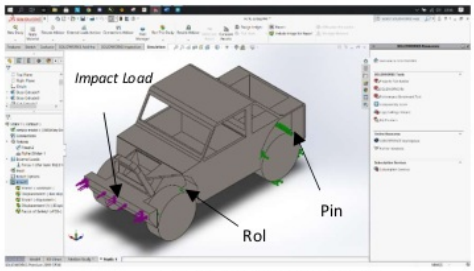

Fig 7. FOD model for static test

3. Model Calculation

Model calculation is based on Full frontal fixed barrier Method [5]. This method is a method used in one of the analyses on crashworthiness, which is a method in the analysis of collision or collision with wall rigid barrier or rigid wall. The walls used are rigid walls that cannot be deflected. The speed of permit on this method is 0-48 km/h, at the standard FMVSS 208. So that with the collision occurs maximum speed reaches a range of 53 km/h, but the speed is included in low speed [6].

In this study used this method against the collision that occurred, but the speed took a little bit with this method. The speeds taken on this method are 30, 45 km/h, and 60, 100 km/h are used as required calculation data.

4. RESULTS AND DISCUSSION

Simulation results When the car is crashed into a wall with various speeds is shown in Figure 7 to Figure 14 below. In this paper the simulation results are represented by displacement and stress figure.

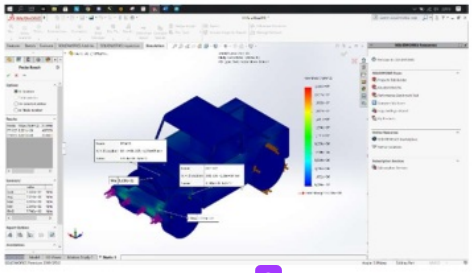

Fig 7. Stress at 30 Km/h

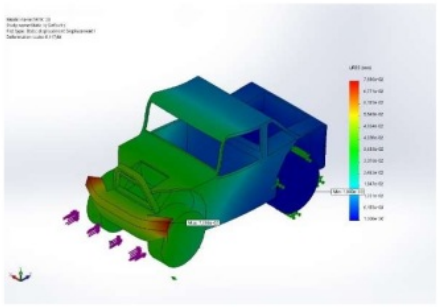

Fig 8. Displacement at 30 Km/h

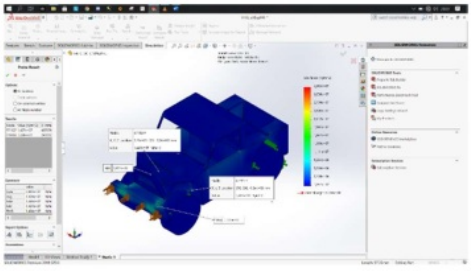

Fig 9. Stress at 45 Km/h

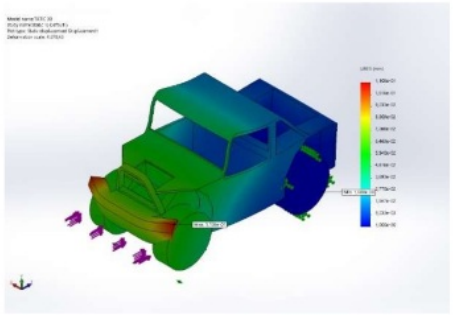

Fig 10. Displacement at 45 Km/h

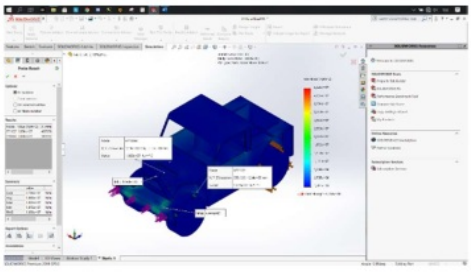

Fig 11. Stress at 60 Km/h

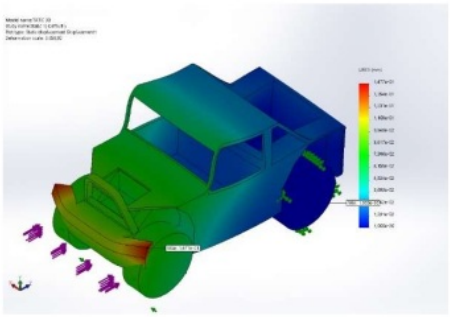

Fig 12. Displacement at 60 Km/h

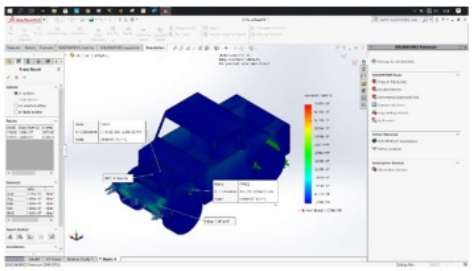

Fig 13. Stress at 100 Km/h

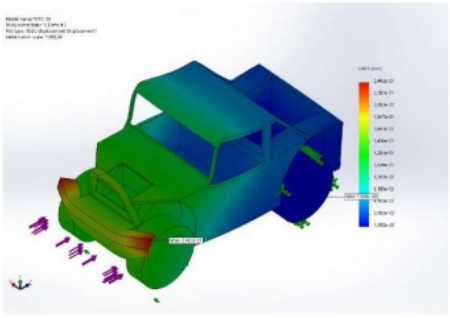

Fig14. Displacement at 100 Km/h

From the simulation results where the car was crashed into a rigid wall, it can be seen that the stress and deflection have the same pattern at various speeds. It appears that the highest stress occurs on the bumper. Meanwhile, the highest deflection also occurs in the bumper. However, what is quite interesting is that the position of the roof also occurs deflection at a speed of 30 km / h, 45 km / h, 60 km / h and 100 km / h. This is because there is a critical point that causes the roof to be very badly damaged, namely the roof supporting pillars or pillars. This should be a concern in the design of this type of electric car.

Numerically and graphically the simulation results can be seen in Table 2 and graphs in the Figure 15 and Figure 16.

TABLE 2. SIMULATED DATA ON MODELS

NO	Velocity $Km/_h$	Stress Max Model x10^8 ($N/_{m^2}$)	Deflection Max Model (mm)	Strain Max Model x10^{-2}	SF *(Safety Factor)*
1	30	39,36	21,04	0,8504	0,1576219
2	45	61,61	31,38	1,286	0,1006979
3	60	85,24	41,65	1,716	0,0727827
4	100	146,7	68,47	2,702	0,0422904

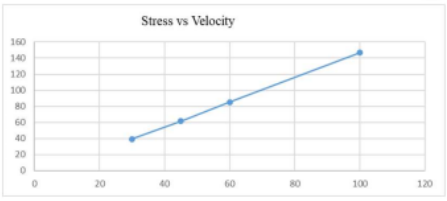

Fig 15. Stress Diagram vs Speed on model

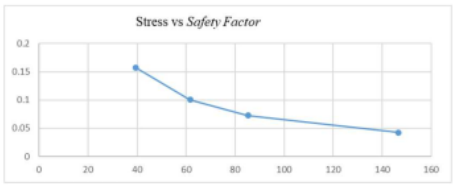

Fig 16. Stress Diagram vs. safety factor on model

In the stress diagram vs the speed that has been shown can be concluded that the stress that occurs increasingly on the model that is carried out the test, then the safety of the model used will also decrease according to the large stress that occurs at the time of the collision occurs. So it can be concluded that the stress that occurs in the body is directly proportional to the speed given.

Based on the results obtained, the stress diagram vs safety factor shows the relationship between the stress occurring against the safety factor. In the stress diagram vs. safety factor that has been described can be concluded that the stress that occurs increasingly on the model that is carried out the test, then the safety of the model used will also decrease according to the large stress that occurs at the time of collision occurs. So it can be concluded that the stress that occurs in an object is inversely proportional to the safety factor produced.

5. CONCLUSIONS

From model analysis and result it can be concluded that the model with the initial design in this study is still in poor condition in modeling, because it is not safe which still has a value of SF < 1 causing damage to the chassis. The resulting stress is greater because the speed given is also getting bigger. The result of deflection is greater when the load or force that occurs is also getting bigger.The safety factor model in the drop test simulation has a greater strain than the simulation in the static test. The FOS in the drop test is not safe to operate because it has an SF value <1, while in the static test it has an SF value> 1. This is because the modeling is not good enough that it causes a very large difference in the FOS value.

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