

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

NAE 2017 CONFERENCE BOOKLET

The 10th International Conference on Numerical Analysis in Engineering Hermes Hotel Banda Aceh, Indonesia August 24th -25th, 2017



Toyohashi University of Technology (TUT), Japan



Faculty of Engineering USU, Indonesia



JSME and JSME – ICIS (International Chapter for Indonesia Section)



Inter University Research Center Eng. Sciences (IURC-ES) Bandung Institute of Technology (ITB)



Universiti Kebangsaan Malaysia (UKM)



BKS-PTN BARAT

Badan Kerjasama Perguruan Tinggi Negeri Wilayah Barat





August 24th -25th, 2017 Banda Aceh, Nanggroe Aceh Darussalam – INDONESIA

The 10th International Conference on Numerical Analysis in Engineering Hermes Hotel Banda Aceh, Indonesia August 24th -25th, 2017

> ORGANIZED BY: Fakulty of Engineering University of Sumatera Utara (FT USU)

IN COOPERATION WITH:

Toyohasi University of Technology (TUT)

 University kebangsaan Malaysia

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INTERNATIONAL CHAIRMAN'S MESSAGES

NAE motto: *to meet old friends and make new friend*. Assalamualaikum warahmatullahi wabarakatuh Ladies and gentleman, Distinguished guests and participants, Good mornings!

On behalf of the organizing committee, welcome to Banda Aceh and to the 10th International Conference on NAE 2017.

First of all, we would like to take this oppurtunity to promote the NAE site to all participants. As you are aware that NAE conference site moves from one place to another in the Indonesia archipelago: Medan (2000, 2001), Batam (2003), Yogyakarta (2005), Padang (2007), Lombok Island – Mataram city (2009), Manado City - North Sulawesi (2011), Pekanbaru – Riau (2013), Batam (2015), and now in Banda Aceh.

Gentlemen!

Today, we are gathering here in Banda Aceh, to follow our NAE tradition that we have nested since year 2000 in Medan noting as the first international event of our activities. We have committed to continue this tradition every two years. We believe that after two years of hardwork on research we may share and dessiminate research results in such a friendship weather of NAE event.

Thus, on behalf of the organizing committees, we would like to express a warm welcome to all delegates and participants to the 10th International Conference on Numerical Analysis in Engineering (NAE 2017). It is a great honor for the Department of Mechanical Engineering, University of Sumatera Utara (FT USU) to host the conference here in Banda Aceh.

I believe that this conference is an important forum for the exchange of information and research result among us, who come from different countries, different educational and research institutes, and different research interest. But we are one in the same room today for all of us have a same tool to achieve our goals, i.e. numerical methods. Thus, I hope that the conctacts established during the conference may bind us in one vision. A vision of achieving better tomorrow together. Wish that we may strengthen close relationship among NAE members, develop more joint research project, and very importantly we have a strong commitment to support the NAE events forever.

In closing, I would like to thank the Rectors of University of Sumatera Utara (USU), Unsyiah, Toyohashi University of Technology (TUT) Japan, and Universiti Kebangsaan



Malaysia (UKM), Bangi, Kuala Lumpur-Malaysia, IKATM, and the management of Hermes Hotel Banda Aceh for supporting this conference. I would also like to thank all International advisory board for their contributions in reviewing the abstracts and manuscript. Last but not least, special thanks goes to all NAE OC members for their hard work and patience.

Wassalamualaikum warahmatullahi wabarakatuh

Thank you!

NAE Internasional Chairman



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1. CONFERENCE ORGANIZATION

1022017 Honorary Board

- 1. Prof. H. Mohammad Nasir, Ph.D, Ak. Ministry of Research Technology and Higher Education Republic of Indonesia
- 2. Dr. Muhammad Dimyati Directorate General empowerment on research and development of ministry od research, Technology, and higher education republicof indonesia
- 3. Prof. Dr. Runtung, SH, M.Hum. Rector, University of Sumatera Utara
- 4. Prof. Dr. Eng. Samsul Rizal Rector, UNSYIAH
- 5. Prof. Emeritus Dr. Satryo soemantri brodjonegoro Institute of technology bandung, Indonesia
- 6. Prof. Emeritus Masanori Kikuchi Tokyo university of science

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- 1. Prof. Hiroomi Homma Toyohashi University of Technology, Toyohashi, Japan
- 2. Prof. Emeritus Masanori Kikuchi Tokyo University of Science
- 3. Prof. Masashi Daimaruya Muroran Institute of Technology, Hokkaido, Japan
- 4. Prof. Kikuo Kishimoto Tokyo Institute of Technology, Tokyo, Japan
- 5. Prof. Yasuhiro Kanto Ibaraki University, Japan

1002017 Scientific Committee

- 1. Prof. Michihisa Koyama
- Kyushu University 2. Prof. Emeritus Masanori Kikuchi
 - Tokyo University of Science
- 3. Prof. Hideki Kawai Muroran Institute of Technology, Hokkaido, Japan
- 4. Prof. Dr. Ir. Bustami Syam
- University of Sumatera Utara
- Prof. Ahmad Kamal Arifin Universiti Kebangsaan Malaysia
- 6. Prof. Yasunori Kikuchi
 - The university of tokyo



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- 7. Prof. Dr. T.M. Indra Mahlia Universiti Tenaga Nasional Malaysia
- 8. Assoc. Prof. Ing. Petr Valsek, Ph.D Czech University of Life Sciences Prague
- 9. Assoc. Prof. Dr. Gorkan A. K. GURDIL Ondokuz mayis University, Turkey
- 10. Hasan Oscan, Ph.D. Karabuk University, Turkey
- 11. Dr. Edward halawa

Charles Darwin University, Australia

International Chair

- 1. Prof. Bustami Syam
- 2. Prof. Masanori Kikuchi
- 3. Prof Ahmad Kamal Ariffin

2. CONFERENCE SCOPES

The conference covers, but not limited to, the following topics:

- Fracture Behaviors
- FEM in Forming Process
- Computational Mechanics
- Static and Dynamic Problems
- Noise and Vibration Control in Engineering
- The Atomic/Molecular Dynamics
- Analysis of Machine Element Design
- Computational Method in Chemical Engineering
- FEM Application in Geotechnical and Structural Engineering
- Numerical and Experimental Fracture Mechanics
- Numerical Analysis Tools for Web-Based Applications
- Computational Methods in Thermo and Fluid Mechanics
- Artificial Intelligence Application in Engineering, such as Expert System, Pattern Recognition, Neural Network Genetic Algorithm, etc.
- Metal and Polymeric Foams
- Experimental Solid and Fluid Mechanics



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3. NAE MILESTONE

- NAE 2000 : Medan, North Sumatra
- NAE 2001 : Batam Island
- NAE 2003 : Batam Island
- NAE 2005 : Padang, West Sumatra
- NAE 2007 : Yogyakarta
- NAE 2009 : Lombok Island
- NAE 2011 : Manado, North Sulawesi
- NAE 2013 : Pekanbaru, Riau
- NAE 2015 : Batam
 - : Banda Aceh, Nangroe Aceh Darussalam

4. INSTRUCTIONS FOR CHAIRPERSONS AND SPEAKERS

- All chairpersons and speakers are requested to meet in their respective session room at least 10 minutes prior to the commencement of each session.
- A total of 50 minutes is given for keynote speakers: 30 minutes for presentation and 20 minutes for discussions.
- Please keep your presentation within the time limits stated.
- Speakers, who are not using their own notebook computer, are advised to submit their presentation materials stored either in USB Flash Disk to the Secretariat Room at least 30 minutes before presentation.



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5. PROGRAM HIGHLIGHT

Table 5.1 shows you the NAE 2017 activities and the Opening Ceremony schedule is described in Table 5.2

Wednesday, 23 August 2017			
TIME	ACTIVITIES		
10:00 - 17:00	Pre-Registration		
Day – 1: Thurse	day, 24 August 2017		
TIME	ACTIVITIES		
8:00 - 9:00 AM	Registration		
9:00 - 10:00 AM	Opening Ceremony		
10:00 - 10:50 AM	Keynote Speeches #1		
10:50 - 11:40 AM	Coffee/Tea Break		
11:40 - 12:30 AM	Keynote Speeches #2		
12:30 - 1:30 PM	Lunch Break + ISOMA		
1:30 - 3:30 PM	Technical session		
3:30 - 4:50 PM	Coffee/Tea Break		
4.01 – 4.30 PM	ISOMA		
4:30 - 5:40 PM	Technical session		
5:40 – 6:00 PM	Closing Ceremony + Group Photo		
7:00 - 9:00 PM	Wellcome Party/Dinner		
Day – 2: Saturd	lay, 25 August 2015		
TIME	ACTIVITIES		
10:00 AM - 7:00 PM	Cultural tour to Sabang Island (arranged upon request)		

6. KEYNOTE SPEECHES

In the 10th International Conference on NAE2017, we hold keynote speeches after opening ceremony and in Technical Session. It is accommodated at ACEH II room, *Hermes Hotel*. The keynote speakers and moderator for keynote speeches are:

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Key note Speaker #1	:	Prof. Akiyuki Takahasi Fatigue crack growth simulation with plasticity induced crack closure effect using s-version finite element method Tokyo University of science, Japan
Key note Speaker #2	:	Prof. Dr. Ahmad Kamal Ariffin Universiti Kebangsaan Malaysia (UKM), Malaysia
Moderator	:	Committee

Title of Paper and Its Abstract in Keynote Speech Session

 \Box The 1st Keynote Speech

Fatigue crack growth simulation with plasticity induced crack closure effect using s-version finite element method

Akiyuki Takahashi, Yuto Shinozaki, Yuichi Shintaku, Masanori Kikuchi Mail

This paper presents fatigue crack growth simulation of plasticity induced crack closure effect using s-version finite element method. The crack closure effect is implemented into the fatigue crack growth simulation system by using a crack closure level. To calculate the crack closure level, elastic-plastic finite element simulation of crack is conducted. For reducing the computational cost and time for the elastic-plastic simulation, the simulation is done only with the local mesh, which is used for the s-version finite element simulation of fatigue crack growth. For examining the numerical accuracy of the elastic-plastic simulation of crack, the same simulation is done with the entire mesh and only with the local mesh. The results illustrate that the crack closure levels calculated with different meshes are almost identical, meaning that the elastic-plastic simulation only with the local mesh can provide us with a numerical result of crack closure level with acceptable numerical accuracy. In addition, the computational time is compared, and is found to be drastically reduced by using only the local mesh. Furthermore, the finite element division in the immediate vicinity of crack tip is changed for making a convergence test of the numerical accuracy. The calculated crack closure level can be converged only with a small number of divisions around the crack tip. Finally, the fatigue crack closure system is applied to a simple cyclic tension problem. The numerical results clearly show that the crack closure effect controls and slows down the fatigue crack growth rate.

7. COLLECTION OF ABSTRACTS

The collection of abstract is arranged in the accordance with the schedule of detailed technical sessions, we are appologize to the chairperson is not include in collection of abstract. It's cause we cannot found your abstract in email. Once again we say sorry for our mistake



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ROOM ACEH II: SESSION I – SESSION II

No	TIME (WIB)	AUTHORS	CODE	TITLE	
1	13.30- 13.40	Irwansyah Idram; Nguyen Phu Sinh; et.al	IRW	INTEGRATION OF COMPUTER-ASSISTED FRACTURE REDUCTION SYSTEM AND 3-DOF-RPS- MECHANISM FOR ASSISTING THE ORTHOPAEDIC SURGERY	
2	13.40- 13.50	Aldi Wira Syahputra, Taufiq Bin Nur	TBN	INTEGRATED BIOMASS PYROLYSIS WITH ORGANIC RANKINE CYCLE FOR POWER GENERATION	
3	13.50- 14.00	Ikhsan Siregar	IKS	METHOD OF CALCULATION OVERALL EQUIPMENT EFFECTIVENESS IN FERTILIZER FACTORY	
4	14.00- 14.10	Ika Puji Hastuty	IKA	SOIL REINFORCEMENT WITH GEOTEXTILE AT EMBANKMENT WITH FINITE ELEMENT METHODE	
5	14.10- 14.20	Syamsul Hadi	SYA	THE SIMULATION OF HORIZONTAL AXIS WATER TURBINE USING FLOW SIMULATION SOLIDWORKS APPLICATION	
6	14.20- 14.30	Riza Inanda Siregar	RIZ	NUMERICAL ANALYSIS OF FLOOD MODELING OF UPPER CITARUM RIVER UNDER EXTREME FLOOD CONDITION	
7	14.30- 14.40	M.F. Othman; R. Kurniawan; et.al	ОТН	A CABLE-DRIVEN PARALLEL ROBOTS APPLICATION: MODELING AND SIMULATION OF A DYNAMIC CABLE MODEL IN DYMOLA	
8	14.40- 14.50	Ismail; E. Ward Plummer	ISM	SURFACE STRUCTURAL ANALYSIS OF THE LAYERED PEROVSKITE CAL.9SR0.1RUO4 BY LOW ENERGY ELECTRON DIFFRACTION I-V	
9	14.50- 15.00	Salmawaty Arif	SAL	ACCURACY AND STABILITY ANALYSIS OF THE MODIFIED LAX NUMERICAL METHOD IN SOLVIN THE SEA WAVES REFRACTION EQUATION	
10	15.00- 15.10	Himsar Ambarita	HIM	NUMERICAL SOLUTION TO SIMULTANEOUS HEAT AND MASS TRANSFER OF SURFACE AREA OF DRYING FOOD	
11	15.10- 15.20	Andianto Pintoro	AND	APPLICATION OF LOW TEMPERATURE ORGANIC RANKINE CYCLE FOR GEOTHERMAL	
12	15.20- 15.30	Bustami Syam; Maraghi Muttaqin; et. al	MAR	STRUCTURAL INTEGRITY OF POWER GENERATION SPEED BUMPS MADE OF CONCRETE FOAM COMPOSITE	
13	15.30- 15.40	M. Sabri; M. Nuh; et.al	NUH	GRIP ANALYSIS OF ROAD SURFACE AND TIRE FOOTPRINT USING FEM	
14	15.40- 15.50	Yasuhiro Kanto	YAS	OPTION DESIGN PATTERN FOR CAE SOFTWARE DEVELOPMENT AND ITS APPLICATION TO	



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No	TIME (WIB)	AUTHORS	CODE	TITLE	
				PROBABILISTIC FRACTURE MECHANICS	
15	15.50- 16.00	Andrey Stephan Siahaan; Himsar Ambarita	HIM	TRANSIENT THERMAL STRESSES ANALYSIS AND THERMAL FATIGUE DAMAGE EVALUATION FOR SKIRT ATTACHMENT OF COKE DRUM	
16	16.20- 16.30	Mohammad Fadly Syahputra; Annas Maiyasya; et.al	MFS	FLOW SHOP SCHEDULING IN CAR PAINTING SCHEDULE PROBLEMS BY USING HARMONY SEARCH ALGORITHM	
17	16.30- 16.40	Amalia; Dani Gunawan, RF Rahmat, MA Muchtar, I Siregar	GUN	IDENTIFYING STRENGTHS AND WEAKNESSES OF UNIT MANAJEMEN MUTU UNIVERSITAS SUMATAERA UTARA (UMM-USU) SOFTWARE USING SCAMPI C	
18	16.40- 16.50	Romi Fadillah Rahmat	ROM	BOYER-MOORE ALGORITHM IN RETRIEVING DELETED SHORT MESSAGE SERVICE IN ANDROID PLATFORM	
19	16.50- 17.00	Mohammad Fadly Syahputra; Ridha Apriani	MFS	GENETIC ALGORITHM TO SOLVE ACADEMIC SCHEDULING PROBLEM	
20	17.00- 17.10	A Amalia, D Gunawan, SM Hardi, D Rachmawati, I Isranuri	AMA	SOFTWARE REQUIREMENTS ELICITATION TO SUPPORT INTERNAL MONITORING OF QUALITY ASSURANCE SYSTEM FOR HIGHER EDUCATION IN INDONESIA	
21	17.10- 17.20	Romi Fadillah Rahmat	ROM	ADAPTIVE NEURO FUZZY INFERENCE SYSTEM FOR FORECASTING RUBBER MILK PRODUCTION	
22	17.20- 17.30	Tigor Hamonangan Nasution; Esra Christian Siagian, et al	TIG	DESIGN OF MONITORING SYSTEM OF RIVER HEIGHT AND SPEED USING ARDUINO	
23	17.30- 17.40	Ikhsan Siregar; Abdillah Arif Nasution, et al	IKS	DESIGN OF PRODUCTION PROCESS MAIN SHAFT PROCESS WITH LEAN MANUFACTURING TO IMPROVE PRODUCTIVITY	
24	17.40- 17.50	Romi Fadillah R Rahmat	ROM	NORMAL AND ABNORMAL RED BLOOD CELL CLASSIFICATION USING SELF ORGANIZING MAPS	
25	17.50- 18.00	Arnawan Hasibuan; Syafruddin M	ARN	EFFECT OF DISTRIBUTED GENERATION INSTALLATION ON POWER LOSS USING GENETIC ALGORITHM METHOD	



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No	TIME (WIB)	AUTHORS	CODE	TITLE
26	18.00- 18.10	D Rachmawati; M A Budiman; L Aulya	RAC	THREE-PASS PROTOCOL SCHEME FOR BITMAP IMAGE SECURITY BY USING VERNAM CIPHER ALGORITHM
27	18.10- 18.20	Muhammad Ikhwan Fahmi; Usman Baafai; et.al	MIF	HARMONIC REDUCTION USING SINGLE TUNE PASSIVE FILTER2
28	18.20- 18.30	Emerson P. Sinulingga; Peter B. K. Kyabaggu	EPS	ELECTROMAGNETIC MODELLING OF MMIC CPWs FOR HIGH FREQUENCY APPLICATIONS



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ROOM MEDINA II: SESSION I – SESSION II

No	TIME (WIB)	AUTHORS	CODE	TITLE	
29	13.30- 13.40	Fathoni Usman; Nurul Amirah Mohammed Noor; et.al	FAT	EFFECT OF BOLTS ARRENGEMENT AND THIKNESS OF GUSSES PLATE ON ROTATION CAPACITY OF BEAM TO COLUMN CONNECTION OF COLD-FORMED STELL SECTION	
30	13.40- 13.50	Hamdani Umar; Samsul Rizal; et.al	HAM	NUMERICAL SIMULATION ANALYSIS ON THE THERMAL PERFORMANCE OF A BUILDING WALLS INCORPORATING PHASE CHANGE MATERIAL (PCM) FOR THERMAL MANAGEMENT	
31	13.50- 14.00	Faisal Faisal; Adi Setiawan; et.al	FAI	EFFECTIVE HEIGHT OF CHIMNEY FOR BIOMASS COOK STOVE SIMULATED BY COMPUTATIONAL FLUID DYNAMICS	
32	14.00- 14.10	Razali Thaib; Samsul Rizal; et.al	RAZ	BEESWAX AS PHASE CHANGE MATERIAL TO IMPROVE SOLAR PANEL'S PERFORMANCE	
33	14.10- 14.20	Muhammad Idris; Uun Novalia Harahap; et.al	MUI	EXPERIMENTAL STUDY TO PRODUCE BIOETANOL AS BIOFUEL FROM THE MIXTURE SALACCA ZALACCA WASTE AND COCONUT WASTE	
34	14.20- 14.30	Damora Rhakasywi; ismail; et.al	DAM	ANALYSIS OF SUBSONICS WIND TUNNEL WITH VARIATION SHAPE RECTANGULAR AND OCTAGONAL ON TEST SECTION	
35	14.30- 14.40	Himsar Ambarita	HIM	NUMERICAL STUDY ON THE EFFECT OF CONFIGURATION OF A SIMPLE BOX SOLAR COOKER FOR BOILING WATER	
36	14.40- 14.50	Ade Nadjuri	ADE	THE 5,000 MT CAPACITY API 650 TANK DESIGN OPTIMIZATION ON 600,000 MTPY CPO PLANT	
37	14.50- 15.00	Nguyen-Phu Sinh; Irwansyah Idram; et.al	IRW	DESIGN OF A NOVEL HYBRID 3-DOF-RPS EXTERNAL FIXATOR MECHANISM FOR ROBOTIC FRACTURED BONE REDUCTION	
38	15.00- 15.10	Samsul Rizal; Razali Thaib; et.al	SAM	EVALUATION OF ROOFTOP PHOTOVOLTAIC ELECTRICITY GENERATION SYSTEMS AT SYIAH KUALA UNIVERSITY	
39	15.10- 15.20	Muhammad Rizal; husni; et.al	MUR	DESIGN AND CHARACTERIZATION OF A LOAD CELL FOR NORMAL AND FRICTIONAL FORCES MEASUREMENT	
40	15.20- 15.30	Taufiq Bin Nur; Kyvlan Bimo Putra, et.al	TBN	THERMODYNAMIC ANALYSIS OF THE INTEGRATED BIOMASS PYROLYSIS WITH POLIMER ELECTROLYTE MEMBRANE FUEL CELL	
41	15.30- 15.40	Bustami Syam, Alexander Sebayang, Maraghi et al.	ALX	THE STATIC RESPONSE OF DRAINAGE PARKING COVER MADE OF POLYMERIC FOAM COMPOSITE	



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No	TIME (WIB)	AUTHORS	CODE	TITLE	
42	15.40- 15.50	Abu Bakar Dabet; Hiroomi Homma	ABU	POTENTIALITY OF ABACA FIBER REINFORCED PLASTIC (AFRP) AS ENGINEERING MATERIALS	
43	16.20- 16.30	Ikhwansyah Isranuri; Mulia; et.al	MUL	STUDY ON COMPOSITE MATERIAL USING ROYSTONEA REGIA FIBER AS HOOD MATERIAL FOR REDUCING AUTOMOTIVE NOISE	
44	16.30- 16.40	Ikhwansyah Isranuri; Alfisyahrin;et.al	ALF	DEVELOPING ACTIVE NOISE CONTROL FOR MOTORCYCLE'S NOISE SILENCER USING Y-SHAPED PVC PIPE TECHNIQUE	
45	16.40- 16.50	Syamsul Bahri Widodo; Hamdani Umar; et.al	SYA	TECHNO-ECONOMIC ANALYSIS OF SOLAR PHOTOVOLTAIC POER PLAN FOR SMALL SCALE FISH PROCESSING IN KOTA LANGSA - A CASE STUDY	
46	16.40- 17.00	Himsar Ambarita; Pramio G. Sembiring; et.al	HIM	A NUMERICAL SIMULATION OF A FLAT-PLATE SOLAR COLLERCTOR OF SOLAR WATER HEATER	
47	17.00- 17.10	Rahmi Karolina; Wafi Muhammad; et.al	WAF	THE EFFECTIVENESS OF STONE ASH AND VOLCANIC ASH OF MOUNT SINABUNG AS A FILLER ON THE INITIAL STRENGTH OF SELF COMPACTING CONCRETE	
48	17.10- 17.20	A. Perwira Mulia Tarigan	APM	MUD PROFILE ANALYSIS OF A MUDDY EASTERN COAST OF NORTH SUMATERA	
49	17.20- 17.30	Sabri; Zahrul Fuadi; et.al	BRI	INVESTIGATION ON THE ACOUSTIC PERFORMANCE OF NATURAL FIBERS FOR SOUND ABSORPTION APPLICATION	
50	17.30- 17.40	Maulida maulida	MAU	UTILIZATION OF MANGO SEED STARCH IN MANUFACTURE OF BIOPLASTIC REINFORCED WITH CLAY USING GLYCEROL AS PLASTICIZER	
51	17.40- 17.50	Bode Haryanto; Chang Chien Hsiang; et.al	BOD	INTERACTION MODELS ON SAND SURFACE OF NATURAL ADSORBENT WITH ADSORBATE CD+2 METAL IONS IN SOLUTION WITH BATCH OPERATION	
52	17.50- 18.00	A. Perwira Mulia Tarigan; Dio Mega Putri	APM	NORMAL VERSUS EXTREME WAVE STATISTICS OF BELAWAN SEA PORT	
53	18.00- 18.10	M.K.M. Nasution; H. Ambarita	нім	RELIABILTY ENUMERATION MODEL FOR THE GEAR IN A MULTI-FUNCTIONAL MACHINE	
54	18.10- 18.20	Ikhsan Siregar; Abdillah Arif Nasution; et.al	IKS	ANALYSIS OF BULLWHIP EFFECT ON SUPPLY CHAIN WITH Q MODEL USING HADLEY-WITHIN APPROACH	
55	18.20- 18.30	lka Puji Hastuty	IKA	SETTLEMENT OF SOIL DUE EMBANKMENT WITH FINITE ELEMENT METHODE	
56	18.30-	T H Nasution	TIG	DESIGN OF RIVER HEIGHT AND SPEED MONITORING	



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18.40	E C Siagian	SYSTEM BY USING ARDUINO
	K Taanjung	
	Soeharwinto	

PARALLEL SESSION SCHEDULE

VENUE	ROOM: ACEH II	ROOM: MEDINA II
TIME (WIB)	Session I	Session I
13.30-13.40	IRW	FAT
13.40-13.50	TBN	HAM
13.50-14.00	IKS	FAI
14.00-14.10	IKA	RAZ
14.10-14.20	SYA	MUI
14.20-14.30	RIZ	DAM
14.30-14.40	OTH	HIM
14.40-14.50	ISM	ADE
14.50-15.00	SAL	IRW
15.00-15.10	HIM	SAM
15.10-15.20	AND	MUR
15.20-15.30	MAR	TBN
15.30-15.40	NUH	ALX
15.40-15.50	YAS	ABU
15.50-16.00	HIM	

VENUE	ROOM: ACEH II	ROOM: MEDINA II
TIME (WIB)	Session II	Session II
16.20-16.30	MFS	MUL
16.30-16.40	GUN	ALF
16.40-16.50	ROM	SYA
16.50-17.00	MFS	HIM
17.00-17.10	AMA	WAF
17.10-17.20	ROM	APM
17.20-17.30	TIG	BRI
17.30-17.40	IKS	MAU
17.40-17.50	ROM	BOD
17.50-18.00	ARN	APM
18.00-18.10	RAC	HIM
18.10-18.20	MIF	IKS
18.20-18.30	EPS	IKA
18.30-18.40		TIG



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Presentation Code: IRW

Integration of computer-assisted fracture reduction system and 3-DOF-RPS mechanism for assisting the orthopaedic surgery

Irwansyah^{1,2}, N.P Sinh1, Jiing-Yih Lai¹, Terence Essomba¹, R Asbar², Pei-Yuan Lee³

¹Department of Mechanical Engineering, National Central University, Taoyuan, Taiwan ²Department of Mechanical Engineering, Syiah Kuala University, Banda Aceh, Indonesia

³Orthopedic Department, Show Chwan Memorial Hospital, Changhua, Taiwan

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Abstract. In this paper we present study of integrating the virtual fracture bone reduction simulation with a novel hybrid 3-DOF-RPS external fixator mechanism to move the fragments into its initial anatomy position and orientation. A 3D model of fractured bone reconstructed and manipulated using 3D design and modelling software, PhysiGuide. The virtual reduction system applied for repositioning a bilateral femoral shaft fracture type 32-A3. Measurement data from fracture reduction and fixation stages was used as basic input to manipulate the manipulator pose in patient's clinical case. The experimental result presents that merging both techniques will give more possibilities for clinician to increase the correctness alignment of fractured bone reduction.



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Presentation Code: TBN

Integrated Biomass Pyrolysis with Organic Rankine Cycle for Power Generation

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Abstract. The growing interest on Organic Rankine Cycle (ORC) application to produce electricity by utilizing biomass energy sources are increasingly due to its successfully used to generate power from waste heat available in industrial processes. Biomass pyrolysis is one of the thermochemical technologies for converting biomass into energy and chemical products consisting of liquid biooil, solid biochar, and pyrolytic gas. In the application, biomass pyrolysis can be divided into three main categories; slow, fast and flash pyrolysis mainly aiming at maximizing the products of bio-oil or biochar. The temperature of synthesis gas generated during processes can be used for Organic Rankine Cycle to generate power. The heat from synthesis gas during pyrolysis processes was transfer by thermal oil heater to evaporate ORC working fluid in the evaporator unit. In this study, the potential of the palm oil empty fruit bunch, palm oil shell, and tree bark have been used as fuel from biomass to generate electricity by integrated with ORC. The Syltherm-XLT thermal oil was used as the heat carrier from combustion burner, while R245fa was used as the working fluid for ORC system. Through Aspen Plus, this study analyses the influences on performance of main thermodynamic parameters, showing the possibilities of reaching an optimum performance for different working conditions that are characteristics of different design parameters.

Keywords: Biomass, pyrolysis, organic Rankine cycle, R245fa, thermal oil.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: IKS

Method Of Calculation Overall Equipment Effectiveness In Fertilizer Factory

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Abstract. This research was conducted at a fertilizer company in Sumatra, where companies that produce fertilizers in large quantities to meet the needs of consumers. This company cannot be separated from issues related to the performance/effectiveness of the machinery and equipment. It can be seen from the engine that runs every day without a break resulted in not all of the quality of products in accordance with the quality standards set by the company. Therefore, to measure and improve the performance of the machine in the unit Plant Urea-1 as a whole then used method of Overall Equipment Effectiveness (OEE), which is one important element in the Total Productive Maintenance (TPM) to measure the effectiveness of the machine so that it can take measures to maintain that level. In July, August and September OEE values above the standard set at 85%. Meanwhile, in October, November and December have not reached the standard OEE values. The low value of OEE due to lack of time availability of machines for the production shut down due to the occurrence of the engine long enough so that the availability of reduced production time.



Presentation Code: IKA

Soil Reinforcement With Geotextile At Embankment With Finite Element Methode

Ika Puji Hastuty

Abstract. At one stage one of the construction work on the main problems is the soft ground subsidence is very large. Large decline was caused by the decrease in land consolidation. Consolidation is the process of release of water from the soil through pore cavity. Conditions ugly subgrade soil in the form of slabs, is necessary to the improvement of the subgrade to be able to support the load of construction. One method that is used as a soil improvement is with geotextile. Geotextile type used on the job-toll road construction project STA 35 + 901 Medan Kuala-Namu is the PP woven geotextile geotextile polypropleen. This study aims to determine the greater the reduction, horizontal deformation, geotextile tensile strength by using the finite element method which affects the length of time to achieve consolidation tanak decrease of 90%, or in other words does not decline further or considered zero. The results obtained from the calculation of this thesis of the decline occurring obtained using geotextile with the finite element method was 0.45 m, large horizontal deformation obtained by using the finite element method most extreme with a geotextile obtained of 0.08 m while the horizontal deformation occur without geotextile of 0.09 m and a tensile stress that is obtained by calculating the geotextile tensile tagangan amounted to 19.51 KN / m2. From these calculations it can be concluded that the use of geotextile can be used as a soil improvement and reinforcement.



Presentation Code: SYA

The Simulation Of Horizontal Axis Water Turbine Using Flow Simulation Solidworks Application

Syamsul Hadi

Abstract. Study about the design of Horizontal Axis Water Turbine in pico hydro power plants involves many parameters. Prestudy using simulation in order to save experiment time and cost was proposed. The turbine blade number, turbine blade curvature angle, turbine bucket angle and blocking system tilt angle were used in this study was. Those four variations were combined each other thereby the best design of turbine would be obtained. The CFD simulation study utilized Flow Simulation Solidworks application which measured data on turbine speed, pressure, force, torque, etc. However, this simulation focused on the value of turbine torque. The best design of turbine was obtained in the turbine with 6 blades, blade curvature angle of 65° and bucket angle of 10° , and blocking system tilt angle of 40° .



Presentation Code: RIZ

Numerical Analysis of Flood Modelling of upper Citarum River under Extreme Flood Condition

Riza Inanda Siregar

Abstract. This paper focuses on how to approach the numerical method and computation to analyse flood parameters. Water level and flood discharge are the flood parameters solved by numerical methods approach. Numerical method performed on this paper for unsteady flow conditions have strengths and weaknesses, among others easily applied to the following cases in which the boundary irregular flow. The study area is in upper Citarum Watershed, Bandung, West Java. This paper uses computation approach with Force2 programming and HEC-RAS to solve the flow problem in upper Citarum River, to investigate and forecast extreme flood condition. Numerical analysis based on extreme flood events that have occurred in the upper Citarum watershed. Some of these events are simulated for various return period of flood discharge flows; 5-years; 10 -years; 55-years and 50-years. The result of water level parameter modeling and extreme flood discharge compared with measurement data to analyse calibration and verification. This paper present exemplifies a practical simulation based engineering approach to investigate the resilience of infrastructures to extreme flood events in riverine systems. It provides a better way to communicate information on the extent extreme floods and shows the importance of flood parameters in flood hazard study.

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August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: OTH

A Cable-Driven Parallel Robots Application: Modelling and Simulation of a Dynamic Cable Model in Dymola

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Abstract. Modeling a cable model in multibody dynamics simulation tool which dynamically varies in length, mass and stiffness is a challenging task. Simulation of cable-driven parallel robots (CDPR) for instance requires a cable model that can dynamically change in length for every desired pose of the platform. Thus, in this paper, a detailed procedure for modeling and simulation of a dynamic cable model in Dymola is proposed. The approach is also applicable for other types of Modelica simulation environments. The cable is modeled using standard mechanical elements like mass, spring, damper and joint. The parameters of the cable model are based on the factsheet of the manufacturer and experimental results. Its dynamic ability is tested by applying it on a complete planar CDPR model in which the parameters is based on a prototype named CABLAR, which is developed in Chair of Mechatronics, University of Duisburg-Essen. The prototype has been developed to demonstrate an application of CDPR as a goods storage and retrieval machine. The performance of the cable model during the simulation is analyzed and discussed. Keywords: Planar CDPR, dynamic cable model, object-oriented modeling, Dymola

nac2017

August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ISM

Surface Structural Analysis of the Layered Perovskite Ca1.9Sr0.1RuO4 by Low Energy Electron Diffraction I-V

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Abstract. The atomic structure at surface of the layered perovskite Ca1.9Sr0.1RuO4 has been studied by Low Energy Electron Diffraction (LEED) I-V. The perovskite Ca1.9Sr0.1RuO4 of single crystal was cleaved in ultra high vacuum chamber (the pressure in the chamber was about 1x10-10 Torr). The experiments were conducted at room temperature (T=300 K). The sharp LEED pattern was observed indicated that the surface is flat. LEED I-V calculation was performed to fit experimental data to obtain the surface atomic structure. The LEED I-V analysis reveals that in the surface of the layered perovskite Ca1.9Sr0.1RuO4 the RuO6 octahedra are rotated (in-plane rotation) alternating clockwise and counterclockwise. The in-plane rotation at the surface is 11 degree which is smaller than that in the bulk (13 degree). The Ru - O(1) bondlength at the surface is found to be 1.936 Å which is about the same as in the bulk (1.948 Å). The Ru – O (2) bond length at the surface is 1.863 Å which is much shorter than that in the bulk (2.040 Å). The volume of octahedral Ru-O6 at the surface is reduced by 9.3% compared to the bulk. The bond length of Ru-O (2) at surface is shorter than that of bulk by 8.7%. This finding shows that the atomic structure at surface of the layered perovskite Ca1.9Sr0.1RuO4 is different than in the bulk. These lattice distortions strongly influence its electronic properties.



Presentation Code: SAL

Accuracy and stability analysis of the modified Lax numerical method in solving the sea waves refraction equation

Salmawaty Arif Mail

Abstract. We analyse the accuracy and stability of the modified Lax numerical method used in solving the two dimensional sea waves refraction equation. The refraction phenomenon on the beach was observed by the fact that waves hit the shore line in perpendicular way. Angles of the incoming waves from offshore keep changing due to the smaller depth of water, and therefore become important to be determined. The accuracy was evaluated by means of the Taylor series expansion and the stability was analysed by the Von Neumann method. The analysis showed that the method is stable for a certain interval although it is only first order accurate.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: HIM

Numerical solution to simultaneous heat and mass transfer on surface area of drying food

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Abstract. Typical method to solve simultaneous heat and mass transfer on surface area of drying food is by using a water activity parameter. The water activity is an individual parameter of each food and determines how strong the connections between food structure and water are. This parameter is developed by using experimental data. In this work, the water activity is proposed to be replaced with a new model that is generated using the mole content of the food is proposed. A numerical method has been developed to validate the proposed method. The method has been tested in convective drying of mango. Three different approaches have been tested, they are analytical method, numerical method, and the proposed method. The results reveal that experimental, analytical and numerical methods show good agreement. It is suggested to use the proposed method to solve simultaneous heat and mass transfer problem in food drying.

nae2017

August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: AND

Performance Analysis of Low Temperature Heat Source of Organic Rankine Cycle for Geothermal Application

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Abstract. Indonesia has a high potential energy resources from geothermal activities. Base on the report of Asian Development Bank and World Bank, the estimated of Indonesian hydrothermal geothermal resource considered to be the largest among the world. If it's can be utilized to produce the electric power, it's can contribute to increasing the electrification rates in Indonesia. In this study, a simulation of electric power generation, use ASPEN Plus, utilizing the Organic Rankine Cycle (ORC) system to convert the low level heat of hydrothermal as an energy source. The temperature of hydrothermal was modelled as hot water which has a temperature range from 60 °C – 100 °C to heat up the organic working fluid of ORC system. The system produced electricity up to 1.42 kW when operated using R134A with water inlet temperature of 100 °C. Changing system working fluid to R245fa, the net power obtained increase to 2.08 kW with the same input condition. This study showed that the ORC system can be implemented to utilize low temperature heat source of hydrothermal in Indonesia.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MAR

Structural Integrity of Power Generating Speed Bumps Made of Concrete Foam Composite

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Abstract. In this paper concrete foam composite speed bumps were designed to generate electrical power by utilizing the movements of commuting vehicles on highways, streets, parking gates, and drive-thru station of fast food restaurants. The speed bumps were subjected to loadings generated by vehicles pass over the power generating mechanical system. In this paper, we mainly focus our discussion on the structural integrity of the speed bumps and discuss the electrical power generating speed bumps in another paper. One aspect of structural integrity is its ability to support designed loads without breaking and includes the study of past structural failures in order to prevent failures in future designs. The concrete foam composites were used for the speed bumps; the reinforcement materials are selected from empty fruit bunch of oil palm. In this study, the speed bump materials and structure were subjected to various tests to obtain its physical and mechanical properties. To analyze the structure stability of the speed bumps some models were produced and tested in our speed bump test station. We also conduct a FEM-based computer simulation to analyze stress responses of the speed bump structures. It was obtained that the speed bumps coupled with polymeric composite bar (3 inches in diameter) are significantly reduce the radial stresses. In addition, the speed bumps equipped with steel casings are also suitable for use as part of system components in producing electrical energy.

Keywords:

Speed bump, EFB fibers, Concrete foam composite, Numerical analysis



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: NUH

Grip Analysis of Road Surface and Tire Footprint Using FEM

M. Sabri¹, M. Nuh²

Abstract. Road grip involve a touch between road pavement and the tire tread pattern. The load bearing surface, which depends on pavement roughness and local pressures in the contact patch. This research conducted to develop a Finite element model for simulating the experimentally testing of asphalt in Jl. AH Nasution Medan, North Sumatera Indonesia base on the value of grip coefficient from various tire loads and the various speed of the vehicle during contact to the road. A tire model and road pavement are developed for the analyses the geometry of tire footprint. The results showed that the greater the mass of car will increase grip coefficient. The coefficient of grip on the road surface contact trough the tire footprint strongly influence the kinetic coefficient of friction at certain speeds. Experimentally show that Concrete road grip coefficient of more than 34% compared to the asphalt road at the same IRI parameters (6-8). Kinetic friction coefficient more than 0.33 was obtained in a concrete path at a speed of 30-40 Km/hour.



August 24th -25th, 2017 Banda Aceh, Nanggroe Aceh Darussalam – INDONESIA

Presentation Code: YAS

Option Design Pattern for CAE Software Development and its Application to Probabilistic Fracture Mechanics

Yasuhiro Kanto

Abstract. With the rapid progress of the computational mechanics, CAE software, such as FEM programs, are having many functions and become more complicated. Because the development shouldn't be stopped, every CAE program should consider future functionality expansions. It is difficult, however, to forecast what types of expansions are required from the future researches. Object-oriented approach appears a promising technique to develop complicated and flexible software. Especially adoption of design patterns fits the purpose. The author has proposed a combination of Decorator pattern and Visitor pattern, or Option pattern for application to the FEM program of structural problems. The proposed Option pattern has unique features such as;

(1) No modification to the original software is required to add new functions.

(2) Functions added independently can be combined with each other.

(3) One function can be described in one file.

These three features have been confirmed by adding nonlinear analyses functions and XFEM function to the linear-elastic structural FEM program.

Probabilistic fracture mechanics, PFM, is another field of software equally significant to the safety analysis and the integrity of important structural components. The structure of the software is totally different from that of FEM. In this paper, the Option pattern is applied to a probabilistic fracture mechanics software, and its applicability and effectiveness are discussed.

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August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: HIM

Transient Thermal Stresses Analysis And Thermal Fatigue Damage Evaluation For Skirt Attachment Of Coke Drum

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Abstract. These coke drums evaluation deals with the transient thermal stress analyses on a coke drum. There are four identical coke drum with different life cycle patterns which will be evaluated to measure the most harmful life cycle of these coke drums; A, B, C, D. 22 thermocouples and strain gauges are installed at the area of the skirt. The temperatures and strains have been measured in every minute and collected. In order to explore operational characteristics of the coke drum measured axial strains at location 5 have been examined. Temperature differences in points 11 and 12 is taken as the correspondence temperature to compare with the measured strain in point 5i and 5, for the thermal stress is the function of temperature. Cooling stage is the most unpredictable stage in coke drum because of the complex multiphase state, but measured results show the stress value still below the yield strength of coke drum material. The previous statement for common coke drum that claimed the cooling stage is the most harmful is not definite in this type of coke drum. Since the hoop strains are relatively lower, the axial maximum, minimum, and interval strains of axial direction are used as parameters and their graphs are plotted. Some selected cycles from coke drum A, B, C, D have been evaluated using Finite Element Method, plastic deformation analyses. We have found that type A's coke drum cycles is the most harmful with life span of 1375 cycles, while type C's coke drum cycles is the safest with 1987 cycles, according to selected cycles which frequently appeared in each type of coke drum.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MFS

Flow Shop Scheduling In car painting schedule problems By Using Harmony Search Algorithm

Mohammad Fadly Syahputra, Annas Maiyasya, Sarah Purnamawati

Abstract. Painting a car using an engine requires scheduling to determine priorities. Determining the priority of car painting in this study is done by looking at the shape and extent of the car. We use flow shop scheduling with harmony search algorithm. Flow shop scheduling is a scheduling model in which the job-job to be processed entirely flows in the same product direction / path. Where there are n jobs that will be processed on the machine m, which must be determined which must be done first and how to allocate jobs on the machine so that obtained a scheduled production process. Harmony Search Algorithm is a metaheuristic optimization algorithm based on music. The algorithm is inspired by observations that lead to music in search of perfect harmony. This musical harmony is in line to find opitmal in the optimization process. Based on the tests that have been done, obtained the optimal car sequence with minimum makepan value.



Presentation Code: GUN

A Case Study of Identification The Maturity Software Level at Unit Manajemen Mutu Of Universitas Sumatera Utara

Dani Gunawan, Amalia Amalia

Abstract. Identification of software maturity level is a method to determine the quality of a software. By doing this identification, we can observe the weaknesses of the software and can formulate some recommendations for upgrading the software level. It will be a reference for future software maintenance and development. This paper discusses the software level maturity with the case study is Unit Manajemen Mutu Universitas Sumatera Utara (UMM USU). The standard used in this measurement is Capability Maturity Model Integrated (CMMI) with emphasis on three process keys which are Requirements developments, Requirements Management and Technical Solution. Measurement Stages are done by constructing measurement metrics based on generic and specific goals requirements of UMM-USU. The testing is done by black box method or functional testing method. The result shows that software quality at UMM-USU is still in initial state. This paper also produces some recommendation references for future software maintenance and software to improve the level of maturity software at UMM-USU.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ROM

Boyer-Moore Algorithm in Retrieving Deleted Short Message Service in Android Platform

Romi Fadillah Rahmat

Abstract. Short message service (SMS) can be used as digital evidence of disclosure of crime, because it can strengthen the charges against the offenders. Criminals use various ways to destroy the evidence, including by deleting SMS. On the Android OS, SMS is stored in a SQLite database file. Deletion of SMS data is not followed by bit deletion in memory, so that it is possible to rediscover the deleted SMS. Based on this case, the mobile forensic needs to be done to rediscover the short message service. The proposed method in this study is Boyer-Moore algorithm for searching string matching. An auto find feature is designed to rediscover the short message service by doing a search using a certain pattern to rematch a text with the result of the hex value conversion in the database file. The system will redisplay the message for each of a match. From all the testing results, the proposed method has quite high accuracy in rediscover the deleted SMS depend on the possibility of overwriting process and the vacuum procedure on the database file.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MFS

Genetic Algorithm To Solve Academic Scheduling Problem

Mohammad Fadly Syahputra, Ridha Apriani, Romi Fadillah Rahmat

Abstract. Class scheduling by manual method can lead to some problems including the time required and schedule mismatch between the variables involved, such as lecturers, students and classrooms. In this research class scheduling and practicum is scheduled by using genetic algorithm. The genetic algorithm is a heuristic search algorithm based on the mechanism of natural selection that is better known as the process of biological evolution. Genetic algorithm is used to get optimal schedule that is by the process of population initialization, fitness evaluation, selection, crossover and mutation. Data on this research delivered from the database of information technology department of the University of North Sumatra. The data is first through the process stages of the genetic algorithm to get the appropriate results. The results of this study is to produce an optimal schedule by scheduling the entire data subject, lecturer, room, day and time.


Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: AMA

Software Requirements Elicitation to Support Internal Monitoring of Quality Assurance System for Higher Education in Indonesia

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Abstract. The Internal Quality Assurance System (in Indonesian: SPMI (*Sistem Penjaminan Mutu Internal*) is a systemic activity of quality assurance of higher education in Indonesia. SPMI

should be done by all higher education or universities in Indonesia based on the Regulation of the Minister of Research, Technology and Higher Education of the Republic of Indonesia Number 62 of 2016. Implementation of SPMI must refer to the principle of SPMI that is independent, accurate, standardize, accurate, well planned and sustainable, documented and systematic. To assist the SPMI cycle properly, universities need a supporting software to monitor all the activities of SPMI. But in reality many universities are not optimal in building this SPMI monitoring system. One of the obstacles is the determination of system requirements in support of SPMI principles is difficult to achieve. In this paper we observe the initial phase of theNengineering requirements elicitation. Unlike other methods that collect system requirements

from users and stakeholders, we observe the system requirements of the SPMI principles from SPMI guideline book. The result of this paper can be used as a choice in determining SPMI software requirements. This paper can also be used by developers and users to understand the scenario of SPMI so that could overcome the problems of understanding between this two parties.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ROM

Adaptive Neuro Fuzzy Inference System for Forecasting Rubber Milk Production

Romi Fadillah Rahmat

Abstract. Natural Rubber is classified as the top export commodity in Indonesia. Its high production lead to big contribution for Indonesia's foreign exchange. Before natural rubber ready to be exported to another country, the production of rubber milk is become the main concern. In this research, we use adaptive neuro fuzzy inference system (ANFIS) to do rubber milk production forecasting. The data presented here is taken from PT. Aenglo Eastern Plantation (AEP), which has high data variance and range for rubber milk production. Our data will span from January 2009 until December 2015. The best forecasting result is 1,182% in term of Mean Absolute Percentage Error (MAPE).



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: TIG

Design of Monitoring System of River Height and Speed Using Arduino

Tigor Hamonangan Nasution, Esra Christian Siagian, Kasmir Tanjung Mail

Abstract. River is one part of the hydrologic cycle. Water in rivers is generally collected from precipitation, such as rain, dew, springs, underground runoff, and in certain countries also comes from melt ice / snow. The height and speed of water in a river is always changing. Changes in altitude and speed of water can affect the surrounding environment. In the paper we will design a system to read the altitude and speed of the river. In this work we use Arduino Uno, ultrasonic sensors and flow rate sensors. Ultrasonic sensor HC-SR04 is used as a river height meter. Based on the test results, this sensor has an accuracy of 96.6%.

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Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: IKS

DESIGN OF PRODUCTION PROCESS MAIN SHAFT PROCESS WITH LEAN MANUFACTURING TO IMPROVE PRODUCTIVITY

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Abstract. his object research is one of manufacturing companies that produce oil palm machinery parts. In the production process there is delay in the completion of the Main shaft order. Delays in the completion of the order indicate the low productivity of the company in terms of resource utilization. This study aimed to obtain a draft improvement of production processes that can improve productivity by identifying and eliminating activities that do not add value (non-value added activity). One approach that can be used to reduce and eliminate non-value added activity is Lean Manufacturing. This study focuses on the identification of non-value added activity with value stream mapping analysis tools, while the elimination of non-value added activity is done with tools 5 whys and implementation of pull demand system. Based on the research known that non-value added activity on the production process of the main shaft is 9,509.51 minutes of total lead time 10,804.59 minutes. This shows the level of efficiency (Process Cycle Efficiency) in the production process of the main shaft is still very low by 11.89%. Estimation results of improvement showed a decrease in total lead time became 4,355.08 minutes and greater process cycle efficiency that is equal to 29.73%, which indicates that the process was nearing the concept of lean production.

Keywords- lean manufacturing, value stream mapping, lead time, Efficiency



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ROM

Normal and Abnormal Red Blood Cell Classification using Self Organizing Maps

Romi Fadillah Rahmat

Abstract. Blood is the essential value in human body which flows in vascular space. To identify a sickness which related to a virus, we can do blood checking, particularly to do red blood checking. Normal and abnormal morphology in red blood cell will help a doctor to identify a sickness. Through the advance of image processing techniques, we can identify the normality or abnormality of red blood cell morphology, and by using classification method such as Self Organizing Maps, we can obtain 93,78% in our experimentation result.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ARN

EFFECT OF DISTRIBUTED GENERATION INSTALLATION ON POWER LOSS

Arnawan Hasibuan¹⁾ dan Syafruddin Masri²⁾

Abstract. Injection of the generator distributed in the distribution network can affect the power system significantly. The effect that occurs depends on the allocation of DG on each part of the distribution network. Implementation of this approach has been made to the IEEE 9 bus standard and shows the optimum location and size of the DG which shows a decrease in power losses in the system. This paper aims to show the impact of distributed generation on the distribution system losses. The main purpose of installing DG on a distribution system is to reduce power losses on the power system. Some problems in power systems that can be solved with the installation of DG, one of which will be explored in the use of DG in this study is to reduce the power loss in the transmission line. Simulation results from case studies on the IEEE 9 bus standard system show that the system power loss decreased from 7.6950 MW to 4.7484 MW. The simulated DG is injected to the bus with the lowest voltage drop on the bus number 9.



August 24th -25th, 2017 Banda Aceh, Nanggroe Aceh Darussalam – INDONESIA

Presentation Code: RAC

Three-Pass Protocol Scheme for Bitmap Image Security by Using Vernam Cipher Algorithm

D Rachmawati¹, M A Budiman¹, L Aulya¹

Abstract. Confidentiality, integrity, and efficiency are the crucial aspects of data security. Among the other digital data, image data is too prone to abuse of operation like duplication, modification, etc. There are some data security techniques, one of them is cryptography. The security of Vernam Cipher cryptography algorithm is very dependent on the key exchange process. If the key is leaked, security of this algorithm will collapse. Therefore, a method that minimizes key leakage during the exchange of messages is required. The method which is used, is known as Three-Pass Protocol. This protocol enables message delivery process without the key exchange. Therefore, the sending messages process can reach the receiver safely without fear of key leakage. The system is built by using Java programming language. The materials which are used for system testing are image in size 200x200 pixel, 300x300 pixel, 500x500 pixel, 800x800 pixel and 1000x1000 pixel. The result of experiments showed that Vernam Cipher algorithm in Three-Pass Protocol scheme could restore the original image.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MIF

Harmonic Reduction Using Single Tune Passive Filter

Muhammad Ikhwan Fahmi, Usman Baafai, Ariadi Hazmi, Tigor Hamonangan Nasution

Abstract. The use of non-linear loads generated by industrial machines can result in current harmonics that are inconsistent with IEEE 519 - 1992 standards. In this paper we discuss the use of single tuned passive filters in reducing harmonics. The system modeling using Matlab Simulink simulation resulted in total harmonic distortion (THD) of 15.55%, can be reduced to 4.77% using single tuned passive filter. The simulation result shows that the filter produces harmonics in accordance with the IEEE 519 - 1992 standards. From the simulation results also shows that the single tuned passive filter can reduce the harmonics of the current 82.23% on the harmonic order target that wants to be reduced and reduce the harmonics of other orders between 7% Up to 8%.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: EPS

Electromagnetic Modelling of MMIC CPWs for High Frequency Applications

Emerson P. Sinulingga¹, Peter B. K. Kyabaggu², and Cakra Danu Sedayu¹ ¹Electrical Engineering Department, Universitas Sumatera Utara, Indonesia ²Bukoola General Enterprises, Kampala, Uganda

Abstract. Realising the theoretical electrical characteristics of components through modelling can be carried out using computer-aided design (CAD) simulation tools. If the simulation model provides the expected characteristics, the fabrication process of Monolithic Microwave Integrated Circuit (MMIC) can be performed for experimental verification purposes. Analysis of aspects such as resonance frequency, mismatch impedance, reflection and dissipation losses can also be carried out with the aid of the developed model. Furthermore, improvements can be suggested before mass fabrication takes place. This research concentrates on development of MMIC technology by providing accurate predictions of the characteristics of MMIC components using an improved Electromagnetic (EM) modelling technique. The knowledge acquired from the modelling and characterisation process of the Coplanar Waveguide Transmission Line structures in this research can be adopted by circuit designers for various high frequency applications.

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August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: FAT

EFFECT OF BOLTS ARRANGEMENT AND THICKNESS OF GUSSET PLATE ON ROTATION CAPACITY OF BEAM TO COLUMN CONNECTION OF COLD-FORMED STEEL SECTION

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Abstract. Cold-formed steel section is currently widely used in construction industry. It is very important to understand the structural behaviour of coldformed steel, beam to column connection especially for design and analysis. In design, a connection will be considered as pin or rigid where a pin connection only take the axial force while the rigid connection resists the moment without any rotation. Meanwhile, in the design of connection, it will be assumed as perfectly pinned or fully rigid but in real situation the connection usually behaves between these two extreme cases which are semi-rigid. This study is aimed to determine effect of bolts arrangement and thickness of gusset plate on rotation capacity of this semi-rigid connection. The Finite Element Method is used in this study. From this study the different number of bolts and thickness of the gusset plate expected give contribution to the strength of the connection especially the moment rotation. In an initial study, the displacement maximum of the beam connected to the column reduced by 7% by increasing number of bolts.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: HAM

Numerical Simulation Analysis on the Thermal Performance of a Building Walls Incorporating Phase Change Material (PCM) for Thermal Management

Hamdani Umar, Samsul Rizal, Medyan Riza, T.M.I Mahlia

Abstract. Phase Change Material (PCM) plays an important role as a thermal energy storage device by utilizing its high storage density and latent heat property. One of the potential applications for PCM is in buildings by incorporating them in the envelope for energy conservation. EnergyPlus was chosen as it has the capability to simulate phase change material in the building envelope. The PCM used is paraffin, beeswax, and paraffin-beeswax mixture. The building material properties were chosen from the ASHRAE Handbook -Fundamentals and the HVAC system used was a window-mounted. The weather file used in the simulation was customized for the year 2015 from the National Renewable Energy Laboratory (NREL) website. Several other parametric studies like varying PCM thermal conductivity, temperature range, location, insulation R-value and combination of different PCMs were analyzed and results are presented. It was found that a PCM with a melting point from 31 to 35 °C led to maximum energy savings and greater peak load time shift duration, and is more suitable than other PCM temperature ranges for light weight building construction



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: FAI

Effective height of chimney for biomass cook stove simulated by computational fluid dynamics

Faisal Faisal, Adi Setiawan, Wusnah Wusnah, Khairil Khairil, Luthfi Luthfi

Abstract. This paper presents the results of numerical modelling of temperature distribution and flow pattern in a biomass cooking stove using CFD simulation. The biomass stove has been designed to suite the household cooking process. The stove consists of two pots. The first is the main pot located on the top of the combustion chamber where the heat from the combustion process is directly received. The second pot absorbs the heat from the exhaust gas. A chimney installed at the end of the stove releases the exhaust gas to the ambient air. During the tests, the height of chimney was varied to find the highest temperatures at both pots. Results showed that the height of the chimney at the highest temperatures of the pots is 1.65 m. This chimney height was validated by developing a model for computational fluid dynamics. Both experimental and simulations results show a good agreement and help in tune-fining the design of biomass cooking stove.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: RAZ

Beeswax as Phase Change Material to Improve Solar Panel's Performance Track Heat and mass transfer

Razali Thaib, Samsul Rizal, Medyan Riza, T. Azuar Rizal, T.M.I Mahlia

Abstract. One of the main obstacles faced during the operation of photovoltaic (PV) panels was overheating due to excessive solar radiation and high ambient temperatures. In this research, investigates the use of beeswax phase change materials (PCM) to maintain the temperature of the panels close to ambient. Solar panels used in this study has 839 mm length, 537 mm wide, and 50 mm thick, with maximum output power at 50 W. During the study, there were two solar panels was evaluated, one without phase change material while the other one was using beeswax phase change material. Solar panels were mounted at 150 slope. Variables observed was, temperature of solar panel's surface, output voltage and current that produced by PV panels, wind speed around solar panels, and solar radiation. Observation was started at 07:00 and ended at 18:00 o'clock. The research shows that maximum temperature of solar panels surface without phase change material is ranging between 46-49 oC, and electrical efficiency is about 7.2-8.8%. Meanwhile, for solar panels with beeswax phase change material, maximum temperature solar panels surface is relatively low ranging between 33-34 oC, and its electrical efficiency seem to increase about 9.1-9.3%.

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Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MUI

Experimental Study To Produce Bioetanol As Biofuel From The Mixture Of Salacca Zalacca Waste And Coconut Water Waste

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Abstract. Bioethanol can replace fossil fuel oil. The transfer of fossil fuel to bio-ethanol fuel is the right step to save the earth from crisis and pollution due to vehicle exhaust. Bioethanol is an alternative, environmentally-friendly fuel derived from natural ingredients/ biomass. Various biomass materials are available abundantly in Indonesia, becoming the source of raw material for bioethanol fuel. Salacca zalacca and coconut water is a biomass that can be converted to bioethanol fuel. Both of these materials are waste that can be obtained for free. Biochemical conversion through distillation process the bioethanol content is 85% and the bioethanol heating value is kJ/kg.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: DAM

Analysis Of Subsonics Wind Tunnel With Variation Shape Rectangular And Octagonal On Test Section

Damora Rhakasywi, Ismail Ismail, Agri Suwandi, Azharyanto Fadhli

Abstract. The need for good design in the aerodynamics field required a wind tunnel design. The wind tunnel design required in this case is capable of generating laminar flow. In this research searched for wind tunnel models with rectangular and octagonal variations with objectives to generate laminar flow in the test section. The research method used numerical approach of CFD (Computational Fluid Dynamics) and manual analysis to analyze internal flow in test section. By CFD simulation results and manual analysis to generate laminar flow in the test section is a design that has an octagonal shape without filled for optimal design.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: HIM

Numerical study on the effect of configuration of a simple box solar cooker for boiling water

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Abstract. In this work, a numerical study is carried out to investigate the effect of configuration of a simple box solar cooker. In order to validate the numerical results, a simple a simple solar box cooker with absorber area of 0.835 m 0.835 m is designed and fabricated. The solar box cooker is employed to boil water by exposing to the solar radiation in Medan city of Indonesia. In the numerical method, a set of transient governing equations are developed. The governing equations are solved using forward time step marching technique. The main objective is to explore the effect of double glasses cover, dimensions of the cooking vessel, and depth of the box cooker to the performance of the solar box cooker. The results show that the experimental and numerical results show good agreement. Heat loss from the top glass cooker is very significant, it can be up to 45%. In order to optimize a simple solar box cooker, the heat loss from the top glass cover must be decreased by promoting additional cover.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ADE

The 5,000 Mt Capacity Api 650 Tank Design Optimization On 600,000 Mtpy Cpo Plant

Ade Nadjuri

Abstract. The 5,000 MT capacity API 650 tank design optimization on 600,000 MTPY CPO plant project is intended to get the best design in terms of quality and cost of materials used and the effect of each variable drive to the volume of the main plate used. This study begins by collecting initial data including EPCC contract technical documents, FEED documents, price quotes documents from partners, API 650 12th Edition Standard and Code as well as other references related. Design variables and their degrees of freedom to the dimensions of the tank (ID and H), material standard numbers and tank corrosion allowance is determined as the initial data and then used as data analysis. The analysis begins with material strength calculation to obtain the volume of main plate material for each part of the tank. Then the calculation result is simulated through statistical methods Analysis of Variance and Taguchi matrices to obtain the optimum design as well as the effect of each variable on the main plate material volume used. And based on the results of the analysis on the 5,000 MT capacity API 650 tank on 600,000 MTPY CPO plant project known that the smaller the diameter of the tank, using material plates with higher standard numbers and minimum corrosion allowance (in the domain) it can reduce the volume of main plate that is used by 25%, while the biggest influence variable to the volume of the main plate used is 83% for Corrosion Allowance, 11% for Material Standards Number and 6% for Tank Dimension.

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August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: IRW

Design of a Novel Hybrid 3-DOF-RPS External Fixator Mechanism For Robotic Fractured Bone Reduction

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Abstract. In fractured long bone fixation treatment, the external ring fixator is often used as an assistive device for repositioning and fitting the empty space between the fracture fragments. The high-precision robotics based on Stewart platform mechanism is a leading in external fixation manipulator types. It allows the surgeons to manoeuvre all six degree of freedom of the fracture bone without losing the stability in fixation. In robotic mechanism system, attaining the end effector shacking hand with the target object safely and accurately is a critical issue. The objective of this study is to design a novel hybrid robot with external fixator for assisting the fractured long bone reduction. Its architecture merges a 3-DOF-RPS mechanism with a double-triangulation parallel manipulator. We investigate the kinematic analysis and simulation to evaluate the performance of the proposed manipulator.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: SAM

Evaluation Of Rooftop Photovoltaic Electricity Generation Systems at Syiah Kuala University

Samsul Rizal, Razali Thaib, Hamdani Umar, T Rizal

Abstract. This study employs geographic information systems (GIS) and the system advisor model (SAM) to assess the potential for rooftop photovoltaic (PV) generation in establishing a green campus. This study shows that a solar photovoltaic (PV) system on Syiah Kuala University campus is technically and financially feasible. We conducted solar site assessments on six potential locations on campus, used a solar energy performance model to analyze the technical feasibility of each location, and performed a financial assessment using a professional PV financial modeling tool to compare different financing options. Our results show that three sites on campus can be used to develop a combined solar PV system of one megawatt. Both direct and third-party ownership models are financially feasible for this combined system. Our findings can be replicable as a case study for future solar PV system development on Syiah Kuala University campus.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MUR

Design and characterization of a load cell for normal and frictional forces measurement

Muhammad Rizal, Husni, Amir Zaki Mubarak, Zulfadhli

Abstract. Force measurement is an important task in mechanical design, optimization, monitoring systems, surface engineering and mechatronic fields. In this study, an octagonal ring-type load cell that can measure normal and frictional forces has been designed and characterized. A three-dimensional load cell has been developed and stress-strain have been studied by theoretical and FEM approaches. Developed load cell has been subjected to a series of experimental tests to determine its sensitivity and to evaluate metrological characterization. The result found that developed two-axes load cell is suitable and reliable to measure static and dynamic force.

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Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: TBN

Thermodynamic Analysis of the Integrated Biomass Pyrolysis with Polymer Electrolyte Membrane Fuel Cell

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Abstract. Indonesia has a large potential of biomass energy which can be used to increase electrification ratio of the country. One the most important biomass resources to be considered as a promising option for fossil fuel substitution and greenhouse effect reduction in the country is waste from palm oil mill plant (POM). This study analysed the possible layout and performance of an integrated biomass pyrolysis with a polymer electrolyte membrane fuel cell (PEMFC) as an alternative for energy system. The PEMFC is considered to be one of a promising conversion technology for clean and efficient power generation in the twenty-first century. The biomass pyrolysis produces syngas which is cleaned from impurities prior entering PEMFC to produce electricity. Aspen plus simulation was used to design and analyse the system integration. Result show that the system can produce electricity with the high efficiency.

Keywords: Biomass, pyrolysis, palm oil mill, PEMFC, efficiency.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ABU

Potentiality Of Abaca Fiber Reinforced Plastic (Afrp) As Engineering Materials

Abu Bakar Dabet, Hiroomi Homma

Abstract. Natural fibre composites are currently considered as the materials which are potential to replace the synthetic fibre composites for engineering material. This paper deals with the fabrication and mechanical property characterization of abaca fibre reinforced plastic (AFRP) composites comparing with other natural fibre reinforced composites. Mechanical property of one directionally reinforced AFRP was evaluated by tensile test. The AFRP composite was fabricated as follows : 1) the abaca fibres were uniformly placed in a rectangular mold along the axial direction (00) that was put in a vacuum bag plastic . 2) then inside of the bag was suctioned to porl the resin infusion (VARI) and to set volume fraction of the fibres, 20%, 30% and 40%. This molding method could provide almost bubble-free AFRP plate of which tensile strenght was expectedly high. However scattering of AFRP tensile strength was very large as compared with metallic materials. Therefore, internal structure of the composite is observed under scanning electron microscope (SEM) to clarify the fracture mechanism, voids and fibre delamination.

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Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: MUL

Study On Composite Material Using Roystonea Regia Fiber As Hood Material For Reducing Automotive Noise

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Abstract. The objective of this research to find out the characteristic of noise reduction of automotive machine by using the Roystonea Regia fiber composite material. The influences of thermal should be considered during investigation of noise level decreasing. Process of specimen preparation through implemented casting method which pressed using molded press machine. Composition of this acoustical panel is 50% of stem of areca king (Roystonea Regia) fiber by 32 mesh number and 50% combination between gypsum and polyurethane. The ready acoustical panel mount under automotive machine cover/cup, and the noise level of automotive machine should be measured with several measuring distances and frequencies according to half spherical method. The result of DTA shows that the maximum characteristic of noise reduction (α) is 0.72 in frequency 125 Hz and minimum in 0.45 at 1200 Hz. Temperature influence shows that in 3180 C the noise reduction is initially burnt. The decrease of noise level got through comparative study between using muffle of acoustical panel and not using. Furthermore, DTA measurement consideration between load and unload of stationary engine testing. The result shows that the average at X-(not using) side is 1,01% and X-'(using panel) side is 10,14%, X+(not using) side is 7,54% and X+' (using panel) side is 4,81%, Z-(not using) side is 2,77% and Z-'(using panel) side is 11,46%, Z+(not using) side is 13,25% and Z+' (using panel) side is 3,86%. Conclusion of the study shows that a noise reduction which made of this acoustical panel appropriate enough for noise reduction on bonnet of machine automotive.

Keyword: Acoustical Material, Areca King Stem (Roystonea Regia) of Fiber, bonnet of automotive, SPL.

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August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: ALF

Developing Active Noise Control For Motorcycle's Noise Silencer Using Y-Shaped Pvc Pipe Technique

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Abstract. The aims of this research to obtain noise reduction of motorcycle exhaust by using the active noise control approaching. On the exhaust, a Yshaped PVC pipe to be bolted where one of its branch to be placed loudspeaker which impermeable conditions. This loudspeaker is functionally as a secondary sound/noise to counter the primary noise of the motorcycle's exhaust noise. The signal generator used in this study is an ISD 4004-module, which serves the system to generate noise according to counter the noise of motorcycle's exhaust. This ISD 4004-module works by recording firstly the noise source, then reversed the phase 180° of recorded sourced noise by phase reversing circuit. So that the opposite noise generated by the sound of signal generator will hit the sourced noise and encounter. The addition of two opposite sounds of the phase with identical but opposite characters will result in noise reduction. The noise level of motorcycle exhaust should be measured with standard measuring distances and verity of rotation according to half spherical method. Through experimental measuring, the reduction around 2 dB in Z-direction at 1000 rpm, and 1.5 dB in Z-direction at 2000 rpm detected at the end of the Y-shaped PVC pipe. Implemented the finite element method, several simulation should verify the experimental approaching. The simulation result shows the noise reduction attain around 4 dB in Z-direction at 1000 rpm.

Keywords: Active noise control, PVC pipe tube, signal generator, phase inverting, motorcycle's exhaust

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Presentation Code: SYA

Techno-Economic Analysis of Solar Photovoltaic Power Plant for Small Scale Fish Processing in Kota Langsa - A Case Study

Syamsul Bahri Widodo, Hamdani Umar, T. Azuar Rizal Mail

Abstract. Fisheries are leading sectors in the municipality of Langsa, with the hauled capacity reached approximately 6,050 tons/year, whereas from the fishaquaculture sector, averagely obtained around 1,200 tons/year. The fishermen groups in the village of Kuala Langsa conducted fish processing either from catches and aquaculture. The fish processing facilities comprises small-scale ice factory unit, gutting unit and cutting, drying unit, and curing unit. Availability of energy and electricity costs during the production process has become major constraint experienced by the fishermen group that suppressed the capability of increasing their production and income. In this study, the potential and costeffectiveness of photovoltaic solar power plant to meet the energy demand of fish processing units have been analysed. Energy requirements at the fish processing units has been estimated to be 130 kW and the proposed design of solar photovoltaic electricity generation at the capacity of 200 kW with the requirement of the area around 0,75 hectares (1.85 acres). Given the location of fish processing units is quite close to the location where the fish supply auctioned, then the analysis is made using the assumption that the installation of photovoltaic panels was done on the roof (OTR) of the building, compared to the installation of solar power plants outside the location (OTL). From the analysis, it has been found that for the installation of OTR, the levelized cost of energy is IDR. 1.115 Per kWh, considering 25 years of plant life at 10% discount rate, with simple payback period of 13.2 years. As for OTL, levelized energy is obtained at IDR.997.5 per kWh, with simple payback period of 9.6 years.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: HIM

A Numerical Simulation of a Flat-Plate Solar Collector of Solar Water Heater

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Abstract. A flat-plate type solar collector for solar water heater is simulated. The flat plate collector is used to heat the water which is circulated by a pump. The pump is powered by electric power. The collector area of the solar collector is $1.6 \text{ m} \times 1.1 \text{ m}$ and the capacity of hot water tank is 80 L. The solar water heater is tested by exposing it on the roof of a building in Medan city of Indonesia from 8.00 AM to 16.00 PM. A set of governing equations are developed and solved. A time marching technique is used. Solar irradiation is modelled using the measured data. The results show that the maximum temperature of absorber plate is 89.46°C. The maximum temperature of water in the tank are 75.73°C and 56.6°C, respectively. Overall thermal efficiency of the present solar collector is 69.1%.

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Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: WAF

THE EFFECTIVENESS OF STONE ASH AND VOLCANIC ASH OF MOUNT SINABUNG AS A FILLER ON THE INITIAL STRENGTH OF SELF COMPACTING CONCRETE

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Abstract. Self Compacting Concrete is a concrete variant that has a high degree of workability and also has great initial strength, but low water cement factor. It is also self-flowable that can be molded on formwork with a very little or no compacted use of compactors. This concrete, using a variety of aggregate sizes. aggregate portions and superplasticizer admixture to achieve a special viscosity that allows it to flow on its own without the aid of a compactor. Lightweight concrete brick is a type of brick made from cement, sand, water, and developers. Lightweight concrete bricks are divided into 2 based on the developed materials used are AAC (Autoclave Aerated Concrete) using aluminum paste and CLC (Cellular Lightweight Concrete) that use Foaming Agent from BASF as a developer material. In this experiment, the lightweight bricks that will be made are CLC type which uses Foaming Agent as the developer material by mixing the Ash Stone produced by Stone Crusher machine which has the density of 2666 kg / m³ as Partial Pair Substitution. In this study the variation of Ash Stone used is 10%, 15%, and 20% of the planned amount of sand. After doing the tasting the result is obtained for 10% variation. Compressive Strength and Absorption Increase will decrease by 25.07% and 39.005% and Variation of 15% compressive strength will decrease by 65,8% and decrease of absorbtion equal to 17,441% and variation of 20% compressive strength will decreased by 67.4 and absorption increase equal to 17,956%.

Keywords: Stone Ash, Stone Crusher and Lightweight Concrete Brick Curing, CLC



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: APM

Mud Profile Analysis of a Muddy Eastern Coast of North Sumatera

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Abstract. It is known that mud profiles are characteristically different from sand profiles in terms of the geometry as well as the wave energy dissipation mechanism. The objective of this paper is to show the characteritics of mud profiles as compared with that of sand profiles. Data obtained from the muddy coast of Pantai Cermin located in the eastern coast of North Sumatera are used to assess the profile zones, the profile geometry and the likely wave energy dissipation. It is found from the best fit of the field data to the profile equations that the wave attenuation coefficient is the predominantly parameter that governs the shape of the mud profiles which are tipically very mild and composed of soft cohesive sediment.

Keywords: mud profiles, muddy coast, wave energy dissipation, cohesive sediment



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: BRI

Investigation On The Acoustic Performance Of Natural Fibers For Sound Absorption Application

Sabri, Zahrul Fuadi, Dinni Agustina

Abstract. Sound absorption materials are generally classified into three types: porous, absorbent panel and cavity resonator. All of these three types are based on the process of energy transforming from sound energy to thermal energy. The characteristic of sound absorbers can be stated in sound absorption coefficient for each incidence frequency. Generally, absorbent materials have absorption coefficient just in a certain frequency. Following a literature review of previous research about the acoustic characteristics of some indigenous materials, this paper has investigated the acoustic performance of two pure natural fibers (figure 1); coir and jute fibers for the purpose of substituting the conventionally used materials such as rock wool and glass wool. The use of natural fibers have many advantages compared to conventional sound absorbers, including reduced production cost, good handling and environmental protection. The sound absorption performance of coir and jute fiber was determined experimentally using a reverberation chamber conforming to the ISO 354 (2003) standard. The results indicate that the sound absorption coefficient is a function of incidence frequency and the angle of incidence sound wave. The maximum absorption coefficient was reached in the value of 90 % at 4000 Hz, while for jute fiber was reached in 77 % at 5000 Hz. For the panels of coir and jute, the results showed that the frequency spans of sound absorption became wider. It was caused by the existence of air cavity behind the test specimen. The sound absorption coefficient for coir panel with air cavity depth of 4 cm was above 80 % ranging from 500 Hz to 5000 Hz, while for jute panel ranged from 630 -3150 Hz. The existence of air cavity behind the samples has increased the sound absorption coefficient significantly.



Banda Aceh, Nanggroe Aceh Darussalam – INDONESIA

Presentation Code: MAU

Utilization of Mango Seed Starch in Manufacture of Bioplastic Reinforced with Clay Using Glycerol as Plasticizer

Maulida

Abstract. Bioplastics are plastics that can be used just like conventional plastics, but will disintegrate by the activity of microorganisms into water and carbon dioxide. Starch is a natural polymer material that can be used for bioplastic production. The addition of reinforcing particles has been shown to improve the mechanical properties of bioplastics. The aim of this research is to know the potency of mango seed and clay filler and glycerol concentration on tensile strength and elongation at break, functional group (FTIR) and surface morphology (SEM). In this study used mango seed starch size of 5 grams, with variation of clay filler mass of 0; 3; 6 and 9 wt%, while mass of glycerol with a variation of 0; 20; 25; 30; And 35% wt. The heating temperature of the bioplastics solution used was 80,53 0C. The resulting bioplastics were analyzed for their physical and chemical properties, including FTIR, SEM, tensile strength, elongation at break. The FTIR analysis shows that no new functional groups are formed. From the analysis of mango starch content obtained 62,82%, 44,0% amilopectin content, amylose content 14,82%, and water content 12,65%. In this study obtained bioplastics with the best conditions on the use of 6% clay and 25% glycerol, with a tensile strength of 5,657MPa, percent elongation at breakup 43,431%.

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Interaction Models on Sand Surface of Natural Adsorbent with Adsorbate Cd+2 Metal Ions in Solution with Batch Operation

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Abstract. The interaction type of metal ion with the adsorbent surface in adsorption operation was evaluated in this study. The binary metal ions in solution was mixed with the sand then shaken in 100 rpm. The kinetics adsorption capacity was than measured with the pseudo order model to evaluate the interaction type from the r2 indicator. The result found that the Cd ions with r2 =0.9656 and r2= 0.9989 for first and second order respectively, for black sand and r2 =0.9070 and r2= 0.9999 for first and second order respectively, for white sand. It was indicated that the interaction type of metal ions on sand surface was occurred together as physical and chemical interaction.

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Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: APM

Normal Versus Extreme Wave Statistics of Belawan Sea Port

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Abstract. Belawan port is the third largest sea port in Indonesia and one of the entrances to the city of Medan in particular and North Sumatra in general by sea. It is known that in certain months maximum wind induced waves occur and affect a variety of activities at the port. This paper presents wave statistical analysis in order to characterize the extreme waves compared with normal waves based on the wind data obtained from the meteorology station located in the vicinity of the port of Belawan. Using normal averaged wind data, it is found that the maximums of normal wave heights are in the range of 0.62 m up to 0.87 m, or in other words less than 1 m. In contrast using extreme wind data, the maximum wave heights range from 3.85 m up to 5.04 m with a return period of up 200 years. In the extreme wave statistics it is the threshold wave height that makes a significant difference.

Keywords: Belawan Port, wind induced waves, wave heights, extreme wave statistics, return period



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: HIM

Reliability Enumeration Model for the Gear in a Multifunctional Machine

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Abstract. The angle and direction of motion play an important role in the ability of a multifunctional machine to be able to perform the task to be charged. The movement can be a rotational action that appears to perform a round, by which the rotation can be done by connecting the generator by hand through the help of a hinge formed from two rounded surfaces. The rotation of the entire arm can be carried out by the interconnection between two surfaces having a jagged ring. This link will change according to the angle of motion, and any yeast of the serration will have a share in the success of this process, therefore a robust hand measurement model is established based on canonical provisions. nae2017

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Presentation Code: IKS

Analysis of Bullwhip Effect on Supply Chain Eith Q Model Using Hadley-Within Appraoch

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Abstract. This research held on a tapioca flour industry company that uses cassava as raw material to produce tapioca starch product. Problems that occur in this company is inaccurate planning, consequently there is a shortage of variation between the number of requests with the total supply is met, so it is necessary to do research with the formulation of the problem that is how to analyze the Bullwhip Effect on the supply chain using Q model through Hadley-Within approach so as not to disturb the product distribution system at the company. Product distribution system at the company, obtained by the number of requests. The 2015 forecast result is lower than actual demand for distributors and manufactures in 2016 with average percentage difference for Supermarket A distributor, Supermarket B and manufacturing respectively 38.24%, 89.57% and 43.11% . The occurrence of information distortion to the demand of this product can identify the existence of bullwhip effect on the supply chain. The proposed improvement to overcome the bullwhip effect is by doing inventory control policy with Q model using Hadley-Within approach.

Keywords: Bullwhip Effect, Model Q, Hadley-Within Forecasting, Supply Chain



Banda Aceh, Nanggroe Aceh Darussalam – INDONESIA

Presentation Code: IKA

Settlement of Soil Due Embankment With Finite Element Methode (Case; Highway Medan – Kualanamu)

Ika Puji Hastuty Mail

Abstract. Consolidation is the process of release of water from the soil through pore cavity. Consolidation occurs on soft soil or on unstable ground that allows for repairs soil to get more stable soil. Prefabricated Vertical Drain (PVD) method is one way to fix the unstable ground. PVD that the system works like a column of sand to drain the water vertically. This study aims to determine the number of settlement, pore water pressure that occurs and the rate of consolidation with Prefabricated Vertical Drain (PVD) and without PVD analytical and finite element method that affect the length of consolidation until reach 90% consolidation, or in other words soil does not decline further or settlement considered zero. Based on the results of analytical calculations, the settle, ent is 0,47 m whereas in the finite element method amounted to 0.45 m. And the rate of consolidation till 90% analytically with PVD is 19 days and without PVD is 63 days whereas without PVD is 110 days. And large pore water pressure that occurs at 0,92 KN/m2.



Banda Aceh, Nanggroe Aceh Darussalam - INDONESIA

Presentation Code: TIG

Design of River Height and Speed Monitoring System by Using Arduino

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Abstract. River is one part of the hydrologic cycle. Water in rivers is generally collected from precipitation, such as rain, dew, springs, underground runoff, and in certain countries also comes from melt ice/snow. The height and speed of water in a river is always changing. Changes in altitude and speed of water can affect the surrounding environment. In this paper, we will design a system to measure the altitude and speed of the river. In this work we use Arduino Uno, ultrasonic sensors and flow rate sensors. Ultrasonic sensor HC-SR04 is used as a river height meter. Based on the test results, this sensor has an accuracy of 96.6%.


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The Static Response of Drainage Parking Cover Made of Polymeric Foam Composite

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Abstract. Open channel conduit is commonly constructed on side roadway, car park area, etc., with the aims to collect rainwater or seapage water. To avoid garbages following the waterflow, the conduit is equipped with adequate cover. In addition, the cover can also be functioned for temporary car park area. Thus, the conduit cover should strong enough to sustain external loading. This paper discusses the design and response of the conduit cover using finite element software ANSYS MECHANICAL version 17.5.

Keywords: Conduit cover, parking bumpers, foam concrete, impact strength, Fiber Oil Palm Empty Fruit Bunch (EFB).



August 24th -25th, 2017

Banda Aceh, Nanggroe Aceh Darussalam – INDONESIA

8. SABANG CITY (GENERAL INFORMATION)





Sabang is a city which is still located in the Special District of Aceh, in Sumatera Indonesia. Sabang is well known as the westernmost island in Indonesia, this is the first island that is the first from the western of Indonesia, besides known as the westernmost island of Indonesia, Sabang also well known as the free trade zone in Indonesia, and as the northernmost spot in Indonesia.

During the World War II, Sabang is the most important island as the harbor in the Southeast Asia. Because Sabang is located in the strategic area, it makes Sabang is known as the free trade zone in Indonesia, because since the Dutch colony in Indonesia, this island was very famous for the harbor and for trade. During the Independence of Indonesia, Sabang also had the important role in keeping the struggle of Indonesia, Sabang stood as the important harbor the Indonesian military during for the independence war with Dutch and Japan. Today, Sabang is set by the Indonesian government as the free trade zone in the 2000. Basically,

the culture of sabang is not different with Aceh, since it is still in one region and one ethnic, that is Melayu ethnic, Sabang culture is very interesting tobe discovered, from the local traditional unique food to the traditional dance, and Ratéb Meuseukat dance id the most famous and unique dance, once you get there you must see this dance, this dance includes one of the most famous dances in Indonesia. It is an interesting dance performed by all female dancers with the unique move style accompanied with music.

There are many interesting places to be visited in Sabang, the one of them is the zero memorial monument, this is a famous spot in Sabang, because in this place is the first spot of extensive calculations of Indonesia from Sabang to Meuroke city, that is why if you are in there, you are like in the westernmost area in Indonesia, this is an interesting place really.

Sabang doesn't have any airport since Sabang is a island city, the transportation to get there is by boat or rented car carried by boat of course. The air transportation only can be reached in Aceh, and then you have to go by car and boat to the Sabang Island. In sabang you can rent a car to the transportation or you can go by traditional transportation or public transportation.