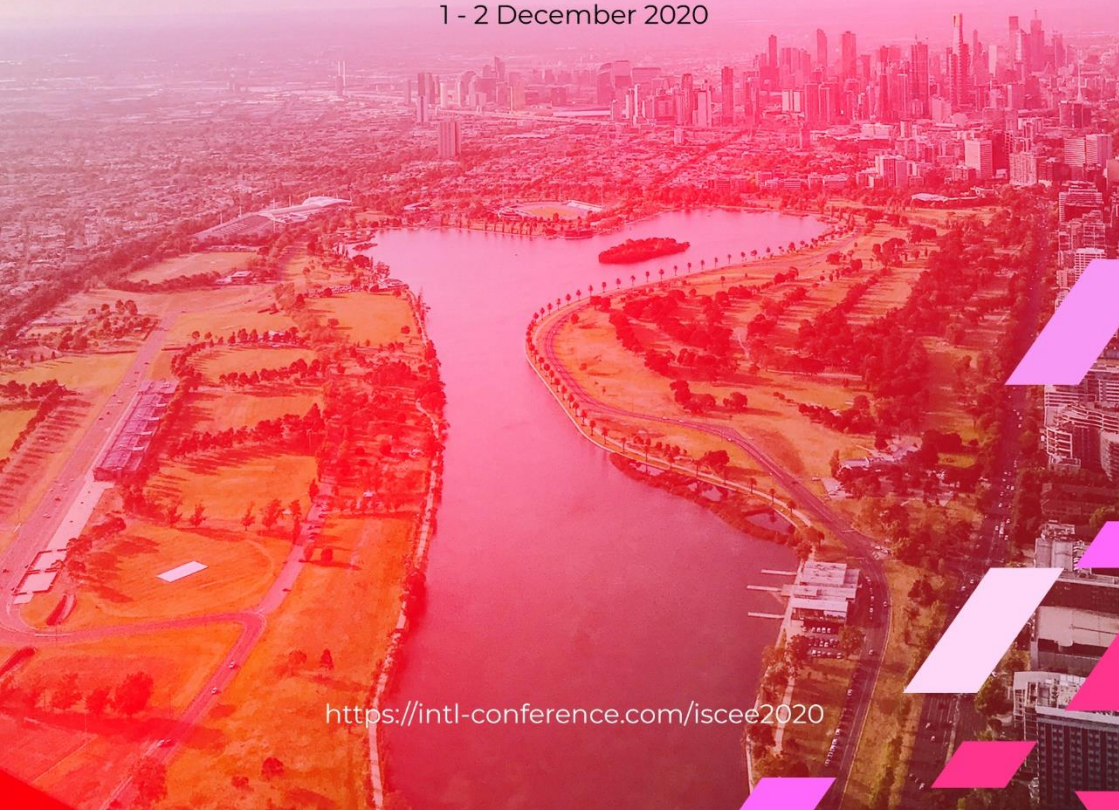
Abstracts & Programme

ISCEE 2020
VIRTUAL CONFERENCE

3rd International Symposium on Civil and Environmental Engineering

Virtual Conference broadcast live from
Universiti Tun Hussein Onn Malaysia

1 - 2 December 2020



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Organisers & Collaborators

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UTHM
Universiti Tun Hussein Onn Malaysia

Faculty of Civil Engineering and Built Environment
Universiti Tun Hussein Onn Malaysia

Co-organiser

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Welcoming Remarks

DEAN FACULTY OF CIVIL ENGINEERING AND BUILT ENVIRONTMENT

It is my pleasure to welcome all the participants today for the 2-days ISCEE 2020.

I welcome all the eminent speakers and guests from all over the world from a different time zone, you have joined us to share your knowledge and vast experience in your research expertise.

Our faculty, Faculty of Civil Engineering and Built Environment (FKAAB), previously known as Faculty of Civil and Environmental Engineering (FKAAS) has organized many conferences. ISCEE is an international symposium that encompasses three parallel conferences which are ICSWER, ISuCOS and ICSIE. These conferences cover different scope of research.

This symposium has come a long way since 2016 and surpassed the civil engineering challenges over the years and has adapted to the changing technological trends in the industry. From having this conference with 162 participants back in 2018, we have come a long way in making this symposium a huge participation with more participants.

I believed this symposium could be a good platform for all the participants to get recent research update in civil engineering field. I wish everyone a successful, safe and fruitful conference.

Thank you.

Profesor Ir. Ts. Dr. Mohd Irwan bin Juki
Dean Faculty of Civil Engineering and Built Environment

CHAIRPERSON OF ISCEE 2020

Welcome to ISCEE 2020.

This is the first symposium in the history of ISCEE which is completely conducted on a digital platform in line with the social distancing norms due to Covid-19 pandemics.

Like every year, the theme of our conference keeps changing and we would like to cover every aspect of civil engineering society through this 2-days symposium. The theme of this symposium is “Shaping the Future through Sustainable Engineering and Technology” which is in line with global sustainable development goals.

We are proud to announce that this conference is being conducted along with the cooperation of Universitas Muhammadiah Yogjakarta, Universitas Airlangga from Indonesia also collaboration with Pavement and Transportation Research Group from Universiti Teknologi Malaysia (UTM).

I would like to thank all the keynote speakers, participants, co-organizers, collaborator, and committees that make this symposium successful one.

Thank you.

Prof. Madya Ts. ChM. Dr. Radin Maya Saphira bt Radin Mohamed
Chairperson on ISCEE 2020

Keynote Speakers

ISCEE 2020 would like to express our most heartfelt gratitude to the following distinguished keynote speakers for gracing our symposium with their presence and providing us with insightful and inspiring keynote addresses.

Assoc. Prof. Dr. Ir. Jazaul Ikhsan
Dean of Faculty of Engineering
Universitas Muhammadiyah Yogyakarta
Keynote speech title: Case Study of Sediment Disaster and Resources Management in Mount Merapi area, Indonesia

Datuk Ir. Ts. Wan Nazri Hj Wan Aria
CEO Gruppe Dynamic Sdn Bhd
Ex Structural Engineer Royal Mecca Clock Tower
Keynote speech title: Emerging Engineering and Technologies in Discipline of Civil Engineering

Assoc. Prof. Dr. Munzilah Md. Rohani
Associate Professor
Universiti Tun Hussein Onn Malaysia
Keynote speech title: Malaysia Public Transport (Issue and Experience)

Assoc. Prof. Ts. Dr. Mohd Haziman Wan Ibrahim
Associate Professor
Universiti Tun Hussein Onn Malaysia
Keynote speech title: Potential of coal bottom ash in concrete production for sustainable construction

Programme

DAY ONE : 1 DECEMBER 2020				
8:30 AM	Registration			
KEYNOTE SESSION	**ZOOM ID: 975 6627 4225 ROOM 1**			
9.00 AM	**Keynote Address 1**			
9.30 AM	**Keynote Address 2**			
10.00 AM	**Keynote Address 3**			
10.30 AM	**Keynote Address 4**			
11.00 AM	BREAK			
PARALLEL SESSION 1	ZOOM ID: 914 3068 5138 ROOM 1	ZOOM ID: 950 0218 7290 ROOM 2	ZOOM ID: 985 6976 8147 ROOM 3	ZOOM ID: 989 8789 4714 ROOM 4
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	016-008	025-010	004-003	001-001
	028-011	041-049	016-008	007-006
	046-021	057-035	006-004	010-007
	079-065	030-062	024-017	057-046
	044-024	054-027	017-010	002-003
	030-018	056-034	024-019	020-012
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PARALLEL SESSION 2	ZOOM ID: 993 1363 5978 ROOM 1	ZOOM ID: 915 2918 1880 ROOM 2	ZOOM ID: 914 7270 2221 ROOM 3	ZOOM ID: 983 2000 7339 ROOM 4
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	062-047	066-051	018-013	023-013
	086-075	030-033	039-030	024-014
	075-059	052-061	027-020	029-017
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	059-072	013-007	013-042	044-032
	074-060	070-069	024-018	027-045
	076-064	080-066	045-037	054-039
	058-036	081-074	049-045	046-051
	060-043	026-040	012-006	033-056
	040-017	033-032	023-028	054-040
	067-052	064-050	006-031	047-042
10.30 AM	**BREAK**			
PARALLEL SESSION 4	**ZOOM ID: 945 5088 0697 ROOM 1**	**ZOOM ID: 973 0929 5509 ROOM 2**	**ZOOM ID: 969 4759 5779 ROOM 3**	**ZOOM ID: 988 6229 9698 ROOM 4**
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	003-002	050-025	033-024	011-005
	038-054	068-053	003-002	017-008
	031-056	073-057	032-025	056-044
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	087-076	064-070	028-021	041-033
	072-073	084-071	002-001	035-023
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	036-024	052-036	038-029	061-054
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	016-020		021-014	053-037
			016-011	039-025
4.00 PM	END OF DAY 2			

Schedules

DAY ONE: 1 DECEMBER 2020 (TUESDAY) PARALLEL SESSION 1		
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ZOOM ID: 914 3068 5138 Moderator: Dr. Nurul Hidayah Mohd. Kamaruddin Telegram Link: https://rb.gy/xfzj6a		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 037-039	Optimum Mix Design of High Performance Concrete Containing Micro POFA Using Historical Data Design	Wan Nur Firdaus Wan Hassan, Mohamed A. Ismail, Mohammad Ismail, Mohd Warid Hussin, Muhammad Ekhlasur Rahman, Khairul H Padil & Nadirah Darus
ISUCOS 016-008	Smart Trowel Tool for Smooth Plastering Work	Sunitha V. Doraisamy
ISUCOS 028-011	Empirical Frequency Response Function Data Used for Non-Probabilistic Artificial Neural Network to Consider Uncertainties in Damage Detection	Khairul Hazman Padil, Norhisham Bakhary , Wan Nur Firdaus Wan Hassan & Nadirah Darus
ISUCOS 046-021	Study on Condition Assessment Metrics Based Facilities Condition Index and Building Condition Index	Muhd Zubair Tajol Anuar, Noor Nabilah Sarbini & Izni Syahrizal Ibrahim
ISUCOS 079-065	Experimental Study: Shear Behaviour of Reinforced Concrete Beams using Steel Plate Strips as Shear Reinforcement	Remir Joseph Eklou, Muhammad Yani Bhayusukma, Halwan Alfisa Saifullah, Senot Sangadji & Stefanus Adi Kristiawan
ISUCOS 044-024	Space Planning of Classroom Kindergarten: A Case Study of Kemas Kindergartens in Batu Pahat, Johor, Malaysia	Fitrynadia Mohd Shahli, Izudinshah Abd Wahab & Zainal Abidin Akasah
ISUCOS 030-018	The Utilization of Lapindo Powder as a Material For High Strength Concrete	As'at Pujianto, Hakas Prayuda, Fanny Monika, Martyana Dwi Cahyati & Fernanda Zulviandika

DAY ONE: 1 DECEMBER 2020 (TUESDAY) PARALLEL SESSION 2		
2:00 PM – 4:15 PM ROOM 1		
ZOOM ID: 993 1363 5978 Moderator: Ir. Dr. Shahrul Niza Mokhatar Telegram Link: https://rb.gy/nrbuw3		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 007-003	Effect of Sugar on Compressive Strength, Drying Shrinkage and Carbonation Of Mortar	Ibrahim M Nasser, Dr. Siti Radziah Binti Abdullah, Abdullah Faisal & Alshalif Ali Hauashdh
ISUCOS 041-046	Performance of Square Steel Tubular Stub Columns In-Filled with Fly Ash and Silica Fume Self-Compacting Concrete under Concentric Loading	Arizu Sulaiman, Falmata Audu Mustapha & Roslli Noor Mohamed
ISUCOS 062-047	Coconut Coir Mat for Slope Vegetation	Mariah Awang
ISUCOS 086-075	Causative Factors for Time and Cost Overrun During Construction Phase of Project : Review of the Literature	R K M Gopang, I A Rehman ,I L Qadir &H H Shaikh
ISUCOS 075-059	Comparative Study of Indonesian Seismic Codes Applied on Vertically Irregular RC Building in High Seismicity Region	Muhammad Ibnu Syamsi, Taufiq Ilham Maulana, H. Widyatama, M. Rezki Ian & R. Indra Lesmana
ISUCOS 039-016	Recycled Glass Cullet as Fine Aggregate and Partial Cement Replacement in Concrete	Saiful Baharin Duraman & Qiu Li
ISUCOS 012-006	A Review: Study on Waste Rubber as Construction Material	N A N A Mutalib, S N Mokhatar, A. M. A Budiea, Z. M. Jaini, A. F Kamarudin & M. S Md Noh
ISUCOS 024-012	Physical and Mechanical Properties of Cement Board Made From Oil Palm Empty Fruit Bunch Fibre: A Review	W Maynet, E M Samsudin & N M Z Nik Soh
ISUCOS 049-029	A Review: Evaluation on Strength Capacity of Concrete and Micro Steel Fiber	Suchitra Ramasamy, Shahiron Shahidan & Adib Fikri Abdul Manaf
ISUCOS 010-005	The Present and Future of Building Materials: A Geomimetic Approach	Y. H. Mugahed Amran

DAY ONE: 1 DECEMBER 2020 (TUESDAY) PARALLEL SESSION 1		
11:15 AM – 12:45 PM ROOM 2		
ZOOM ID: 950 0218 7290 Moderator: Sr. Dr. Nazirah Mohamad Abdullah Telegram Link: https://rb.gy/yzrwlb		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 019-009	Potential of Activated Carbon in Lime Mortar Plastering in Term of Fire Resistance and Thermal Performance	Mohammad Ashraf Abdul Rahman, Anis Solehah Binti Yazid, Mariah Binti Awang, Mohd Kamaruzaman Bin Musa, Mohd Syafiq Syazwan Bin Mustafa, Nuramidah Binti Hamidon, Nurzalina Binti Hashim & Faridahanim Binti Ahmad
ISUCOS 025-010	Sustainable Concrete with Scrap Tyre: Impact on Strength and Health	Nurul Huda Suliman, Muhammad Akid Zaini, Adiza Jamadin, Anizahyati Alisibramulisi, Nursafarina Ahmad & Norhafizah Binti Salleh
ISUCOS 041-019	Performance of Fly Ash and Silica Fume Self-Compacting Concrete- Filled Steel Tubular Stub Columns under Axial Compression	Falmata Audu Mustapha, Arizu Sulaiman & Roslli Noor Mohamed
ISUCOS 057-035	Performance of Sodium Silicate as Self-Healing Agent on Concrete Properties	Mohamad Fitri bin Mah Hasaan & Norfaniza Mokhtar
ISUCOS 030-062	Finite Element Analysis on Flexural Behavior of Non-Prismatic Longitudinal Section Reinforced Concrete Deep Beam	Martyana Dwi Cahyati, Hakas Prayuda, Fanny Monika, Muhammad Mirza Abdillah Pratama, Eri Putra Siswantoro & Panji Pradana
ISUCOS 054-027	Effect of Water-Cement Ratio on Mechanical Properties of Rubberized Fly Ash Concrete	A M Najmi, A K Mariyana, P N Shek, Z Nurizaty, M Z Ramli, M N A Alel, K A Mujedu, O G Aluko & M Tohami
ISUCOS 056-034	The Key Criterias in Deciding to Tender For Construction Projects	Asmah Alia Mohamad Bohari, Roseline Anak Ikau, Hemyza Budin, Nurulhudaya Abdul Hadi & Valerie Chan Sue Lin Abdullah

DAY ONE: 1 DECEMBER 2020 (TUESDAY) PARALLEL SESSION 2		
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PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 051-045	Potential Influence of Courtyard on Indoor Thermal Comfort of Office Buildings in Hot- Humid Climate	F Abass, L H Ismail, I A Wahab, A A Elgadi & H Kabrein
ISUCOS 062-048	Facility Management in Private Finance Initiative Project in UTHM Pagoh Campus	Mariah Awang
ISUCOS 066-051	Numerical Analysis of Corrosion Induced Cracking in Reinforced Concrete Structure	S S Ayop
ISUCOS 030-033	The Effect pf Palm Shell as Coarse Aggregate Replacement on Self Compacting Concrete with Different Curing Methods	Fanny Monika, Hakas Prayuda, Fadillawaty Saleh & Martyana Dwi Cahyati
ISUCOS 052-061	Linear-Elastic Stress Field of Notched Concrete Beam: An Application of Finite Element in Theory of Critical Distances	Mohamad Shazwan Ahmad Shah, Norhazilan Md. Noor, Mohd. Nasir Tamin, Ahmad Beng Hong Kueh, Libriati Zardasti & Nordin Yahaya
ISUCOS 078-068	Progressive Collapse of a Single Layer Schwedler Dome	Yazmin Sahol Hamid & Nazatul Farahin Kamilan
ISUCOS 029-013	Analysis of Digital Technologies for Prevention of Accidents In Construction of High-Rise Building Projects	Muhammad Tarique Lakhiar, A.H Abdullah, M.T Lakhiar & S.Sohu
ISUCOS 043-028	Structural Performance Assessment of High Strength Concrete Containing Spent Garnet under Three Point Bending Test	Ahmed M. A. Budiea, Sek Wei Zhen, Shahrul Niza Bin Mokhatar & Khairunisa Muthusamy
ISUCOS 087-077	Repurposing Typical Institutional Hall as Temporary Covid-19 Quarantine Stations in Johor: A Review Study in KKTM	Nur Amalina Hanapi, Nur Atikah Hanapi & Che Winni
ISUCOS 034-037	Hydration Behaviour and Properties of Binary Blended Rice Husk Ash Cement Paste	Apeh, Abah Joseph

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PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSEWR 009-005	Performance of Aerated and Unaerated Steel Slag Filter System at Primary Treatment System for Phosphorus Removal from Textile Industrial Effluent	Nur Ain Nazirah Mohd Arshad & Rafidah Hamdan
ICSEWR 004-003	Comparison of Missing Rainfall Data Treatment Analysis at Kenyir Lake	Azreen Harina Azman, Nurul Nadrah Aqilah Tukimat & M.A.Malek
ICSEWR 016-008	Utilization of Fruit Wastes as Natural Coagulant in Treating Municipal Wastewater	Nur Shahzaiwa Wafa Shahimi, Nur Syamimi Zaidi; Muhammad Burhanuddin Bahrodin & Amir Hariz Amran
ICSEWR 006-004	The Effect of Ventilation During Peak Hours and Cooking Activities on Coarse Airborne Particulates (PM10 And Tsp) in Middle-Class Apartments in Surabaya: A Multilevel Approach	A D Syafei, T N Ciptaningayu, U Surahman; A C Sembiring, A W Wardana, A F Assomadi, R Boedisantoso & J Hermana
ICSEWR 024-017	Peat Water Treatment as an Alternative for Raw Water in Peatlands Area	Firdaus Ali, Dwi Lintang Lestari & Marsya Dyasthi Putri
ICSEWR 017-010	Non-Flooding and Flooding Characteristics of a Natural Straight River	Mohd Fadhli Abd Rashid, Zulkiflee Ibrahim, Mazlin Jumain, Radzuan Saari, Noraliani Alias, Mohamad Hidayat Jamal & Amyrhul Abu Bakar
ICSEWR 024-019	The Effectiveness of Microbubble Technology in the Quality Improvement of Raw Water Sample	Firdaus Ali, Khalidah Nurul Azmi & Madina Rain Firdaus

DAY ONE: 1 DECEMBER 2020 (TUESDAY) PARALLEL SESSION 2		
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ZOOM ID: 914 7270 2221 Moderator: Dr. Wesam A.Y. Almadhoun Telegram Link: https://rb.gy/h5wusg		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSEWR 040-033	Shoreline Monitoring using Unmanned Aerial Vehicle (UAV) at Regency Beach, Port Dickson	Isha Baizura Ismail & Mohd Adib Mohammad Razi
ICSEWR 035-046	Rainfall Monitoring Supported by Temporal and Spatial Information of Debris Flow Initiation Area in Merapi Volcano	A Hairani, A P Rahardjo & D Legono
ICSEWR 018-013	Effective Microorganisms Composite Scupper Drain (Em-Csd) as a New Revolution in Drainage System: A Preliminary Study	Feroz Hanif Mohamed Ahmad,Mohamad Hidayat Jamal, Abdul Rahman Mohd. Sam & Nuryazmeen Farhan Haron
ICSEWR 039-030	Correlation Between Pump Discharge and Operational Cost of Polder System: Case Study of Pekalongan Regency	Deddy Susanto
ICSEWR 027-020	Parkia Speciosa Skin as Adsorbent in Methylene Blue Dye Adsorption From Aqueous Solution: Fixed Bed Column Adsorption Study	Azhar Abdul Halim, Nurul Amanina Che Mokhtar, Sarah Nadira Hurairah, Marlia Mohd Hanafiah & Nurulhana Nordin
ICSEWR 043-035	Preparation of Synthetic Calcium Carbonate by Continuous Method	Z Mahim, E M Salleh, R Othman & S N Mohd Sabri
ICSEWR 030-022	Physical Simulation for Effect Seasons and Fertilizer on Solidified Fabric Peat Soil; A Soil Column Model Study	Syafik Akmal Mohd. Tajuddin, Junita Abdul Rahman, Radin Maya Saphira Radin Mohamed & Adel Al-Gheethi
ICSEWR 026-026	Relative Treatment Efficiency Index of Eichhornia Crassipes in Removing Cd, Pb and Ni from Wastewater	Nur Zaida Zahari, Piakong Mohd Tuah, Vun Leong Wan & Fera Nony Cleophas
ICSEWR 044-036	Water Circulation Reduces Contamination: Geo-Chemical and Mineralogy Aspect	Sabariah Musa
ICSEWR 050-047	Establishment of Flood Damage Function Model for Urban Area in Kuantan: A Preliminary Study	Noor Suraya Romali & Zulkifli Yusop

DAY ONE: 1 DECEMBER 2020 (TUESDAY) PARALLEL SESSION 1		
11:15 AM – 12:45 PM ROOM 4		
ZOOM ID: 989 8789 4714 Moderator: Dr. Ahmed Mokhtar Albshir Budiea Telegram Link: https://rb.gy/398HJvE		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 005-002	Investigation of Soft Layer in Between Hard Layer for Sedimentary Rock Formation by using Electrical Resistivity Analysis	Mohd Firdaus Md Dan @ Azlan, Fannie Ziton Pilang, Aziman Madun, Ahmad Khairul Abdul Malik, Edy Tonnizam Mohammed, Mohd Khaidir Abu Talib & Faizal Pakir
ICSIE 001-001	Soil Water Variation due to Grass Water Uptake	Siti Saidatul Azween Ismail & Nazri Ali
ICSIE 007-006	Utilization of Palm Oil Mill Residue as Sustainable Pavement Materials: A Review	Nura Shehu Aliyu Yaro, Madzlan Napiah, Muslich Hartadi Sutanto, Mohd Rosli Hainin, Aliyu Usman, Suleiman Abdulrahman & Saeed Modibbo Saeed
ICSIE 010-007	Comparison of Gravity Anomalies from Recent Global Geopotential Mod-Els with Terestrial Gravity and Airborne Gravity Over Johor Region.	Shuib Rambat, Nazirah Binti Mohamad Abdullah, Norehan Yaacob, Nor Azizi Othman & Zainal Abidin
ICSIE 057-046	Durability of Clayey Soil Stabilized with Potassium Additive	Nabeel K. Asmeel, Harith E. Ali, Abideen A. Ganiyu & Muyideen O. Abdulkareem
ICSIE 002-003	Optimalisation Disaster Reacting Unit Based on Digital as a Disaster Mitigation on Indonesia National Roads	Adityo Budi Utomo, T K Suryoaji & E K Friatmojo
ICSIE 020-012	Assessment of Community Noise Annoyance due to Transverse Rumble Strips Installation at Residential Areas	Nadirah Darus, Zaiton Haron, Khairulzan Yahya, Nordiana Mashros, Mohd Hanifi Othman, Wan Nur Firdaus Wan Hassan & Khairul Hazman Padil

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ZOOM ID: 983 2000 7339 Moderator: Ts. Dr. Ahmad Fahmy Kamarudin Telegram Link: https://rb.gy/ffsjbd		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 037-021	Evaluation and Statistical Analysis of HRS-WC Mixture Performance Modified with Tropical Latex	Dian M. Setiawan, Anita Rahmawati & Endrian Mubarak
ICSIE 035-022	Empirical Evaluation of Lane Changing Following Gap Distance on Expressway	Haydar Ataelmanan Ali Mohamed, Othman Che Puan & Sitti Asmah Binti Hassan
ICSIE 023-013	A Case Study of Building Information Modelling (BIM) for Subsurface in Malaysia	Chia Keh Chun, Koo Chai Hoon, Lau See Hung & Lee Min Lee
ICSIE 024-014	Effects of Tire Pyrolysis Oil (TPO) on The Rheological Properties of Bitumen	Abdulnaser Al-Sabaeei, Madzlan Napiah, Muslich Sutanto, Wesam Alaloul & Nura Bala
ICSIE 029-017	Users Acceptance on E-Hailing System as Alternative Transportation using Modal Shift Method	Muhammad Azmie Nazri, Kamarudin Ambak, Mohd Razu Hanifi Yazid & Ahmad Raqib Abd Ghani
ICSIE 051-035	Effect of Tropical Natural Rubber on the HRS Wearing Course	Anita Rahmawati, Dian Setiawan & Nantia Nudianti
ICSIE 059-050	The Effect of Soil Porosity and Geopolymer Viscosity on the Spreading of Grouting in Weathered Clay Shale	Sumiyanto, S P R Wardani & A S Munthohar
ICSIE 024-019	Optimization the Physical Properties of Waste Denim Fiber Modified Bio-Asphalt Binder using Response Surface Methodology	Abdulnaser Al-Sabaeei, Madzlan Napiah, Muslich Sutanto, Wesam Alaloul, Nur Izzi Md Yusoff, Noor Zainab Habib & Waqas Rafiq
ICSIE 022-027	Asphalt Mixture Incorporating Activated Crumb Rubber As Additive: Marshall Properties	Siti Nur Naqibah Kamarudin, Mohd Rosli Hainin, Muhammad Naqiuddin Mohd Warid, Mohd Khairul Idham Mohd Satar & Norhidayah Abdul Hassan
ICSIE 044-029	Road Traffic Noise for Asphalt and Concrete Pavement	A Awwal, N Mashros, S A Hasan, N A Hassan, N Darus & R Rahman

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 3		
8:30 AM – 10:15 AM ROOM 1		
ZOOM ID: 934 4565 4040 Moderator: Dr. Nurul Hidayah Mohd. Kamaruddin Telegram Link: https://rb.gy/e9xnhk		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 030-023	Seismic Performance of Low-Rise Building using Graded Concrete as Flexural Elements	Hakas Prayuda, M M A Pratama, P Puspitasari, Y Novitasari, W Damayanthi, S Arifurrizal & A A Permanasari
ISUCOS 059-072	Non-Destructive Investigation of a 44-Years-Old RC Structure Exposed to Actual Marine Tidal Environments using Electrochemical Methods	Pinta Astuti, Khalilah Kamarulzaman & Hidenori Hamada
ISUCOS 074-060	Comparison of Thermomechanical Properties of Kenaf and Polypropylene Fibers	Salmia Beddu, Amalina Basri, Zakaria Che Muda, Fatyn Farahlina, Daud Mohamad, Zarina Itam, Nur Liyana Mohd Kamal & Teh Sabariah
ISUCOS 076-064	Comparative Study of Indonesian Spectra Response Parameters for Buildings According to 2012 and 2019 Seismic Code	Restu Faizah & Rahma Amaliah
ISUCOS 058-036	A Review: Evaluation on Strength Capacity of Concrete using Micro Steel Fiber	Adib Fikri Abdul Manaf, S Shahidan, M F N Mazlan, S Ramasamy, S S M Zuki, M A M Azmi & N Ali
ISUCOS 060-043	Effect of Durian Sawdust as a Partial Replacement of Fine Aggregate in Concrete	Siti Noratikah Che Deraman, Muhammad Afif Daniel Abdul Rashid, Siti Asmahani Saad, Nadiah Md Husain & Siti Aliyyah Masjuki
ISUCOS 040-017	Utilization of Bamboo Matting Waste for Paving Block Mixed Design	Arthur Daniel Limantara, Fauzie Nursandah, Bambang Subiyanto, Hery Lilik Sudarmanto, Satriyani Cahyo Widayati & Sri Wiwoho Mudjanarko
ISUCOS 067-052	Effects of Loading Rates on Concrete Compressive Strength	Aiman Irfan Abdullah

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 4		
10:45 AM – 12:45 PM ROOM 1		
ZOOM ID: 945 5088 0697 Moderator: Ir. Dr. Shahrul Niza Mokhatar Telegram Link: https://rb.gy/3j4iu9		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 055-031	Potential Mixture Cold Lava Sand and Volcanic Ash as a Mixture of Concrete	Rika Deni Susanti, Rafiza Abdul Abdul Rajak, Jefrianto Gowasa & Devi Indryani Siahaan
ISUCOS 003-002	Framework of Factors for the Improvement of the Significant Clauses in the Standard Form of Contract for the IBS Construction Approach in Malaysia	Mohd Ashraf Mohd Fateh& Mohd Reeza Yusof
ISUCOS 038-054	The Role of POFA and Recycled Plastic in Enhancing Concrete Properties	Siti Rahimah binti Rosseli, Muhd Norhasri Muhd Sidek, Nor Hafida binti Hashim, Nor Aida binti Mohd Mustafa & Nina Najirah Mohd Ali
ISUCOS 031-056	An Investigation of Self-Compacting Concrete Incorporating Banana Skin Powder as Partial Cement Replacement	N. Mohamad & Siti Khalidah binti Abdul Aziz
ISUCOS 049-030	The Effect on Thermal Properties of Concrete Containing Micro Steel Fiber (CMSF)	Suchitra Ramasamy, Shahiron Shahidan & Adib Fikri Abdul Manaf
ISUCOS 069-067	Mechanical Properties of Oil Palm Shell Lightweight Aggregate Concrete	Zalipah Jamellodin, Lam Phooi Sim, Huang Chai Qing, Suraya Hani Adnan, Norhafizah Salleh & Noor Azlina Abdul Hamid
ISUCOS 020-044	Optimization of Cuttlefish Bone towards Compressive Strength of Foam Concrete	Daliah Hasan
ISUCOS 087-076	Visual Inspection and Determining Bridge Load Rating over Torrential River Rimac in Lima, Peru	C Blas, F Fernandez & E Carrera
ISUCOS 072-073	Physical Model on Effects of Tunnelling towards Single Piles Under Zoned of Influence	Feras Abuallan, Siti Norafida Jusoh, Houman Sohaie, Aminaton Marto, Hisham Mohamad & Afikah Rahim

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 5		
2:00 PM – 3:00 PM ROOM 1		
ZOOM ID: 998 6859 5799 Moderator: Dr. Nurul Hidayah Mohd. Kamaruddin Telegram https://rb.gy/pvjlkr		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 019-009	The Effectiveness of Demolished Tile Material for Soil Improvement: A Review	Ermyza Hillary, Faizal Pakir, Nur Adila Ab. Aziz & Aziman Madun
ICSIE 036-024	Effect of Polyurethane Mix Ratio on the Strength of Polyurethane Treated Marine Clay	J W Bak Sen, N Z Mohd Yunus, S Saleh, K Ahmad,A Rahim & K Mat Said
ICSIE 048-038	Investigates the Effect of Utilizing Fly Ash and Bottom Ash as a Replacement of Aggregate Dust In Porous Asphalt Mixtures for Sustainable Cities and Communities	Syahirah Mansor, Suria Haron (Dr.), Mohd Izzat Joohari, Mazlina Razali & Rozaini Ramli
ICSIE 016-020	A Review of Different Type of Granular Materials in Rigid Pavements	Hazirah Bujang, Mohamad Yusri Aman & Mohammad Nasir Mohamad Taher

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 3		
8:30 AM – 10:15 AM ROOM 2		
ZOOM ID: 996 2008 8243 Moderator: Dr. Nur Shaylinda Mohd. Zin Telegram Link: https://rb.gy/8gphgc		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 001-001	Awareness of Construction Professionals from the Northern Region of Malaysia about Low Carbon Building Materials	Mohd Rohim Omar, Afizah Ayob, Safwati Ibrahim, Mustaqqim Abdul Rahim, Hafnidar A. Rani, Hamizah Mokhtar & Shaiful Munir Leman
ISUCOS 013-007	Punching Shear in Reinforced Concrete Flat Slabs in Multi-Storey Car Park Building Structure	Jeffrey Choong Luin Chiang & Tan Weng Zun
ISUCOS 070-069	Shear Strength and Elastic Modulus Behavior of Coconut Fiber- Reinforced Expansive Soil	Anita Widianti, Willis Diana & Muhammad Rojkhan Alghifari
ISUCOS 080-066	Acoustic Emission Analysis of Corroded Concrete Beam under Flexural Test	Ahmad Zaki, Zainah Ibrahim & Tan Jun Ying
ISUCOS 081-074	Cyclic Loading Test for Segmental Concrete-Filled Hollow Precast Concrete Columns and Foundation Connection	Guntur Nugroho
ISUCOS 026-040	The Development of New Generation of Manikin for Outdoor Thermal Comfort Evaluation " A Literature Review	Rhubenthiraan Kelundapyan & Mohd Azuan Bin Zakaria
ISUCOS 033-032	Structural Performance of Reinforced Self-Compacting Concrete Columns Produced with Palm Oil Fuel Ash	Kasali Adebayo Mujedu, Mariyana Aida Ab- Kadir & Mohammad Ismail
ISUCOS 064-050	Strength Properties of Green Concrete Mix With Added Palm Oil Fibre and Its Application as a Load-Bearing Hollow Block	Prof. Ir. Dr. Abdul Aziz Abdul Samad, Mohammad Zulhairi Mohd Bosro, Muhammad Afiq Tambichik, Prof. Dr. Noridah binti Mohamad & Dr. Goh Wan Inn

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 4		
10:45 AM – 12:45 PM ROOM 2		
ZOOM ID: 973 0929 5509 Moderator: Sr. Dr. Nazirah Mohamad Abdullah Telegram Link: https://rb.gy/k5gxys		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ISUCOS 003-015	Revisit the Financial Issues and the Impact to Construction Project in Malaysia	Mohd Ashraf Mohd Fateh & Tan Hee Yee
ISUCOS 050-025	Structural Performance of Lightweight Foamed Concrete Slab Strengthening with Fibres: A Review	Noridah Mohamad
ISUCOS 068-053	Enhancement of Project Management Practices in UAE Construction Industry through Agile Management Principles: A Survey	Mohammad Alyammahi, A. Suratkon & A. Budiea
ISUCOS 073-057	Overview of the Development of Relocatable Offshore Platform in Marginal Fields	Noor Shaerra Amiera Mohd Sharif & Montasir Osman Ahmed Ali
ISUCOS 053-058	Applicaartificial Neural Network on Health Monitoring of Offshore Mooring System	Yee Xin En, Ir. Dr. Mohamed Mubarak Abdul Wahab & Dr. Montasir Osman Ahmed Ali
ISUCOS 077-063	Structural Behaviour of PSCC Slab Panel under Four Point Bending Test	M.A. Iman, N. Mohamad, A.A.A Samad, W.I. Goh, M.A. Tambichik & M.Z.M. Bosro
ISUCOS 071-055	Experimental Study For Flexural Behaviour Of Precast Aerated Concrete Panel (PACP) under Flexure Load	Noor Hazlin Abdul Rahim, Noridah Mohamad, Abdul Aziz Abdul Samad & Goh Wan Inn
ISUCOS 064-070	Shear Strength Capacity of a 2-Span Continuous Reinforced Concrete T-Beams Strengthened with Carbon Fibre Reinforced Polymer (CFRP) Sheets using The Modified Khalifa & Nannis Theoretical Method	A A Abdul Samad, M B S Alferjani, N Mohamad, M H Ahmad, N. Ali & O. Elzaroug
ISUCOS 084-071	Case Study on the Impact of Artificial Light on Lighting Performance Quality for Architecture Studio	N A Adnan, N S Sujali & N D Md Amin

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 5		
2:00 PM – 3:00 PM ROOM 2		
ZOOM ID: 912 2125 0986 Moderator: Dr. Eng. Pinta Astuti Telegram https://rb.gy/dpxmxo		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 030-026	Convergence Study for Rock Unconfined Compression Test using Discrete Element Method	Muhammad Irfan Shahrin, Rini Asnida Abdullah, Mohd Nur Asmawisham Alel, Radzuan Saari, Nurul Ain Ibrahim, Nur Ain Mat Yusof & Mohd Fadhli Abd Rashid
ICSIE 052-036	Evaluation of Control Performance at Signalised Roundabout: Case Study at Bulatan Seksyen 15, Bandar Baru Bangi, Selangor, Malaysia	Muhammad Danial Rosli, Sitti Asmah Hassan, Nordiana Mashros, Azman Mohamed & Nur Sabahiah Abdul Sukor
ICSIE 031-018	Design of Road Curve using Unmanned Aerial Vechicle (UAV) Image	Siti Aishah Nordin, Mustaffa Anjang Ahmad, Shahiron Shahidan, Nurul Izzati Raihan Ramzi Hannan & Norbazlan Mohd Yusuf

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 3		
8:30 AM – 10:15 AM ROOM 3		
ZOOM ID: 972 7787 2977 Moderator: Dr. Nor Hazurina Othman Telegram Link: https://rb.gy/qwmnrs		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSEWR 011-043	Development of Water Quality Monitoring Device using Arduino Uno	Muhammad Izz Hakimi Zaidi Farouk
ICSEWR 013-042	Estimating Carbon Sequestration of Green Roof Plants in Tropical Climate	Mohamad Norfekry Md. Yacob, Hartini Kasmin & Muhammad Iqbal Hakeem Hashim
ICSEWR 024-018	Existence of Microplastics in Indonesias Surface Water: A Short Review	Firdaus Ali, Khalidah Nurul Azmi & Madina Rain Firdaus
ICSEWR 045-037	Metals Contamination on Soil and Surface Water (Earth Drainage) Due to Leachate Migration from Piyungan Landfill.	Nursetiawan, Nor Amani Filzah Mohd Kamil, Nur Shaylinda Mohd Zin & MS Sahar
ICSEWR 049-045	Analysis of Sand Mining Impacts on Riverbed in the Downstream of the Progo River, Indonesia	Jazaul Ikhsan, A Rezanaldy & M. A. Z Mohd. Remy Rozainy
ICSEWR 012-006	Betta Persephone: The Challenges in Only Existed Natural Habitat; Ayer Hitam Peat Swamp Forest (Ahpsfr), Muar Johor.	Mohd Rafiq Bin Mujilan, Noor Adelyna Mohammedd Akib & Nazirah Binti Mohamad Abdullah
ICSEWR 023-028	Simulation of Chlorine Decay in Water Distribution System using EPANET	Nur Shazwani Muhammad & Siew Ming Shin
ICSEWR 006-031	Identification of Pollutant Sources on PM10 (Case Study: West Surabaya)	T N Ciptaningayu, A D Syafei & M Santoso

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10:45 AM – 12:45 PM ROOM 3		
ZOOM ID: 969 4759 5779 Moderator: Dr. Wesam A.Y. Almadhoun Telegram Link: https://rb.gy/8aklac		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSEWR 034-023	Identification of Indoor Air Quality (IAQ) Sources in Libraries through Principal Component Analysis (PCA)	Amalina Abu Mansor, Sunarti Shamsul, Samsuri Abdullah, Nazri Che Dom, Nur Nazmi Liyana Mohd Napi, Ali Najah Ahmed & Marzuki Ismail
ICSEWR 033-024	Spatio-Temporal Modelling of Noise Pollution	Nur Nazmi Liyana Mohd Napi, Mohd Hafizul Zainal, Samsuri Abdullah, Nazri Che Dom, Amalina Abu Mansor, Ali Najah Ahmed & Marzuki Ismail
ICSEWR 032-025	Clay as Sustainable Building Material and its Benefits for Protection in the Built Environment	Muntari Yar' adua Mudi
ICSEWR 003-002	Discovering Source of Residents Complaint on Air Quality: Preliminary Studies on Particulate Matter (PM2.5) and Sulphur Dioxide (SO_2)	Nor Amani Filzah Mohd Kamil, M N Nur-Nabilah, O Norzila, A W Nurul-Bahiyah & M K Khairuddin
ICSEWR 036-027	A Column Study on the Efficiency and Reusability of Kapok Fibre as Car Wash Wastewater Treatment	Nor Haslina Hashim, Weng Chun Chen, Muhammad Shahrul Shafendy Ibrahim, Nor Maizzaty Abdullah & Zarizi Abdullah
ICSEWR 052-048	Effect of Electromagnetic Field on The Efficiency of Acetogenic Treatment of Pome	Mustafa wajdi, Khalida Muda, Nur Syamimi Zaidi, Mohd Hafiz Puteh & Mohamad Darwish
ICSEWR 041-032	Streamflow Simulation of Progo River by using Swat Model	Pradipta Nandi Wardhana
ICSEWR 028-021	The Use of Waste Disposal of Woven Result of Bamboo for Mixed Standard Mix Design Paving Block	Arthur Daniel Limantara & Fauzie Nursandah
ICSEWR 002-001	Analysis of Song Putri Reservoir Storage Area on Sedimentation Rate using Mathematical Model Approach	Novi Andhi Setyo Purwono

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 5		
2:00 PM – 3:00 PM ROOM 3		
ZOOM ID: 920 3245 9682 Moderator: Dr. Ani Hairani Telegram https://rb.gy/xamfe1		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSEWR 025-016	Contribution of Settlements in Urban Area in Earth Conservation Efforts	Elizabeth Titiek Winanti, Indiah Kustini & Heri Suryaman
ICSEWR 038-029	Parameter Design Analysis of Rice Husk as Activated Carbon in Wastewater Treatment	Nursyazwani Muhammad & Norashikin Ahmad Kamal
ICSEWR 037-039	Measurement of Riverbank Erosion Rates of Pusu River using Erosion Pins Method	Nur Aqilah Mohd Rosli, Saerahany Legori Ibrahim, Rabitah Handan & Md Noor Bin Salleh
ICSEWR 021-014	The Management Trends on the Collection and Recovery of the Household Bulky E-Waste in Malaysia	Nurul Aini Osman, Norazli Othman, Roslina Mohamad & Shreeshivadasan Chelliapan
ICSEWR 016-011	Influence of Low Frequency of Magnetic Field on Sludge Bulking under Long Sludge Retention Time	Nur Syamimi Zaidi, Khalida Muda, Johan Sohaili, Muhammad Burhanuddin Bahrodin & Norelyza Hussein

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 3		
8:30 AM – 10:15 AM ROOM 4		
ZOOM ID: 942 9986 7919 Moderator: Dr. Ahmed Mokhtar Albshir Budiea Telegram Link: https://rb.gy/2J6sU1u		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 040-030	Mapping of Blackspots Accident Area at North South Expressway to Produce Expressway Advisory System	Nur Shazwana Md Mansor, Muhamad Razuhanafi Mat Yazid, Nurul Aisyah Abdul Rashid, Aizat Mohd Taib & K Ambak
ICSIE 044-032	Assessment of Young Drivers Behaviour and Driving Speed along Horizontal and Vertical Alignments	W N Sakinah, N Mashros, S A Hassan, R Faiz, M Azman & R Rahman
ICSIE 027-045	The Comparison of Pile Bearing Capacity using 8 Direct Method Based on Cpt Data in Surabaya Area	Putu Tantri Kumala Sari & Mila K. Wardani
ICSIE 054-039	Sex Disparity in Satisfaction and Loyalty Towards Urban Rail Transit: A Survey of Light Rail Transit (LRT) Passengers in Kuala Lumpur, Malaysia	Ahmad Nazrul Hakimi Ibrahim & Muhamad Nazri Borhan
ICSIE 046-051	Influence of the Pulverised Method on the Plasticity and Strength Behaviour of Cement Stabilised Clayshale and Sandstone	Edi Hartono, Agus Setyo Muntohar & Nurza Purwa Abiyoga
ICSIE 033-056	Traffic Congestion Evaluation at Unsymmetrical Signalized Intersection of Sentul, Yogyakarta	Noor Mahmudah, Bayu Segara Anjasmoro & Muchlisin
ICSIE 054-040	An Overview of Heavy Vehicle Accidents Characteristic on Expressways in Malaysia	Norhafizah Manap, Muhamad Nazri Borhan, Muhamad Razuhanafi Mat Yazid, Norhashidah Manap & Nur Atiqah Wahid
ICSIE 047-042	The Effectiveness of Home Delivery for Grocery Based on External Cost	Nahry & Meshal Raghvendra Edvian

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 4		
10:45 AM – 12:45 PM ROOM 4		
ZOOM ID: 988 6229 9698 Moderator: Ts. Dr. Ahmad Fahmy Kamarudin Telegram Link: https://rb.gy/xtrepi		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 042-043	The Strength Behaviour of Eggshell Powder Substitution on Soil- Lime Stabilization	Willis Diana, Anita Widianti &Edi Hartono
ICSIE 011-005	Effect of the Polypropylene Fibre as Full Replacement of Filler on Asphaltic Concrete Performance	Mohd Izzat Joohari, Mohd Khairul Azhar Ismail, Afifuddin Habulat & Anis Nabilla Che Rosadi
ICSIE 017-008	Pullout Resistance of Sand-Geosynthetics Reinforcement	Mohd Khairul Azhar Ismail, Mohd Izzat Joohari, Afifudin Habulat & Fairus Azwan Azizan
ICSIE 056-044	Effects of Curing Time using Crushed Coconut Shell (CCS) and Coconut Shell Ash (CSA) as Additive to Improve Lateritic Soils	Rozaini Ramli, N A Wan Mansor, J Idrus, S Mansor & N H H Abdullah
ICSIE 060-049	Development of Paver Block Containing Recycled Plastic	Lillian Gungat, Fulgentius Anthony, Abdul Karim Mirasa, Hidayati Asrah, Nurmin Bolong, Nurul Ariqah Ispal and Siti Jahara Matlan
ICSIE 034-053	Traffic Detection Program using Image Processing and the 1997 Indonesian Highway Capacity Manual (MKJI)	Muchlisin Muchlisin, Farah Afina Wijayanti & Nurtia Amanda
ICSIE 062-052	A Study on Durability for Rigid Pavement Against Acid Environment and Displacement Model	Wahyu Widodo
ICSIE 041-033	Properties of Bitumen Modified with Latex under Short Term Aging	Ululazmi Jamaris, Norhidayah Abdul Hassan, Mohd Zul Hanif Mahmud, Haryati Yaacob, Sitti Asmah Hassan & Che Ros Ismail
ICSIE 035-023	Examination of Lane Changing Duration Time on Expressway	Haydar Ataelmanan Ali Mohamed, Othman Che Puan & Sitti Asmah Hassan

DAY TWO: 2 DECEMBER 2020 (WEDNESDAY) PARALLEL SESSION 5		
2:00 PM – 3:00 PM ROOM 4		
ZOOM ID: 999 2478 7270 Moderator: Mr. Emil Adly Telegram https://rb.gy/3m0OcMM		
PAPER ID	**PAPER TITLE**	**AUTHORS**
ICSIE 058-047	Development of Web Based Mapping Program for Spatially Distributed Slope Stability Analysis	Raden Harya Dananjaya, Noegroho Djarwanti & Bindra Jati Gunawan
ICSIE 061-054	Identification of Black Spots on Bekasi City Roads	Widodo Budi Dermawan & Ester Arina Wardani
ICSIE 014-011	Settlement Reduction of Peat Soil Columns Improved using Muf-P Polymer Resin	Mohd Nazrin Mohd Daud & Nik Norsyahariati Nik Daud
ICSIE 053-037	Plastic Solutions for Pullout Capacity of Suction Caissons in Clays Considering Anisotropic Undrained Shear Strengths	Suraparb Keawsawasvong & Teerapong Senjuntichai
ICSIE 039-025	Geotechnical Characteristics of Waste Steel Dust (SW104) for Soil Improvement Works	Nor Hafizah Hanis Abdullah

Abstracts – ISuCOS 2020

ISuCOS 2020: 001-001

Awareness of Construction Professionals from the Northern Region of Malaysia about Low Carbon Building Materials

Mohd Rohim Omar, Afizah Ayob, Safwati Ibrahim, Mustaqqim Abdul Rahim, Hafnidar A. Rani, Hamizah Mokhtar and Shaiful Munir Leman
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Abstract. Despite current global market conditions, a superior financial climate has lowered the demand for innovative low carbon building materials, with construction owners typically prioritizing project value, time, practicality, and aesthetics. This situation creates an obvious dilemma for practitioners and stakeholders, as carbon emission linked to the use of construction materials should decrease. This study presents the awareness among the construction professional in the northern states of Malaysia in relation to low carbon building materials (LCBM) via interviews and structured questionnaire surveys conducted with 93 companies of architects and civil and structural consultants. Of 76.9% valid responses, 44.6% to 51.4% claimed to be Aware and have a good knowledge about unfired earth bricks, prefabricated hollowcore floor system (PHFS), and prefabricated timber frame system; however, their usage remained low. PHFS provided satisfactory experiences to practitioners and ranked the highest (20.3%) in the recommendations for future projects. The sustainability and suitability of a particular LCBM is highly determined on-site, has project specific influences, and varies across structures types from project to project.

ISuCOS 2020: 007-003

Effect of sugar on Compressive Strength, Drying Shrinkage and Carbonation of Mortar

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Abstract. Mortar is one of the construction materials used worldwide which used to bind building blocks such as stones, bricks, and concrete masonry units. This paper presents the experimental investigation on the effect of sugar on setting time of cement and compressive strength, drying shrinkage, and carbonation of mortar using composite cement. Different percentages of sugar varying from 0 to 0.08 % by weight of cement was selected as retarder. It was found that the initial and final setting time of composite cement paste increased with the increase of sugar dosage. The maximum initial and final setting time occurred when sugar content is 0.08 %, where it increased the initial time from 100 to 550 min and increased final setting time from 135 to 610 min. All specimens were subjected to air curing. The compressive strength and carbonation specimens were tested at 7, 28, 56, 90, and 150 days while for the drying shrinkage prisms, tests was conducted at 150 days. The compressive strength of mortar containing 0.06% sugar increased by 9.25 % at age 150 days compared to control specimens, while the drying shrinkage of mortar was less affected by sugar. The carbonation depth test shows that all specimens are almost the same with a slight increase in specimens that contain sugar.

ISuCOS 2020: 010-005

The Present and Future of Building Materials: A Geomimetic Approach

V S Lesovik, R S Fediuk, Mugahed Amran and Norwati Jamaluddin

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Abstract. Understanding the stage of the evolution of science is impossible without relying on a specific stage in the context of the development of society. Building materials science has achieved some success in making composites that ensure the building/structure safety, which includes safeguarding against the natural and man-made impacts. Besides, another milestone in building science of materials comprises the technological evolution for developing new composites, aiming to produce a robust structural concrete system. Understanding this trend is desirable from the standpoint of a new design and synthesis of building materials using an innovative initial material base. Optimization of the “man – material – environment” system is a difficult mission, which entails multidisciplinary approaches. Within the framework of the new theory of “geomimetics” in building science of materials, the concepts of technogenic metasomatism, the law of affinity microstructures, and the possibilities of creating composites that respond to operational loads by “self-healing” of defects are first formed. The purpose of the article is to introduce the basic principles of the science of geomimetics in terms of design and synthesis of building materials.

ISuCOS 2020: 012-006

A Review: Study on Waste Rubber as Construction Material

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Jamilus Research Centre, Faculty of Civil Engineering & Built Environment, Universiti Tun Hussein Onn Malaysia, 86400, Parit Raja, Batu Pahat, Johor
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Abstract. Sustainable construction is highlighted in current development as the environmental issue is one of the major issues of global concern. This issue also relates to waste generated each year. The bulk of waste was estimated to increase, which can reduce space in the world and can cause pollution. Many researchers have come up with inventions and ideas to manage that situation. Some researchers use the waste rubber in a concrete mix as a partial coarse or fine aggregate replacement. The alternative in a concrete mix depends on the size of the rubber that is used and the appropriateness. In this paper, the critical perspective of waste rubbers discussed in detail. It is shown from the review that if compared with the existing one, there is some reduction in the workability and mechanical properties of concrete. Rubberised concrete, however, still has its superiority in terms of energy absorption. The use of pozzolanic material in the concrete mix, the application, the proportion of rubber and the choice of rubber types helps a lot to compensate for the weakness of rubberised concrete.

ISuCOS 2020: 013-007

Punching Shear in Reinforced Concrete Flat Slabs in Multi-Storey Car Park Building Structure

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Abstract. Punching shear failure had been the cause of some fatal accidents that had occurred in the past in flat slabs of car park structure. A number of such failure reports had identified the underlying reasons being in the use of outdated or obsolete standards

which have been phased out. Therefore the design and analysis of punching shear strength in reinforced concrete flat slab is a key procedure that requires precision and accuracy. Over the years, although researchers had done a lot of experimental studies on the behaviour of flat slab structures, but the punching shear failures still happened despite many precautions being taken when designing for the car park structure. In this paper, some data that had been presented by previous researchers are used to identify the few design criteria for multi storey car park structure, and these results will also be compared with Eurocode 2 and two other standards, namely the phased out BS8110 and ACI318. From there the analysis for punching shear in multi storey car park structure is carried out using the Eurocode 2 approach considering the varying design parameters such as the sizes of column, slab thickness, span between columns and shapes of column. These parameters played a major role in assessing the punching shear strength in multi storey car park structure. In the model simulation, it was found that among the four selected parameters for study, the thickness of slab and the column size adopted are key factors that can enhance the punching shear strength capacity. On the other hand, the use of square column was proven to have an average of 27% higher punching shear strength than circular column. Besides that, the span between columns in two plane directions are best to range around 6m and 7m but due to car park functional expectations, a flat slab bay areas of 8m x 6m and 9m x 6m can be recommended for the purposes of accommodating more car park spaces.

ISuCOS 2020: 016-008

Smart Trowel Tool for Smooth Plastering Work

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Abstract. Plastering is the most important activity in construction works. It is done widely as a finishing technology for interior and exterior walls made of bricks, concrete or timber, as it provides heat insulation, sound absorption and protection against air pollution and weather, thus providing a clean, level surface for further finishing tasks. Plastering work usually consumes time and involves a lot of cement wastage. A trowel is used as a tool in plastering work but yet time consumption is high in completing the work. It is because the

design of the trowels and the quality of the trowel itself is not suitable for plasterers. This study focuses on designing a smart trowel tool for smooth plastering work for low-cost residential building, and to compare the time consumption for the smart trowel tool with the conventional method. The smart trowel tool was tested with 4 experts from the construction industry at the end. The main aspect that was taken into consideration in determining the most suitable materials to build this tool was the time factor in conducting and completing the plastering works. The feedbacks given through expert validation was positive and suggested that such a tool should be marketed in the related field. This is mainly because the smart trowel tool that was build tends to give comfortability and convenience to its' users. The tool further plays the role of as environmentally friendly that contributes towards sustainability. Lastly, the smart trowel tool consumes lesser time compared to the conventional method.

ISuCOS 2020: 019-009

Potential of Activated Carbon in Lime Mortar Plastering in term of Fire Resistance and Thermal Performance

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Abstract. The use of lime mortar plastering for wall construction in residential and light commercial buildings has increased significantly over the world. Unique characteristic of hydrated lime increases the strength of the tensile bond. The larger the amount of cement content in cement lime mortar, the low the air content thus the bond strength stronger. The performance of plastering under fire exposure is an item of major importance in securing construction. Activated carbon is one known adsorbent which has a high capacity to adsorb gases and improved fire resistance ability of concrete. The purpose to conduct this study is to identify the optimum proportion of lime mortar plastering containing activated carbon with different percentages which is 0%, 10%, 30% and 50% as cement replacement. Therefore a fire resistance test was conducted on cement plaster mixtures with variable ratio content of activated carbon to identify the optimum

proportion according to the temperature reading by an infrared thermometer for 30 minutes. Based on the results obtained, the sample with 30% activated carbon as cement substitution was the most effective since it gave a relatively low initial temperature reading which was 28.2 .The test showed only a slight increase in temperature after the first five minutes which is 93.1% and reached 108.2 at maximum even after 30 minutes of testing. There was no hair crack developed and no visible of smoke observed from the sample compared to existing plaster which formed hair crack and visible of smoke at 280 after 16 minutes of testing. Therefore, 30% of activated carbon is the optimum proportion in lime mortar plastering due to ability to resist fire and prevention from hair crack and visible smoke formation. This proportion can be applied to the interior and exterior wall of the building especially at the compartment wall and along the escape route.

ISuCOS 2020: 025-010

Sustainable Concrete with Scrap Tyre: Impact on Strength and Health

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Abstract. The increasing of scrap tyres is unknown to what extent these tyres are disposed of in a way that is environmentally friendly and legal. Therefore, one way should be worked out to reduce scrap tyres and preserving the environment. To relate the issue of achieving environmental sustainability with the construction industry, this study was carried out by adopting scrap tyres crumbs replacing coarse aggregates in the concrete mixture called as tyre crumbs concrete (TCC). This study aimed to investigate the compressive strength of TCC and the effect of its use as construction materials, to consumer health. The TCC mixtures were designed in various replacement of coarse aggregate with tyres crumbs of 5%, 10%, and 15% over coarse aggregate volume. All specimens were tested in both material strength and environmental laboratory to determine TCC structural strength and also the hazardous level of TCC to the life health through water quality test. The result of this study found that 10% of the scrap

tyres replacement is the most optimum TCC mixture design in which the strength is similar to the control concrete. The environmental test on curing water also found the pH, BOD, and COD gave no harmful substances leaching from the cube specimens. In conclusion, the use of scrap tyres in concrete manufacturing can reach the sustainability of construction resource, environmentally and economically, in line with Sustainability Development Goal 2030, the agenda of the United Nations Development Program.

ISuCOS 2020: 028-011

Empirical Frequency Response Function Data used for Non-probabilistic Artificial Neural Networks to Consider Uncertainties in Damage Detection

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Abstract. The modern application of frequency response function (FRF) with artificial neural networks (ANN) has become one of the leading methods in the field of vibration-based damage detection. However, since full-size empirically obtained FRF data is used as ANN input, it will result in a wide composition range of the ANN input layer. Therefore, principal component analysis (PCA) is always used to reduce the size of the FRF data. Despite this, PCA alone is unable to be effective in selecting important information from the actual FRF data, due to the large size of FRF data in addition with existing uncertainties. Therefore, this study proposes the combination of a non-probabilistic ANN based-method with PCA to consider the uncertainties and the inefficiency of using empirical FRF data for damage detection. The empirical FRF data is obtained from a steel truss bridge model. The results show that the highest PoDE values of 95% are obtained at the exact damage locations and the DMI values show the severity of the damage at the actual damage locations. Overall, the results show that the proposed method is efficient in dealing with uncertainties using FRF for damage detection.

ISCEE 2020 VIRTUAL CONFERENCE

ISuCOS 2020: 024-012

Physical and Mechanical Properties of Cement Board Made from Oil Palm Empty Fruit Bunch Fibre: A Review

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Abstract. Oil palm empty fruit bunch (OPEFB) fibre has been introduced to replace current materials mainly such as wood fibre that was not encouraged to be used as a construction sourced due to the sustainability of wood fibres and prevents the high demand of forest resources. In Malaysia, the cultivation and use of the oil palm and its products have increased because of high market demand, and this has resulted in the abundant availability of the empty fruit bunch (EFB). The EFB fibre geometry and particle size in the EFB cement bonded boards have their own mechanical and physical properties. The fibre to cement ratios are also different to boards made out of wood fibres. This experimental research work has been conducted by other researchers. The larger the particle size, the better the compaction of EFB-CB effects of cement setting by much larger surface on the board area. Short particles lead to low values of modulus of elasticity (MOE), caused by inadequate of empty fruit bunch (EFB) particles to cement substances. Nevertheless, short particles avoid large void spaces and irregularities towards cement board. Using different Cement-EFB fibre ratio has direct influence on thickness swelling (TS), modulus of rupture (MOR), and modulus of elasticity (MOE). Strength of EFB-CB depends on the bonding between fibre and cement composites. The pre-treatment fibre was indicated where the EFB fibre composite were dimensionally stable for bonding mechanisms and could be used for both interior and exterior building utilizations based on the tested physical and mechanical properties on cement-boards.

ISuCOS 2020: 029-013

Analysis of Digital Technologies for Prevention of Accidents in Construction of High-Rise Building Projects

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Abstract. Over several decades, the building sector has been regarded as a high-risk sector with a low degree of creativity and a reluctance to adopt change. Likely reasons for building incidents include human misconduct, unsafe work practices, faulty machinery and dangerous working conditions. Furthermore, to have a better and safer operating climate, the company can take advantage of new health and safety technology. This paper seeks to investigate the use of various emerging innovations and how they can be used to improve health and safety in the construction of Highrise building projects. Detailed analysis of literature from previous researchers on new technologies and interventions for construction job site safety such as Virtual Reality (VR), online databases, Building Information Modelling (BIM), RFID, 3D Computer-Aided Design (3D CAD), 4D Computer-Aided Design (4D CAD), wearable robotics, and sensor-based technologies was carried out. It was evidenced from the analysis that not only the utilisation of these new technologies can contribute in improving health and safety in high rise building projects, but also the viability of their implementation in the building industry.

ISuCOS 2020: 039-016

Recycled Glass Cullet as Fine Aggregate and Partial Cement Replacement in Concrete

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Abstract. Utilisation of recycled glass cullet in concrete has obvious benefits with respect to environmental conservation and sustainable development. The problems of rising landfills can be reduced. Reduction of primary aggregates for concrete where alternative

materials would suffice can also be fulfilled. Glass also contains large amounts of silicon and calcium which means that in theory, is pozzolanic. However, the possibility of alkali-silica reaction (ASR) due to the presence of silica must also be addressed. Tests were performed to investigate the suitability of using cullet in concrete. A sieve analysis was performed to determine the size distribution of the cullet and provided basis to the range of samples that could be cast. Using cullet as partial replacement aggregate in concrete has resulted in minor increases in concrete consistence (workability) and minor reductions in compressive strength. When ground glass cullet (GGC) was used as 30% partial cement replacement, the consistence increased considerably, whilst the later age compressive strength was close or higher (depending on the mix proportions used) compared to the corresponding control mixes, which did not have GGC incorporation. The early age strength was lower and strength development was slower at early ages further suggesting likelihood of pozzolanic activity. Accelerated ASR tests have shown the occurrence of ASR in concrete mixes using cullet as replacement aggregate to be more than control mixes which used conventional aggregate. The magnitude of ASR was also found to be colour dependant- green coloured cullet resulted in less expansion than when using amber cullet. Qualitative microstructural analysis of specimen micrographs recorded in Secondary Electron Imaging (SEI) mode using a Scanning Electron Microscope (SEM) have shown that mortar specimens using cullet displayed more cracking at longer curing periods. Cracks propagated from, and surrounded the glass particles, further suggesting the occurrence of ASR activity. Depending on size classification used, glass cullet can therefore be recommended to be used as partial aggregate replacement and partial cement replacement in concrete. The possibility of durability attack due to ASR reaction must however be taken into consideration.

ISuCOS 2020: 040-017

Utilization of Bamboo Matting Waste for Paving Block Mixed Design

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Abstract. This research was conducted to find the optimum percentage value of woven bamboo fibre as a coarse aggregate substitute to achieve the minimum compressive strength according to SNI 03-0691, 1996. The absorption percentage also observed so that later produced paving with bamboo fibre with compressive strength and intake. This research uses a trial and error method. The sample is tested in a cube with 15x15x15 cm as many as 20 pieces with paving quality planned are K-225 or 18,675 MPa. The percentage substitution ratio is derived from the crude stone's volume acting as coarse aggregate on the paving block mixture. Making test specimens is done by testing the material's characteristics, and the waste of bamboo fibre is spread layer by layer. Testing the compressive strength of concrete paving is done at 28 days. The average compressive strength test results with different percentages of woven bamboo fibre of 0%, 5%, 15%, 25% are 20.7 MPa, 17.6 MPa, 12.3 MPa, and 9.9 MPa. The optimum compressive strength based on the minimum standard of 17 MPa paving blocks is 7% and has an optimum absorption of 0.13%.

ISuCOS 2020: 030-018

The Utilization of Lapindo Powder as a Material for High Strength Concrete

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Abstract. This study discusses the utilization of Lapindo powder for pozzolan material in the manufacture of high-quality concrete. The existence of Lapindo mud is one of the disasters that destroy many

residential areas. This mud is still increasing in volume without being able to be utilized by the community. In terms of its chemical properties of Lapindo mud, processed into a powder, it has no hydration properties when mixed with water, but it can harden naturally. This research has investigated the characteristics of high-quality concrete by utilizing the mud of Lapindo as additional material. The examinations are workability, compressive strength, tensile strength, moisture content, water absorption, and porosity. The specimens were made in a cylindrical shape with a 75 mm diameter with a height of 150 mm. The test results show that Lapoindo powder can be used as additional material to manufacture high-quality concrete. The composition suggested through this study is 10% of the weight of cement. The compressive strength for 10% Lapindo content is 45 MPa at 28 days.

ISuCOS 2020: 041-019

Performance of Fly Ash and Silica Fume Self-Compacting Concrete Filled Steel Tube Stub Columns under Axial Compression

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Abstract. Experimental research on the performance of fly ash and silica fume self-compacting concrete filled steel tube (FSS CFST) stub columns under axial compression were conducted. The main parameters varied in the tests are steel tube's diameter to thickness ratio, D/t (from 20 to 33), and yield strength (from 275.83 MPa to 350.51 MPa). The self-compacting concrete grade used as infill is M60 concrete with 50% and 10% addition of fly ash and silica fume, as partial replacement of Portland cement. The performance of FSS CFST stub columns is examined via the axial compression capacity, load-shortening response, and mode of failure of 12 specimens. The results indicate that the ultimate axial load capacity of the columns increases as the D/t ratio decreases. The FSS CFST columns have a maximum concrete contribution ratio of 3.72, a strength index greater than unity, and a ductility index of 2.431 and below. The predicted values obtained using Eurocode 4 closely estimate the test results with a mean of 0.927 and a standard deviation of 0.073. Conversely, the

predicted values using ACI code are more conservative with a mean of 1.341 and a standard deviation of 0.089.

ISuCOS 2020: 046-021

Study on Condition Assessment Metrics based Facilities Condition Index and Building Condition Index

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Abstract. This paper presents several types of condition assessment metrics that were used by previous literatures. The condition assessment metrics are developed to supports decision-making for stakeholders in accomplishing the maintenance priority and proposed budget-driven. These condition assessments have both advantages and disadvantages to support the building infrastructure and asset management. This paper studies two groups of condition indexes which are monetary- derived and engineering-derived approach. Both approaches are well-known methods to determine the condition index of buildings or facilities. Monetary approach involved a facility condition index, FCI. The FCI can be determined through estimation of deferred maintenance listed from basic, intermediate and advanced parameters. On the other hand, the engineering-derived approach is mostly referred to the Building Condition Index, BCI. Findings focused on the critical review from the rating system, conditions and recommendations that have been used by the FCI and the BCI. It was found that the disadvantages of the facility condition index can be improved through the integration of the BCI during the process. The details and quantitative figures that can be determined from the BCI will help an efficient FCI determination. Besides, BCI approach can also be used independently to give fast and first-hand findings on the conditions of buildings or facilities to the stakeholders. In conclusion, an efficient building and asset management can be offered by considerations in combining the BCI and FCI to promotes "best practice" when evaluating the condition assessment due to defects and deteriorations of assets and facilities.

ISuCOS 2020: 030-023

Seismic Performance of Low-Rise Building Using Graded Concrete as Flexural Elements

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Abstract. Graded concrete is a material innovation in the field of civil engineering that aims to create environmentally friendly and economical construction materials. Previous research has shown that graded concrete increases material rigidity so that graded concrete can increase the level of serviceability of structures, indicated by the decreasing of deflection. Investigations on the performance of structures using graded concrete as building material need to be studied further with broader structural indicators. Further studies related to structural performance including base shear reactions, fundamental periods, storey stiffness, storey drift, and storey displacement, should also be discussed. In this study, a 3-storey residential building is modelled using ETABS in 3D approach. The effect of disparity in concrete strength on structural performance is examined.). The buildings that employ graded concrete as a construction material can offer a better level of occupant comfort due to the lesser vibration period generated. The application of graded concrete in beam components can increase the value of the storey stiffness. It is because of the greater the modulus of elasticity, the greater the stiffness produced by the beam. It increases the confinement of the enclosed plate so that the stiffness of the building floor also increases. The use of high strength concrete in the beams will change the mode shape of the structure from flexure to shear type. In shear mode shape, the column will form a double curvature so that the mode shape of the structure tends to form a convex pattern. The benefit of the shear-type mode shape is the lesser value of storey displacement at the top level.

ISuCOS 2020: 044-024

Space planning of classroom kindergarten: A case study of KEMAS kindergartens in Batu Pahat, Johor, Malaysia

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Abstract. The numbers of kindergarten in Malaysia boost every year as a learning environment for children as preparation for them to face the next level of education in primary school. Thus, comfortable learning environments are essential to enhance not only well-being but also increase the productivity and learning of the children. Therefore, the importance of organization and utilization of spaces can influence children's activities and learn. This paper aims to identify the criteria of space planning and the issues of space comfort of the public kindergarten in Batu Pahat, Johor, Malaysia. By using a case study as a method, the observation of the classrooms and interviews with the teachers of the kindergarten emphasized the specific space planning applied in public kindergarten. However, some issues are highlighted regarding interior decoration and space arrangement by the occupant. Data obtained hopefully will give some ideas and benefit for the future direction of kindergarten's teacher, authority, architect, and designer to improve the quality of the physical environment, especially in creating space for children.

ISuCOS 2020: 054-027

Effect of Water-Cement Ratio on Mechanical Properties of Rubberized Fly Ash Concrete

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Abstract. One of the efforts to reduce the dependency of concrete production on natural resources along with carbon reduction is by

utilizing recoverable materials as concrete constituents such as crumb rubber from scrap tires and fly ash from industrial waste. This study is aim to investigate the mechanical properties of rubberized fly ash concrete which utilized crumb rubber and fly ash as a replacement for a proportion of fine aggregate and cement, respectively. Crumb rubber was used to replace 5 and 10% fine aggregate while fly ash was used to replace 10% OPC by weight. Three different water-binder (w/b) ratio, 0.55, 0.50 and 0.45, were used. The concrete specimens were prepared and tested for their density, compressive strength, splitting tensile strength, and flexural strength. Result gathered from the experimental works show a reduction in properties of rubberized concrete when compared to conventional concrete. By using lower w/b ratio, the reduction tends to decrease and rubberized concrete with 0.45 w/b ratio recorded comparable density and strength to that normal concrete. The use of a lower water-binder ratio in concrete mix improved the strength of rubberized fly ash concrete equivalent to the normal concrete, allowing for usage of green materials in real building construction.

ISuCOS 2020: 043-028

Structural Performance Assessment of High Strength Concrete Containing Spent Garnet under Three Point Bending Test

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Abstract. The utilization of river sand for miscellaneous construction purposes had directly increased due to rapid growth of construction industry. This fact caused over exploitation of riverbeds and troubled the eco-system. This study aims to find out the optimum percentage of spent garnet in high strength concrete and to forecast the structural performance of high strength concrete containing spent garnet with the previous research results. This study focusing on comparing and forecasting the utilization of 0%, 10%, 20%, 30% and 40% spent garnet as a sand replacement in high strength concrete at the age of 28 days. The level of 20% replacement of sand seen to be the optimum percentage of spent garnet for this concrete mixture to enhance its structure performance. It is concluded that, utilization of

spent garnet in high strength concrete production able to reduce the dependency on river sand and lesser the waste from landfill.

ISuCOS 2020: 049-029

A Review: Evaluation on Strength Capacity of Concrete and Micro Steel Fiber

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Abstract. Concrete has been used for a very long period in construction sites all over the globe. Concrete is very crucial in producing structural members in any building structure. It has to be strong enough to bear the loads of building so that it will not be failed. In order to increase the strength of concrete, this study has been focussing on the critical review on concrete containing micro steel fibre. In this study, the research is to determine whether the usage of micro steel fibre can improve the compressive and splitting tensile strength of concrete or not. Generally, as the content of micro steel fibre in the concrete matrix increases the strength of the concrete show an improvement in term of compressive strength and tensile strength. All the tests conducted in all the paper that has been reviewed are following the standard test of British Standard. In a nutshell, the addition of micro steel fibre in concrete has a significant effect in terms of compressive strength and also tensile strength to the concrete itself. The mechanical strength of concrete is expected to increase compared to normal concrete; however, the tensile strength does not show any improvement.

ISuCOS 2020: 049-030

The Effect on Thermal Properties of Concrete Containing Micro Steel Fiber (CMSF)

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Abstract. Nowadays, the improvement of construction materials towards sustainable construction materials had become important. Due to the hot and sunny climate in Malaysia, the consumption on electricity increases. This causes a decrease of comfort in residence. This study was conducted to determine the thermal properties for concrete consists of micro steel fibers (MSF). In this study, a series of concrete cubes that consists of different percentage of MSF (0%, 0.2%, 0.4%, 0.6%, 0.8%, 1.0%) was made in order to carry out compression test. Then, a Hot Guarded Box was used to obtain the optimum percentage of MSF in the concrete for thermal conductivity. As a result, the optimum percentage of MSF obtained from the compression test was 0.8% with a reading of 25.7Mpa. While, the optimum percentage of MSF obtained for thermal conductivity 0% with a reading of 0.34 W/mk. As a conclusion, it was proven that the inclusion of MSF in a concrete matrix will increase the thermal conductivity.

ISuCOS 2020: 055-031

Potential Mixture Cold Lava Sand and Volcanic Ash as A Mixture of Concrete

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Abstract. Mount Sinabung is a mountain volcano is active that exist in North Sumatra. To minimize the impact that occurs then the ashes of volcanic and sand lava cold can be used as a material replacement in part of cement and aggregate fine. The purpose of this study was to determine the effect of using volcanic ash as a partial substitute for cement and cold lava sand as a partial substitute for fine aggregate

on the compressive strength value. Variations of the mixture were made by adding 5%, 7.5% , and 10% at the immersion age of 7 days, 14 days, 21 days, and 28 days. The test object used is a cube with a size of 15 cm x 15 cm x 15 cm. Results of the study showed that the mixture variation 5% by the age of 28 days can be used as an ingredient mixed early concrete because the value of compressive strength approaching normal concrete. The value of the compressive strength of concrete with a mixture of 5% is obtained at 16.78 MPa, 7.5% of 15.68 MPa, and 10% of 16.02 MPa. The compressive strength of the concrete obtained is still below normal compressive strength.

ISuCOS 2020: 030-033

The Effect of Palm Shell as Coarse Aggregate Replacement on Self Compacting Concrete with Different Curing Methods

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Abstract. Self-Compacting Concrete (SCC) is a type of concrete that can compact itself without the aid of a vibrator or human labor. This concrete is very suitable for work on concrete structures that are difficult to be compacted manually. This study aims to determine the effect of replacing coarse aggregate using palm kernel shell waste. The variation of the shells used was 40%; 50% and 60% of the coarse aggregate volume. Utilization of palm shell waste is expected to reduce the use of natural resources as the main material for concrete and utilize waste optimally. The examination consists of fresh and hardened properties. Fresh properties test is one of the mandatory requirements that must be carried out on self-compacting concrete. The fresh properties check consisted of slumpflow, T-50, J-Ring, V-Funnel and L-Box. Meanwhile, the hardened properties test were carried out in the form of compressive strength and splitting tensile strength. Hardened properties testing was performed when the specimens were 3, 7, 28 and 56 days old. The curing process is carried out until the concrete is 7 days old with a method consisting of sealed curing, moist curing, water curing, air curing and oven curing.

ISuCOS 2020: 056-034

The Key Criterias in Deciding to Tender for Construction Projects

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Abstract. Planning for a construction project is a formidable task which involves a huge investment with multiple stakeholders such as clients, consultants, and contractors. A tender is a submission of a technical, administrative, and contractual material made by a potential contractor in response to an invitation to tender by the project client. Established contractors normally realise the importance of doing initial research before committing themselves to enter the tender. Normally, tender pre-qualification is a strict process. A low-quality tender submitted due to problems such as insufficient time and incomplete tender documents normally lead to tender rejection by the client. Thus, this research aimed to provide a strategy to help the contractors in deciding whether they should or should not submit a tender at the initial tendering decision phase. The literature review was focused on the key factors identified in influencing the decision making process and in the final part, the initial conceptual model was established.

ISuCOS 2020: 057-035

Performance of Sodium Silicate as Self-Healing Agent on Concrete Properties

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Abstract. The most used and important materials in the construction industry are concrete. Even though concrete is strong and durable, but it is still exposed to the crack. The most severe phenomenon of cracking happens in concrete without adequate and prompt care, and the framework of the crack continues to grow, which ultimately involves substantial potential maintenance costs increase. This study aims to investigate the effect of sodium silicate as self-healing agent on engineering properties and to observe the influence of sodium silicate inclusion in concrete on the microstructural characteristics.

The self-healing mechanism in a concrete help in reducing the cracking problem as it could delay the deterioration time and reduce the interaction of humans in managing the crack. Sodium silicate used in the concrete reacts with calcium hydroxide that already contains in the concrete to produce a new kind of binding material, namely calcium silicate hydrate (C-S-H). The outcome of the study has developed green and new technology to the concrete production in achieving sustainability.

ISuCOS 2020: 058-036

A Review: Evaluation on Strength Capacity of Concrete Using Micro Steel Fiber

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Abstract. Concrete is widely use in the field of engineering especially in the construction. Although, it was commonly used in the construction field, concrete was generally brittle and have many disadvantages such as weak in tension and poor in cracking. This issue has led to enhance the strength of concrete in term of compressive and tensile strength. Therefore, numerous researchers have found a way to improve the mechanical properties of concrete by adding additive material such as micro steel fiber (MSF). This study presents the critical review about effect of micro steel fiber in the different type of concrete in term of mechanical properties which were compressive and tensile strength. A method of systematic literature review was done to identify the relevant paper for this study. The test that were review for this study was slump test, compressive strength test and tensile test. The result from the review showed that the compressive strength of concrete only will increase in the normal concrete with the fiber volume of 0.5% until 2%. Meanwhile, the result of compressive test was show decrease in the self-compacting concrete due to the different water content for this type of concrete with normal concrete. Besides that, a review in tensile strength showed that the normal concrete, self-compacting concrete and ultra-high performance concrete was increased the tensile strength of concrete with the fiber volume 0.5% until 2%. In conclusion, different type of concrete obtained different effect when there was an additional

of micro steel fiber in the mixture. It was ideal to add micro steel fiber in concrete in order to improve the tensile strength.

ISuCOS 2020: 034-037

Hydration Behaviour and Properties of Binary Blended Rice Husk Ash Cement Paste

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Abstract. For the hydration process of Rice Husk Ash (RHA) – cement blended mixtures to be fully explored and understood, the degrees of Cement, RHA-Cement reactions, non-evaporated water and free-lime contents as well as fresh properties and compressive strengths were determined at varying ages. Mixes of PC and RHA-PC blended cement pastes at replacement levels of 0, 5, 10, 15, 20, 25, 30, 35, 40 45 and 50 % respectively, by mass of PC labelled as PC, 5RHA-PC, 10RHA-PC, 15RHA-PC, 20RHA-PC, 25RHA-PC, 30HA-PC, 35RHA-PC, 40RHA-PC, 45RHA-PC and 50RHA-PC at a constant W/b ratio of 0.50 were used for this study. From the aforementioned mixes, fresh properties such as water of consistency and setting times were determined. Mortar cubes (50 x 50 x 50 mm) were cast and cured at 7, 14, 21, 28, 56 and 90 days and compressive strength determined at each aforementioned test age, then, there was stop hydration of the crushed specimens by immersion in a mixture of methanol to acetone (1:1) for one hour, filtered and dried for two hours. The sample was crushed and sieved through a 75µm sieve. Non- evaporable water content was determined by the loss on ignition method as well as free-lime content by the glycerol/ethanol method for each mix at same curing ages. PC and PC – RHA mixes were compared. Test results showed that water of consistency and setting times increased gradually with the addition of RHA as it replaced PC. Furthermore, compressive strength increased steadily up to 28 days and then gradually up to 90 days for the PC, but for the blended (RHA-PC) mixes, equating and surpassing control mix values at ages after 28 days for pastes with RHA less than 30 % replacement of PC. This is attributed to pozzolanic reactions with Ca (OH)2 liberated from cement hydration at later ages in addition to the cement hydration at early ages. For pastes containing RHA more than 30 % of PC, compressive strength was less than control values attributed to dilution effect. The

trend in behavior for the non- evaporable water content is same with compressive strength but the free – lime content steadily increased up to 28 days and gradually with increase in RHA content up to 90 days for the PC paste, but for RHA-PC Pastes, they increased up to 56 days and then decreased up to 90 days. These results could enhance modelling of the behavior of RHA-PC blended cement paste.

ISuCOS 2020: 037-039

Optimum Mix Design of High Performance Concrete Containing Micro POFA Using Historical Data Design

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Abstract. This paper presents the optimized mix design based on the response surface methodology (RSM) in producing high performance concrete (HPC) by utilizing palm oil fuel ash (POFA) as cement replacement material. The historical data design was used based on the existing testing data determined from the laboratory experiments. The variable in this study includes POFA percentage (10%, 20%, and 30%). The concrete mixes were tested both for fresh and hardened properties of high performance concrete. The optimized level for POFA in the HPC mix proportion was determined by the maximization of workability, early, 28 days', and later compressive strength. The response of each mix that contains POFA showed a significant increase in the workability and compressive strength with respect to the plain HPC. The results presented the optimum solution for mix design of high performance concrete with POFA that achieve the targeted goal performance criteria (fresh and hardened properties).

ISuCOS 2020: 026-040

The Development of New Generation of Manikin for Outdoor Thermal Comfort Evaluation: A Literature Review

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Abstract. All Urban Heat Island (UHI) is expected to be a disastrous challenge to human in the following decade as a result of continuous urbanization without appropriate planning and design. The impacts of UHI are even getting worse due to large population density with improper building design especially in dense metropolitan cities. A lot of research has been carried out for UHI phenomenon both in tropical and seasonal climates. There are many factors contributing to the formation of UHI phenomenon that includes increasing rate of urbanization and population density, uncontrollable factors and controllable factors. In a fundamental study, a prolonged exposure to heat impact will significantly contribute to human discomfort and health problems resulting in heat-related illness. Since the consequences of UHI are considered to be more significant, the severity of the problem should be critically examined and carefully reported. Many research efforts have been implemented for making conceptual design and also a wide range of literature is available for continuing the mitigation strategies. The development of thermal manikin is one of mitigation effort to investigate the occurrence of UHI and to evaluate thermal comfort in microclimate conditions as representative of human simulation model. Hence, this paper focused on the suitability of porous material for new generation of manikin that is suitable for outdoor thermal comfort evaluation. The input for this paper can be a step forward in evaluation of outdoor thermal comfort and increase awareness of society and government about the effects of human thermal comfort.

ISuCOS 2020: 060-043

Effects of Durian Sawdust as a Partial Replacement of Fine Aggregate in Concrete

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Abstract. Recently, many researches all over the world are focusing on ways of utilizing either industrial or agricultural wastes as a source of raw materials for the construction industry. The aim of this study is to determine the optimum proportion of durian saw dust as partial replacement for fine aggregate. These wastes utilization would not only be economical but may also help to create a sustainable and pollution free environment. Durian sawdust is one such fibrous waste-product from durian skin. In this paper, untreated durian sawdust has been partially replaced in the ratio of 0%, 5%, 10% and 15% by volume of fine aggregate in concrete. Fresh concrete tests like compacting factor test and slump test were undertaken along with hardened concrete tests like compressive strength test and UPV test. The result shows that durian sawdust of 5% partially replacement of fine aggregate can be used for structural and non-structural purposes.

ISuCOS 2020: 051-045

Indoor Thermal Comfort Assessment in Office Buildings in Hot-Humid Climate

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Abstract. This paper aims to assess the user's perception of thermal comfort and air conditioning in office buildings in Batu Pahat, Johor area. Field experiments were conducted utilizing environmental measurement and Post Occupancy Evaluation (POE) in Batu Pahat District Land Office (Pejabat Daerah) and (C2 and ORICC) office

buildings in the Universiti Tun Hussien Onn Malaysia (UTHM). The environmental measurement was conducted using thermal comfort station BABUC A, whereas the POE was based on the ASHRAE55-2010 standard. The environmental parameters included relative humidity, air temperature, and air velocity. They were measured and compared with MS-1525, ASHRAE 55, and ISO 7730 standards. Results indicated that indoor air temperature in C2 has good compliance with MS-1525, ASHRAE 55, and ISO 7730 standards and criteria with a measured comfort range of 24 °C-26 °C. Whereas for ORICC and Pejabat Daerah, temperatures were a bit lower than the suggested range. At the same time, the range of relative humidity was found to be higher than ASHRAE limits but complied with other standards. Moreover, adequate air velocity standards were not met in the three office buildings, in which they were measured within 0.4-0.5 m/s range. Furthermore, thermal comfort levels and the POE survey results indicated that users' in hot tropical office buildings could acclimate to a higher indoor environment than what was suggested by standards.

ISuCOS 2020: 041-046

Performance of Square Steel Tubular Stub Columns In-filled with Fly Ash and Silica Fume Self-Compacting Concrete under Concentric Loading

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Abstract. Concrete filled steel tube (CFST) column is a composite member comprising of structural hollow steel tube and concrete core. This paper evaluates the effect of fly ash (FA) and silica fume (SF) on square CFST stub columns' behavior under concentric loading. The self-compacting concrete (SCC) grade used is M60 with the addition of 50% FA and 10% SF as a partial replacement of Portland cement. The performances of the fly ash-silica fume self-compacting (FSS) CFST columns are examined through the axial compression capacity, the load-shortening response, and the failure mode of stub columns. The axial load of the FSS CFST columns is compared with the international design codes to validate the available design codes' accuracy. The results yield that the FSS CFST columns' ultimate axial

load capacities range between 1408.80 kN and 808.70 kN, while the reference CFST columns' capacities range between 1332.80 kN and 789.20 kN. FSS concrete improves the concrete contribution ratio and strength index of the square CFST stub columns. However, reference CFST columns demonstrate better ductility than FSS CFST columns. This is attributed to the brittleness of the FSS concrete. All the square CFST stub columns fail via local buckling. Eurocode 4 slightly over predicts the square CFST columns' ultimate capacity by an average of 4.58%. The American Concrete Institute (ACI) code, on the other hand, over predicts the axial capacity of the CFST stub columns by an average of 17.46%.

ISuCOS 2020: 062-047

Coconut Coir Mat for Slope Vegetation

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Abstract. Soil erosion occurs naturally in the environment due to elements like wind, water, and gravity. The loss of soil from the land surface can be detrimental to both terrestrial and aquatic environments by depleting nutrients, increasing runoff and affecting aquatic life. There are plenty methods that can be used to control soil erosion. One of the common methods is using erosion control blanket such as geotextile, turf reinforcement mats etc. The problems with current blanket are the manufacturer is focusing on duration of the blanket to decompose without considering the effectiveness to help plants grow. Therefore, this research was conducted to investigate the potential of coir mat by using coconut coir as the main material to promote the growth of plants roots along with reducing soil erosion and to identify the different of shear strength of soil with and without coir mat. It was evaluated by studying the effectiveness of coir mat by monitoring growth of plants roots whilst soil was evaluated by determining its shear strength, both with coir mat and without coir mat via Direct Shear Test. From Visual Inspection Test conducted, coir mat influencing the growth of plants roots where the fibrous of roots with coir mat is uplifting compared to without coir mat. In term of length, roots with coir mat is shorter than without coir mat as nutrient supplies in the soil decrease length of roots but increasing roots fibrous. As for Direct Shear Test, the presence of coir mat does not affect the value of cohesion and decreasing the value of friction angle and shearing resistance compared to without coir mat, respectively. Therefore, coir

mat can be used as an alternative in reducing soil erosion because the fibrous of roots with presence of coir mat is uplifting compared to without the presence of coir mat and help in increasing nutrients supplies in the soil along with helping growth of roots to reduce soil erosion even though coir mat does not significant in increasing shear strength parameter.

ISuCOS 2020: 062-048

Facility Management in Private Finance Initiative Project in UTHM Pagoh Campus

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Abstract. Facility management (FM) in Private Finance Initiative (PFI) involved a long-time process and duration in improving the infrastructure and associating the facilities. FM will give a support role or service within an organisation that have been strategically integrated approach to operating, maintaining, improving and adapting the buildings and supporting services in order to create natural environment. In a long-term relationship, facility management need to evolve to a higher strategic level in compliance with the organisations strategy. At the end of the process, it will achieve best value and performance on delivery of support services. In this research, direct observation has been done to analyze facility management provided in UTHM Pagoh Campus. Furthermore, the satisfaction level of building occupants also was investigated by using different measurement factors in a structured questionnaire to measure the effectiveness. Hence, the results concluded that the total overall satisfaction of users towards facility provided by private sector are mostly satisfied among building occupants. From the results obtained, outdoor area was ranked first out of eight measurement factors. An interview has been done in order to clarify the success of facility management. It can be summarized that all the facility supplied by private sector were meets Key Performance Indicators (KPIs), by meant it also need to improvised their services provision.

ISuCOS 2020: 063-049

Shear Behaviour of Patched Reinforced Concrete Beam with Web Reinforcements

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Abstract. Damage occurring in a reinforced concrete beam (e.g. spalling) can reduce the beam's capacity to withstand external loads. The damage becomes more critical if it occurs in the shear span since it may lead to shear failure. Patching of the damage zone with suitable patch repair material could be the best option for restoring the shear capacity of the beam. This research investigates the shear behaviour of a patched reinforced concrete beam. The patching material used is unsaturated polyester resin (UPR) mortar. The behaviour of this beam under flexure-shear load is compared to that of a normal reinforced concrete beam. The behaviours investigated include the load-deflection behaviour, strains of both longitudinal and web reinforcement, and cracking behaviour. The results indicate that the UPR mortar is capable of restoring the strength of the damaged reinforced concrete beam. The characteristics of UPR mortar (low elastic modulus and high strength) can be the origin of the overall behaviour of the patched reinforced concrete beam.

ISuCOS 2020: 066-051

Numerical Analysis of Corrosion Induced Cracking in Reinforced Concrete Structure

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Abstract. Computer simulation is one of the approaches that can be used to study the effects of corroded reinforcement on concrete structures. Several researchers have used finite element (FE) software to understand more clearly the relationship between corrosion parameters, such as attack penetration and loss of steel section with deterioration parameters such as cracking and spalling, which affect the residual capacity of concrete structures. The objective

of using numerical analysis in the current study is to understand the effects of corrosion expansion on the behaviour of surface crack width. Furthermore, the study will help to determine parameters for the experimental investigation. The output from the previous works will be used to model specimens with different bar diameters and bar locations using a finite element approach. The results from the finite element analyses will be discussed subsequently.

ISuCOS 2020: 067-052

Effects of Loading Rates on Concrete Compressive Strength

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Abstract. Concrete structures are subjected to loadings which can be static or dynamic and in most cases, both. Deeper understanding on how concrete behaves to different modes of loading needs to be assessed, particularly the rate; and to study its effects, a property of concrete such as its compressive strength requires to be examined in relation to the changes in the loading rates. Different loading conditions or rates can alter how cracks in concrete are formed in terms of crack velocity and crack intensity in regions where stress equals to the applied pressure. However, various studies have shown contradicting results with respect to how varying loading rates may affect the compressive strength of concrete. This research conducted 5 different concrete mixes to study the effect of loading rate on compressive strength of concrete. Concentric uniaxial loading, in terms of pressure as opposed to displacement, was subjected to the hardened concrete cube specimens at different loading rates increasing constantly at 0.2 MPa/s and 0.4 MPa/s which are within the standard limits. Moreover, loading rates beyond the extremes were also subjected in one of the mix design for study and analysis purposes. Results showed that there is a relatively minor relationship between the loading rate and the compressive strength for both specimen sizes in which the trend shows that the higher the loading rate, the higher the compressive strength but with minimal deviation in the magnitudes of the strengths.

ISuCOS 2020: 038-054

The Role of POFA and Recycled Plastic in Enhancing Concrete Properties

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Abstract. This paper presents the experimental investigation conducted on Grade 30 concrete incorporating Palm Oil Fuel Ash (POFA). POFA is an agro-industrial waste from palm oil which creates uncontrolled landfill disposal to our country, detected with high silica-alumina that act as a good pozzolanic material as binder similar to cement. Together with POFA, this study also incorporates treated Polyethylene Terephthalate (PET). Total 45 concrete cube specimens size 100 x 100 x 100 mm were prepared with 5 different mol of Sulphuric Acid to treat PET. The workability of fresh concrete properties was tested through slump test and the hardened concrete performance were confirmed by compression test at 7, 14 and 28 days. Based on the results, treated PET with 8 mol Sulphuric Acid and 5% POFA concrete significantly improves consistency compared to the control specimen. This resulted from the liquidation technique applied to POFA during the concrete mixing process that functions as a liquid lubricant which can easily blend with cement component. Furthermore, 5% POFA and 8 mol treated PET concrete shows better enhancement in strength due to the interaction between raw POFA that act as filler and PET act as fiber reinforcement to help the concrete.

ISuCOS 2020: 075-059

Comparative Study of Indonesian Seismic Codes Applied on Vertically Irregular RC Building in High Seismicity Region

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Abstract. The Aceh earthquake suffering Indonesia in 2004, and some big ground motions afterward led the earthquake-resistant building standard provisions to be updated. The rise of ground motions increases the lateral forces, so reevaluating existing buildings is needed, especially for Irregular buildings, which are more vulnerable than the regular ones. This study investigates the increase of earthquake loads and the building response in the high seismicity region due to the updated Indonesian code from SNI 1726:2002 to SNI 1726:2012. Building A in DI Yogyakarta with vertical irregularity on a certain floor is chosen as the object to be studied. There are two types of seismic loads to be simulated, response spectrum and time history analysis. The building is simulated using the numerical program, and four ground motion histories are selected for the dynamic exiting forces. The analysis result shows an increase in the story force either in the response spectrum or the time history. By taking the building's top floor as the reference point, the increase in lateral displacement is also detected in both response spectrum and time history analysis. From the interstory drift ratio examinations, it is also found that there is a weak point located on the setback part that is not identified just by observing the total displacement. This paper compiles the comparison of two versions of the Indonesian seismic code, two types of seismic force, and two points of view in analyzing the building response. Furthermore, the result presented in this paper also beneficial for mitigating the building.

ISuCOS 2020: 074-060

Comparison of Thermomechanical Properties of Cement Mortar with Kenaf and Polypropylene Fibers

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Abstract. In the past decades, Fiber Reinforced Concrete has been gaining more attention in the concrete research development. There are many advantages of the inclusion of fiber into reinforced concrete structures. It was found that the inclusion of fibers in concrete, be it synthetic or natural, resulted in the improvement of the thermal properties of concrete, as well as its strength to some extent. However, the inclusion of fibers in concrete does affects its thermo-mechanical properties. The objective of this study is to identify the potential of the addition Polypropylene and Kenaf fibers in cement mortar at different compositions (0.1%, 0.2%, and 0.3%). Eight mixes were analyzed for this purpose. Upon investigating the flow ability, compressive strength, tensile strength, and thermal conductivity of the mortar samples, it was found that the incorporation of PP and Kenaf fibers reduced the flow ability. Cement mortar samples containing 0.1% addition of PP and Kenaf fibers show the highest compressive strength compared to other percentages, while samples containing 0.3% addition of PP and Kenaf fibers show the highest tensile strength compared to other percentages. The thermal conductivity of mortar samples shows reduction when high percentages of both fibers were used.It can be concluded that, the incorporation of certain percentages of fibre can improve both mechanical and thermal properties.

ISuCOS 2020: 052-061

Linear-Elastic Stress Field of Notched Concrete Beam: An Application of Finite Element in Theory of Critical Distances

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Abstract. Fatigue failures occur in all structures including brittle and ductile structures. However, the study on fatigue in ductile material like metal and steel has tremendously developed compared to brittle material such as concrete. Fortunately, the Theory of Critical Distance (TCD) is witnessed successfully assess fatigue fracture in concrete. In obtaining one of the outputs using TCD which is critical distance, fatigue limit of concrete that is obtained through laboratory testing and stress field generated using computational analysis engineering software (CAE) are required. In this article, the concern will be on producing the valid and reliable stress field data since inaccurate input into the CAE will result unreliable output that is exposed to errors. In order to guarantee the result is accurate, validation works were conducted in pre-process and post-process phase while analysing finite model using ABAQUS. As the outputs comply accordingly based on the validation works, the critical distance is confidence to be consumed for the subsequent research related to TCD.

ISuCOS 2020: 030-062

Finite Element Analysis on Flexural Behavior of Non-Prismatic Longitudinal Section Reinforced Concrete Deep Beam

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Abstract. Increasing of building constructions demand affects the innovation for developing structural elements, especially in the beam element known as deep beams. The deep beam is a popular beam with an adequate ratio of a/d < 1.0. Therefore, Compared to the standard beam, the strength of the deep beam shows better. It also can be applied to various construction. Based on observations in the field, the length of the cross-section of the deep beam varies significantly, starting from the prismatic and non-prismatic shapes. Therefore, this research has conducted to determine the effect of non prismatic longitudinal section variations on the RC deep beam behavior using finite element method. The simulation model analyzed consists of one prismatic longitudinal section and two types of the non-prismatic longitudinal section. The result shows that the non-prismatic longitudinal of the deep beam gives effects on slightly decreasing flexural load, ductility and failure mode. The failure modes shown in models show the same characteristics, which are both experiencing shear failure.

ISuCOS 2020: 076-064

Comparative Study of Indonesian Spectra Response Parameters for Buildings according to 2012 and 2019 Seismic Code

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Abstract. The Indonesian government has determined a new seismic code for structural design of buildings and non-buildings, namely SNI 1726:2019. This new code is a revision of the previous code of 2012. The fundamental difference between the two seismic codes of 2012 and 2019 is in the earthquake hazard map (EHM) that was used. 2012 seismic code uses the EHM-2010, while 2019 seismic code uses the EHM-2017. The EHM-2017 has been updated by revising a data of subduction parameters and updating the number of active fault from 81 to 251. This revision has an impact on increasing the spectral value of SS and S1 which is a parameter that must be reviewed in structural planning. This study investigated the seismicity status of 34 cities in Indonesia by comparing the values of the spectra response parameters (SDS and SD1) according to seismic code of 2012 and 2019. This study found that the SDS and SD1 value from 2012 to 2019 increased in 15 cities but decreased or remained in 19 other cities. The cities that experienced an increase of SDS and SD1 values were Bandar Lampung, Banjarmasin, Bengkulu, Gorontalo, Jayapura, Manokrawi, Medan, Palembang, Palu, Pangkal Pinang, Pontianak, Serang, Surabaya, Tanjung Selor, and Yogyakarta. It seems that the vulnerability assessment of the existing building in the 15 cities must be done to estimate their capacity under earthquake load designed by 2019 Seismic Code. Overall, Jayapura city has the highest of SDS and SD1 values in 2019 compared to SDS of the other cities.

ISuCOS 2020: 079-065

Experimental Study: Shear Behaviour of Reinforced Concrete Beams Using Steel Plate Strips as Shear Reinforcement

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Abstract. Stirrups bars are widely used as shear reinforcement in reinforced concrete beams. It is quite attractive to explore the use of another type of material for stirrups. This study aims to investigate the shear behaviour of reinforced concrete beams using steel plate strips and conventional stirrups as shear reinforcement. Two full-scale reinforced concrete beams were tested to fail in shear in this experimental program, and the test parameter for this study was the types of shear reinforcement. The shear resisting behaviour of the beam specimens was discussed by evaluating the crack patterns, load-deflection response and the shear strengths of the beam specimens. The shear capacities determined experimentally were compared with the prediction values calculated based on the Modified Truss Theory. The ratio of the measured to estimated shear strength in the steel plate RC beams and reference beam showed a fairly good agreement as these ratios were only slightly different. Results of this study show that there is only a slight difference in the global behaviour of the steel plate RC beam and the reference beam using conventional stirrups.

ISuCOS 2020: 080-066

Acoustic Emission Analysis of Corroded Concrete Beam under Flexural Test

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Abstract. Corrosion of reinforced concrete (RC) structures have been one of the major causes of structural failure. Early detection of the

corrosion could help limit the location and the extent of necessary repair, as well as reduce the cost associated with rehabilitation work. The acoustic emission (AE) technique, one of the non-destructive methods, is more effective for assessing steel corrosion in the RC structures. The AE technique successfully monitors and analyse energy signals released from the fracture of the concrete matrix by steel corrosion activity using AE sensors placed on the concrete surfaces. The main objective of this study is to utilize the AE technique for flexural behaviour assessment of corroded RC beam specimens under loading test. Three concrete beams were performed for evaluation of corroded specimens using the AE technique. During the experiments, the corroded specimens were flexural loaded together with data acquisition by AE technique. The data obtained were processed and AE parametric-based analysis was carried out. The AE technique was successfully conducted for fracture monitoring of the corroded specimen under flexure load. The AE parameters include the AE hits and Ib-value of AE data were successfully introduced to assess the flexure behaviour of the corroded beam specimens.

ISuCOS 2020: 078-068

Progressive Collapse of a Single Layer Schwedler Dome

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Abstract. Single layer Schwedler Dome composed of Circular Hot Hollow Frame (CHHF) is investigated to understand the effects of individual member removal to the behaviour and stability of single layer dome. The failure of space structure such as Sultan Zainal Abidin Stadium and Bucharest Dome clearly show an understanding of such failure and the behaviour of the space structure is important to develop a safer structure especially in the future. This study deals with a single layer dome having a diameter of 52 m and the span to depth ratio of ½. The loads subjected on the nodes of the structure consists of dead, live and wind loads and assumed to be 1kN each. Due to the symmetric geometry of the dome, the removals were done on the quarter section of the dome only assumed that the loads distribution patterns are similar for each section. This study required 210 members' removals and the result obtained has been analysed

thoroughly. In order to achieve the objectives of the research, computer programming such as FORMIAN, AutoCAD and SAP2000 V18 have been used to generate the geometry of the dome and afterwards analysed the stability of the structure. Demand Capacity Ratio (DCR) has been used as a parameter to measure the redistribution pattern of the loads applied on the structure. The structure has been set to have DCR value of less than one during the initial stage of the analysis and the increment of DCR value after the individual member removals were collected. The value of the DCR and the numbers of overstressed members existed in the structure after the removals show the criticality of the section.

ISuCOS 2020: 070-069

Shear Strength and Elastic Modulus Behavior of Coconut Fiber-Reinforced Expansive Soil

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Abstract. Shear strength behavior of expansive soil reinforced by randomly placed fiber depends on the added materials' content. This research investigated the effect of the waste coconut fibers content on the stress-strain relationship, the shear strength parameters, and the mixture's elastic modulus. In this study, the coconut fiber content was varied from 0.25% to 1% with 0% fiber as control. The clay samples were tested after mixing by unconsolidated-undrained triaxial test. In general, according to the test result, the inclusion of randomly placed waste coconut fiber has enhanced the peak deviatoric stress, the shear strength parameters, and the elastic modulus. At 0.6% fiber content, the shear strength and the samples' elastic modulus have increased to 79.46% and 153%, respectively, compared with those not reinforced with coconut fiber.

ISuCOS 2020: 059-072

Non-destructive Investigation of a 44-Years-Old RC Structure Exposed to Actual Marine Tidal Environments using Electrochemical Methods

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Abstract. Investigation of deterioration progress in marine structures without destroying them is crucial as early detection of damage before applying the suitable remedial measures. This study presents a series of non-destructive assessment on a 44-year-old naturally corroded RC structure exposed to marine tidal environments using observation of defective appearances and electrochemical tests. The visual observation was conducted by inspecting the corrosion condition of steel bars, crack patterns, and the spalling of concrete cover. The electrochemical investigations carried out in this research consisted of the half-cell potential mapping, the electrical resistivity of concrete, and the corrosion rate of steel bars. The results revealed that electrochemical test results conducted in this research were in good agreement with the actual deterioration degree checked by defective appearances. The RC structure was categorized as Grade II-1 (first half of the acceleration stage). Based on the deterioration degree, both applications of small direct current to control the potential of steel bars in immunity condition and patch repair method by removing the chloride contaminated concrete were recommended as appropriate repairing strategies, and they could extend the service life the of structure.

ISuCOS 2020: 072-073

Physical Model on Effects of Tunnelling Towards Single Piles Under Zoned of Influence

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Abstract. Rapid development in the urban area leads to a significant decrease of available construction land. Therefore, an alternate solution is by utilizing underground area via tunnel construction, as it can help to accommodate transportations and infrastructures, thus saving the area on the surface for other important construction. However, tunnel excavation causes soil redistribution and settlement. For urban areas where large building used pile for foundation, tunnelling might affect the pile integrity. Therefore, this paper presents a physical modelling to investigate the tunnel-pile-soil interaction. The laboratory tests determined the longitudinal and transverse ground surface settlement induced by tunnelling, as well as the movement and induced bending moment on a single pile foundation. The laboratory testing conducted with constant parameter tunnel cover to tunnel diameter ratio of 2.5 with pile to tunnel distance of 1.5 of tunnel diameter. For validation, initial results were compared with previous findings and shows an agreement. Further test then conducted with higher tunnelling speed. With higher speed, it was found that surface settlements, pile movements and bending moment increases.

ISuCOS 2020: 081-074

Cyclic Loading Test for Segmental Concrete-Filled Hollow Precast Concrete Columns and Foundation Connection

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Abstract. Segmental Concrete-Filled Hollow Precast Concrete Columns (SHPCC) consists of the combination of cast-in-place

concrete and segmental precast concrete. The difference in compressive strength exists between the cast-in-place and precast concrete. The objective of this research is to evaluate the behavior of column-foundation joint of semi-precast concrete column under axial and lateral cyclic loading. column-foundation joint of SHPCC has been evaluated by using ACI T1.1.2005. The result shows that the SHPCC can be used only at the moderate moment resisting frame system (SRPMM).

ISuCOS 2020: 086-075

Literature Review – Most Common Factors for Schedule Delays and Cost Overrun during the Construction Phase of the Project

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Abstract. The construction sector contributes to a country's development by providing real solutions to human needs, improving the gross domestic product (GDP), and providing job opportunities. Besides numerous benefits, the construction industry is a resource-driven sector and faces many challenges. One of the challenges is to complete the construction project on time within the budget that is momentous for the client, consultant, and contractor. However, time and cost overrun are the most common anomalies due to improper management of the constructions. Hence, this article aimed to recognize the most affecting causative factors to delays and cost overrun construction projects. The detailed literature and comprehensively reviewed from 49 research articles of the past three decades found that 'delay in the payment' is the most repeated factor mentioned by 35 researchers in their studies. However, 'poor site management,' labor, material related factors, and 'delay in design development with errors' are the most repeated factors reported by the researches for the delay and cost overrun. This paper also suggests the appropriate strategies and techniques minimize the causative factors of time and cost overruns uncovered from the previous literature.

ISuCOS 2020: 087-077

Repurposing Typical Institutional Hall as Temporary Covid-19 Quarantine Stations in Johor: A Review Study in KKTM

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Abstract. The current situation of the world with the pandemic of COVID 19 has brought a mass conversion of places as a temporary shelter recently. In Malaysia, the list of gazetted sites by the government for the COVID quarantine stations were being retrieved in March 2020 to facilitate Ministry of Health in coping with the sporadic diseases. To achieve lower production cost and rapid execution of disaster shelter for the pandemic, possible open plan spaces in institutional building will be identified to perform temporary medical shelter. Resuscitation area, wards, pharmacy, x-ray room, staff room and meeting rooms are among the required spaces in determining the medical layout planning of the particular quarantine station. A descriptive and qualitative design was being used based on the literature review and case studies in order to get the information and to identify clear demarcation of circulation and movement in the quarantine station. Ultimately, foreseeing holistic changes and novel solutions in construction industry in Malaysia, this result will contribute to further assist authorities to gazette other institutional hall as transitional stay which will be become the norms nowadays.

Abstracts – ICSEWR 2020

ICSEWR 2020: 003-002

Discovering Source of Residents Complaint on Air Quality: Preliminary Studies on Particulate Matter (PM2.5) and Sulphur Dioxide (SO_2)

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Abstract. Based on previous report, air quality in Universiti Tun Hussein Onn (UTHM) main campus can be categorized as good quality. However, high numbers of complaints especially on dust and unpleasant odour received from residents which located adjacent to industrial area in Parit Raja, Batu Pahat, Johor. Thus, this preliminary studies is to discover the source of complaints with focus on Particulate Matter (PM2.5) and Sulphur Dioxide (SO2) concentrations. PM2.5 and SO2 were measured by using Temtop airing 1000 and aeroqual series 500, respectively at five sampling stations in UTHM main campus. Measurement for PM2.5 and SO2 concentrations were collected for 24 hours and 1 hours, respectively from July to September 2019. The average concentration for PM2.5 at KTDI (83.63 ug/m3) and FKAAB (40 ug/m3) were above the allowable limit. PM2.5 concentration was increased 348 times, which from 0.24 g/m3 (2008) to 83.6 g/m3 (2019) by refer to previous study. Meanwhile, SO2 concentrations for all sampling stations were not exceeded the allowable limit. However, very high concentrations were detected at short duration that did not affect the average concentration. This high concentration can be the cause of complaints on unpleasant odour. Finding from this study can be used as preliminary data for detail monitoring and finding the source of air pollution.

ICSEWR 2020: 004-003

Comparison of Missing Rainfall Data Treatment Analysis at Kenyir Lake

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Abstract. Rainfall is one of the frequent data used in weather-related studies. Sometimes the data have missing information that needs the treatment to make sure the data can be useful, complete and reliable. There are many methods in treating missing data suggested by previous studies. The best selected method to estimate missing rainfall data in different regions may vary depending on the rainfall pattern and spatial distribution. Therefore, this paper discussed and compared 3 different methods in missing data treatment. The selected methods are Expectation Maximization (EM), Inverse Distance Weighted (IDW) and Multiple Imputation (MI). After analysis, the best method is IDW based on root mean square error (RMSE), mean absolute error (MAE), correlation coefficient (r) and percentage of error (% of error) values. The IDW method has RMSE, MAE values and the lowest % of error values. In addition, the r value of IDW method is highest compared to EM and MI method. MI method recorded the highest values of RMSE, MAE and % of error with the lowest r value that proved MI method is the least accurate method to use in missing data treatment. After all methods were implemented, it proved that the IDW method is the best way to treat missing data because the analysis shows monthly rainfall distribution for 4 treatment stations in line to 3 missing data stations compared to EM and MI methods.

ICSEWR 2020: 006-004

The Effect of Ventilation during Peak Hours and Cooking Activities on Coarse Airborne Particulates (PM10 And TSP) in Middle-Class Apartments in Surabaya: A Multilevel Approach

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Abstract. Indoor air pollution is a serious problem today in part because many people spend the majority of their time indoors. The result of multiple indoor activities and outdoor pollutants entering indoor spaces, indoor pollution can cause various potentially fatal respiratory diseases and yet is rarely studied. The purpose of this study was to determine the relationship between ventilation, peak hours and cooking activity on indoor pollutants. This research was conducted December 2017-April 2019 in 59 apartment units in Surabaya, Indonesia. A multilevel model with three models was used to determine the relationships between ventilation, peak hour, cooking activities and indoor pollutants, specifically, PM10 and TSP. The concentrations of indoor PM10 and TSP were generally 25-99 µg/m3, and at that concentration, peak hours occurred in the afternoon. Peak hour in the morning can increase indoor PM10 and TSP. Cooking activities carried out near an open window can increase indoor concentrations of PM10 and TSP, likely due to higher outdoor than indoor concentrations.

ICSEWR 2020: 009-005

Performance of Aerated and Unaerated Steel Slag Filter System at Primary Treatment System for Phosphorus Removal from Textile Industrial Effluent

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Abstract. Improper tertiary treatment of industrial effluent discharged causes an excessive phosphorus input which leads to eutrophication. Excessive growth of algae will degrade the natural ecosystem of surface waters. Conventional treatment such as activated carbon filter used as a polishing unit in the tertiary treatment is unable to eliminate the phosphorus completely. Approximately, 0.3 " 15 mg/l of phosphorus still presents in the final discharge of industrial effluent. Therefore, this study is conducted to provide alternative solutions in removing phosphorus at primary stages to avoid tertiary treatment by using natural treatment with cost saving materials to further remove phosphorus from the textile industrial effluent. Aerated and unaerated lab-scale steel slag filters systems were run for 16 weeks at water treatment plant. The sample collected was analyzed twice a week for the parameters of pH, alkalinity, dissolved oxygen and total phosphorus. The results of this study showed that the unaerated steel slag filter (USSF) has a high percentage of phosphorus removal compared to aerated steel slag filter (ASSF) which is 46% to 70% while ASSF have removal efficiency of 37% to 68%. However, the removal efficiency of activated carbon filter (ACF) used in treatment plant is better than ASSF and USSF which is 52% to 81%. The mechanism of removal involved is likely to be through adsorption.

ICSEWR 2020: 012-006

Betta Persephone: The Challenges in Only Existed Natural Habitat; Ayer Hitam Peat Swamp Forest (AHPSFR), Muar Johor

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Abstract. B. persephone is an endemic species and has been categorized as endangered species in Ayer Hitam Peat Swamp Forest (AHPSFR), Muar Johor. The area is the only wild stronghold of this species. This species is facing greatest threats nowadays. As the study aimed to analyze the challenges of this species by using qualitative method. Interviews session has been conducted by the involvement of four respondents which all of them are ichtyologists and have expertises in this matter . Also, observations have been conducted inside AHPSFR. The data that have been gathered in interviews being analyzed by using NVIVO software. For, observation sessions, a checklist was being obtained from the findings of the interview sessions. In the findings, all the respondents and observations have the consensus that challenges have been found out were overexploitation, open land for palm oil plantation, illegal logging, water pollution, fires and illegal mining. These challenges needed to be overcome in order to make sure the sustainable survival of this species for the references of future generations.

ICSEWR 2020: 016-008

Utilization of Fruit Wastes (Jackfruit and Mango Seeds and Banana Trunk) as Natural Coagulants in Treating Municipal Wastewater

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Abstract. The adequacy of chemical coagulant such as alum is all around perceived. However, there are numerous drawbacks including

impeding impacts on human well-being and generation of high sludge volumes. Therefore, this study was conducted to investigate potential of fruit wastes - jackfruit (artocarpus heterophyllus) seeds, banana trunk peduncles (musa) and mango (mangifera indica) seeds in becoming natural coagulant to treat wastewater. A series of jar test was performed to determine the effect of individual coagulants on turbidity removal, coagulation activity and COD removal under various operating factors such as type and concentration of solvents used for extraction, pH and coagulant dosage. From the findings, optimum solvent concentration of 2.5M of sodium hydroxide (NaOH) reacted with banana trunk peduncles at optimum pH and dosage of pH 7 and 50 mg/L, respectively with turbidity removal of 90.2%, coagulation activity of 83.4% and chemical oxygen demand (COD) removal of 94.8%.

ICSEWR 2020: 017-010

Non-Flooding and Flooding Characteristics of a Natural Straight River

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Abstract. Floods happen in Malaysia due to average rainfall over than 2000mm per year. It happens when the flow of water exceeds the river banks and flow through the floodplain area, which is known as overbank flow. Flood causes damage of infrastructure and building and loss of life. Therefore, this paper investigates the characteristics of pattern river development; width, depth and flow within channel. This physical modelling discusses the pattern of river by employing the miniature current meter and point gauge equipment to collect and record the data along the channel. The discharge of 0.2 L/s and 0.5L/s were used for non-flooding and flooding cases. The non-flooding and flooding cases were identified by using rectangular flume known as Sustainable Flume. The flume used in this study has 4.95 X 0.69 X 1.26 m of rectangular main channel with non-fixed-bed. As a result, the flooding case shows the depth of channel increasing at the upstream and decreasing at the downstream compared to non-

flooding case with changes of velocity and mannings roughness coefficient n.

ICSEWR 2020: 016-011

Influence of Low Frequency of Magnetic Field on Sludge Bulking under Long Sludge Retention Time

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Abstract. The aim of the present study is to investigate the potential of low frequency magnetic field application as an alternative approach to control sludge bulking with regards to operational condition of sludge retention time (SRT). Two sequencing batch reactors, Reactor A (SBRA) and Reactor B (SBRB), were operated in long SRT to induce the bulking. SBRA was subjected to 88.0 mT, low frequency of magnetic field intensity while SBRB served as a control system. Due to the effect of magnetic field, biomass in SBRA postulated high aggregation of 95% compared to 65% postulated by biomass in SBRB. These observations imply that the low frequency of magnetic field was able to enhance the ability of the biomass to form stable flocs under the probable adverse effect of long SRT. SBRA also showed consistently high COD removal of average 87% compared to SBRB of average 67%. These observations imply that the low frequency of magnetic field was able to enhance the biodegradation ability of aerobic bacteria even under long period of SRT.

ICSEWR 2020: 018-013

Effective Microorganisms Composite Scupper Drain (EM-CSD) As a New Revolution in Drainage System: A Preliminary Study

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Abstract. Effective microorganisms composite scupper drain (EM-CSD) system, which is designed using eco-composite in porous

concrete with the concrete mixture and a cement replacement, consists of the waste material elements that being recycled, such as, rice husk ash (RHA), egg shells, palm oil fly ash, wood waste ash, and many more, for the purpose of ecologically sustainable development, and also for managing stormwater quantity and quality. The various researches related to eco-composite materials have been done, mainly as the construction and building materials. Besides, the porous concrete itself is mainly being used as paving material for the construction of parking lots, sidewalks and secondary roads. Thus, the good quality of porous concrete in terms of the concrete strength, the workability, the porosity, and so on are required. Meanwhile, previous researches related to effective microorganisms (EM) as an admixture in concrete have been done. However, the previous researches of eco-composite, specifically using RHA and EM did not focus on the drainage systems. Therefore, this paper presents a preliminary study of EM-CSD system using RHA and EM as a cement replacement, as a green technology and sustainable development in urban drainage systems. This kind of technology is a new revolution to replace the existing drainage systems, with high cost effective consideration, high concrete mixture strength and workability, and low temperature. For the part of the research, this new drainage system technology has been implemented in several areas in Selangor, specifically in Shah Alam in order to mitigate the flash flood, stagnant water lead to the mosquitos fertilization issue, and vandalism of the drainage cover, which cause a safety issue for public. The early findings seem encouraging that indicates the eco-composite porous concrete can be successfully in construction.

ICSEWR 2020: 021-014

The Management Trends on the Collection and Recovery of the Household Bulky E-Waste in Malaysia

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Abstract. E-waste is becoming a global concern due to the increasing demand for the use of electrical and electronic equipment. Key issues in disposing of e-waste have also been the question of hazardous

containment, which may cause health and environmental problems. This research investigated the processing and recovery of household e-waste in Malaysia. An in-depth interview and evaluation was performed at 10 recovery facilities that carried out the process of collecting, segregating and dismantling e-waste. The finding revealed that the household e-waste recycling process was still in its infancy and that appropriate techniques had not been used to deal with hazardous substances in particular. The problem is getting worse as there is no strict control on household e-waste and inadequate collection of household e-waste. The Government of Malaysia is now pushing forward with plans for better household e-waste management in the future.

ICSEWR 2020: 024-017

Peat Water Treatment as an Alternative for Raw Water in Peatlands Area

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Abstract. Indonesia is the second country that has the largest percentage of peatlands in the world [11]. Basically, peatlands play an important role as a counterweight to environmental ecosystems. However, if not managed properly, then these benefits cannot be used optimally. Areas with peatlands are generally inland areas that do not yet have access to clean water. It is not uncommon to find clean water crisis conditions occurring in areas with peatlands, due to the fact that the use of peat water as a source of raw water has not yet been implemented, where water resources on peatlands are mostly from peat water itself. The use of peat water as a source of raw water requires in-depth studies both in terms of quality, continuity, and quantity, so that it does not cause health, social, and economic issues, when used by the community as a source of clean water. Through this research, there will be a review of the application of peat water treatment that has been used and that has been studied in previous studies, so that it will be known the challenges to be faced as well as alternative solutions to face these challenges, especially in Indonesia.

ICSEWR 2020: 024-018

Existence of Microplastics in Indonesias Surface Water: A Short Review

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Abstract. Plastic waste is often being an issue that needs to be overcome since mostly plastic waste ends up in environment. Some studies stated that most of them in marine environment are thought to derive from terrestrial environments and to have been transported in the fluvial systems. It is nearly impossible for nature to completely breakdown plastic waste, regarding its durability and resistance to degradation. Small fragment resulted from the slowly breakdown of plastic waste is an emerging contaminant in water environment called as microplastic. This study is conducted as a short review of microplastics existence in Indonesia, particularly in the surface water. High population in urban areas, along with inadequate management of plastic waste in Indonesia, it is possible that microplastics occur in the surface water or river as receiving water body. Studies about microplastics occurrence have been conducted mostly in Citarum River, given its status as the top 10 most polluted places in the world. It is known that microplastic tend to persist in water and has possible risks to the living organisms. Hence, managing microplastic pollution is needed which can be in the form of management strategy and treatment technologies used to remove microplastics from water.

ICSEWR 2020: 024-019

The Effectiveness of Microbubble Technology in the Quality Improvement of Raw Water Sample

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Abstract. An experimental study to observe the performance of a microbubble generator (MBG) and a microbubble-generating nozzle on a water and wastewater treatment is carried out under laboratory conditions. The MBG is used to treat wastewater from water bodies

which was impacted by domestic and industrial wastewater treatment plant. The study uses an MBG with a spherical body and a drilled hole, along with a dispersing nozzle. The MBG and the nozzle was placed at the bottom of the microbubble reactor tank. Two types of pressure gauges are installed around the MBG and the nozzle in order to examine the inlet water pressure and the inlet gas pressure. The gas pressure and the water pressure used are based on the best microbubble size produced from a prior experiment. The waters Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Total Suspended Solids (TSS), and Turbidity has been analysed in the beginning and every 10 minutes of a 60 minute detention time, a sample is taken from the tank outlet in order to examine the effectiveness of the MBG.

ICSEWR 2020: 027-020

Parkia Speciosa Skin as Adsorbent in Methylene Blue Dye Adsorption from Aqueous Solution: Fixed Bed Column Adsorption Study

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Abstract. Adsorptions by using adsorbents which are low cost and environmentally friendly are commonly being studied to benefit the wastewater treatment field at present. This study was conducted to determine whether the skin of Parkia speciosa (Petai) is suitable to be used as an adsorbent for the process of adsorption of methylene blue. The column adsorption study had been carried out to study the effect of different flow rates. In the column experiments with different flow rate, the higher the flow rate, the lower the breakthrough time recorded. This study utilized methylene blue which was diluted to replace wastewater containing dye from the industrial areas. The ability of Parkia speciosa to act as an absorbent was tested to compare the data of methylene blue adsorption from the dye solution. Dye solution was let to run through the adsorbent filled in the column adsorption space. The adsorption product determined the ability rate of Parkia speciosa as an adsorbent of the methylene blue dye. The rate of methylene blue removal in the adsorption process by column method depends on the flow rate. High column adsorption capacity requires shorter time for the absorber to become saturated. The

adsorption kinetics using Parkia speciosa skin was performed using a mathematical model; Model Thomas, model Yoon and Nelson and model Bohart-Adams. The most suitable models for studying column adsorption kinetics are the Thomas model and the Yoon-Nelson model.

ICSEWR 2020: 030-022

Physical Simulation for Effect Seasons and Fertilizer on Solidified Fabric Peat Soil: A Soil Column Model Study

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Abstract. Physical Simulation for Effect Seasons and Fertilizer on Solidified Fabric Peat Soil; A Soil Column Model Study

ICSEWR 2020: 034-023

Identification of Indoor Air Quality (IAQ) Sources in Libraries through Principal Component Analysis (PCA)

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Abstract. Indoor air quality (IAQ) is an important role in affecting visitors and staffs' health in library. However, good ventilation and suitable types of furniture materials in the indoor environment were important to preserve better indoor air quality for the occupants. In this study, the status of indoor air pollution using in-situ measurement for chemical and physical parameters had been examined. The chemical parameters measured were formaldehyde (CH2O, ppm), carbon monoxide (CO, ppm), carbon dioxide (CO2), fine particulate matter (PM2.5, mg/m3) and coarse particulate matter (PM10, mg/m3). The physical parameters such as relative humidity (RH, %), temperature (T, ºC) and air movement (AM, m/s) were also measured. The

dominant sources of IAQ had been determined by using Principal Component Analysis (PCA). Principle Component (PC-2, S1) and PC-1 (S2) (CO, CO2 and CHO) have become an indicator for chemical contaminants and the number of occupants that present in the library. The main contributor of indoor air quality in both areas was thermal comfort, which contributed 56.146% (PC-3, S1) and 60.76% (PC-4, S2). In conclusion, air quality in the libraries was affected by surrounding activities, ventilation performance and physical parameters.

ICSEWR 2020: 033-024

Spatio-Temporal Modelling of Noise Pollution

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Abstract. Physical Simulation for Effect Seasons and Fertilizer on Solidified Fabric Peat Soil; A Soil Column Model StudyEnvironmental noise defined as an unwanted or harmful outdoor sound created by human activities. For example, the noise emitted through industrial activities and transportation networks such as road, rail and air traffic. In Malaysia, most of the schools located very close to the roadside and near busy places such as cities, shops, and residential areas. This study aims to analyze the environmental noise in terms of spatial and temporal analysis in two primary schools in Terengganu State. The noise monitoring had conducted in two (2) primary schools with different land use; residential area (Batu Rakit Primary School) and commercial area (Paya Bunga Primary School) on the school and non-school days by using Sound Level Meter (SLM). The spatial mapping had constructed by using SketchUp® 2018 and Surfer® version 11 software. The noise level between both study areas was significantly different based on a p-value of less than 0.05. It also exceeded the permissible limit provided by the Department of Environment (DOE), Malaysia, whereby the Equivalent Noise Level (LAeq) was higher at the residential area compared to the commercial areas due to traffic volume and noise from surrounding activities. Lastly, the area near the roadside has higher critical noise pollution compared with the location that furthers from the roadside. In conclusion, this study is useful in creating awareness to the public about the noise pollution effect on

primary school students and is also can be used for mitigation measures to have a better place for students to study.

ICSEWR 2020: 032-025

Clay as Sustainable Building Material and its Benefits for Protection in the built Environment

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Abstract. This study examines the properties and benefits of clay use as building material that enhances environmental protection. The rationale for this examination stems from the views held by scholars that clay bricks are more preferred as sustainable building materials; however there is limited research into whether the choice of clay materials is influenced only by its environmental benefits. The study undertook a systematic literature review and adopted a quantitative research methodology involving the survey of the selected building and civil construction firms in Katsina, Kano and Kaduna states of Nigeria. The research data collected based on the economic, social and environmental properties of clay and its benefits in environmental protection was analyzed using descriptive statistical techniques. The study found that the economic aspects of clay make it more significant as a building material that is useful in environmental protection. The study recommends further research into the improvement of clay as a building material that addresses the sustainable triple bottom line of economics, social and environmental requirements.

ICSEWR 2020: 026-026

Relative Treatment Efficiency Index of Eichhornia crassipes in Removing Cd, Pb and Ni from Wastewater

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Abstract. Relative treatment efficiency index (RTEI) is used to identify the efficiency of the treatment by the plant itself. The higher the RTEI

indicates the more efficient the treatment by the plant studied. In this research, E. crassipes were used to evaluate its RTEI value in removing heavy metals cadmium (Cd), nickel (Ni) and lead (Pb) from wastewater. E. crassipes were grown in FSSAs lake water and spiked with 1 mg/L, 3 mg/L and 5 mg/L of Cd, Ni and Pb respectively. The experiment were conducted within 14 days period to evaluate its potential in phytoremediation of heavy metals from the wastewater. The results showed that the removal of Cd, Ni and Pb by E. crassipes were highest at 1 mg/L respectively. It was observed that E. crassipes were effective in removing Pb compared to Cd and Ni. Antagonistic effects between heavy metals were found in affecting the removal efficiency of each other except for metal Pb. E. crassipes were able to achieve highest RTEI = 0.91 with 98.2% removal of Pb followed by RTEI = 0.52 with 50.2% removal of Cd and RTEI = 0.62 with 44.7% removal of Ni. After 14 days treatment, E. crassipes show significant toxic effects on plant roots and leaves as the concentration of heavy metal increased. The accumulation of heavy metals in plant tissues were shown in ranged from 7.48 mg/kg to 2864.12 mg/kg (Cd), 46.18 mg/kg to 3628.21 mg/kg (Ni) and 2.69 mg/kg to 6012.68 mg/kg (Pb). The results also revealed that the accumulation of heavy metals was higher in the roots than stalks and leaves. It was found that bionconcentration factor (BCF) of Pb, Cd and Ni in root at 1 mg/L were exceed 1000. Study on translocation factor (TF) of all metals were recorded low in ranged of 0.01-0.79 respectively. This indicates that the phytoremediation mechanism uptakes of E. crassipes is rhizofiltration. This study give a better understanding on the potential of E. crassipes in removing heavy metals from wastewater especially industrial wastewater.

ICSEWR 2020: 036-027

A Column Study on the Efficiency and Reusability of Kapok Fibre as Car Wash Wastewater Treatment

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Abstract. The car washing industry which consumes large amount of water produces Car Wash Wastewater (CWW) which were likely to exceeds the standard set in both Malaysias and Singapores regulation. Kapok Fibre (KF) is a natural adsorbing material which

have large lumen and low density is believed to be able to act as an adsorbent to manage the CWW. This study was done to determine the characteristic of KF and CWW and investigate the efficiency of KF in treating CWW along with the reusability of KF through a column study with Organic Loading Rate (OLR) of 12.41g COD/L.day. The CWW contains a certain concentration of Chemical Oxygen Demand (COD, Oil and Grease (O&G), and Anionic Surfactant (AS) though the interaction between KF and AS is novel. KF found out to has the capability in removing COD, O&G, and AS up to 88.37%, 100%, and 83.8% respectively. However, in reusability experiment there is limitation to KF in which by exceeding the operation time to 600 minutes of treatment, the efficiency in removing COD, O&G, and AS were found to drop to 62.02%, 75%, and 55% respectively. This shows that KF could be an avant-garde, low-cost sustainable treatment to treat CWW instead of the conventional high cost and complex operating system.

ICSEWR 2020: 023-028

Chlorine Decay Simulation in Water Distribution System using EPANET

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Abstract. Chlorine is used as a disinfectant in the water treatment process so that treated water is delivered safely to consumers. However, chlorine concentration decays when water flows from the treatment plant to the supply point, due to the reaction with natural organic matter and the inner surface of the pipe. Low chlorine concentration may encourage bacteria re-growth, while high chlorine concentration can result in the formation of harmful chemical components. Therefore, this study aims to simulate the complex process of chlorine decay using EPANET. This exercise enables the determination the chlorine concentration dosage required to maintain the desired requirement given by the World Health Organization (WHO) and the Ministry of Health, Malaysia (MOH). A successful model with an extended period of simulations of 72 hours enable the mapping of spatial and temporal variations of flow and residue chlorine concentrations at all links and nodes. Constant chlorine dosage of

3.96 mg/l at node R1 has successfully satisfy the requirement given by WHO and MOH. The residue chlorine concentrations at the nodes and links in the water distribution system also depends on the water usage at node 5, the size of service reservoir and service tank and distance from the reservoir.

ICSEWR 2020: 039-030

Correlation between Pump Discharge and Operational Cost of Polder System: Case Study of Pekalongan Regency

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Abstract. The coastal area in Pekalongan has a big problem of flood that is caused by rain and tidal flood. To overcome the situation, in 2018-2019, a drainage with polder system has been built at Mrican-Wonokerto area, Pekalongan Regency, equipped with the 5 km embankment and long storage. The aim of this study was to acquire correlation model between pump discharge and fuel oil consumption of Mrican-Wonokerto Polder System and to conduct simulation of operational cost from the fuel oil to the electricity provided by PLN. We used quantitative method and our data were in the form of pump operation record of Silempeng and Sengkarang pump houses. The analysis results indicated that the equation of the relation between the pumping volume capacity (X) (in m3) and fuel oil consumption (Y) (in liter) of Silempeng and Sengkareng pump house were linear equations. The equations were Y = 0.2509 + 0.0044 X with a correlation coefficient (r) of 0.928 for Silempeng and Y = 0.5608+0,0035 X with a correlation coefficient (r) of 0.981 for Sengkarang. The equation of relation between the actual pumping volume and and fuel oil consumption during the absent of rain was Y = 0,5292+0,0067.X with a correlation coefficient (r) of 0.8328, while the equation of rainy days was Y = 0,6605+0,005.X with a correlation coefficient (r) of 0.8329. The simulation of change from propulsion of diesel pump machine to electric propultion proofed that the change could generate efficiency in the aspect of operational cost.

ICSEWR 2020: 006-031

Identification of Pollutant Sources on PM10 (Case Study: West Surabaya)

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Abstract. The emission of motor vehicles can cause air pollution, the industry, and household activities and is currently a severe problem. Surabaya City, especially West Surabaya, is an area that has heavy traffic because it is a warehouse area, directly adjacent to Gresik Regency, which is an industrial area and other activities such as garbage Final processing place and port. Therefore, study needed to monitor the quality of the PM pollutants in West Surabaya and further estimates are the source location of the pollutants. The results of this study can complement previous research and can be used to make policies in air pollution control in Surabaya city. Sampling for PM10 using Gent Stacked Filter Unit (Gent SFU) every six days between November-December and meteorological data obtained using Kestrel 5500. The concentration of PM10 was analyzed using the gravimetric method while estimating the pollutant source location using the Conditional Probability Function (CPF). The average concentration of PM10 at the time of research of 32.24 g/m3. The estimated source location of pollutant for PM10 is from north, northeast, east, south, and southwest and the potential source of pollutant is possible from industrial activities, traffic, warehousing activities, and natural sources such as dirt dust.

ICSEWR 2020: 040-033

Shoreline monitoring using Unmanned Aerial Vehicle (UAV) at Regency Beach, Port Dickson

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Abstract. Coastal monitoring, mapping and analysis are comprehensive for various coastal studies, such as advancement of regression planning, geohazard identification, decomposition-enhancing research, and theoretical or predictive modelling or coastal

characterization. The objectives of this research were to identify shoreline changes at Regency Beach, Port Dickson using Pix4Dcapture, Pix4Dmapper and ArcGIS 10.3 software to use the images captured by unmanned aerial vehicle. Flight plans were scheduled from February 2020 to June 2020. In five months of study period, improvements to the shoreline have been noticeable and may impact the coastal region in the immediate future. As the objective of this study has been successfully achieved, drones can be proposed as an ideal alternative for monitoring coastal changes.

ICSEWR 2020: 043-035

Preparation of Synthetic Calcium Carbonate by Continuous Method

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Abstract. The production of precipitated calcium carbonate (PCC) was performed by a continuous method with additional mechanical stirring and retardant agent after the carbonation process. The PCC was produced at four different conditions i.e. without stirring and retardant agent (XSR), PCC with stirring only (S0), PCC with stirring, and 4g of a retardant agent (S4) and PCC with stirring and 20g of a retardant agent (S20). The continuous method 1 L of PCC slurry was consistently achieved at 7 minutes of the carbonation time that was controlled for all samples. The PCC yield was generally consistent with a slight reduction with increasing the retardant agent weight. Laser Particle Size Analyzer (LPSA) showed the finest PCC, which is 5.093 µm was produced without any additional mechanism (XSR) after the carbonation process. FESEM micrographs showed there were two types of PCC structure particle; fine hollow shape and coarse irregular shape. The result of Zeta potential portrayed the negative Zeta values for all samples with the highest values of -2.9 mV for S0 sample. The high purity of high-grade calcium carbonate for all samples was determined using X-ray Fluorescence (XRF). In general, there was no significant change occurred on the morphology of the PCC but offered a larger effect on particle refinement. Meanwhile, mechanical stirring resulted in an increment of the PCC particle size, but the retardant agent provided particle refinement effect.

ICSEWR 2020: 044-036

Water Circulation Reduces Contamination: Geo-chemical and Mineralogy Aspect

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Abstract. The water quality index is not stable for long time constraints because variable forms of contamination affect by groundwater movements. During recharge and discharge circulation in the ground, the original water quality is disturbed by the surface water injected into the ground system. This paper aims to identify the purity of water contaminations in the ground layer (clay mineral) using water cycled method. The groundwater quality gives the best result on dilution actions more than 12% decreases compared with purity indexes. The recharge coefficient found in the range of 0.05 to 0.19 for the study area. Schedulable pumping for withdrawal groundwater flushing for water distribution also gave positive in quality index. Using geo-chemical (XRF) and mineralogy (XRD) analysis, the effectiveness of geo-chemical and mineralogy contributes to balance the contamination movements and treats on the cycled water in order to natural or mineral water intake. The circulation system with control function more quality-effective to pure the groundwater ecology system with lower cost-treatment for water distribution purpose. Therefore, evaluating the water quality for duo actions in this study must consider the safety level for the ground system and water demand records.

ICSEWR 2020: 045-037

Metals Contamination on Soil and Surface Water (Earth Drainage) Due To Leachate Migration from Piyungan Landfill

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Abstract. Decomposition of solid waste has the possibility of leached its heavy metal content into the leachate. Leachate flows into soil and

surface water causing possible leachate contamination onto surrounding area. Monitoring of heavy metals contaminant is crucial to control the migration of leachate. This study focusses on metals migration of leachate from Piyungan landfill into surrounding soil area and earth drainage. Triplicate soil and earth drainage samples were taken at ground level for each station to be analyzed using the inductively coupled plasma mass spectrometry (ICP-MS). Based on metals measurement in soil, there are two paths of leachate migration. Even though, the concentration of As, Ni, Cr and Mn were reduced from the landfill until the downstream, all sampling station shows high concentration in soil, which were above the standard limit for residential area. In addition, these metals also show the concentration above the standard limit for earth drainage. Soil contamination was occurred in ages ago before this study was conducted based on Cu, Ba, Li, V, Co and Ti were accumulated in soil based on high concentration were detected. However, these metals show low concentration in earth drainage during sampling work was conducted in this study. While Pb, Mg, Zn, Cd and Sr were not migrated due to low concentration in all sampling stations except the station nearest to landfill area. In general, the metals contamination in soil and earth drainage from the landfill will be tended to the hazardous condition in future. In addition, surrounding the landfill area is residential area and agricultural activities at the downstream. Thus, the effect to residents and plants could be contribute the hazard of metals contamination.

ICSEWR 2020: 037-039

Measurement of Riverbank Erosion Rates of Pusu River Using Erosion Pins Method

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Abstract. Riverbank erosion is a major concerns in all parts of the world due to its extensive impacts geomorphologically and economically. This study aims to quantify the rates of riverbank erosion of Pusu River using erosion pins method. Two sections of the river were selected namedly site A and site B where site A is a straight section while site B is situated on the outside bend. 21 pins were

installed at each site in a grid pattern. Measurement of erosion pins exposure were taken from February 2019 to April 2019. Field observation were made to identify the possible factors influencing the bank erosion. The average rates of bank erosion ranged between 0.05 cm/day to 0.21 cm/day at site A and 0.09 cm/day to 0.51 cm/day at site B. Bank failure occurred at site B towards the end of measurement period due to high flow after heavy rainfall event. Field observation suggest that rates of river bank erosion was influenced by several factors such as the flow velocity and vegetative cover of the bank.

ICSEWR 2020: 013-042

Estimating Carbon Sequestration of Green Roof Plants in Tropical Climate

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Abstract. A green roofs is one of the recommended methods of practice in improving the sustainability of urban areas. Green roofs can be used as a passive technique to reduce carbon dioxide (CO2) emissions from the atmosphere. This is due to the role of green roof layers which are vegetation and soil to process the photosynthesis activities and to capture CO2 from the atmosphere. The objective of this paper is to quantify and to compare the amount of CO2 sequestration by ten potential green roof plants, in order to estimate the CO2 reduction within the surrounding atmosphere. It is found that, by planting the Alternanthera Paronychioides (Alternanthera P.) on the roof surface could reduce the indoor air temperature as well as the CO2, thus enhance the quality of air. This study also revealed that the Alternanthera P. generates the highest photosynthesis rate or CO2 uptake compared to the other nine plants, as high as 23.59 mol CO2 m-2s-1. It is predicted that if the Alternanthera P. is to be installed on a 0.64 m2 test bed roof, the CO2 could be reduced almost 0.010 tonnes, annually. This suggested that by planting Alternanthera P. on the roof surfaces may potentially give advantages on mitigating the greenhouse gas emission, particularly CO2, and reducing the impact of global warming.

ICSEWR 2020: 011-043

Development of Water Quality Monitoring Device Using Arduino UNO

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Abstract. Water quality monitoring of water bodies periodically is essential to ensure it is within the allowing limits. The development of a simple and low-cost water quality measurement device for real time monitoring using Internet of Things (IoT) technology is presented in this study. Kolora meter is an alternative to the existing commercial monitoring devices. It was developed using the open-source platform Arduino UNO model and NodeMCU board as the microcontroller and Wi-Fi connection respectively. Two sensors such as temperature and turbidity were selected to be installed as the early stage of Kolora meter development. The physical parameters (temperature and turbidity) of water were measured and the data collected from this device can be viewed on the mobile phone using Kolora Mobile Application via Wi-Fi connection.

ICSEWR 2020: 049-045

Analysis of Sand Mining Impacts on Riverbed in the Downstream of the Progo River, Indonesia

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Abstract. The Progo River is a river that flows in the Province of Central Java and Yogyakarta Province in Indonesia. This river originates at Mount Sindoro with the main river length of about 138 km and has a watershed area of approximately 243,833,086 hectares. The Progo River is a natural river which has one of its upper reaches, which is sourced from Mount Merapi. This condition resulted in the Progo River being affected by the material carried by cold lava. The research method is carried out by analysing the amount of sand mining, social and economic impacts, sediment transport, degradation or aggradation at the point of review based on primary and secondary data from the results of laboratory measurements and tests. The

location of the research was carried out at the point of the Srandakan Bridge to the Progo River Estuary. The results showed that at the Srandakan Bridge point to the Progo River Estuary the volume of sand mining was 459,576 m3/year, one of the social and economic impacts of sand mining was the opening of job opportunities for the community around the mining location, and degradation of the river bed, with a degradation value of 0.43 m/year.

ICSEWR 2020: 035-046

Rainfall Monitoring Supported by Temporal and Spatial Information of Debris Flow Initiation Area in Merapi Volcano

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Abstract. Debris flow frequently attacks rivers in Merapi Volcano and causes damage of infrastructures and fatalities. To reduce the risk of debris flow, a warning system has been developed by Sabo Office Center. Critical line and snake line graph are applied in Merapi Volcano to monitor characteristics of rainfall in the upland river basin. However, this system cannot identify location and arrival time of debris flow. To enhance reliability of the warning system, numerical simulation seems to be a good tool. This research proposed an idea to combine rainfall-based warning system with the numerical simulation. The simulation can be used to identify debris flow initiation by using slope stability theory. Results of this research showed that fluctuation of rainfall intensity reflects changes of debris flow initiation area. The more severe rainfall intensity, the larger volume of surface flow, and thus the greater debris flow initiation takes place. When the rainfall monitoring is combined with the debris flow simulation results, there is a tendency of the enlargement of the debris flow area to follow the growth of the hourly rainfall.

ICSEWR 2020: 050-047

Establishment of Flood Damage Function Model for Urban Area in Kuantan: A Preliminary Study

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Abstract. Previous studies on flood damage assessment mostly discussed the relationship between flood damage with hydrological impacts parameters such as flood depth and flood duration. The influence of resistance parameters on flood damage is rarely investigated. Hence, an attempt has been made to establish a flood damage function model based on the relationships between flood damage and the socio-economic and property characteristics variables for urban area in Kuantan. A field survey was conducted to gather damage data and related information during the 2013 Kuantan flood using face to face interview technique. The residential structural damage was found to be influenced by the household income, types of construction materials, and house level. On the other hand, household income, house types and occupation have been identified as the most significant variables that influence the residential content damages. For commercial category, only the area of the premises had significant effect on the variation of structural damages, whereas the content damage was found to be depended mostly on the types of business and the area and level of the premises. Knowing the relationship between flood damages and its influencing factors, these models can be used for further flood risk assessment studies in the study area.

Abstracts – ICSIE 2020

ICSIE 2020: 001-001

Soil Water Variation Due to Grass Water Uptake

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Abstract. Shallow landslide is the phenomenon of slope collapse frequently occurring in tropical rainforest regions such as Malaysia based on geotechnical problem. This paper aims to determine the effects of grass on the shallow slope's stability in terms of the variability of soil moisture, and to establish 1D suction of soil moisture due to grass water uptake. Moisture variations were used to compare the moisture content with time using GID and Fotran code tools. Based on the literature review findings, numerical simulation modelling was applied to achieve the most suitable condition for replicating grass water uptake within the soil slope. Six types of grasses were used in this research. The correlation between numerical simulation results is appropriate for these six types of grasses, but only Indropogon Gayanus grass with field monitoring results was achieved for validation. This paper assessed slope stability due to the influence of six types of grasses induced suction. The long grassroots are special between both kinds of grass, ranging from 0.3048 m to 4.000 m. This work gives a clear belief that Axonopus Compressus grass extracts water much faster than other grasses and is useful in preserving unsaturated soil stability.

ICSIE 2020: 005-002

Investigation of Soft Layer in between Hard Layer for Sedimentary Rock Formation by using Electrical Resistivity Analysis

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Abstract. This study aims to predict the occurrences of soft layers in between hard layers in sedimentary rock formation based on electrical resistivity analysis. ABEM Terrameter LS Box with 40 electrodes with 2.5 meters spacing in pole-dipole method was used. Standard Penetration Test (SPT) was conducted to obtain the value for the number of blows (N-value). RES2DINV was used to analyse a two-dimensional illustration of the soil layers in the pseudo section diagram. Results show that the groundwater table is located 2.0 meters below the ground surface. Based on the resistivity analysis, the subsurface profile is consists of topsoil, soft silty clay (N0-N4, 6 > Ω > 20 ohm), medium-stiff silty clay (N5-N6, 20>Ω>360 ohm), medium dense coarse sands (N13-N16, 361>Ω>550 ohm), stiff silty clay (N10-N18, 550>Ω>720 ohm), hard silty clay and gravel (N50, 720>Ω>1100 ohm), and moderate weathered and slightly fractured shale stone (N50, Ω>1100 ohm). Although the correlation between resistivity values and SPT N-values shows a very good relationship with R2 ranges from 0.83 to 0.89, electrical resistivity analysis is not suitable to determine the soft layer in between hard layer in a sedimentary rock formation due to the presence of high ground water table.

ICSIE 2020: 002-003

Optimalisation Disaster Reacting Unit Based On Digital as a Disaster Mitigation on Indonesia National Roads

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Abstract. DRU or Disaster Reacting Unit is a set of construction heavy equipment used for natural disaster mitigation response that affect to national roads and bridges. DRU consists of excavators, motor graders, wheel loaders, vibro rollers, dump trucks, and dozers. Digital-based DRU management using e-peralatan provides many changes compared to conventional methods including less standby time, faster equipment rental ordering time, cost certainty, time certainty, document administration certainty, and process certainty and can be used by anyone, at anytime, anywhere. Based on e-peralatan, the mitigation of natural disasters that require DRU can be carried out on target with a good number of units of equipment needed, location, and shortly time of mobilization to the location.

ICSIE 2020: 011-005

Effect of the Polypropylene Fibre as Replacement of Filler on Asphaltic Concrete Performance

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Abstract. Flexible pavement is extensively used in Malaysia as the construction cost of the pavement is lower compared to the rigid pavement. The uppermost layer of the flexible pavement called surface course, is made from asphalt bituminous mixture. This layer is a flexible layer where it can deform if subjected to great loads. The most popular defect that can be seen in flexible pavement is rutting. This study investigated the effect of Polypropylene (PP) fibre in influencing the behaviour and properties of the bituminous mixture when fully replaced as a filler and to evaluate the compressive

strength of it. Marshall Mix Design was first used to obtain the optimum binder content and lastly, the specimens were compressed using Uniaxial Compressive Test machine to obtain its compressive strength. From the study, PP fibre reinforced bituminous mixture increased the compressive strength, the value of Marshall stability and help to reduce the flow. With all the stated effects, Polypropylene is ideal for replacing the conventional filler as it helps to strengthen the pavement layer and thus might be able to help save the maintenance cost for the constant repair of the conventional pavement layer.

ICSIE 2020: 007-006

Utilization of Palm Oil Mill Residue as Sustainable Pavement Materials: A Review

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Abstract. The advances in industrial technology have led to a major rise in the amount and forms of residue, especially during the processing of agricultural products. With the paradigm shift towards renewable energy and sustainability, there is much emphasis on biomass energy around the world which generates an immense amount of residues yearly. These residues are burgeoning issues because they are not effectively managed and utilized. Hence, one solution is utilizing them in the pavement industry. This article focuses on palm oil mill residues that are abundantly available and discarded in Malaysia. This study evaluates published works of literature relating to the utilization of these residues like the Palm Oil Fiber (POF), Palm Oil Fuel Ash (POFA), and Palm Oil Clinker (POC) and Palm Kernel Shell (PKS) in the pavement industry. The outcome of the review acknowledges the greater sustainability potential of these residues with affirmative and satisfactory performance via the result of numerous research work. Also, with a reduction in CO2-emission, low radioactivity, and heavy metal leaching level. Therefore, the review suggests more exploration and utilization of the residue in the pavement industry since it promotes safety and harness sustainability.

ICSIE 2020: 010-007

Comparison of Gravity Anomalies from Recent Global Geopotential Mod-Els with Terestrial Gravity and Airborne Gravity over Johor Region

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Abstract. Gravity anomalies can yield an indirect but extremely useful picture of lateral changes in rock composition and structural patterns especially for rapid development area such as Johor region. The gravity anomalies can be derived from Global Geopotential Model (GGM) which is one of special product from the satellite technology that able to deter-mine high accuracy of the earths gravity field. In this study, the gravity anomalies derived from recent GGM published by International Global Geopotential Model were compared with five other GGMs model that compromised either terrestrial or airborne or both to derive the gravity anomalies. In order to identify the best gravity model over the Johor region, two types of GGM class model has been selected for the comparisons which known as satellite only and combined class model. The result shows that the gravity anomalies de-rived from satellite only class model with up 300 spherical harmonic coefficients is the best fit model and can be used as a reference for the Johor region. The RSME for the recent GGM via satellite only were +/- 5.865 and +/- 3.347 mGal for terrestrial and airborne gravity anomalies respectively compared to other GGM. Gravity anomalies can yield an indirect but extremely useful picture of lateral changes in rock composition and structural patterns especially for rapid development area such as Johor region. The gravity anomalies can be derived from Global Geopotential Model (GGM) which is one of special product from the satellite technology that able to deter-mine high accuracy of the earths gravity field. In this study, the gravity anomalies derived from recent GGM published by International Global Geopotential Model were compared with five other GGMs model that compromised either terrestrial or airborne or both to derive the gravity anomalies. In order to identify the best gravity model over the Johor region, two types of GGM class model has been selected for the comparisons which known as satellite only and combined class model. The result shows that the gravity anomalies de-rived from satellite only class model with up 300

spherical harmonic coefficients is the best fit model and can be used as a reference for the Johor region. The RSME for the recent GGM via satellite only were +/- 5.865 and +/- 3.347 mGal for terrestrial and airborne gravity anomalies respectively compared to other GGM.

ICSIE 2020: 017-008

Pullout Resistance of Sand-Geosynthetics Reinforcement

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Abstract. Geosynthetics are widely used in earth retaining structures such as steep slope and earth retaining wall. The stability of the earth retaining structures depends on the interaction between geosynthetics and soil at the reinforced area known as reinforcement mechanism. The reinforcement mechanism of the soil reinforced structure usually difficult to be analysed thoroughly. It is because the preliminary study on the pullout resistance and durability of the reinforcement material is not taking into account before it has been used to the site location especially in Malaysian practises. Less supervision and the assessment after the installation of the reinforcement materials also contributed to the failure of the soil reinforcement. In this paper, the laboratory model was used to imply the real condition of the soil reinforced structure using pullout test. A standard pullout test was carried out by using geotextile and geogrid reinforcing elements embedded into silica sand of size D50=1.357mm and D50=0.571mm subjected to normal pressures of 100kPa, 150kPa and 200kPa.The conventional machine used is Pull out box test where size of box is 700mm (length) X 550mm (height) X 400mm (width). Comparative result and analysis showed that the geotextile reinforcement give more resistance rather than geogrid reinforcement under high normal pressure.

ICSIE 2020: 019-009

The Effectiveness of Demolished Tile Material for Soil Improvement: A Review

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Abstract. The presence of clay soil underlying foundation has been affected for failure in several civil engineering structures. Soil improvement methods are one of the usual practices to improve the strength of soils. Recently, many researchers have reported the effects of non-traditional additives, on soils geotechnical properties and proven this additives are extensively used to solve the problematic soil. However, there is a lack of publications on the fundamental microstructural behaviour of non-traditional additives treated clay soil soils and their influence on the engineering behaviour. Therefore, this paper focused on determining the improvement mechanism for stabilization and the performance of clay soil mixed with two types of additives: traditional and non-traditional additives, namely cement and Demolished Tile Waste (DTM). A microstructural study pH analysis had been conducted and reviewed to elucidate the stabilization mechanism. It also includes an unconfined compressive test, oedometer consolidation test and compaction test used to assess the stabilized soil's engineering properties. The laboratory tests showed the effectiveness of the additive on stabilizing the soft clay by using DTM. The microstructural tests results indicated the formation of new mineral products in the mixtures, identified as sodium aluminosilicate hydrate (NASH) and calcium silicate hydrate (CSH) for soils treated with DTM. In the nutshell, at an early period the selected additive had expected to successfully increase the strength of soft soil. Thus, the application of selected non-traditional stabilizers was considered can reduce cost for the geotechnical project.

ICSIE 2020: 020-012

Assessment of Community Noise Annoyance due to Transverse Rumble Strips Installation at Residential Areas

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Abstract. Transverse rumble strips (TRS) acts as a traffic calming device to alert inattentive drivers, however, inappropriate design may generate excessive noise level which cause annoyance among the nearby residents. This study attempts to assess community noise annoyance by investigating current TRS designs and characteristics, measuring roadside noise level and traffic characteristics and evaluating noise annoyance due to TRS installation. Middle overlapped (MO), middle layer overlapped (MLO) and raised rumbler (RR) TRS profile types were selected. Noise indices such as A-weighted equivalent continuous sound pressure level (LAeq), sound level exceeding 10% (L10) and 90% (L90) of specified time were measured using sound level meter (SLM) based on ISO 11819 - 1: 2001 Acoustics: Measurement of the influence of road surfaces on traffic noise - Part 1: statistical pass-by (SPB) method. Traffic characteristics such as volume and speed were also measured. Then, community noise annoyance was evaluated in terms of LAeq changes, noise limit comparison by the Department of Environment (DOE) and traffic noise index (TNI) calculation. It was found that there are various TRS profile types with the thickness of only 3mm. Regardless the types, TRS installation has increased the roadside noise level of about 7dBA and exceeded permissible noise limits.

ICSIE 2020: 023-013

A Case Study of Building Information Modelling (BIM) for Subsurface in Malaysia

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Abstract. Unforeseen ground condition often leads to the occurrence of cost overrun and project delay in Malaysia's architecture, engineering, and construction (AEC) industries. The implementation of Building Information Modelling (BIM) for subsurface was attempted to reduce uncertainties associated with the underground conditions. A pilot case study was performed to understand the 3D subsurface modelling workflow in BIM environment. A construction site in Ara Damansara, Petaling Jaya, Malaysia was selected for the pilot case study. The site investigation data of the study area were interpreted and input into AutoCAD Civil 3D with geotechnical module to perform the 3D subsurface modelling at various detail levels. The workflow of the modelling process in case study was documented for future references. Through this pilot study, it was found that the adoption of BIM for subsurface modelling could produce soil profiles for different engineering purposes such as visualisation of subsurface conditions during project initiation stage, preliminary conceptual design, and detailed analysis and design of geotechnical structures, particularly foundation. The BIM implementation for geotechnical data improves the management of site investigation data, enhances the visualisation of subsurface profile, and improves the efficiency in communicating the subsurface conditions to all stakeholders in a project team.

ICSIE 2020: 024-014

Effects of Tire Pyrolysis Oil (TPO) on the Rheological Properties of Bitumen

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Abstract. Millions of tires are produced worldwide every year and after a short time become waste. This is considering a massive waste need to be incorporated in various sustainable applications such as in a bitumen modification. In this study, tire pyrolysis oil-modified bitumen was prepared at 0%, 5%, 10%, and 15% by total weight of the blend. The influence of tire pyrolysis oil (TPO) on the conventional and high-temperature rheological properties of bitumen was evaluated by conducting penetration grade, ring and ball, dynamic viscosity, complex modulus, phase angle, and rutting resistance evaluations. Results show that the addition of TPO into base bitumen reduces the penetration values and slight reduction in softening points of modified bitumen which indicating the consistency and applicability of the TPO as a bitumen modifier. Based on the dynamic viscosity and temperature sweep test performed by a dynamic shear rheometer, it was observed that overall, TPO improved the viscosity, complex modulus, phase angle, and permanent deformation of bitumen at the temperature range of 40 to 76 °C, particularly at lower TPO content. Furthermore, TPO-modified bitumen exhibits rutting resistance better than base bitumen which could be attributed to the improvement in the elastic behaviour of bitumen with the addition of TPO. 15%TPO-modified bitumen show adequate rheological properties to be used as an alternative for base bitumen in hot regions pavement applications.

ICSIE 2020: 029-017

User's Acceptance on e-Hailing System as Alternative Transportation by Using Modal Shift Method

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Abstract. e-Hailing system is one of the medium that are functioning to minimize the person on using the private transportation. Due to modern technology era, internet is used to ease the user in communication. With the internet platform assist, the e-Hailing system has well in management with the users can request the destination, travel time and also the cost for this service. The objective of this study was to identify the contributing factors effect to use e-Hailing system and also to analyze modal shift between public transport and e-Hailing system. Therefore, a study towards user's acceptance on using e-Hailing system as alternative transport based on the modal shift method with Binary Logistic regression analysis was necessary to identify factor and effect that influence modal shift occur from public transport to the alternative transport which is e-Hailing system. Johor Bahru area was the selected area as the location of the study due popular with the e-Hailing system. This study also shows the type of e-Hailing system that is used and will know the how this system really works with the safety, cost and also travel time. The binary logistic regression analysis shows that all the components were positively significant. This alternative transport is actually sending the user to the destinations that are selected by the user in the application. Therefore, the e-Hailing system is an alternative transport that must be used for people nowadays.

ICSIE 2020: 024-019

Optimization the Physical Properties of Waste Denim Fiber Modified Bio-asphalt Binder Using Response Surface Methodology

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Abstract. This research used waste denim fiber (WDF) as a new modifier to mitigate the inconsistency problem of bio-asphalt that incorporated waste cooking oil (WCO). Response surface methodology (RSM) was applied to design and analyze the experimental data.16 blends of base and bio-asphalt binders were prepared with high shear mixer and evaluated by conducting penetration, ring and ball temperature and temperature susceptibility tests. Optimization of the properties was performed by RSM to come up with the optimum amount of the additives that can be recommended. Results showed that the addition of waste denim fiber reduced the penetration values and increased the ring and ball temperature and the penetration index of base and WDF-modified bio-asphalt binders. These findings reveal that WDF-modified bio-asphalt binders can perform well at the intermediate and high-temperature pavement applications. Numerical optimization results utilizing the developed models exhibited that optimum properties can be achieved with 5% of WCO and 6% of WDF.

ICSIE 2020: 037-021

Evaluation and Statistical Analysis of HRS-WC Mixture Performance Modified with Tropical Latex

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Abstract. The Marshall characteristics of HRS-WC mixed with tropical latex as a substitute of the 60/70 penetration grade asphalt material

were studied. The statistical analysis aiming to decide whether the tropical latex as a substitute of the 60/70 penetration grade asphalt material with levels of 1%, 3%, 5%, and 7% would affect the Marshall performance of HRS-WC was conducted. The suggested content of the tropical latex usage in the HRS-WC mixture was analyzed. The analysis results showed that tropical latex could improve the Marshall characteristics of HRS-WC. However, the extreme percentage of tropical latex could potentially reduce HRS-WC stability. Statistically, under 5% confidence level, latex utilization as substitution of the 60/70 penetration grade asphalt material with contents of 1%, 3%, 5%, and 7% only affected the flow parameter of HRS-WC mixture, among others Marshall characteristics (density, VMA, VFA, VIM, stability, and Marshall Quotient). Moreover, it is suggested to consider the usage of latex content in the HRS-WC mixture between 1% to 3%, in terms of the 60/70 penetration grade asphalt material substitution.

ICSIE 2020: 035-022

Empirical Evaluation of Lane Changing Following Gap Distance on Expressway

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Abstract. Lane changing (LC) is an essential aspect of driving behaviour on expressways, which impacts on traffic efficiency and safety. Therefore, a wrongful execution of LC, especially the wrong choice following distance before the LC manoeuvre. This could lead to road crashes, mostly in the form of rear-end, sideswipe, or angled crash. This research assesses the characteristics of drivers' following gap distance during LC. The study was performed on a segment along Kuala Lumpur – Seremban expressway. Data were collected along the selected segment using an instrumented test vehicle approach. A passenger car was instrumented with a Video Velocity Box (VBox), which an on-board data acquisition system used for video recording of field traffic events. Hence, VBox attached to the test vehicle was used for recording the following gap distance during LC manoeuvres in the field. After that, the video records were played back on a computer to estimate the gap distance. A total of 174 following incidences were observed in this work. Finding from the study revealed that the following gap distance before LC of the sampled

motorists ranges from 4.89 to 81.15 m with a mean and standard deviation of 18.47 and 12.16 m, respectively. Furthermore, out of the 174 sampled drivers, about 86.7% recorded following gap distances in the range of 10 to 30 m, implying that the majority of the motorists accept short gaps while executing LC. It was also found that the space gap is regarded as an essential variable than the time gap because as drivers travel at desired speeds, they tend to be guided by the available space rather than time.

ICSIE 2020: 035-023

Examination of Lane Changing Duration Time on Expressway

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Abstract. Lane changing (LC) manoeuvre has been regarded as an essential characteristic of driving behaviour, which mostly influences traffic efficiency and safety. Thus, a wrongful performance of LC could lead to accident occurrence in the form of rear-end, sideswipe, or angled crash. Consequently, to develop countermeasures to minimize events associated with LC, an understanding of drivers' behaviours during LC manoeuvres and its duration are essential. This study explores into characteristics of drivers' LC duration time along Kuala Lumpur – Seremban expressway. Data were collected along a selected segment using an instrumented vehicle. A passenger car was instrumented with a Video Velocity Box (VBox), which used video recording of field traffic event Hence, VBox attached to the test vehicle was used for recording LC manoeuvres in the field after which the video records were played back in a computer to estimate the LC duration times. A total of 174 LC manoeuvre incidences were observed in this study, the LC duration times of the observed motorists' LC events ranged from 0.90 to 10.52 seconds with mean and standard deviation values of 3.02 and 1.32 seconds, respectively. Out of 174 sampled drivers, an approximate of 162 representing 93% performed LC manoeuvre in less than 5.0 seconds with most of them executed in less than 3.0 seconds. This implies that more than 90% of the drivers observed are characterized by an aggressive LC driving behaviour. It was also found that the LC duration times data obtained in this study fits a Lognormal distribution reasonably.

ICSIE 2020: 036-024

The Effect of Polyurethane Mix Ratio on the Strength of Polyurethane Treated Marine Clay

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Abstract. Marine clay (MC) is recognised as an unfavourable soil in the construction field, given it continues to present problems of bearing capacity, consolidation, and settlements. In this paper, polyurethane was used to improve the properties of MC using a different mix ratio of polyol and isocyanate. The marine clay was characterised examining the particle size distribution (PSD), specific gravity (SG), Atterberg limits (AL), and performing standard proctor tests. Aside from that, an unconfined compressive test (UCT) was conducted to investigate the strength enhancement of treated marine clay (TMC) at various polyol to isocyanate mixing ratios. The UCT results indicated that the TMC could be effectively improved at the polyol to the isocyanate mixing ratio of 45:55. The unconfined compressive strength (UCS) of the MC consequently improved from 146 kPa to 286 kPa due to the addition of polyurethane. At the same time, the axial strain at failure decreased from 5.3% to 2.9% due to the treatment of the MC using polyurethane.

ICSIE 2020: 039-025

Geotechnical Characteristics of Soil Stabilised with Waste Steel Dust for Soil Improvement Works

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Abstract. This paper reports on the research carried out onto a kind of waste material from the medication supply industry viz, the waste steel dust. This research focuses on the potential of the waste steel dust as soil stabiliser agent based on strength improvement. Soil

stabilisation is conducted to enhance the geotechnical characteristics of the problematic soil, such as marine clay soil. The engineering properties of the marine clay soil has been determined such as particle size distribution, particle density and plasticity of the soil. The soil sample was mixed and compacted with different amount of the waste steel dust i.e. 5%, 10% and 15% for compaction and strength test. Dry weight technique was used to prepare these samples. Standard Proctor Test has been executed to determine the Optimum Moisture Content (OMC) and Maximum Dry Density (MDD) of the stabilised soil sample. Meanwhile, Unconsolidated Undrained Triaxial Test (UUT) has been done to obtain the undrained cohesion, cu of the stabilised soil. Findings from this study shows that additional of waste steel dust in the marine clay soil is unbeneficial, because as the content of the waste steel dust increased, the value OMC increased and both of MDD cu and decreased. Therefore, the waste steel dust alone incapable to become a soil stabiliser agent. However, based on the comparison with previous study, it is found out that the presence of activated agent could potentially increase the performance of the waste steel dust as soil stabilizer. Significant findings from this study would contribute additional literature knowledge related to soil improvement works using waste material.

ICSIE 2020: 030-026

Convergence Study for Rock Unconfined Compression Test using Discrete Element Method

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Abstract. Mesh convergence is a vital issue that needs to be addressed in a numerical model. This study investigated the effects of mesh element number on the Discrete Element Method (DEM) to the response of granite rock under compression loading. This study used the 3D finite-element code LS-DYNA to model the Unconfined Compression Test (UCT) numerical simulation. Models with five different mesh types were conducted for convergence mesh, namely normal mesh, fine mesh, super fine mesh, coarse mesh, and super coarse mesh. The mesh convergence of rock media has been

conducted using DEM and steel plates simulated using the Finite Element Method (FEM). The DEM-FEM numerical analysis is compared with the results obtained from the experimental test. The best mesh was obtained as the simulation could reproduce the trends of the stress-strain curve, the failure behaviour and compression strength observed in the experimental test. Normal mesh was selected as the best mesh type in this study based on the comparisons that have been made. This study shows that the DEM-FEM numerical simulation is able to represent the granite rock and can be used for further study based on the results of mesh convergence.

ICSIE 2020: 022-027

Asphalt Mixture Incorporating Activated Crumb Rubber as Additive: Marshall Properties

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Abstract. The major problem of dry mix method is poor interaction between asphalt binder and additive causing improper workability. Hence, air void content will be increased and reduced the strength of asphalt mixture. Activated Crumb Rubber (ACR) as additive is one possible approach to improve the issue. In this study, nine ACR contents were considered in the study i.e. 0%, 0.25%, 0.5%, 0.75%, 1%, 2%, 3%, 4% and 5% by weight of total mixtures. The performance of Marshall stability, stiffness, flow and density test of hot mix asphalt mixture was analysed. Based on the results, 0.75% of ACR gave optimum improvement to the performance of Marshall Stability properties.

ICSIE 2020: 044-029

Road Traffic Noise for Asphalt and Concrete Pavement

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Abstract. Traffic noise has been recognized as the greatest source of noise pollution. This paper aims to assess roadside noise levels on asphalt and concrete pavements and evaluate the suitability of the existing traffic noise prediction models. Stretches with asphalt and concrete pavements on Skudai-Pontian Highway was selected to observe traffic noise during peak and off-peak periods together with observation of traffic flow characteristic. The finding showed that observed traffic noise falls in the range of 79 and 89 dBA with most of the higher noise found during the peak period for asphalt pavement and off-peak period for concrete pavement. A comparison of observed noise with 5 traffic noise models found that the Penang noise model pattern is almost close to the observed noise. Regression analysis was performed to develop a traffic noise model in order to predict noise generated by different types of pavements in different traffic conditions. All traffic noise models were found to be competent to predict the present traffic noise. Thus, it can be concluded that the pattern for traffic noise for different types of pavements is not similar under different traffic conditions and a new traffic noise model for a specific condition is needed for the better prediction of traffic noise.

ICSIE 2020: 040-030

Mapping of Blackspots Accident Area at North South Expressway to Produce Expressway Advisory System

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Abstract. The study was carried out to produce an advisory system based on the blackspot accidents mapping at the North-South Expressway (NSE). Blackspots are location where the road traffic crashes have historically concentrated by type of accident in which the accident caused fatalities, severe injuries, minor injuries and damage. This research aims to identify accident blackspot and plotting accident data into a digital map of the study area to produce advisory systems for highway users. The software used in this study namely Google Earth Pro, ArcMap and ArcGIS online. Results showed that blackspot location are known in the form of mapping where it can be performed online. In addition, the path with high number of accident points weightage location were identified and prioritized. By applying Google Earth Pro and ArcGIS software, the advisory system was created, and these blackspot locations can also be easily accessed by highway users. Therefore, the advisory system helps in facilitate the users for trip planning base on the accident status locations as a precautionary measure and initiative to reduce the rate of road accident in expressway.

ICSIE 2020: 044-032

Assessment of Young Drivers' Driving Behaviour and Driving Speed along Horizontal and Vertical Alignments

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Abstract. Young drivers are more likely to experience car crashes as they tend to have risky driving behaviours. This study aims to assess young drivers' driving behaviour and driving speed along the horizontal and vertical alignments of roads. The 20 young drivers who participated in this study were asked to complete a self-reported assessment (Driver Behaviour Questionnaire) and then invited for an on-road driving assessment during daytime and night-time, along horizontal and vertical road alignments at a selected route in Skudai, Johor. The results from the Driver Behaviour Questionnaire revealed that distractions during driving was the most frequently reported behaviour that caused car crashes amongst young drivers, followed by error and violation. Speed profile was found to be higher during daytime when compared to night-time. A significant difference in speed between male and female drivers was noted at horizontal curves during daytime and vertical curves during night-time. The study concluded that such aberrant driving behaviours would have an impact on the driving performance, particularly on horizontal and vertical curves.

ICSIE 2020: 041-033

Properties of Bitumen Modified with Latex under Short-term Ageing

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Abstract. Short-term ageing is a common issue in bitumen mixing production, and it severely affects the physical, rheological and chemical properties of the bitumen. Polymer modified bitumen is regarded as a preferable paving material to improve the performance of asphalt pavement against binder ageing. One of the additive types used to innovate modified bitumen is natural rubber (latex). This study evaluated the physical properties of bitumen modified with latex under ageing condition. Different percentages of latex (i.e. 2.5%, 5.0%, 7.5% and 10.0%) were added to the control 60/70 penetration grade (PEN) bitumen, which was then tested for penetration, softening point, viscosity, loss on heating and storage stability. The bitumen samples were conditioned under short-term ageing (i.e. rolling thin-film oven) prior to performance tests. Results indicated that modifying bitumen with latex hardens the conventional bitumen 60/70 PEN and potentially improves the bitumen's resistance against temperature susceptibility with a high value of softening point. The addition of latex up to 10% produces a homogenous blend even after short-term ageing condition.

ICSIE 2020: 051-035

Effect of Tropical Natural Rubber on the Hot Rolled Sheet (HRS) Wearing Course

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Abstract. One effort to improve the performance of road pavement layers and the quality of asphalt mixes is through the modification of asphalt by polymeric materials addition. Latex is a polymer material that can be used and easily found in Indonesia, known as one of the worlds largest natural rubber producer countries. This study intended

to improve the quality of HRS-WC mixture by utilizing latex 1%, 2%, 3%, 4%, 5%, 6%, 7%, and 8% as a partial replacement of asphalt material through Marshall testing. From the test results, it can be summarized that the Optimum Asphalt Content (OAC) value of the HRS-WC mixture was 7%. Furthermore, the Optimum Latex Content (OLC) meeting the specifications was 1% with a Density value of 2.25, a VMA value of 19.68%, a VFA value of 76.78%, a VIM value of 4.57%, a stability value of 1766.44 kg, a Flow value of 3.14 mm, and MQ value of 629.01 kg/mm.

ICSIE 2020: 054-039

Sex Disparity in Satisfaction and Loyalty towards Urban Rail Transit: A Survey of Light Rail Transit (LRT) Passengers in Kuala Lumpur, Malaysia

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Abstract. The aim of this study is to explore the effect of sex disparity on passenger satisfaction and loyalty to the light rail transit (LRT) services in Kuala Lumpur, Malaysia. A total of 417 responses from a self-administrated questionnaire were analyzed using non-parametric tests, namely Mann-Whitney U test and Spearman's correlation test. Based on the Mann-Whitney U test, results showed a significant difference between male and female LRT passengers in terms of their satisfaction and loyalty. In addition, the Spearman's correlation test proved a significant and positive relationship between passengers' sex, satisfaction and loyalty. Finally, future suggestions were made based on the findings reported in this study.

ICSIE 2020: 054-040

An Overview of Heavy Vehicle Accidents Characteristic on Expressways in Malaysia

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Abstract. Heavy vehicles (Heavy goods vehicles and buses) play a vital role in the economic wellbeing of a country. Safety measures are necessary to ensure the safety of heavy vehicles and other vehicles since the majority of crashes involving heavy vehicles are frequently severe crashes. This study investigates the accidents involving heavy vehicles on the expressways in Malaysia. Result of the analysis shows that most of the heavy vehicle accidents on expressways occurred during the day (54.8%) and clear weather (88.1%). Most night-time accidents and fatal accidents occurred on roads without street lights, where the total of 22.2% of the heavy vehicle accidents occurred on roads without street lights while 16.8% of the accidents occurred on roads with street lights. Heavy vehicle accidents frequently occur in flat areas, and they cause 33% of the deaths in multivehicle accidents. The finding of this study can help safety planners to develop a safety management plan for heavy vehicles, especially for heavy goods vehicles.

ICSIE 2020: 047-042

The Effectiveness of Home Delivery for Grocery based on External Cost

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Abstract. e-Grocery is one of the e-commerce sectors whose growth has increased significantly. This condition indicates the transition from conventional to online shopping and impacts the rate of home delivery services. Consequently, it may cause home delivery trips to produce the same or even greater externalities compared to conventional shopping trips. This study is aimed to analyze the effectiveness of

home delivery based on the external cost aspect. Home delivery trips are analyzed using travel diary data of a grocery delivery service provider, whereas the conventional shopping trips are analyzed using the data taken from the consumers of conventional shopping. Compared to conventional shopping trips which are dominated by cars, home delivery using motorcycles produce an external cost of 23%-57% lower. In order to increase the effectiveness of home delivery, consumers are required to choose more than one time window. This will provide a greater opportunity to do more efficient delivery routing.

ICSIE 2020: 042-043

The Strength Behaviour of Eggshell Powder Substitution on Soil-lime Stabilization

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Abstract. This study explored the investigation into enhancing soil strength characteristics using eggshell powder (ESP) as a lime substitution on soil-lime stabilization. The ESP was naturally available while using this material, which could reduce cost and other environmental effects. The influence of varying percentages of eggshell powder as a lime substitution in changes of the strength and durability is observed based on the unconfined compression test conducted on two soil and two lime types (hydrated lime and quicklime). Influence factors were studied, including soil and lime types, ESP content, curing time, and durability against wetting-drying (w-d) cycles. The unconfined compressive strength (UCS) and the durability values of ESP-stabilized soils decreased, while ESP content increased. However, this value was higher than the unstabilized ones. The ESP substitution on soil-lime stabilization marginally affected the strength and durability of soil-lime stabilization. The UCS increased with the increasing curing period for all specimens. Soils with more clay particles reacted better to both hydrated lime and quicklime. Additionally, strength development occurred in soil-quicklime mixtures more than in soil-hydrated limes. Based on a durability test, it was known that the maximum ESP substitution was 50% from the

Optimum Lime Content (OLC); beyond that content, the strength of soil might dramatically be degraded.

ICSIE 2020: 056-044

Effects of Curing Time Using Crushed Coconut Shell (CCS) and Coconut Shell Ash (CSA) as Additive to Improve Lateritic Soils

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Abstract. Numerous constructions in Malaysia have encountered the issues where soil cannot fulfil the standard required specification due to the bearing capacity of soft soil is too weak to withstand traffic loading. Recently, there is a lot of defeats related to soil settlement and distorting of the structure effect by the inflated compressibility and low in shear strength of the soil. This research study on the effects of natural additives in crushed coconut shell (CCS) and coconut shell ash (CSA) to enhance the durability of lateritic soil for road pavement. The effects of curing time in the CCS and CSA admixture of soil is examined. Different proportions of 5% and 9% CSA with a constant 8% CCS were used to study the effect on lateritic soil. Series of preliminary tests were performed followed by engineering test of Compaction test in identification on optimum moisture content (OMC) and maximum dry density (MDD) followed by California Bearing Ratio (CBR) for curing day of 4 days, 7 days and 14 days of soil mixtures sample to investigate its enhancement to soil strength. Further review from the previous research has also been carried out and it is pointed out that by using natural CCS and CSA brushed up the soil load-bearing capacity due to the increment of CBR value obtained as compared to the normal mix. Hence, it can be concluded that the combination of natural additives CCS and CSA in the soil also have the capability to improve the soil strength and can be suggest to replace aggregates and cement for use in lateritic soil stabilization subject to road works.

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The Comparison of Pile Bearing Capacity using 8 Direct Method based on CPT data in Surabaya Area

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Abstract. This research focuses on comparing the pile bearing capacity resulting from eight different methods that have been developed and are widely used in design. The methods used are the Schmertmann (1978), LCPC (Bustamante & Gianeselli 1982 " Laboratoire Central des Ponts et Chausees), De Ruiter and Beringen (1979), Tumay and Fakhroo (1982), Price and Wardle (1982), Philipponnat (1980), Aoki and De Alencar (1975), and the Penpile methods (Clisby et al 1978). CPT data is used in this study because it is considered easier, faster and fast and relatively economical, and supplies continuous records with depth. Twenty different CPT data variations in the Surabaya area were used in this study. The piles used in this study are concrete piles with a diameter of 60 cm. The result of this research is that the bearing capacity using the Schmertmann method tends to be greater when compared to other methods while the Penpile method produces the lowest carrying capacity. The ratio of the minimum and maximum carrying capacity of the 8 methods used is up to 20%.

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Durability of Clayey Soil Stabilized With Potassium Additive

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Abstract. This research focuses on comparing the pile bearing capacity resulting from eight different methods that have been developed and are widely used in design. The methods used are the Schmertmann (1978), LCPC (Bustamante & Gianeselli 1982 " Laboratoire Central des Ponts et Chausees), De Ruiter and Beringen

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Development of Web-based Mapping Program for Spatially Distributed Slope Stability Analysis Additive

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Abstract. Rainfall-induced landslide is considered as the deadliest disaster in Indonesia. Many efforts have been made to mitigate the landslide, such as landslide hazard mapping in the landslide-prone area. The traditional landslide mapping is commonly conducted using scoring method which is based on field investigation and data collection. The underlying mechanical theory of this method is vague. In this study, a web based slope instability mapping program was developed using well established geotechnical theory in slope stability. This program is based on infinite slope method. To calculate the infiltration depth, Green-Ampt model was employed. In order to investigate performance of the program, a case study is conducted in Gerdu, Karanganyar, Central Java, Indonesia. The result shows that the program can map the spatial distribution of the safety factor nicely. The program also works well with the raster and vector data.

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Development of Paver Block Containing Recycled Plastic

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Abstract. Disposal of accumulated plastic waste daily is an exigent in solid waste management. Hence, this study investigated the possibility of utilizing plastics waste in paver block fabrication for the pedestrian walkway. The development of paver block containing recycled plastic was started with a trial mix in order to identify the appropriate method for paver block fabrication. Two methods which are heating and compression were observed during the trial mix before proceeding to full scale casting. Compression method was selected in the production of paver block for further test. There were two ratios of cement, sand and soil used in the design mix namely mixture A and mixture B. The plastic content used in each mix were 0%, 5%, 10%, 15%, 20%, 25% and 30% by weight of sand. Laboratory tests conducted on the specimen were compressive strength, water absorption and skid resistance. Both mixtures were compared in terms of compressive strength in order to select the appropriate ratio. The results showed that mixture B produced higher compressive strength compared to mixture A. Replacement of 5% recycled plastic exhibits the highest compressive strength for mixture B, however for economical consideration the replacement can be utilized up to 30% recycled plastic content. Based on the water absorption test, the recycled plastic increases the water absorption. However, the skid resistance of the paver block was found higher than the requirements. Therefore, paver block made of recycled plastic incorporating locally available material has the potential for use in the construction of pedestrian path.

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The Effect of Soil Porosity and Geopolymer Viscosity on Spreading Grouting in Weathered Clay Shale

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Abstract. Fly ash geopolymer is a potential material for the stabilisation of clay shale. Therefore, this research determines the effect of soil porosity (n), binder activator ratio (f/a), and geopolymer viscosity on the injected grout volume (Vi) and soil-grout column of weathered clay shale. The research was carried out using fly ash as a geopolymer binder, dissolved in Na2SiO3 and NaOH(10M) with an activator ratio of 1:1. The binder activator ratios were 0.50, 0.75, 1.0, and 1.25, with injection applied in the compacted clay shale using three dry densities corresponding to the porosity of 0.42, 0.48, and 0.54. Furthermore, a cylindrical specimen with 46 mm diameter and 100 mm height was used to carry out this test. A hole with a diameter of 12 mm and 80 mm depth was bored at the centre of the specimen to model a fracture grouting method, which was injected with the geopolymer by applying a pressure of 100 kPa for 20 minutes. The research found that the higher the binder activator ratio, the lesser the viscosity obtained; therefore, the grout easily penetrated the pores between the soil particles. As a consequence, more volume of geopolymer could be injected in soil. Binder activator ratio lesser than 0.75 was ineffective for the injection method, and binder activator ration between 1.00 - 1.25 was recommended for the grouting injection method. A new equation to determine the grout diffusion was proposed based on this experiment, as written in the equation $\left(R_i/R_b\right)^{n\cdot f/a} = K\left(V_i/\pi\cdot R_b^2\cdot L\right)^{n\cdot f/a}$.

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Influence of the Pulverised Method on the Plasticity and Strength Behaviour of Cement Stabilised Clayshale and Sandstone

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Abstract. Clayshale and sandstone are types of sediment that generally have a contrast soil behaviour. Clayshales, however, is less durable due to the hydrosphere and atmospheric exposure, but a sandstone has low strength in loose condition. The present research is to investigate the effectiveness of dry and spray pulverised method on cement-stabilised clayshale and sandstone. The cement content ranged from 2% to 10% by the dry weight of soil. The unconfined compression strength test was performed on cement-stabilised soil. Atterberg limit test was also performed to evaluate the soil modification due to stabilisation. The results show that cement reduced the liquid limit and increased the plastic limit, which caused a decrement on the plasticity index. As the cement content increased, the unconfined compression strength of clayshale and sandstone also significantly increased. This study has shown that the unconfined compressive strength with the pulverised spray method is higher than that of the dry pulverised method. The secant modulus made using dry pulverised method is higher than the pulverised spray method. The dry pulverised process generates specimens with more brittle behaviour than the spray-pulverised method, based on the study of damage property by using energy dissipation.

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A Study on Durability for Rigid Pavement against Acid Environment and Displacement Model

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Abstract. An acidic environment commonly found in peat soils or expansive soil will harm the quality of rigid pavement by considering its use at long-life plan, traffic load, and minimization of damage to the crossroad due to vehicle braking. As a concrete provider, chemical admixture as mixed materials today is widely used with the reasons of workability, initial strength, as well as saving of material used. This research aimed to find out the durability of concrete admixture using sika-NN and plastocrete (retarding and water reducing admixture) at the acid environment and knowing the displacement that occurred using ABAQUS software modeling. It used the laboratory experimental method and the cube concrete sample 15x15x15 cm with the compressive strength of 33.2 MPa. A total of 18 concrete samples were immersed using normal pH water and H2SO4 at pH 1 ± 1 tested at 3, 7, 14, 28, 60, and 90 days using the Duplo method. In this research, the concrete durability was carried out using, Ultrasonic Pulse Velocity Test (UPVT) to test the density, compressive test, and modeling concrete displacement on peat soils with vehicle loads in acidic environments using software ABAQUS. The mixed design results show an average setting time value of about 112 minutes. Coarse aggregate and cement decrease due to additives is approximately 24% and 18% respectively, increasing the use of fine aggregate to 16.49%, but the value of concrete density increases base on soaking time. Besides that, there is a decrease in compressive strength up to 16% at the age of 90 days. The value of displacement in the modelled pavement uses a maximum load of 8 tons each 2.994 mm for concrete with normal water and 3.045 mm for concrete with an acid environment respectively. Concrete soaked in acid water is the greatest deformation that occurred in rigid pavement using ABAQUS and indicates that acid water has an impact on decreasing concrete quality.

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Traffic Detection Program using Image Processing and the 1997 Indonesian Highway Capacity Manual (MKJI)

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Abstract. As a part of transport planning and assessment, traffic volume is essential data. However, many Indonesian's transports engineers, in particular, still use manual traffic counting to collect data series for traffic volume in 24 hours or more. This method is considered inefficient and expensive along with technological developments in this modern era. The purpose of this study tries to simplify the traffic counting method by developing an automatic vehicle detection program based on the 1997 Indonesian Highway Capacity Manual (MKJI) classification. The application that used in this study is KS Traffic Analyzer as open source code traffic counting based on Java and OpenCV library. This application then modifies as MKJI 1997 vehicles classification to measure traffic data in urban and rural road using drone quadcopter. This tool using GGaussian Mixture Model (GMM) method for processing images/videos of traffic based on the background and foreground. Traffic footage was tested at different times, height, and angle of shooting. The accuracy was measured by comparing the volume from the program and manual counting. The results showed that the best accuracy between real traffic volume and automatic counting in the program is in the urban street with the best accuracy reached 93.66% which was taken video in the morning and the height is 5 m. This result of this study also answers the function of road performance based on volume per capacity.

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Traffic Congestion Evaluation at Unsymmetrical Signalized Intersection of Sentul, Yogyakarta

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Abstract. Sentul intersection is unsymmetrical signalized intersection located nearby Sentul Market, so this intersection very potential causing traffic congestion. Traffic congestion does not only affect the increasing of total travel time, but it will also cause delay, long queue of vehicles, higher vehicle operating cost, and lower level of service. Hence this study aims to analyses the performance of unsymmetrical intersection based on Indonesians regulation and to determine the congestion cost occurred at Sentul signalized intersection. To do so this study utilized quantitative method to evaluate the performance of intersection and to estimate congestion cost at intersection. The stages of study starting from primary data collection by traffic survey, traffic modelling to assess the intersection performance, and analyzing congestion cost using software. The analysis was performed by utilizing software and by considering 3 conditions, namely existing, 1st alternative, and 2nd alternative. The results showed the intersection performance of existing condition was very poor with level of service (LOS) F, average delay of 106.71 second/vehicle, queue time of 134.42 seconds, and congestion cost of intersection was IDR 3,722,627 per hour. The 1st alternative was re-designing phase time of traffic light and the 2nd alternative were re-designing green time, widening of approach area, applying left turn on red (LTOR) for the west-arm of intersection, and removing on-street parking area. The results of the 1st alternative obtained LOS of F, average delay of 95.53 second/vehicle, queue time of 115.78 seconds, and congestion cost of IDR 3,163,927 per hour. The 2nd alternative resulted LOS of E, average delay of 74.23 second/vehicle, queue time of 61.70 seconds and congestion cost of IDR 1,876,757 per hour. Therefore the 2nd alternative is the best solution since it will reduce congestion cost by 50% as well as improve intersection performance.