



**IconCEES**  
2023

7th International  
Conference on  
Civil and Environmental  
Engineering for  
Sustainability

9 - 10 October 2023

ABSTRACTS  
& PROGRAMME  
BOOK



**7th International Conference on Civil and  
Environmental Engineering for Sustainability**

9 – 10 October 2023  
Impiana KLCC Hotel, Kuala Lumpur  
Malaysia

<https://intl-conference.com/iconcees2023>

## Organiser

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Main organiser



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

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## Foreword By the Vice-Chancellor Universiti Tun Hussein Onn Malaysia



Assalamu'alaikum warahmatullahi  
wabarakatuh

Respected Delegates, Distinguished  
Guests, Ladies and Gentlemen!

Today, I am both honored and thrilled to welcome each and every one of you to the 7th International Conference on Civil and Environmental Engineering for Sustainability (IConCEES2023). As we congregate under the powerful theme, "Engineering A Better Future: Multidisciplinary Perspectives on Sustainable Development," we set the stage for profound discussions, ground-breaking insights, and a shared vision for our world's future.

The fields of civil and environmental engineering have long stood as pillars in the evolution of our societies. But as our planet grapples with unprecedented challenges, from climate change to urban sprawl, it has become abundantly clear that our engineering solutions must be broader, deeper, and more interdisciplinary than ever before.

IConCEES2023 is not just a conference; it's a testament to our global commitment to sustainable development. "Engineering A Better Future" is more than a slogan. It embodies our collective responsibility and the pressing need for innovation. It reminds us that our blueprints, designs, and structures are not just for the present but are footprints for the generations to come.

Let's remember that every brick we lay, every structure we erect, and every infrastructure project we undertake has the power to either harm or heal our environment. Through our collective effort and the advancements we discuss here, let's ensure that our profession stands as a beacon of sustainable development for generations to come.

Our discussions over these two days will transcend borders and bridge disciplines. We'll dive into topics that merge the technical with the ethical, and the practical with the visionary. From sustainable urban planning to eco-friendly construction materials, and from water resource

management to renewable energy integration – our conference will showcase the amalgamation of expertise from different spheres, all with a singular goal – a sustainable tomorrow.

I encourage all attendees to engage actively, to question, to collaborate, and to envision. Let this be a breeding ground for ideas that not only challenge the norms but redefine them.

A heartfelt appreciation goes to the conference organizer - the Faculty of Civil Engineering and Built Environment, the tireless organizing committee, and all those who have worked behind the scenes to ensure the success of this conference.

In conclusion, as we embark on this two-day conference, let's remind ourselves of the power and responsibility we hold. We are not just engineers or professionals; we are the architects of a sustainable future. And together, armed with knowledge, passion, and collaboration, we can truly engineer a world that future generations will be proud to inherit.

Thank you, and I wish all of you a fruitful and inspiring conference!

**Prof. Ir. Ts. Dr. Ruzairi Abdul Rahim**  
Vice-Chancellor  
Universiti Tun Hussein Onn Malaysia

## Foreword By the Dean Faculty of Civil Engineering and Built Environment

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Assalamu'alaikum warahmatullahi  
wabarakatuh and greetings to all participants  
and delegates.

Welcome to IConCEES 2023.

Our faculty, the Faculty of Civil Engineering and  
Built Environment, Universiti Tun Hussein Onn  
Malaysia is proud to host IConCEES 2023 for  
the seventh time since 2009.

First and foremost, on behalf of the Faculty of Civil and Environmental  
Engineering, Universiti Tun Hussein Onn Malaysia (UTHM), I would like  
to warmly welcome all participants to the 7th International Conference on  
Civil and Environmental Engineering for Sustainability (IConCEES 2023),  
held in Kuala Lumpur, Malaysia on the 8th and 9th October 2023.

I would like to express my heartfelt gratitude to the organizing committee,  
and everyone else behind the scenes who have worked tirelessly to bring  
this event to fruition. The theme for this year's conference, the theme  
"Engineering A Better Future: Multidisciplinary Perspectives On  
Sustainable Development", resonates with the rapidly changing  
landscapes of civil and environmental engineering. As we stand at the  
crossroads of technological advancements and environmental  
conservation, it is imperative for us, the pioneers in this field, to strike a  
harmonious balance. This reminds us of the importance of our roles as  
civil and environmental engineers.

This 7th IConCEES 2023 is an ideal platform to share current ideas and  
findings on topics related to civil and environmental engineering. UTHM  
aspires to be a global university and we have made much effort towards  
achieving this ambition. This conference aims to encourage all prominent  
scientists and researchers as well as industrial players together in one  
place so that we can share and exchange ideas, knowledge, and  
expertise, widen networking among each other, and promote new  
technology towards a sustainable future.

To all distinguished representatives from government and non-government, higher learner and research institutions, I thank you all for being present here today. I hope all delegates will participate actively in the conference and share their thought and ideas in their scope of interest within the civil and environmental engineering area. It is also hoped that during this conference, delegates will take the opportunity to renew old friendships and meet new acquaintances, as well as explore Kuala Lumpur. I believe this conference could be a good platform for all the participants to get recent research updates in the civil engineering field. In these 2 days, we'll delve deep into pathbreaking research, innovative technologies, and methodologies that promise a sustainable future.

Once again, welcome to Malaysia and IConCEES2023. Let's embark on this exciting journey together!

Terima kasih and thank you!

**Prof. Ir. Ts. Dr. Mohd Haziman Wan Ibrahim**

Dean

Faculty of Civil Engineering and Built Environment

## Foreword By the Executive Chairman IconCEES 2023

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Assalamu'alaikum warahmatullahi  
wabarakatuh.

Greetings to distinguished guests, esteemed scholars, innovators, industry experts, and fellow participants!

Alhamdulillah, I am very grateful that this international conference is convened today to gather more than one hundred speakers presenting papers about the field of Civil and Environmental Engineering.

As we gather today for the 7th International Conference on Civil and Environmental Engineering for Sustainability, I am filled with gratitude and excitement. The convergence of brilliant minds in this venue speaks volumes about our shared commitment to sustainability and the global community.

Over the years, IconCEES has provided a platform for discussions, debates, and deliberations. This year, our chosen theme for IconCEES2023, "Engineering A Better Future: Multidisciplinary Perspectives on Sustainable Development," emphasizes not only the pivotal role of engineering but also the importance of collaboration across diverse disciplines. Engineering, in its very essence, is about creating solutions. But to address the multifaceted challenges of sustainable development, we need to move beyond traditional boundaries. As we journey through the sessions and discussions of IconCEES2023, I hope we all leave with renewed passion, fresh perspectives, and actionable ideas.

In closing, I would also like to congratulate and thank all the 7th IconCEES 2023 committee members for their hard work and diligence. I would like to express my gratitude to the Faculty of Civil Engineering and Built Environment and FKAAB Consult for their cooperation in managing the conference. Your dedication makes this gathering possible. It is always hoped that this conference will be organized in the future with a more exciting theme to be discussed and shared by all parties.

Let's harness our collective intellect and creativity to truly engineer a better, sustainable future.

Thank you, and let's make IConCEES2023 a landmark event in our shared journey towards sustainability!

**Assoc. Prof. Dr. Mohd Adib Mohammad Razi**  
Executive Chairman of IConCEES2023



## Keynote Speakers



**Dato' Jana Santhiran Muniayan**

Secretary General  
Ministry of Transport, Malaysia

*Title: "Sustainable Transport in Malaysia"*



**Prof. Dr. Obiya Hiroyuki**

Professor  
Saga University, Japan

*Title: "Strict Tangent Geometrical Stiffness for  
Ultra Large Displacement Analysis"*



**Prof. Dr. Tavio**

Professor

Institut Teknologi Sepuluh Nopember, Indonesia

*Title: " Environmentally-Friendly Biomaterial Innovation for Retrofitting  
of Houses and Low-Rise Buildings in Indonesia"*



**Prof. Ir. Ts. Dr. Adnan Zainorabidin**

Professor

Universiti Tun Hussein Onn Malaysia

*Title: " Forensic In Geotechnical Engineering: Lesson Learned"*

## Programme

Day 1 (9 October 2023)			
Time	Impiana Halls 1 and 2		
08:00 AM	Registration		
09:00 AM	Welcoming Remarks & Opening Ceremony		
09:15 AM	Keynote Address 1 by Dato' Jana Santhiran Muniayan		
09:45 AM	Keynote Address 2 by Prof. Dr. Obiya Hiroyuki		
10:15 AM	Coffee Break		
Parallel Technical Sessions 1			
Time	Mawar Room	Melati Room	Jasmin Room
11:00 AM	18	5	3
	20	6	4
	29	8	17
	30	9	28
	57	26	75
	77	27	107
	99	47	134
	90	31	
01:00 PM	Lunch Break		
Parallel Technical Sessions 2			
Time	Mawar Room	Melati Room	Jasmin Room
02:00 PM	25	33	11
	39	34	91
	51	43	112
	52	65	115
	135	66	118
	76	132	
03:30 PM	Coffee Break		
Parallel Technical Sessions 3			
Time	Mawar Room	Melati Room	Jasmin Room
03:45 PM	13	42	1
	16	56	35
	124	58	54
	127	126	61
	128	130	60
	129	131	98
05:00 PM	End of Day 1		

Day 2 (10 October 2023)		
Time	Room A - <a href="https://shorturl.at/qtCV3">https://shorturl.at/qtCV3</a>	
09:00 AM	Keynote Address 3 (Online) by Prof. Dr. Tavio	
10:00 AM	Keynote Address 4 (Online) by Prof. Ir. Ts. Dr. Adnan Zainorabidin	
10:45 AM	Coffee Break	
Parallel Technical Sessions 4		
Time	Mawar Room	Melati Room
09:00 AM	139	40
	105	48
	110	53
	114	78
		81
		125
10:45 AM	Coffee Break	
Parallel Technical Sessions 5		
Time	Mawar Room	Melati Room
11:00 AM	45	21
	46	36
	97	80
	79	86
	55	102
		121
01:00 PM	Lunch / End of Day 2	

Day 1 (9 October 2023)			
Online Presentation			
Time	Room A	Room B	Room C
11:00AM	10	24	49
	14	32	50
	15	85	69
	63	108	120
	71	116	137
	82	122	83
	93	123	112
	111	138	59
		103	
01:00 PM	Break		
Time	Room A	Room B	
02:00 PM	19	2	
	37	7	
	70	23	
	72	136	
	84	89	
	100	101	
	104	113	
	106	119	
	38	62	
05:00 PM	End		

## Presentation Schedules

DAY ONE		
<b>Mawar Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>11:00 AM - 01:00 PM</b>
	<b>Session Chair:</b>	<b>Dr. Noorwirdawati Ali</b>
PAPER ID	PAPER TITLE	AUTHORS
18	Impact of COVID-19 on Construction Projects: Challenges and Opportunities	Mohammed F.M. Abushammala & Siham Farrag
20	Construction Asset Management: Challenges of Construction Asset Management and Its Improvement Approaches	Norpadzlihatun binti Manap, Yaw Suet Xin & Noralfishah Sulaiman
29	Performance of High Strength Concrete Containing Fine Metakaolin, Palm Oil Fuel Ash and Coal Bottom Ash as Substitute Material Towards Mechanical Properties	Masni A Majid, Nurazuwa Md Noor, Mohd Hanif Ismail, Nur Anis Natasha Che Rahim & Muhammad Nur Rasyid bin Abu Bakar
30	Strength and Heat Emissions Performance of High Strength Concrete Containing Fine Metakaolin & Palm Oil Fuel Ash as Partial Cement Replacement	Masni A Majid, Nurazuwa Md Noor, Mohd Hanif Ismail, Nur Anis Natasha Che Rahim & Muhammad Nur Rasyid bin Abu Bakar
57	Embodied Carbon Consideration for Maintenance & Repair Appraisal in Heritage Building : A Review	Azeanita Suratkon, Sushilawati Binti Ismail & Muhammad Shafiq Bin Mahmad
77	Predictive Model for Corrective Maintenance Costs: Empowering Decision-Making in Building Renovation	Ali Hauashdh
99	Exploring Lift Car Defects: An Examination of Common Defects and The Possible Causes	Siti Nurul Ainun Bt Mohd Mustafa, Noor Syafiqah Mohd Sabri, Norishahaini Mohamed Ishak & Nurul Najihah Mad Rosni

DAY ONE		
<b>Melati Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>11:00 AM - 01:00 PM</b>
	<b>Session Chair:</b>	<b>Ir. Ts. Dr. Mohd Firdaus bin Md. Dan@Azlan</b>
PAPER ID	PAPER TITLE	AUTHORS
5	The Use of Geoelectrical Resistivity Methods to Detect the Potential Landslides in Payung, Batu City, Indonesia	Muhammad Fathur Rouf Hasan, Prof. Adi Susilo, Eko Andi Suryo & Arliandy Pratama
6	A Review of Conductive Additives for Enhancing the Electrical Properties of Self-Sensing Asphalt	Arsalaan Khan Yousafzai, Muslich Hartadi Sutanto, Muhammad Imran Khan, Nura Shehu Aliyu Yaro, Abdul Muhaimin Memon, Muhammad Tariq Khan, Muhammad Adeel Arshad
8	Multifunctional Porous Pavement Prototype for Urban Pluvial Flood Protection: Preliminary Findings on Contribution of Attitudes to Acceptance Willingness toward Proposed Scientific and Engineering Solutions	Snezana Svetozarevic, Vladana Rajaković-ognjanović, Branislava Lekic & Aleksandar Savic
9	Instrumented Pile Load Tests in Limestones and Granite Formations – Case Studies with Optical Fibre Strain Sensors	Hisham Mahamad, Aizat Akmal A M Beddelee, Bun Pin Tee
26	Geobamtile to Support Road Embankment Over Deep Soft Ground	Adnan Zainorabidin, Nasfiza Binti Mokhtar & Kaw Sai Low
27	Prediction Model of Hydraulic Conductivity for Sedimentary Residual Soil Mixed Bentonite as Compacted Clay Liner	Zainuddin Atiqah Najwa, Norazlan Khalid, Mazidah Mukri & Nor Zain
47	Influence of Particle Size for Malaysia Peat to The Cyclic Triaxial Loading Parameters	Adnan Zainorabidin, Siti Nurul Aini binti Zolkefle, Ang Koh Ann, Habib Musa Mohamad & Kasbi bin Basri
90	The Effect of Different Degree of Compaction Towards Electrical Resistivity Value for Cohesive Soil	Ahmad Khairul Abd Malik, Aziman Madun, Mohd Firdaus Md Dan, Faizal Pakir & Mohd Khaidir Bin Abu Talib

DAY ONE		
<b>Jasmin Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>11:00 AM - 01:00 PM</b>
	<b>Session Chair:</b>	<b>Ir. Dr. Goh Wan Inn</b>
PAPER ID	PAPER TITLE	AUTHORS
3	Compressive Strength of Nano-Bio Concrete	Muyideen Oladimeji Abdulkareem
4	Effect of CGW Addition on the Physical, Mechanical, Acoustic and Fire Resistance Properties of Autoclaved Aerated Concrete	Efil Yusianto, Noraini Mars, Izzati Abdul Manaf & Hafizuddin Hakim Shariff
17	Utilisation of Industrial Waste Materials in The Production of Geopolymer Concrete	Mohammed F.M. Abushammala, Siham Farrag & Ibrahim Al-Balushi
28	Evaluation of Compressed Earth Block (CEB) with the utilization of Durio Zibethinus Fiber (DZF)	Nur Masyitah Osman
75	Compressive Strength, Water Absorption and Morphology of High-Alumina Ladle Furnace Slag Blended Cement Mortar Subjected to Short-Term Steam Curing Regime	KH Mo, Suhana binti Koting, Yong Chee Lok & Haider Hamad Ghayeb
107	High-Density Geopolymer Using Slag and POFA Based Geopolymer Concrete: Engineering Properties	U. Johnson Alengaram, Muhammad Shazril Idris Ibrahim, Ahmed Mahmoud Alnahhal, Mohamad Afifyahmi Bin Rushdi Amir & Mohamed Tarek Mohamed Fouad
134	The Use of Coffee Waste in Bio-Foamed Concrete Brick (B-FCB) To Reduce the Penetration of Carbon Dioxide (CO <sub>2</sub> ) into Concrete	Abdullah Faisal Alshalif, Y.M. Azri, J. M. Irwan, Mutafl. A, Honin Ali Yahya Alshaer, S.J.S.Hakim
31	Computational Study on Lightweight Concrete Beam Incorporating Palm Oil Fuel Ash (POFA) And Mussel Shell Ash (MSA) As Partial Cement Replacement	Sufian Kamaruddin & Goh Wan Inn



DAY ONE		
<b>Mawar Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>02:00 PM - 03:30 PM</b>
	<b>Session Chair:</b>	<b>Ir. Ts. Dr. Tong Yean Ghing</b>
PAPER ID	PAPER TITLE	AUTHORS
25	Forensic Analysis for Slope Failure Case of Housing Area at Cikarang, West Java Indonesia	Muhammad Fathur Rouf Hasan & P A M Agung, Prof. Adi Susilo, Eko Andi Suryo & Mustaffa Anjang Ahmad
39	Investigation of Soil and Plant Nutrients in Residential Area in Parit Rasipan Drainage System	Rafidah Hamdan, Muhammad Hafiq Afifi Azman & Muhammad Safwan Miswan
51	Using Unmanned Aerial Vehicle (UAV) for a Safer Roof Inspection at Tunku Tun Aminah Library	Sr. Dr. Anuar bin Mohd Salleh, Nur Adlina & Nur Ayu Ardilla Mohd Zin
52	Landslide Monitoring by using Terrestrial Laser Scanning	Sr. Dr. Anuar bin Mohd Salleh & Nurul Riffqah
135	Green Roof Thermal Performance of Small-Scale Prototype using IES-VE Simulation in Tropical Climatic Condition	Mohamad Norfekry Md Yacob, Hartini binti Kasmin, Siti Nazahiyah Rahmat, Nurul Nadrah Tukimat & Ariff Nazri
76	Compressibility Behavior of Marine Clay Treated by Combination of Coal Ash And Cement	Mohd Firdaus Md Dan, Aziman Madun & Faizal Pakir

DAY ONE		
<b>Melati Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>02:00 PM - 03:30 PM</b>
	<b>Session Chair:</b>	<b>Prof. Madya Sr. Dr. Mustaffa bin Anjang Ahmad</b>
PAPER ID	PAPER TITLE	AUTHORS
33	Assessment of Permanent Deformation on Asphalt Mixtures Incorporating Forta-Fi fibre as Additive Material	Mohamad Yusri Aman
34	Carbon Monoxide Emission and Eco-Driving for Freight Sustainability	Ruslan Hassan
43	The Effectiveness of Building Information Modelling (BIM) in Solving Railway Project Management Issues in Malaysia	Peniel Ang, Roslinda Ali & Mohamad Hafiz Zaini
65	The Effect of Aggregate Micro and Micro Texture on Pavement Skid Resistance	Mohamad Yusri Aman, Mohammad Nasir Mohamad Taher & Hazirah Bujang
66	Redefining User Experience: A Study of Free-Fare Buses and Its Service Quality in Johor, Malaysia	H Zakaria, M Md. Rohani, N Nordin, K Ambak, M F Mohd Pozi and N F A Mohd Rashidi
132	Performance Analysis of Roundabout using SIDRA, a Micro-Analytical Software	Nasradeen Ali Khalifa Milad, Ahmad Raqib Ab Ghani & Goh Chua Chien

DAY ONE		
<b>Jasmin Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>02:00 PM - 03:30 PM</b>
	<b>Session Chair:</b>	<b>Prof. Madya Ts. Dr. Rafidah binti Hamdan</b>
PAPER ID	PAPER TITLE	AUTHORS
11	Optimization of Eco-Waste Synthesis in Zinc Oxide-Graphene Oxide For Cephalexin Antibiotics Removal	Radin Maya Saphira binti Radin Mohamed, Nurul Atikah binti Heshammuddin & Muhammad Thaqif bin Mohd Zailan
91	Reduction of Ammoniacal Nitrogen, COD and Color from Natural Rubber Industry Effluent Using Bentonite as Adsorbent	Mohamad Anuar Kamaruddin, Zawawi Daud, Mohd Baharudin Ridzuan & Nur Faizan Mohamad Rais
112	Strengthening the Resilience Adaptability for Critical Asset Protection	Ezdihar Hamzah, Mohd Nadzri Bin Jaafar & Hariati Abdullah Hashim
115	Anaerobic Digestion of Landfill Leachate Wastewater Using Electrogenic Bacterial Species	Show Pau Loke, SK Hanan Rahman, Joshua Yap Lip Yun, Chiew Lin Yap & Chan Yi Jing
118	20 Years of Air Pollutant Index Trend Analysis in Kuching, Sarawak (2000-2019)	Hisyammudin Maseri, Siti Hasyiyati Drahan, Maqueline Cyndi Nap & Zetty Baiduri Hossen

DAY ONE		
<b>Mawar Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>03:45 PM - 05:00 PM</b>
	<b>Session Chair:</b>	<b>Ts. Dr. Zeety binti Md. Yusof</b>
PAPER ID	PAPER TITLE	AUTHORS
13	Load Test Performance of Bored Pile with Distributed Fibre Optic Strain Sensing	Bun Pin Tee, Hisham Mohamad, Aizat Akmal Bin A.Mohamad Beddelee
16	Instrumented Pile Load Test: Analysing Measurement Anomaly at the Pile Head	Aizat Akmal Bin A.Mohamad Beddelee, Hisham Mohamad, Bun Pin Tee, Muhammad Yusoff b Mohd Nasir
124	Exploring the Effects of Reinforcement Ratio on Concrete Rigid Pavement Structure in Malang, Indonesia: Experimental Study and Analysis	Nawir Rasidi, Candra Aditya & Sri Wiwoho Mudjanarko
127	Stability of Orthotropic Runway Plate under The Combination In-Plane and Transversal Dynamic Loads on Kerr Foundation Soil Modelling	Teuku Muhammad Rasyif, Muhammad Daffa Fachrur Reza & Sofia W Alisjahbana
128	Dynamic Response of Orthotropic Plate Due to Local Friedlander Blast Loads On Kerr Foundation Soil Modeling	Muhammad Nuzulul Furqan, Teuku Muhammad Rasyif & Sofia W Alisjahbana
129	Optimization of Floor Plate Design for Building under Human Activity Loads to Achieve Occupant Comfort	Teuku Muhammad Rasyif, Lisa Rosanti & Sofia W Alisjahbana

DAY ONE		
<b>Melati Room</b>	<b>Date:</b>	<b>9 October 2023</b>
	<b>Time:</b>	<b>03:45 PM - 05:00 PM</b>
	<b>Session Chair:</b>	<b>Prof. Madya Ir. Ts. Dr. Nor Haslinda bt Abas</b>
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56	The Effect on Tensile and Surface Morphological Properties of Oil Palm Empty Fruit Bunch Fibre Through Hot Water Treatment	Emedya Murniawaty Samsudin, Nik Mohd Zaini Nik Soh, Hasniza Abu Bakar & Astimar Abd Aziz
58	A Foundational Study on Rational Optimization of Damping Ratio for Accurate Dynamic Simulation with Ultra Large Displacement	Erjon Krasniqi, Ryuki Nagano, Muhammad Nizam bin Zakaria & Hiroyuki Obiya
126	Utilization of Dry Tailing as Mortar Filler in Bricks	Devina Cintiya, Fatin Adriati, Mohammad Ihsan & Teuku Muhammad Rasyif
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	<b>Time:</b>	<b>03:45 PM - 05:00 PM</b>
	<b>Session Chair:</b>	<b>Dr. Nor Amani Filzah bte Mohd Kamil</b>
PAPER ID	PAPER TITLE	AUTHORS
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35	Application of Nanobubbles in Floating Kinetics Models for Efficient Oil Removal from Produced Water	Radin Maya Saphira binti Radin Mohamed, Mohd Adib Mohammad Razi, Mohd Hairul Khamidun, Umi Fazara Md Ali & Mohammad Faizal Che Daud
54	Datum Verification for Coastal Engineering Studies	Mustaffa Anjang & Ahmad Hazmi Hamdan
61	Application of Fish-Integrity Biological Index and Water Quality Index to Assess the Ecological Health of the Pahang River, Malaysia	Mohd Adib Mohammad Razi, Mohd Shalahuddin Adnan & Zulkifli Abdul Rashid
60	Rainfall Projection Using CMIP6 Models of Extreme Area in Johor	Siti Nazahiyah Rahmat, Nurul Nadrah Tukimat & Hanafi Hamid
98	Potential Groundwater Investigation Using Electrical Resistivity Imaging for Industrial Facilities in Gebeng, Malaysia	Muhammad Farhan Zolkepli, Solahuddin Daud, Mohd Fakhurrizi Bin Ishak & Muhammad Afiq Jazrin Bin Mohamad Sidek

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	<b>Time:</b>	<b>11:00 AM - 01:00 PM</b>
	<b>Session Chair:</b>	<b>Dr. Norhafizah bte Salleh</b>
	<b>Link:</b>	<a href="https://shorturl.at/qtCV3">https://shorturl.at/qtCV3</a>
PAPER ID	PAPER TITLE	AUTHORS
10	Insights on Sustainable Elements in Ancient Iraq: A Systematic Review	Ahmed Abbas Fadhal & Izudinshah
14	Exploring the Conceptual Framework of Sustainable Urban Planning: A Case Study of Marib, Yemen	Izudinshah & Redhwan Ayedh Ali Al-hakari
15	Factors Influencing of Construction Projects Success: A Case Study of Social Development Fund (SFD) Mukalla Branch in Yemen	Saleh Mohammed Mubarak AL-Bakri AL-Nasi & Sushilawati Binti Ismail
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71	Augmenting Project Management Knowledge Areas through Technological Mediation: Contractor Perspectives	Nikolaos Voulvoulis, Norpadzlihatun binti Manap, Noralfishah Sulaiman, Ahmad Albastaki & Khor Chee Ying
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	<b>Session Chair:</b>	<b>Dr. Noor Azlina Abdul Hamid</b>
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32	Developing a Conceptual Model to improve the Implementation of Agile Management Principles in UAE Construction Projects	Azeanita Suratkon & Mohammed Al-Yamahi
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116	Crack Width Behaviour of High-Performance Fiber Reinforced Concrete Slabs Affected by Steel Fiber Composition	Krisnamurti Krisnamurti
122	Effect of Green Mussel (Perna Veridis) Shell Powder as Partial Fine Aggregate Replacement in Concrete	Noor Azlina Abdul Hamid, Nor Hazurina Othman, Sallehuddin Shah Ayop, Noralfishah Sulaiman & Muhammad Shabery Sainudin
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	<b>Session Chair:</b>	<b>Sr. Ts. Dr. Nazirah binti Mohamad Abdullah</b>
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59	Spatial and Temporal Analysis of Marine Water Pollution in Port: Developing A GIS Database for Assessing Patterns and Trends	Nazirah Mohamad Abdullah, Badrul Hisham bin Ismail, Izyan Hakimah Kamar Supardi & Astina Binti Tugi

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	<b>Time:</b>	<b>02:00 PM - 05:00 PM</b>
	<b>Session Chair:</b>	<b>Mrs. Noor Aliza bte Ahmad</b>
	<b>Link:</b>	<a href="https://shorturl.at/qtCV3">https://shorturl.at/qtCV3</a>
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72	Retention Pond as an Alternative to Mitigating Runoff and Sustainable Water Source at Jember University	Entin Hidayah, Fidyasari Kusuma Putri & Mokhammad Farid Ma'ruf
84	Tsunami Risk Mapping in Tempurejo District, Jember Regency based on BNPB Criteria using TOPSIS Method	Retno Utami Agung Wiyono, Entin Hidayah & Andri Pujianto
100	Application of Multinomial Logistic Regression Toward Adaptive Reuse of Pre-war Shophouses	Nur Ain Ebas, Muhamad Shahril bin Mohd Abdullah, Muhammad Ammar bin Shafi & Mohd Saifullah bin Rusiman
104	An Overview of Coastal Erosion Monitoring Along the Coast of Negeri Sembilan, Malaysia	Mohd Adib Mohammad Razi, Isha Baizura Ismail & Ahmad Zaidi Bin Mispan
106	Assessment of The Sub-Urban Drainage System Resilience on The Increased Flooding Scenario using Storm Water Management Model (SWMM)	Lukman Mohd Najib, Norazlina Bateni & Darrien Mah Yau Seng
38	A Low-Cost Innovation Design for Portable Rubbish Cage Trap (PRCT) in Drain System	Noor Aliza Ahmad, Zarina Md Ali & Intan Nurliya Zainal

DAY ONE		
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	<b>Time:</b>	<b>02:00 PM - 05:00 PM</b>
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	<b>Link:</b>	<a href="https://shorturl.at/bouDT">https://shorturl.at/bouDT</a>
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7	A Review of Dominant Factors Project Manager Competency in Various Implementations of the Construction Industry	Mohd Norazam Yasin, Rahmat & Adriadi
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113	Innovative VIBROSTAB Geo-Technology : Combining Vibrofloatation and Stabilisation with Waste Glass Powder Adoption	Chan Chee Ming, Tuan Noor Hasanah Tuan Ismail, Akmal Hafiz Nurhaizal Azam, Farah Aisyah Mohamed Kamal & Julia Elisya Mohd Azman
119	Analytical Study on Effect of Groundwater Table and Rainfall Infiltration on The Stability and Performance of Muar Trial Embankment by Using PLAXIS 2D	Sim Min Loung, Felix Ling & Zaihasra Abu Talib
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139	Predictive Modelling for Concrete Strength Prediction using Linear Regression Algorithm	Nickholas Anting Anak Guntor, Faisal Sheikh Khalid, Alvin Lim, Mohd Aliff Mohd Anuarn & Joewono Prasetyo
105	The Performance of Cement Sand Brick Containing Kenaf Powder as Sand Replacement Materials	Sallehuddin Shah Ayop & Umar Arif Redzuan Umar Radzi
110	Damage Plasticity Model for Green Concrete Material	Noridah bt Mohamad & Mohamad Zulhairi Mohd Bosro
114	Mechanical and Thermal Performance of Pineapple Leaf Fibre (PALF) as Admixture in Interlocking Compressed Earth Brick (ICEB)	Mohd Norazam Yasin, Ruzaimah Razman, Nur Anis Dzulkiflee, Nazirul Hafiz Saifulbahri & Suhana Hassan

DAY TWO		
<b>Melati Room</b>	<b>Date:</b>	<b>10 October 2023</b>
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40	Prediction of N-value of Parit Raja Clay based on Empirical Formulation of Primary Velocity and SPT-N value	Aizat Mohd Taib, Dayang Zulaika Abang Hasbollah, Mohd Firdaus Md Dan & Noorasyikin Binti Mohammad Noh
48	Assessment of Slope Mapping by Using Unmanned Aerial Vehicle (UAV)	Mustaffa Anjang Ahmad, Muhammad Dzikri, Mohd. Juraidi Bin Ahmad & Muhammad Azim Bin Khairul Kahar
53	Stabilization of Peat Using Sugarcane Bagasse Ash (SCBA) and Cement as A Stabilizer	Zeety Md Yusof, Mohd Firdaus Md Dan, Aziman Madun & Mohd Khaidir Bin Abu Talib
78	Measurement Uncertainty Evaluation in Soil Liquid Limit Testing	Alvin Lim & Lua Keng Leong
81	What Influences Parents' Decisions to Use Sustainable Mode (Public Bus) with Their Children? A Case Study in Batu Pahat, Johor	Basil David Daniel, Nursitihazlin Ahmad Termida, Mohd Hanifi Bin Othman & Nur Azyan Syafiqah Mohd Yahya
125	Factors Influencing Students' Choice of Sustainable Transportation Modes on University Campuses	Nursitihazlin Ahmad Termida, Nasradeen Ali Khalifa Milad, Goh Chua Chien & Norahmarfarain Ahmad

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	<b>Time:</b>	<b>11:00 AM - 01:00 PM</b>
	<b>Session Chair:</b>	<b>Dr. Tuan Norhayati Tuan Chik</b>
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45	Wave Climate Analysis for Shoreline Management Plan in Kelantan, Malaysia	M A M Yusoff, E H H Al-Qadami, M A M Razi, M Wang, A Mokhtar & M Mahamud
46	The Efficiency Removal of Oil in Water (OIW) By Application of Milliscale Air Bubbles	Mohd Adib Mohammad Razi & Muhammad Fadhli Mohd Yusof
97	Shoreline Condition and Protection at the Coast of Kedah, Malaysia; A Case Study	W-M Wan-Afnizan, E H H Al-Qadami, M A M Razi, N A Aminon, M Mahamud & A Aziz
79	Towards Greener Concrete: A Comprehensive Review of Waste Glass Powder as a Partial Fine Aggregate Substitute	Shahrul Niza Bin Mokhtar, Seyed Jamalaldin Seyed Hakim, Tuan Norhayati Tuan Chik, Tong Yean Ghing & Ahmad Fahmy Kamarudin
55	A Review of Structural Health Monitoring in Heritage Building due to Cracking Issues	N A Yusoff, Seyed Jamalaldin Seyed Hakim, Tuan Norhayati Tuan Chik, Izzati Aini Mahamood & Nor Aiza Erme Mohamad

DAY TWO		
<b>Melati Room</b>	<b>Date:</b>	<b>10 October 2023</b>
	<b>Time:</b>	<b>11:00 AM - 01:00 PM</b>
	<b>Session Chair:</b>	<b>Dr. Zaihasra Abu Talib</b>
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21	Campus Walkability: Enhancing Pedestrian Safety Through Installation Of Raised Crosswalks	Aleeya Erdyna Mohd Noor Azmi & Basil David Daniel
36	Sustainable Performance of Industrialised Building Systems in the Construction Phase	Nor Haslinda Abas
80	The Performance of Steel Fibre Reinforced Concrete With Waste Glass As Partial Replacement of Fine Aggregate	Noorwirdawati Ali & Abdifitah Mohamed Yusuf
86	The Effect of External Load to Slope Stability using Slope/W in FT 006, Section 61.50, Pulau Pinang	Zaihasra Abu Talib & Mohd Akmal Kamal Arrifin
102	Deformation of Peat Soil Reinforcement Settlement Using Single - Layer Bamboo Dendrocalamus Asper	Zeety Md Yusof, Nurul Aina Khairul Anuar, Adnan Zainorabidin, Mohd Khaidir Abu Talib, Mohd Firdaus Md Dan @ Azlan, Noorasyikin Mohammad Noh
121	Teachers' perception of urban noise in the classroom: Case Study in Mukah, Sarawak	Sayed Jamalaldin Seyed Hakim, Yean Ghing Tong & Aurelia Paul

## Abstracts

### ID 1

#### Effect of bacteria inoculation in solidification/stabilization matrices for fibreboard wastewater sludge

**Muhammad Hasanuddin Mohd Kamal<sup>1</sup>, Muhammad Afiq Nuqman Shahrurizan<sup>1</sup>, Nurul Nasuha Mohd Rais<sup>1</sup> and Nor Amani Filzah Mohd Kamil<sup>1,2\*</sup>**

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**Abstract:** Fiberboard factories are rapidly growing to fulfill the increasing demand for timber production. Therefore, due to this rapid growth, there is a need to address wastewater sludge disposal concerns. This is crucial because the sludge contains a high concentration of contaminants that endanger the environment and public health. This study aims to treat the sludge by determining the potential of bacteria inoculation in the Solidification/Stabilization (S/S) method based on compressive strength, heavy metal leaching, and Chemical Oxygen Demand (COD) concentrations. The materials used in sludge remediation were Portland cement to act as a binder and *Sphingobacterium spiritivorum*. This study involves compressive strength testing, leaching tests using Toxicity Characteristics Leaching Procedure (TCLP), COD, and heavy metals concentrations analysis using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) equipment in accordance with U.S. Environmental Protection Agency guidelines (U.S. EPA). After bacteria inoculation, data shows an increase of approximately 4.4% in compressive strength test. COD concentration level reduces by around 1.5% but heavy metals concentration increases except for Chromium (Cr) and all elements still exceed the permissible limits. Based on the overall results, the method of bacteria inoculation in S/S method revealed the potential to remediate wastewater sludge.



## ID 2

### Noise Emissions Mapping from Ampang Line LRT

**A Arbaan<sup>1\*</sup>, M H Othman<sup>1</sup>, Y G Tong<sup>1</sup>, A R Ab Ghani<sup>1</sup>, K Ambak<sup>2</sup>, M N Borhan<sup>3</sup> and N S Abdul Sukor<sup>4</sup>**

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**Abstract.** Train transportation is considered safe, sustainable, and climate-friendly mode of transportation. However, it may also lead to higher noise which may be annoying, disrupt sleep, and disturbance on residents who live nearby the train track. The aims of this study are to evaluate Light Rail Transit (LRT) noise level in urban area, at LRT Ampang Line by using grid lines method and to develop LRT noise mapping. The residential area that is located near the track was chosen in this study. The measurement of noise level for train passing-by was measured using B&K Type 2250 which was placed at 1.2 meter above the ground level. Noise measurement was carried out using 25 m x 25 m grid lines with short-term sampling method of 20 minutes of measurement for each point. The LRT noise level in the study areas at distance of 15 m from the centre of train tracks was found to be higher (77.04 dBA) than noise limit (65 dBA) guidelines from Department of Environment. The graph trendline of noise level was decreasing from 15m (30.64 dBA) to 115m (8.68 dBA) from the centre of the train tracks. These shows that the further the distance of the Sound Level Meter (SLM) placement, the lower the difference of the noise train pass-by and the background noise. The LRT noise mapping will be useful for the future LRT noise prediction.

#### ID 4

### Effect of CGW Addition on the Physical, Mechanical, Acoustic and Fire Resistance Properties of Autoclaved Aerated Concrete

**E Yusrianto<sup>1,2</sup>, N Marsi<sup>2,3\*</sup>, N Kassim<sup>2</sup>, I A Manaf<sup>2</sup> and H K Shariff<sup>4</sup>**

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**Abstract.** Today, the normal growth population and development in big cities have caused many problems such as municipal solid waste, noise pollution and also attack-fire. To solve all of these problems, six series of eco-friendly autoclaved aerated concrete (AAC) based on ceramic and gypsum waste (CGW) addition in ratio of 5%, 10%, 15%, 20%, 25% and 30% wt have been prepared. The physical, mechanical and functional properties of sample have been examined. The work density of reference sample (RS) is around 593.71kg.m-3 with compressive strength around 1.64MPa. The result showed that the compressive strength increased with the increment of CGW addition for not more than 5% wt. The maximum value of compressive strength was 2.39MPa at 5% wt. In other words, the CGW succeeded in increasing the compressive strength about 45.73% compared to the normal value of reference sample (RS). The sound absorption coefficient of sample at low frequency (500Hz) is higher than the previous studies and has been characterized as a class C and D absorbent material. Except for RS, the direct fire resistance results showed the physical surface of the samples had free crack, not burnt and melt during direct fire for more than 950°C for 20min. The result also showed that the CGW addition has succeed to improve the thermal storage of AAC around 59.15% compared to RS. Based on results, the AAC with CGW addition samples are suitable for wall application especially for partition walls, sound barriers and thermal wall. For further study, the effect of direct fire on the mechanical properties of AAC based on CGW is still in progress.

## ID 5

### The Use of Geoelectrical Resistivity Methods to Detect the Potential Landslides in Payung, Batu City, Indonesia

**M F R Hasan<sup>1,2</sup>, A Susilo<sup>2\*</sup>, E A Suryo<sup>3</sup>, P A M Agung<sup>1</sup>, A Pratama<sup>1</sup>,  
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**Abstract.** Landslides are a serious threat as they cause damage, loss of economic assets, infrastructure, and productive land. When entering the rainy season, several areas in Indonesia often experience landslides; one of them is Batu City, which has experienced 267 landslides in the last 4 years (2019-2022). This study aims to map landslide prone areas in the study area using the resistivity geoelectric method. The method used is the geoelectrical resistivity Schlumberger configuration, the measurement points are 10 locations, and the distance between the electrodes is 10 meters. Data analysis is presented in 1D and 2D models to make interpretation easier. Based on the research results, the measured rock types are breccia tuff, clay, tuff, and the last layer is lava rock. The area that experienced the most frequent high landslides was in the Anjasmara Tua volcanic rock formation, bedrock (lava rock) was found at an average depth of 25 meters, while in the Upper Quaternary volcanic rock formations, lava rock was found at an average depth of above 50 meters. The meeting of rock lava layers with the clay rock can become a slip zone due to differences in the density of rocks that are very contrasting.

## ID 6

### A Review of Conductive Additives for Enhancing the Electrical Properties of Self-Sensing Asphalt

**Arsalaan Khan Yousafzai<sup>1,2\*</sup>, Muslich Hartadi Sutanto<sup>1,3</sup>, Muhammad Imran Khan<sup>4</sup>, Nura Shehu Aliyu Yaro<sup>1</sup>, Abdul Muhaimin Memon<sup>1</sup>, Muhammad Tariq Khan<sup>2</sup>, Muhammad Adeel Arshad<sup>2</sup>**

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**Abstract.** Asphalt is traditionally an insulator to the flow of electric current, but it can be transformed into a self-sensing conductive material by incorporating recyclable and environmentally friendly additives. These additives offer a range of smart and sustainable applications in the pavement industry. However, there is still much to be learned about the production and performance behavior of conductive asphalt. This study presents a comprehensive review of the literature on conductive additives used in asphalt to provide a holistic understanding of the current state of research in this field. The objective of the study is to critically review and characterize conductive additives used in asphalt to achieve electric conductivity in it and resultingly explore its self-sensing features. The development of conductive asphalt has significant research potential, and improving its piezoresistivity and conductive network is the focus of future smart asphalt technology research. The review provides an in-depth understanding of conductive asphalt concrete and identifies current research themes and corresponding challenges. This study serves as a valuable resource for researchers and industry professionals working in the field of conductive asphalt.

## ID 7

### A Review on Dominant Factors of Project Manager Competency in Various Implementations for the Construction Industry

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**Abstract.** In carrying out construction projects, the competence of a project manager is always debated by civil engineering practitioners, because the project manager is very important and a key factor in achieving successful project implementation. Therefore, a project manager must have the appropriate competencies to lead the implementation of construction projects. Existing competency research has been identified from various global competency sources, such as IPMA Competency Base Line (ICB), APM Competency Framework (ACF), and Project Management Competency Development (PMCD). When looking at it as a whole, their competencies have a lot in common with the competencies in PMCD. There are three main groups of PMCD competencies namely: Knowledge Competence, Technical Competence, and Personal Competence. This research examines previous research articles related to project manager competencies for successful projects. This research was randomized to global research since 5 years ago, starting from 2018 to 2022. This paper reviews the competencies strictly to determine the dominant project manager competencies that are widely used in the implementation of construction projects. This research examines and determines the appropriate factors sequentially in the three competency groups for project success. This study produces the most dominant competency factors and is widely used by project managers to be successful in handling construction projects.

## ID 8

### Multifunctional Porous Pavement Prototype for Urban Pluvial Flood Protection: Preliminary Findings on Contribution of Attitudes to Acceptance Willingness Toward Proposed Scientific and Engineering Solutions

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**Abstract.** Rapid urbanization and climate change correlate with an increase in frequency of flood events, globally. For many cities worldwide pluvial floods bring significant risk. Permeable/pervious paving (PePav), as an essential sustainable urban drainage technique, is one of the key environmental solutions for urban flooding. Waste and recycled materials in the construction industry for PePav production comply with the principles of circular economy and sustainable development. The influence of the human factor is well recognized in efforts to apply those solutions and make them self-sustainable. The preliminary results show that younger female students and students with lower family monthly income are prone to express more positive attitudes toward PePav generally. Students from different study groups (Departments of Psychology, Hydraulic and Environmental Engineering, and Construction Project Management) show significantly different attitudes toward PePav. Statistical models indicate that the PePav acceptance *willingness* can be predicted with moderate accuracy by knowing attitudes toward PePav and personal experience in construction. The contributions of the fact that someone's close person has been affected by a flood may vary depending on the type of PePav scientific and engineering solutions.

## ID 9

### Instrumented Pile Load Tests in Limestones and Granite Formations – Case Studies with Optical Fibre Strain Sensors

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**Abstract.** In instrumented pile load test, obtaining reliable strain profile is crucial to interpret the load-transfer behaviour of the test pile. For conventional instrumented pile load test, extensive quantity of point-based sensor such as vibrating wire strain gauges and tell-tale extensometers were installed to measure strains and pile deformation especially when the test pile is long and with large variation in soil stratum. With the advancement of distributed fibre optic sensor (DFOS) technology, it has significantly improved the conventional instrumented pile load test method. DOFS based on Brillouin Optical Time Domain Analysis (BOTDA) is a novel technique for measuring strains in a continuous manner that outweighed the conventional point-based sensors. A full continuous pile length strain profile minimised misinterpretation of the load-transfer and mobilised shaft friction of the test pile, especially the cast-in-situ pile. This paper discusses two case studies of instrumented pile load tests performed using BOTDA technology for the Klang Valley Mass Rapid Transport (KVMRT) project found in limestones and granite formations. The interpreted results in terms of load transfer response, average unit shaft resistance, and elastic shortening of rock socketing piles are in exceptional agreement with conventional instrumentations such as Vibrating Wire Strain Gauges (VWSG) and Linear Variable Displacement Transducers (LVDT) at 6% difference. The maximum unit shaft frictions acquired in granitic layer was about 2,200 to 2,500 kN/m<sup>2</sup> whereas the pile founded in limestones achieved maximum unit shaft friction of 1,800 to 1,900 kN/m<sup>2</sup>.

## ID 10

### Insights on Sustainable Elements in Ancient Iraq: A Systematic Review

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**Abstract.** This paper investigates the sustainable elements of ancient Iraq, with an emphasis on site, water, materials, energy, and indoor environmental quality. A thorough search was directed of various databases, bringing about a sum of 31 significant articles that met the inclusion criteria. The reviewed literature uncovers that ancient Iraq had a critical degree of complexity and development when it came to sustainable practices, especially in the space of energy, water, materials, and indoor environmental quality. These sustainable practices could give vital experiences and examples to advanced sustainability endeavours. The outcomes of the present paper are introduced in a few tables and diagrams, including the conveyance of explored articles by year, journal, and locale, as well as the main 10 driving articles in the sample literature. By and large, this systematic review features the capability of ancient sustainable practices to illuminate advanced sustainability struggles and highlights the significance of interdisciplinary examination to distinguish and advance sustainable practices athwart assorted societies and ancient times.



## ID 11

### Optimization of eco-waste synthesis in zinc oxide-graphene oxide for cephalixin antibiotics removal

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**Abstract.** Cephalixin (CFX) is an antibiotic prescribed for a wide variety of conditions, including bacterial infections and urinary tract infections. It has recently been labelled as an emerging pollutant due to the high concentrations of CFX that indicate a potential risk to the environment. This research set out to discover the best conditions for producing a leachate from waste materials utilising the Eco-Zinc Oxide-Graphene Oxide (Eco-ZnO/GO) catalyst for the efficient removal of CFX. The Eco-ZnO/GO nanocomposite that were generated from waste is used for adsorption in an aqueous solution. Field Emission Scanning Electron Microscope (FESEM) was used to characterise Eco-ZnO/GO nanocomposite while Response Surface Methodology (RSM) were used to optimise the removal efficiency of CFX across three factors: starting concentration, mixing speed, and contact time. Average nanoparticle sizes for Eco-ZnO and GO were measured to be 23 and 122 nm, respectively. Eco-ZnO/GO has a maximum removal efficiency of 89.55% at the optimal factor of 1000 rpm in 30 minutes when working with a concentration of 100 mg/l of CFX. The results of the study demonstrated that the waste nanocomposite technology is used to remove the material effectively, which can add to our growing body of knowledge in this area.

**ID 12**

**Integrating Empirical Model with Remote Sensing and GIS for Prediction of Soil Erosion**

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**Abstract.** The Universal Soil Loss Erosion (USLE) is an empirical, parametric model tested and validate under diverse soil, climate, topographic, management practices and a factor that accounts for a prediction for an average of annual soil erosion. The study aimed by integrating the USLE with Remote Sensing (RS) and Geographic Information System (GIS) to determine the potential soil erosion in the Universiti Pertahanan Nasional Malaysia (UPNM). There are five parameters that should justify in the USLE model which are rainfall erosivity (R factor), soil erodibility (K), slope steepness and length (LS factor), land use (C factor) and practice management (P factor). These 5 parameters will produce their own single mapping and data output after a process in GIS software. Then, all the 5 parameters map was overlaid and calculated by the raster calculator in order to determine the soil erosion of the catchment area. The result produced by the USLE method by combination with GIS is an annual soil erosion map which is in a different class of erosion value. The output given starts with low, moderate, high, very high and extremely high level of erosion. For extremely high classes, the value of erosion is about 88.20 – 162.99 ton/ha/yr in about 0.7% of study area and low class value is only 0 – 10.23 ton/ha/yr (43% of study area). Thus, the proposed integrated USLE with GIS is useful for elucidating soil erosion processes in the UPNM catchment.

**ID 13**

**Load Test Performance of Bored Pile with Distributed Fibre Optic Strain Sensing**

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**Abstract.** A novel technique of instrumenting the performance of a bored pile during a maintained load test was performed using optical fibre sensing technology. The technology, namely Brillouin Optical Time Domain Analysis (BOTDA), allows strains to be measured continuously along the whole length of the pile, producing a complete load-transfer regime (t-z curve) and shaft friction profile along the pile. This paper describes a pile load test on a 1.2m diameter bored pile at Putrajaya founded on weathered granitic residual soils. Methods to convert the distributed strain measurements to the load transfer response, shaft resistances, and compression profile are described in the paper. Comparable results were obtained between the distributed fibre optic strain sensor and the conventional system (vibrating wire strain gauges) and theoretical calculation. However, the distributed fibre optic strain sensor has the added advantage of detecting localized defects such as pile necking, bending, and overall behaviour of bored piles effectively.

## ID 14

### Exploring the Conceptual Framework of Sustainable Urban Planning: A Case Study of Marib, Yemen

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**Abstract.** This paper explores the conceptual framework of sustainable urban planning through a case study of Marib, Yemen. The study investigates the underlying principles, key concepts, and theoretical foundations of sustainable urban planning, and analyzes how they apply to the context of Marib. Thought the existing literature on sustainable urban planning, including document analysis, the study identifies the challenges and opportunities of implementing sustainable urban planning in Marib, and proposes strategies for bridging the gap between the conceptual vision and the practical implementation of sustainable urban planning. The study delves into the conceptual framework of sustainable urban planning through a case study of Marib, Yemen. It uncovers key insights into the city's approach to sustainability, offering valuable lessons for urban planning strategies in similar contexts. The findings of the study contribute to the development of a comprehensive conceptual framework of sustainable urban planning that can be applied to other contexts, as well as to the practical implementation of sustainable urban planning in Marib and other similar cities in Yemen and beyond.

**ID 15**

## **Factors Affecting the Success of Construction Projects: A Case Study of the Social Development Fund (SFD), Mukalla Branch in Yemen**

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**Abstract.** The construction industry's vitality hinges on the achievements of its constituent projects led by construction companies. This paper seeks to elevate awareness within the construction sector about the evolving landscape of development and economic stability. It underscores the necessity of formulating policies and strategies for national economic planning and construction endeavors. Within Yemen, the construction sector faces persistent challenges that contribute to project failures across administrative, economic, and social domains. These failures often originate from inadequate planning, coordination, communication, and technology utilization. Against this backdrop, our exploration delves into multifaceted factors influencing the success of construction projects. Focusing on the Social Fund for Development (SFD)- Mukalla Branch in Yemen, this study endeavors to establish a conceptual framework that illuminates the impact of functional, management, environmental, and organizational elements on project success. The scope encompasses engineers, contractors associated with the SFD- Mukalla Branch, and relevant agents from the sponsoring authority. Notably, the SFD-Mukalla Branch achieved success through the completion of 66 projects across diverse governorates, including Hadhramut, Shabwah, AlMahrah, and Sokatra. The collaborative efforts of 140 engineers and 66 contractors underpinned the triumph of these initiatives. In methodological terms, this paper adopts a quantitative questionnaire approach that aligns with the study's descriptive nature. This approach supports the conceptual framework development aimed at identifying pivotal factors that shape Yemen's construction industry success conceptually. The far-reaching significance of this research lies

in its potential to catalyze further scientific exploration and provide a foundational structure for future inquiries. The research objectives, in this context, can be summarized as follows: Establish a conceptual framework illustrating the correlation between functional and management factors and the conceptual success of construction projects within SFD-Mukalla Branch, Yemen. Illuminate the conceptual interplay between environmental, and organizational factors and the success of construction projects within SFD-Mukalla Branch, Yemen. Formulate a model delineating conceptual success factors grounded in the case study of the SFD-Mukalla Branch. In conclusion, this conceptual endeavor aspires to contribute to the foundational knowledge underpinning advancements in Yemen's construction landscape. By conceptualizing the factors driving project success, this study aims to pave the way for more resilient and prosperous construction endeavors.

## ID 16

### Instrumented Pile Load Test: Analysing Measurement Anomaly at the Pile Head

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**Abstract.** Loading activity during Distributed Optical Fibre Strain Sensor (DOFS) instrumented pile load test prevails the strain disparity within the pile's initial depth and converges at a certain depth. This work aims to determine the strain convergence (SC) depth: investigate the influence factor of the SC and propose a standard empirical model for SC depth determination. The strain profile variation at any point within the pile diameter is examined using PLAXIS 2D. A set of test cases are simulated starting with defining influence factors of SC depth and further analysis of the cogent factor. The proposed model is validated to a few real field projects. This work is significant to determine the real start (RS) depth of the plotted strain profile and will improve data processing for the pile load transfer analysis of the DOFS instrumented pile load test. The cogent factor that influences the SC depth is the jack area coverage to pile area and an empirical model is proposed to determine the SC depth. The model is validated to a few real field projects with nominal differences of SC by the model to the field measured at  $\pm 0.05$  sensitivity, comply the model goodness of fit at 0.9492 (R-square).

## ID 17

### Utilisation of industrial waste materials in the production of geopolymer concrete

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**Abstract.** Cement production is one of the primary sources of carbon dioxide emissions. Oman produces around 1.5 million tons of industrial waste annually, of which more than 1.2 million tons are slag and Fly Ash from the mining industry. This study aims to utilize the waste materials stagnating in landfills to develop an alternative to OPC (OPC) concrete. GPC is an innovation in building materials that replaces cement in concrete with ground-granulated blast-furnace slag (GGBS) and Fly Ash. This study used compressive strength to compare the two types of concrete. The test results were obtained after seven days, fourteen days, and twenty-one days using six different mixed concrete designs. The results indicated that the compressive strength of GPC altered along with the mix proportions. The best mix proportion of 25% Fly Ash and 75% GGBS reached 41 MPa within seven days, significantly higher than OPC concrete. Finally, GPC can be used as an alternative to OPC concrete with the potential to reduce the pollution from producing Portland cement, offering a greener approach to the construction industry as a sustainable material.



## ID 18

### Impact of COVID-19 on Construction Projects: Challenges and Opportunities

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**Abstract.** After the onset of Covid-19, the economy and trade worldwide faced severe disruption, which simultaneously affected industries, businesses, construction companies, and households. All the sectors were hit the hardest by the economic crises caused due to Covid-19. Likewise, the construction sector was not spared by the crisis; in fact, it received the hardest blow. Due to the disruptions of trade, supply chains were disrupted, labor shortages, and Covid19 protocols resulted in delays in projects, consequently causing the cost overrun. Hence, to analyse the situation of construction sector of Oman, this study surveyed professionals from the industry to understand the challenges and their impacts on the construction sector. Moreover, the study focused on the improvements that have been made so far since the vaccination drives gained pace in Oman. Because of Covid-19, almost 90% of the respondent's delays in projects. However, 21% of the respondents reported that their companies were not able to claim relief entitlements, this is also proved by the similar amount of people reporting that the contracts implemented in Oman doesn't protect the rights of all parties equally. The results also shown that labor shortage and cost overrun have the major impacts on the construction sector, followed by claims for relief entitlements in case of project delays.

## ID 19

### Assessing The Impact of Lithological and Geological Features on Electrical Resistivity Tomography (ERT) at Kelantan River Basin, Malaysia

**Z M Nizam<sup>1,2\*</sup>, A T S Azhar<sup>1,2</sup>, M Aziman<sup>1</sup>, Z M N Hidayat<sup>3</sup>, J A Aziz<sup>4</sup> and N M N Amri<sup>5</sup>**

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**Abstract.** The relationship between lithological and geological features using Electrical Resistivity Tomography (ERT) lies in its ability to explore critical subsurface information. Due to limited accessibility of subsurface, ERT emerge as non-invasive geophysical method that provide high-resolution image of subsurface electrical resistivity distribution, which is closely related to the lithology and geological features of the subsurface. The study aims to obtain information on lithology and subsurface geological structures and to interpret the presence of aquifers, whether within the alluvial layer or within the bedrock. The methodology involves pole dipole and gradient-XL procedures to generate ERT data at At-Taqwa Gua Musang Mosque, Mini Zoo Kuala Krai, Kg. Sedar Tumpat and Kuala Jambu, Tumpat in Kelantan. Result showed low electrical resistivity values measured less than 100Ωm in areas with high clay content, whereas higher resistivity values exceeding 500Ωm were observed in areas with sand and gravel deposits. The presence of faults and fractures is considered as it influences resistivity value by elucidating intricate connections between survey lines. Findings of this study employ algorithms to analyse and interpret model resistivity with topography to precisely identify areas with high mineral exploration endeavours and bring forth ground breaking perspectives by incorporating real-time monitoring. Kelantan River Basin is selected as significant environmental importance to understanding subsurface dynamics through its

susceptibility potential of groundwater recharge and discharge, economic significance decision-making and sustainable practice in social development. This study insights ERT for further exploration in ground management strategies, mineral exploration practices and development of advanced innovation of ground exploration.

## ID 20

### Assessing The Impact of Lithological and Geological Features on Electrical Resistivity Tomography (ERT) at Kelantan River Basin, Malaysia

**Z M Nizam<sup>1,2\*</sup>, A T S Azhar<sup>1,2</sup>, M Aziman<sup>1</sup>, Z M N Hidayat<sup>3</sup>, J A Aziz<sup>4</sup> and N M N Amri<sup>5</sup>**

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**Abstract.** The relationship between lithological and geological features using Electrical Resistivity Tomography (ERT) lies in its ability to explore critical subsurface information. Due to limited accessibility of subsurface, ERT emerge as non-invasive geophysical method that provide high-resolution image of subsurface electrical resistivity distribution, which is closely related to the lithology and geological features of the subsurface. The study aims to obtain information on lithology and subsurface geological structures and to interpret the presence of aquifers, whether within the alluvial layer or within the bedrock. The methodology involves pole dipole and gradient-XL procedures to generate ERT data at At-Taqwa Gua Musang Mosque, Mini Zoo Kuala Krai, Kg. Sedar Tumpat and Kuala Jambu, Tumpat in Kelantan. Result showed low electrical resistivity values measured less than 100Ωm in areas with high clay content, whereas higher resistivity values exceeding 500Ωm were observed in areas with sand and gravel deposits. The presence of faults and fractures is considered as it influences resistivity value by elucidating intricate connections between survey lines. Findings of this study employ algorithms to analyse and interpret model resistivity with topography to precisely identify areas with high mineral exploration endeavours and bring forth ground breaking perspectives by incorporating real-time monitoring. Kelantan River Basin is selected as significant environmental importance to understanding subsurface dynamics through its susceptibility potential of groundwater recharge and discharge, economic

significance decision-making and sustainable practice in social development. This study insights ERT for further exploration in ground management strategies, mineral exploration practices and development of advanced innovation of ground exploration.

## ID 21

### Campus Walkability: Enhancing Pedestrian Safety Through Installation Of Raised Crosswalks

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**Abstract.** Walking is one of the most common sustainable modes of transportation in university campuses. To ensure its sustainability, pedestrian facilities that are safe, comfortable and reliable must be adequately provided. Various traffic calming measures have been introduced to enhance the safety of pedestrians. In Universiti Tun Hussein Onn Malaysia (UTHM), 6 raised crosswalks (RCW) have been installed along Persiaran Tun Ghafar Baba. This study aimed to investigate the impact of RCWs on vehicular speed reduction. Speed data were collected at each RCW. Vehicle speeds were recorded before, at and after the RCWs. Speed profiles developed indicate that the 85th percentile speed difference of RCWs were 14 – 25 km/h, which meant that the percentage of speed reduction at RCWs were remarkably high (31 – 48% reduction). Statistical tests confirmed that all RCWs yielded significant drops in speed i.e., the peak mean travelling speed versus the operational speed at the device. Furthermore, it was found that the zones of influence were between 29 – 50 m. This shows that drivers start reducing their speeds from as far as 50 m from the RCWs. Based on these findings, it can be concluded that raised crosswalks are effective in reducing speed, thus enhancing pedestrian safety while crossing as drivers tend to be more aware of their surroundings at lower speeds.

## ID 22

### A Review of Potential Coconut Shell in Increasing California Bearing Ratio (CBR) Value of Subgrade Soil

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**Abstract.** In recent years, coconut production and waste generation have witnessed significant growth. There is a rising interest in the utilization of coconut by-products, such as coconut shells (CS), in soil stabilization to support Sustainable Development Goals (SDGs). This review presents the promising potential of CS in increasing the California Bearing Ratio (CBR) value of subgrade soils. It first focuses on examining the physicochemical properties of CS followed by the CBR performance of soil-CS with varying additives and mixture proportion in un-soaked and soaked condition. The findings reveal that CS, when combined with various additives, demonstrates notable improvements in soil strength, making it a promising candidate for ecofriendly and renewable road construction materials. Further research is needed to optimize CS and additive combinations for effective soil stabilization under soaked conditions, ultimately promoting sustainable road infrastructure development.

## ID 24

### Comprehensive Multi-Objective Optimization of External Window Design for Energy-Efficient and Comfortable Buildings

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**Abstract.** This paper investigates the influence of external window design parameters on airconditioning energy consumption, daylighting and ventilation in an apartment building in Guangxi, China. In order to achieve a harmonious balance between energy consumption, interior daylight and ventilation,  $L_{16}(4^5)$  orthogonal experimental design (OED) were selected. The results show that the width (B) is the most important factor in determining the comprehensive performance, followed by the material (A), height (C) and bottom height (D) of the external window. Based on empirical tests, the optimal design parameter combination emerged as A2B1C3D4 (Heat aluminum window frame and Low-E hollow glass, 1200mm×1500mm×700mm), which effectively meet low energy consumption, favourable daylighting and ventilation effects simultaneously. These evaluation results provide valuable reference for exterior window design in the context of Guangxi.



## ID 25

### Analysis of Damage to Residential Buildings Due to Ground Movement Resulting from Man-Made Excavation in Soil Swelling Potential Zone

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**Abstract.** Sometimes, an activity of open excavation for the basement area of a new infrastructure does not pay attention to the environmental, geological, and geotechnical aspects. The excavation performed on the soil with swelling potential will involve problems during construction implementation. The wrong standard operational procedures will result in environmental damage, including buildings around the construction site. One case occurs in Cikarang, West Java, and is a subject of this study. This research aims to use geotechnical and geosurvey methods to determine the causes of damage in residential areas due to the construction of basement areas in new hotels. The results study found the reduction of a factor of safety (FS) before the excavation process was between 1.20 to 1.40, and after the excavation existed at 0.70 to 0.80. From the field observation, data studied from field and laboratory geotechnical data, and some analysis using the geotechnical software, the damage was caused by the ground movement during the excavation process in the soil with swelling potential. Intensive analysis shows that the deformation due to ground movement reached 3.0 – 9.0 mm using the geotechnical method, close to the actual measurement using the

geosurveying method. The final condition is unstable, and some effort is required to recondition.

## ID 26

### Geobamtile to Support Road Embankment Over Deep Soft Ground

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**Abstract.** Road surface profile failure is often a major issue for roads. This paper presents a way of providing support beneath the road embankment between the over-deep soft ground which is referred to as "Geobamtile." It is designed and constructed to prevent failure due to the type of subsoil that accommodates the entire structure of the road itself. The construction of roads, whether new roads or upgrading existing roadways is bound to the alignment and might be allocated on problematic land that needs appropriate treatment before any structures can be built. A way of providing geobamtile is being studied and developed in Malaysia and has made it possible to safely build road embankments over extremely soft and deep sub grades areas without creating significant post-construction settlements. These useful advantages are made possible by the extraordinary tensile and bending capabilities of bamboo in bundles. The area and amount of buoyancy characteristic can be easily adjusted by the number of tiers of bamboo-geotextile setup within the system during construction. The expected supporting load and amount of postconstruction settlement can invariably be manipulated to some extent. In general, this green and sustainable invention design will have a positive social impact by providing significant financial benefits to rural and indigenous populations.

**ID 27**

## **Prediction Model of Hydraulic Conductivity for Sedimentary Residual Soil Mixed Bentonite as Compacted Clay Liner**

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**Abstract.** This paper describes a development of regression model on predicting the hydraulic conductivity value for sedimentary residual soil mixed bentonite. The data for required parameter for model development was based on the laboratories testing such as compaction testing and hydraulic conductivity testing. The multiple linear regression model (MLR) was selected to develop a hydraulic conductivity model (*k*-model). The empirical model was developed based on the 45 datasets from experimental studies encompassing range of maximum dry density (MDD), optimum moisture content (OMC), effective stress and bentonite content. The model developed in this study has met the conditions and has been verified according to the statistical validity requirements. The result shows that the fitted regression model has the reasonably good regression model for  $R^2 = 79\%$ . Meanwhile, the validation shows the small deviation discrepancy from Mean Square Error (MSE), Mean Absolute Error (MAE), and Mean Absolute Percentage Error (MAPE) with a determination coefficient,  $R^2 = 82\%$ . In conclusion, the develop *k*-model in this study present a good prediction for hydraulic conductivity value.

**ID 28**

## **Evaluation of Compressed Earth Block (CEB) with the utilization of Durio Zibethinus Fiber (DZF)**

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**Abstract.** The Compressed Earth Block (CEB) by utilizing the Durio Zibethinus Fiber (DZF) is an innovative idea to promote the Green Initiatives Buildings in the construction industry. The utilization of agricultural waste product which is Durio Zibethinus contribute to minimization of the firing process which involves high energy and emitted high carbon footprint. Rising interest in producing ultimately green and environmentally friendly building materials has opened the initiative to re-use the waste from the agriculture industry, which also reduces the potential pollution source. In this study, the CEB was produced by the addition of durian peel fiber to the brick mix at different percentages of 2%, 3%, and 5% and was assessed for its mechanical and physical properties. On the other hand, the durian fiber was first treated with aluminium sulfate to improve durability and reduce the water absorption rate. With the proper use of a stabilizer, the CEB is proven to demonstrate comparable strength and durability compared to a burnt clay brick. It was found that the 3% of durian fiber addition is the best mix with the highest compressive strength over time and has a decreasing pattern of the water absorption rate over time.

## ID 29

### Performance of High Strength Concrete Containing Fine Metakaolin, Palm Oil Fuel Ash and Coal Bottom Ash as Substitute Material Towards Mechanical Properties

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**Abstract.** The increased use of high-strength concrete in the construction industry causes a significant amount of cement production that contributes to major carbon dioxide (CO<sub>2</sub>) emissions. However, various additives such as fine metakaolin (FMK), palm oil fuel ash (POFA), and coal bottom ash (CBA) can be used to improve concrete performance and reduce carbon footprint. A portion of cement in the concrete was replaced with 20% of FMK and various percentages of POFA (5%, 10%, 15% and 20%) by weight. While sand was replaced with 10% of CBA. Slump test, water absorption test, compressive strength test, flexural strength test, and split tensile strength tests were performed on concrete samples comprising FMK and POFA as cement replacement and CBA as sand replacements in this research. The partial replacement of FMK and POFA for cement and sand for CBA decreased the workability of the concrete. The small particle size of FMK and POFA serve as fillers, reducing concrete's water absorption. The replacement of POFA by 10% shows the highest compressive strength compared to the control sample. However, water absorption, flexural strength, and split tensile strength improved with the addition of up to 20% POFA. This proves that the incorporation of FMK, POFA and CBA causes the reaction of alumina oxide, silica oxide, and calcium oxide with calcium hydroxide (C-H) from cement with water during the hydration process of the concrete.

**ID 30**

**Strength and Heat Emissions Performance of High Strength Concrete Containing Fine Metakaolin & Palm Oil Fuel Ash as Partial Cement Replacement**

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**Abstract.** Cement production significantly contributes to greenhouse gas emissions, specifically carbon dioxide (CO<sub>2</sub>) emissions. In addition to the CO<sub>2</sub> emissions from cement production, the increase in palm oil fuel ash (POFA), which is the by-product of the palm oil industry, can also contribute to environmental pollution. This study carried out on POFA and metakaolin (MK) as a partial cement replacement can reduce the problem of greenhouse and environmental effects. Apart from that, it can also increase the level of concrete strength. In this study, the slump and compressive strength tests were carried out first on concrete that uses fine metakaolin (FMK) only as a partial cement replacement to obtain an optimum value of FMK. Thus, the optimum FMK content found in this study was 20%. Next, slump tests, compressive strength tests, and heat of hydration tests were carried out on samples containing FMK and POFA content as a partial cement replacement up to 40% of the total cement replacement. The POF content starts at 5%, followed by 10%, 15%, and 20%. In addition to that, FMK content of 20% and superplasticizer (SP) of 2% were constant for all design mixes. The workability of concrete increases with the inclusion of FMK and POFA as partial cement replacements and 2% of SP as a constant. However, the strength of concrete containing 20% of FMK and 5% of POFA as partial cement replacement has given better compressive strength than ordinary Portland cement (OPC) concrete up to 14.07% at 28 days. Additionally, it is found that the exact amount of 20% FMK and 5% POFA enables concrete to be reduced to 5.54% in peak temperature compared to OPC

concrete. Furthermore, the formation of C-S-H gel was increasingly generated and able to fill in the gaps in concrete when the POFA content increased, thus making the concrete denser and stronger than the control series.



## ID 31

### Computational Study on Lightweight Concrete Beam Incorporating Palm Oil Fuel Ash (POFA) And Mussel Shell Ash (MSA) As Partial Cement Replacement

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**Abstract.** Lack of research on the application of POFA and MSA in foamed concrete beam has become the biggest obstacles for Malaysia to use this alternative renewable resource as cement replacement in concrete. Besides, the testing process of foamed concrete beam require high cost and time consuming. Hence, a computational modelling and numerical analysis will replace the conventional experimental work in analyzing the ultimate load, load-deflection profile and cracking and will be completed using ABAQUS software.

**ID 32**

**Developing a critical influential factors Model (CIFsM) for Agile Management Principles in UAE Construction Projects**

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**Abstract.** The construction industry plays a crucial role in the global economy, with significant annual expenses and a substantial contribution to the GDP of the UAE. This has led to a surge in building projects, fostering rapid expansion among construction companies. However, challenges have emerged that hinder this growth, including high interest rates and intensified competition among building firms. Additionally, issues like lost or missing equipment impede project timelines and escalate dedicated costs. Many of these challenges can be addressed by addressing inefficiencies within internal processes of companies. Agile construction, a method or approach that facilitates swift adaptation to changes in delivery or design, has the potential to alleviate these challenges. By reducing the time between problem identification and solution implementation, agile construction can enhance project efficiency. This study aims to propose critical influential factors Model (CIFsM) for Agile Management Principles to enhance the performance of construction projects in the UAE. The proposed model covers five critical influential factor groups: organizational, challenges, human resources, technical, and construction industry project performance in the UAE. The research recommends implementing the model empirically using a quantitative approach to enhance integration among construction parties and alleviate concerns about low project performance levels. Developing a CIFsM model based on agile management principles offers a promising avenue to enhance construction project performance in the UAE by addressing critical influential factors and adopting an empirical quantitative approach, leading to improved project integration and reduced concerns about low performance levels.

### ID 33

#### Assessment of Permanent Deformation on Asphalt Mixtures Incorporating Forta-Fi fibre as Additive Material

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**Abstract.** An increasing number of load applications has caused permanent deformation that leading to longitudinal depressions in the wheel paths and small upheavals at the sides and subsequently effects the ride quality for road users. To address this issue, modifying asphalt mixtures using Forta-Fi fibre was introduced. This paper focuses to assess the permanent deformation and resistance to rutting of the asphalt mixtures containing Forta-Fi fibre. In this study, the influence of Forta-Fi fibre on asphalt mixtures was investigated by incorporating four different percentages of the fiber (0%, 0.3%, 0.5%, and 0.7%). The asphalt mixtures were prepared using a conventional bitumen 60/70 penetration grade as the base binder. Compacted specimens were subjected to dynamic creep testing with deviator stress levels of 207 kPa and 500 kPa, performed over 3600 cycles at a 60°C. The findings demonstrate that the inclusion of 0.3% Forta-Fi fiber in asphalt mixtures tested under deviator stress loads of 207 kPa and 500 kPa increased the creep stiffness by 26.1% and 43.1%, while the permanent deformation decreased by 18.4% and 43.8% compared to specimens without the Forta-Fi fibre. Additionally, the rutting values showed a reduction of 12.2% and 24.3% in the respective stress conditions. In contrast, an excessive percentage of Forta-Fi fibre was added, the creep stiffness exhibit reduce as increases permanent deformation and potential to rutting. This outcome is attributed to the impact of fibre components on the elastic behavior of the mixtures. In conclusion, the inclusion of 0.3% Forta-Fi fibre in the

specimens resulted in improved resistance to rutting and overall better performance compared to conventional mixtures.

**ID 34**

## **Carbon Monoxide Emission and Eco-Driving for Freight Sustainability**

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**Abstract.** Carbon monoxide (CO) indirectly causes climate change because it affects the abundance of greenhouse gases such as carbon dioxide and methane. Carbon monoxide is formed because of incomplete combustion in diesel engines. The fate of CO towards achieving freight transportation sustainability is presented. Firstly, the pollutant (CO) emitted by diesel engines from freight vehicles was determined from field studies using the tailpipe emission technique. The effect of the behavioural approach, eco-driving, was also observed for the 304 km trip demonstrated by the drivers of the 40-footer truck. Ecodriving has many advantages, including emitting less CO, saving in fuels, and reducing accidents and traffic summons. Secondly, for freight sustainability, CO should be further reduced by adhering to Euro standards of the European Union for heavy-duty vehicles, which states that the emission should be 1.5 g/kWh. Thirdly, a diesel oxidation catalyst (DOC), which converts CO to CO<sub>2</sub>, is an option that can be used. Then fourthly, the decarbonisation of transport using heavy electric trucks also shows some promise, although they are best for moving goods for a short distance. Finally, an efficient logistics system with optimal solutions adopting several measures is suggested for sustainability. These include 'Hub-Spokes' distribution, a polarised fleet, expanded delivery windows and lastmile delivery. Thus, these five steps help decarbonise the transport sector and consequently accelerate the zero carbon emission transition.

**ID 35**

**Application of Nanobubbles in Floating Kinetics Models for Efficient Oil Removal from Produced Water**

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**Abstract.** The primary objective of this study was to gain insight into the kinetics mechanism involved in the removal of oil from produced water using nanobubbles. A small-scale device called Solari - N MBG 0.35, manufactured by Solari Energy Limited, was employed to generate nanobubbles. Batch experiments were conducted to evaluate the impact of varying nanobubble concentrations on oil removal. The results revealed that at initial of contact time led to enhanced oil removal. This improvement was attributed to factors such as increased interfacial energy, improved mixing, and enhanced contact between the nanobubbles and oil droplets. However, after a 30-minute duration, the efficiency of oil removal reached a plateau due to the presence of smaller and more stable residual oil droplets. To analyze the nanobubble flotation process, the study employed five distinct models using experimental data. These models included the firstorder model, first-order model with a rectangular distribution, fully mixed factor model, improved gas/solid adsorption model, and second-order model. Statistical analyses were performed, considering parameters such as coefficient of determination ( $R^2$ ), root mean squared error (RMSE), mean absolute percentage error (MAPE), and mean absolute deviation (MAD). The fully mixed factor model, improved gas/solid adsorption model, and second-order model

demonstrated excellent fitting performance at different contact times. These findings deepen our understanding of the oil removal efficiency of nanobubbles, emphasizing the significance of factors like concentration, contact time, and the selection of appropriate kinetic models. The study provides valuable insights into the application of nanobubbles in flotation processes and underscores the importance of selecting suitable models based on specific conditions and particle sizes.

**ID 36**

**Sustainable Performance of Industrialised Building Systems in the Construction Phase**

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**Abstract:** The Industrialised Building System (IBS) is a construction method where components are manufactured in controlled environments, either on-site or offsite, before being assembled into construction works. This study identifies sustainable indicators through literature reviews, extracting sixteen indicators for a sustainability evaluation. A survey was conducted among developers, designers, civil and structure (C&S) consultants, mechanical and electrical (M&E) consultants, manufacturers, and contractors in North Malaysia, focusing on Kedah's state. The participants have experience in both IBS and conventional construction. The data collected from the questionnaires were analyzed for the mean and Relative Importance Index (RII). The survey results indicate agreement with the sixteen indicators identified from the comprehensive review. This study provides an overview of the current perceptions of sustainable indicators performance among various stakeholders in Kedah's construction industry.



**ID 37**

## **A Comprehensive Review of Studies Focusing on the Intersection of Urban Flooding and Historic Urban Landscapes**

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**Abstract.** Due to evolving climate patterns and the deterioration of infrastructure in historic cities, these urban locales confront escalating flood-related risks. A profusion of academic discourse has separately explored the subjects of urban flooding and historic urban landscapes, but an integrative, systematic review of both areas concurrently remains scarce. This review presents a holistic perspective of the convergence between urban flooding and historic urban landscapes, meticulously evaluating 101 scholarly articles sourced from the Web of Science database spanning from 2006 to 2022. The disciplinary classification encompasses 24 categories. A careful examination of the methodologies employed in these articles reveals flood vulnerability mapping as a prevalent tool in urban heritage conservation, while nature-based solutions emerge as potent strategies for mitigating urban flooding challenges. The insights derived from this review shed light on the present state of affairs regarding urban flooding risks in historic cities, and provide a wealth of information beneficial to decision-makers and practitioners engaged in urban stormwater management.

**ID 38**

**A Low-Cost Innovation Design for Portable Rubbish Cage Trap (PRCT) in Drain System**

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**Abstract.** One of the primary contributors to water pollution is the presence of solid waste or rubbish within the drainage system. Moreover, the presence of an obstruction within the drainage system would impede the movement of water, so leading to the occurrence of a flood. Based on the given circumstances, a recommended solution to address the issue involves the utilisation of a Portable Rubbish Cage Trap (PRCT). This research seeks to investigate and assess hydraulic features such flow rate, total amount of collected garbage, and rainfall distribution, in addition to proposing an innovative design of a PRCT employing reusable and recycled materials from a building site. The components of PRCT are cable ties, grey polyvinyl chloride (PVC) tubing, and green netting available in two sizes. To produce a low-cost project, these materials are collected from rubbish found on building sites. The drainage line under investigation is situated in Taman Universiti, Johor Bahru. The study aims to compare the data obtained from previous data using Mesh type cage and analysis performed in this study includes the measurement of the weight of the collected waste in the PRCT, the examination of rainfall patterns, and the assessment of the hydraulic properties affecting the effluent flow rate over a two-week period. The investigation reveals that the Mesh Type wall has a higher weight of imprisoned waste 388.52 kg compared to the PRCT with 339.3 kg. The mean flow rates for the Mesh type cage and PRCT are 7.43 mm<sup>3</sup>/s and 39.2 mm<sup>3</sup>/s, respectively. The highest recorded rainfall distribution in October 2020 was 39 mm, while the highest recorded weight was 57.3 kg. The market potential of the PRCT can be enhanced by ensuring cost-effective measures for collecting construction waste materials and labour, as well as by improving the durability of the PRCT.

**ID 39**

**Investigation of Soil and Plant Nutrients in Residential Area in Parit Rasipan Drainage System**

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**Abstract.** Nutrient pollution pertains to the occurrence of elevated concentrations of nitrogen, phosphorous, and potassium within aquatic systems. Nutrient pollution is the process by which excessive nutrients, primarily Nitrogen, Phosphorus and Potassium (NPK), are supplied to bodies of water and can act as fertilizer, causing excessive algal growth. This phenomenon is also known as eutrophication. Excessive nutrient levels can cause more serious issues, such as low dissolved oxygen levels in the water. The main objective of this study has been to evaluate the soil and plant nutrient content in the residential area of the Parit Rasipan drainage system. NPK levels were determined by collecting soil and plant samples at four specified sampling points within the study area, both during wet and dry days using the APHA 4500 NORG-B and US EPA 6010B (ICP OES) methods. In addition to that, the pH, Dissolved Oxygen (DO), and temperature were recorded in situ. Water samples were also collected and analysed for specific parameters, including Total Nitrogen (TN), Total Phosphorus (TP), and Potassium (K). The analysis was carried out using a HACH DR6000 Spectrophotometer and Atomic Absorption Spectroscopy (AAS). The study findings indicate that the soil concentrations of TN (1660– 2250 mg/kg), TP (100–360 mg/kg), and K (1020–1692 mg/kg) fall within the range of low to very high classifications. In the meantime, it is noteworthy that the concentrations of TN (4780–7870 mg/kg), TP (821–1640 mg/kg), and K (702–9160 mg/kg) in plants have been categorised as ranging from moderate to very high. In the context of water quality monitoring, the collected data indicates that the pH levels range from 3.16 to 3.22, the dissolved oxygen levels range from

0.95 to 0.98 mg/L, and the temperature ranges from 29.30°C to 26.34°C, observed during both wet and dry weather conditions. In summary, based on the analysis of the findings, it can be determined that the Parit Rasipan drainage system demonstrates a significant concentration of NPK elements under both wet and dry weather conditions, primarily as a consequence of residential activities occurring within the area.

**ID 40**

**Prediction of N-value of Parit Raja Clay based on Empirical Formulation of Primary Velocity and SPT-N value**

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**Abstract.** The standard penetration test is used to measure the standard penetration number (NValue), which known is to be costly with limited data at particular locations. Therefore, the seismic refraction technique was used as an alternative method due to its lower cost, less time consumption, wide profile coverage and sustainable environment. However, it does not provide the N-value of soil. This study attempts to predict the standard penetration number (N-value) of Parit Raja clay based on empirical formulation between the primary velocity (Vp) of seismic refraction and the SPT-N value. Data acquisition was performed using ABEM Terraloc MK-6, geophones and a 12 lb sledgehammer. IXseg2seggy, Optim and Surfer 8 were used to analyze seismic refraction data. The subsurface profile of Parit Raja clay comprises five layers, including topsoil, soft clay, medium-stiff clay, stiff clay, and very stiff clay with Vp in the range of 159-1000 m/s, 1000-1366 m/s, 1366-1589 m/s, 1589-1659 m/s and >1659 m/s, respectively. The empirical formulation that was successfully established was  $N = (9E-06) Vp^2 - 0.0093Vp + 2.3959$  with a correlation coefficient of  $R^2 = 0.9869$ . This study indicated that the SPT–N value of Parit Raja clay could be predicted based on primary velocity results from the seismic refraction analysis.

## ID 42

### Fatigue of Notched Steel Hollow Sections Under Sinusoidal Cyclic Loading

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**Abstract.** In this paper, the numerical modelling of the fatigue of notched steel hollow sections under sinusoidal cyclic loading is presented. Steel hollow sections are commonly used as structural components, particularly for beams, columns, girders, trusses and bracing. The biggest concern is flaws or minor cuts that create notches in the steel hollow sections. The presence of a notch could degrade the strength properties and consequently lead to serious disadvantages in fatigue life. The fatigue assessment was carried out using the finite element program WELSIM. SHS50x50x3.0 was selected for the three-dimensional model. The sinusoidal cyclic loading was applied with a minimum force of 1.665 kN and a maximum force ranging from 5.550 kN to 16.65 kN. Variables such as notch depth and amplitude ratio were simulated to acquire the stress range and the number of cycles. The results showed that the stress range for unnotched specimens is 46.258 MPa to 164.93 MPa and for notched specimens is 52.273 MPa to 189.89 MPa. It was found that the presence of a notch leads to an increase in the stress range and the decrease in the number of cycles. The unnotched specimens can withstand the number of cycles from  $1.83 \times 10^6$  to infinity. Meanwhile, the number of cycles for notched specimens ranges from  $1.20 \times 10^6$  to  $8.36 \times 10^7$ . At each amplitude ratio, except for  $A = 0.10$ , the number of cycles is insignificant difference.

**ID 43**

## **The Effectiveness of Building Information Modelling (BIM) in Solving Railway Project Management Issues in Malaysia**

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**Abstract.** Railway projects involve complex planning and management as compared to regular construction projects, but BIM can simplify and improve the management of these projects. MRT 2 faced problems like design discrepancies and coordination issues, while Gemas - JB ETS encountered issues with construction changes, cost overruns, and project delays. Hence, this research intends to investigate the project management issues and examine the effectiveness of BIM implementation in solving project management issues in railway construction projects in Malaysia. A qualitative study was executed by conducting semi-structured interview on BIM professionals from the MRT 2 and Gemas-JB ETS railway construction projects. Six purposively selected respondents from the railway construction industry were interviewed, achieving data saturation. The main issues discovered were lack of communication, lack of coordination, clashes in construction, redesign and unrealistic schedules. The said issues mainly occurred during pre – construction stage. The level of BIM effectiveness in MRT 2 is high when full BIM was implemented as compared to Gemas – JB ETS that have low effectiveness when partial BIM was implemented. The findings of this study is able to show that full BIM implementation in a project management can greatly enhance coordination and efficiency while reducing costs in the railway industry.

**ID 45**

## **Wave Climate Analysis for Shoreline Management Plan in Kelantan, Malaysia**

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**Abstract.** Waves climate analysis and investigation are of primary concern for several purposes such as maintaining coastal structures, navigation and maritime operations, coastal management, and recreation and tourism. Therefore, understanding the wave climate of a particular region helps in making informed decisions related to coastal and maritime activities, ensuring safety, efficiency, and sustainability. In this paper, wave analysis was conducted for Kelantan State shoreline, Malaysia. The studied shoreline covers around 71 km starting from Pengkalan Kubur to Besut. 5 years data (2014 to 2019) was collected at the location of 6.3N and 102.3E. The analysis was performed under different aspects including, annual wave rose, annual percentage reoccurrence, return period analysis, and closure dept. According to the results, it was found that the predominant waves are coming from the 60 to 90 degrees North sector due to the unlimited fetch in that direction. Besides it was noticed that more than 50% of the waves have periods between 4 to 7 seconds and around 52% have wave heights of less than 1.5m. Also, it was found that the wave depth for a 100-year return period is about 2.75m. Finally, the depth of closure was calculated and found to be 7 m. The outcomes of this study can provide a better understanding of the wave climate along the Kelantan State shoreline and can be used as a reference for future coastal and maritime activities.



**ID 46**

**The Efficiency Removal of Oil in Water (OIW) By Application of Milliscale Air Bubbles**

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**Abstract:** The existing technology for separating oil in water (OIW) can bring harm to the environment, particularly to marine life. A new environmentally friendly technique has been proposed, involving the use of milliscale air bubbles. This study was conducted to determine the suitable retention time for injecting the milliscale air bubbles into the OIW. The significance of this study lies in its ability to separate OIW through a procedure that is environmentally safe and does not impact the ecosystem or marine life. The method used in the study involved mixing palm oil with water on a volumetric hydraulic bench. Retention times of 5 minutes, 15 minutes, 30 minutes, and 60 minutes were used in the study. The results indicated that separating oil in water required a substantial amount of time when utilizing milliscale air bubbles. In this study, a 60-minute retention time exhibited a significant number of separations, producing 512 bubbles compared to 44 bubbles generated in 5 minutes for 200 mL of oil. The longer the retention time, the more bubbles were produced. Overall, milliscale bubbles can effectively be used for the separation of oil in water.

## ID 47

### Influence of Particle Size for Malaysia Peat to The Cyclic Triaxial Loading Parameters

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**Abstract.** Peat is a partially decomposed soil with volumes of plant structures with high moisture content. The morphology of peat combines the definition of the structural arrangement of soil particles that are associated with its element mainly fibres, moistures and pore structures. The understanding of peat's performance including its particle size is essential to understand but difficult to interpret. Laboratory-based research by the cyclic triaxial test was implemented to determine the cyclic loading parameters (cyclic shear modulus, G and damping ratio, D) using samples sized 50mm by 100mm height from three different locations. The samples were performed under different effective stresses (25kPa, 50kPa, 100kPa) and frequencies (0.1Hz, 1Hz, 3Hz). Wet analysis from the particle size distribution test was used to evaluate and analyse the relationships between the cyclic loading parameters and peat's particle size effects. As a result, the particle sizes of Malaysian peat samples were significantly related to the performance of G and D behaviour in the cyclic loading test. Through this analysis, an understanding of the variability of particle sizes for Malaysian peat was contributed originally from the degree of decomposition itself that can alter the behaviour of cyclic loading parameters in an advanced test.

**ID 48**

## **Assessment of Accuracy Slope Mapping by Using Unmanned Aerial Vehicle (UAV)**

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**Abstract.** Unmanned aerial vehicles (UAVs) are an emerging technology for 3D Earth modelling and mapping. UAVs collect aerial images that are used to generate orthophotos with the assistance of navigation systems such as the Global Positioning System (GPS) and telemetry monitors at the Ground Control Station (GSC) for monitoring and controlling the UAV in autonomous flight. However, precision is critical in UAV photogrammetry mapping (PMg) to present acceptable precision measurements of the captured images that closely related to Ground Sample Distance (GSD) as most survey works are gradually shifting away from conventional surveying equipment such as total station and theodolite which has good precision measurement. This study focuses on the application of UAVs at close-range topography and mapping of land slope. Flight through the slope will vary in terms of flying altitude, affecting the GSD's value for each slope height. The accuracy of PMg for land slope is subsequently assessed by evaluating the accuracy of slope mapping, particularly the slope height derived from Digital Elevation Model (DEM), Digital Surface Model (DSM) of orthophotos and Global Navigation Satellite System (GNSS) survey. Since the majority PMg is performed on almost totally horizontal surfaces, and the GSD change value obtained remains constant. The purpose of this study is to investigate the accuracy of PMg of land slope by land slope mapping at 100m above ground level, as well as to determine the ideal flying height for UAV to achieve excellent accuracy for aerial mapping. The RMSE recorded for x and y coordinate were (RMSE<sub>x</sub> = 0.654198cm) and (RMSE<sub>y</sub> = 0.668516cm) while for elevation error was (RMSE<sub>z</sub> =

0.512062cm). The optimal flight altitude for accurate slope mapping is below 70m, with a differential elevation of 0.043m. This study's output is to help and assist authorities in construction planning, particularly during the cutting and filling process; to determine the precise amount of earth required for construction; and control the cost of earthwork.

ID 49

## Effect of Dual Flocculant by Unmodified *Manihot esculenta* Starch and Aluminium Sulphate on the Removal of Chemical Oxygen Demand Optimized by Response Surface Methodology

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**Abstract.** Applying inorganic metal salt-based aluminium sulphate ( $\text{Al}_2(\text{SO}_4)_3$ ) or alum in wastewater treatment has gained many concerns regarding the impact on health and environmental implications. Due to the negative consequences, incorporating inorganic and natural flocculants in the coagulation-flocculation process is the alternative way to reduce undesirable effects. In this study, an evaluation performance of *Manihot esculenta* (ME) starch and alum as a dual flocculant was conducted to remove chemical oxygen demand (COD) in the optimum weight ratio of alum/starch = 0.06. The optimization of coagulation-flocculation by the optimal (custom) design, response surface methodology (RSM) presented that applying a dual flocculant improved the COD removal efficiency by up to 93% compared to a single coagulant (alum) of 85%. Besides the performance of COD removal increased, the dosage of the chemical coagulant was reduced by up to 64% at the optimum condition of 18 mg/L alum dosage, 307 mg/L starch dosage, pH 9, and 27 mins settling time. The analysis of variance (ANOVA) indicated that the quadratic model was significantly developed with a  $p$ -value < 0.05. The results were justified by a high coefficient of determination ( $R^2_{\text{alum}} = 0.9641$ ) and ( $R^2_{\text{dual flocculants}} = 0.9335$ ) using single and dual flocculants, respectively. The findings supported ME starch as an alternative approach in minimizing chemical coagulants in wastewater treatment.

## ID 50

### Simultaneous removal of turbidity, suspended solids and chemical oxygen demand from carwash wastewater using aluminium electrodes in monopolar mode electrocoagulation

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**Abstract.** The growth of car wash centres across the country increases every year due to the increase in the number of vehicles needed to meet transportation demands for daily affairs. Therefore, it is a concern about releasing carwash wastewater (CWW) into the drainage system and waterways without proper treatment. This is a problem for small and medium enterprises that lack the financial budget to provide a suitable treatment system for a car wash centre. The effects of hazardous contaminant emissions can harm ecology and public health. Electrocoagulation using aluminium (Al) electrodes is expected to replace the use of chemicals in the coagulation system that will leave harmful secondary residues and be expensive in terms of cost. With that, this study was conducted to identify the effectiveness of electrocoagulation using Al electrodes to eliminate target contaminants such as turbidity, suspended solids (SS), and chemical oxygen demand (COD) from CWW. This study involves using Al electrodes arranged in a monopolar manner and connected to a power supply with a maximum current of 2.0 A. CWW samples were collected from car wash centres around Parit Raja, Batu Pahat. Several operating parameters (current density, CWW initial operating pH, and electrocoagulation time) have been selected to determine the optimum conditions for EC treatment methods specifically designed to treat CWW. The results of the study exhibit that the optimum conditions have been determined at a current density of 29 A/m<sup>2</sup>, CWW initial operating pH of 8 and an electrocoagulation time of 70 minutes to achieve the highest level of uptake for turbidity (91.2% removal), SS (82.7% removal) and COD (64.8% removal). These findings underline the ability of this treatment method to remove targeted contaminants from CWW. This study contributes to developing a treatment technique that is

more practical for treating CWW. In addition, this study also has important implications in mitigating water pollution, preventing ecosystem damage, and reducing health-related risks due to improper discharge of CWW.

## ID 51

### Application of Unmanned Aerial Vehicle (UAV) for a Safer Roof Inspection at High Rise Building

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**Abstract.** A roof must be inspected regularly since it needs to be durable and structurally solid and sound. Roof inspection may be dangerous since many buildings are tall and large. This study focused to carry out visual inspection for high-rise structure using unmanned aerial vehicle (UAV), determine the defects of Tunku Tun Aminah Library's (TTAL) roof through photos taken by UAV and evaluate the suitability of UAV for roof inspection. A DJI Mavic 3 Classic drone was used to fly over the roof of Tunku Tun Aminah Library (TTAL) in Universiti Tun Hussein Onn Malaysia (UTHM). Photographs were collected during the flight, and all photos are checked and processed to recombine the distinct images using Agisoft Metashape software in order to find the defects on TTAL's roof. The results of analysis showed that there were seven (7) defects on the roof. The condition of the roof was evaluated using Condition Survey Protocol 1 (CSP1) Matrix which got the overall condition of TTAL's roof is 5.6 (yellow) which shows the roof is in a fair condition. Knowing the condition of the roof only from photos of an UAV indicates that UAV is suitable to use for roof inspection. This study shows the difference between inspecting by conventional method and using UAV. The study concludes that UAV may be deployed in a way besides the conventional method and proposed a safer and time saving method for roof inspection.



**ID 52**

## Landslide monitoring by using Terrestrial Laser Scanning

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**Abstract.** The landslide has been on the rise and has a wide-ranging impact, such as lives lost, structure destruction, road damage, and natural resource depletion. This study aims to determine the advantages, limitations, and applicability of TLS for monitoring various landslide movements and identify the maximum measuring range of scanner in TLS. This study will provide a description for future researchers on the outcome of monitoring landslides using TLS method. The previous research papers are obtained based on the PRISMA guideline and search string. The review found that researchers most use Reigl model scanners due to their high scanning range, and TLS can be used to monitor rockfall, earth slides, earth flow, rockslide, complex, debris flow, and rock topples. However, TLS has difficulties filtering vegetations, scanning the topography of seabed and detecting millimetre scale deformations. Hence, recommendations are proposed to overcome the limitations of TLS.

**ID 53**

**Stabilization Of Peat Using Sugarcane Bagasse Ash (Scba) and Cement as A Stabilizer**

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**Abstract.** Peat is one of the major groups of land available in Malaysia, which has a high compressibility, low shear strength and very soft soil with high organic content. Thus, peat is considered not suitable to support a construction site in its natural state. Among the methods used for peat stabilization is to use cement. However, this method is not environmentally friendly because of the use a lot of cement. In this study, Sugarcane Bagasse Ash (SCBA) used as a partial replacement to Ordinary Portland Cement (OPC) in the stabilization of peat in the ratio of 5% until 20%. Laboratory tests on the characteristics of the physical, chemical and mechanical properties have been conducted to see the strength of the soil and different of microstructure between soil treated / untreated. The mixing ratio of 15 PCBA an optimum mix of replacement SCBA with OPC showed increased strength by testing unconfined compressive strength (UCS). Scanning Electron Microscope (SEM) shows the changes in the different microstructure of a sample of 100 PC with the 15 PCBA of the hollow nature is reduced and becomes denser due to the reaction of the filler material SCBA. The reaction pozzolanic is evidenced by the test Energy Dispersive X-Ray (EDX) with the reduced of carbon and calcium increase value. Indirectly, it can increase the strength of peat after stabilization.

**ID 54**

## **Datum Verification for Coastal Engineering Studies**

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**Abstract.** An observational study on the differences between chart datum and land survey datums in Batu Pahat Datums serve as a starting point for surveying projects and are used to measure land elevations and water depths. High sea level is one of the factors contributing to the occurrence of high tide floods in the Batu Pahat area. Land survey datum and Chart datum can be used to determine the height of the coastline. Stone revetments and long stretches of embankments or bounds along the coastline can prevent sea water from entering the drain, which can cause property damage and crop and plant destruction. Then, it can be considered a reference source for each contractor before beginning any construction, especially in the coastal area. Make people aware of the differences between chart datum and land survey datum. On the coast of Batu Pahat, an observational study of the data was conducted to determine the difference between the two datums at two different places representing the Batu Pahat shoreline. Therefore, tidal data for the coastal area in Batu Pahat are required to determine the chart datum values and verified by observation on Pulau Sialu. The static GPS observation method is also used to determine the value of land survey data. In order to find the difference between two types of datum, a levelling work had been done. The CD value for the Batu Pahat shoreline is around 1.59m and it was verified with the previous data report in the coastal area of Batu Pahat.

**ID 55**

## **A Review of Structural Health Monitoring in Heritage Building due to Cracking Issues**

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**Abstract.** This paper reviews the application of Structural Health Monitoring (SHM) on heritage buildings due to crack problems. SHM is an essential tool for ensuring the safety and long-term preservation of historic structures. The review focuses on the challenges and opportunities of implementing SHM techniques on heritage buildings, including the use of non-destructive testing, wireless sensor networks, and machine learning algorithms. The paper also highlights case studies of successful SHM implementations on heritage buildings and discusses the importance of integrating SHM into the overall maintenance and preservation strategy for these structures. In general, the article convincingly highlights the critical significance of incorporating SHM in heritage buildings. This practice is essential for guaranteeing the enduring preservation and safety of these building, thereby securing their legacy for future generations.

**ID 56**

## **The Effect on Tensile and Surface Morphological Properties of Oil Palm Empty Fruit Bunch Fibre Through Hot Water Treatment**

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**Abstract.** The Oil Palm Empty Fruit Bunch (EFB) fibre is one of the major crops in Malaysia, which contributes large scale of waste that make it reasonable for utilization in cement-based products. However, the presence of extractives affects the performance of EFB fibre and causes an incompatibility of EFB fibre and cement. Hence, this research has been conducted to explore the performance of various temperatures with different soaking hours to provide new knowledge of the performance of the physical and mechanical properties of EFB fibres as a reinforcement. The tensile strength of the EFB fibre increased dramatically with the temperature at all soaking times. However, longer soaking times have contributed to the reduction in tensile properties because of delignification, resulting in weakening or damage to the fibres. Thus, the surface morphology observation proved that as temperature increased, the number of silica bodies removed from the fibre surface increased (800°C, 900°C and 1000°C) at all soaking hours, and started to damage at 700°C (3 hour soaking time) when showing circular craters on the surface and the lignin layer starting to damage. Therefore, these results are quite promising for further study to support the feasibility of utilising OPEFB fibres as reinforcing materials in composites.

**ID 57**

## **Embodied Carbon Consideration for Maintenance & Repair Appraisal in Heritage Building: A Review**

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**Abstract.** Reducing carbon emissions is critical to mitigating climate change, and the building sector is one of the largest contributors to carbon emissions, accounting for about 39%. Recent evidence has shown that accounting for embodied carbon in Life Cycle Assessment (LCA) could help reduce carbon emissions during the maintenance and repair phase. This paper narratively examines the literature review of embodied carbon considerations in life cycle assessment (LCA) of historic buildings during the maintenance and repair phase. The search of all previously published articles was conducted through various databases by using certain keywords which have been identified as relevant for this study. The findings from the database's search were summarized and synthesized after being reviewed to ensure that the research questions could be met. The results show that the consideration of embodied carbon in LCA is essential in the selection of maintenance or repair approach considering environmental aspects. In addition, this study also highlights the importance of maintenance durability on the amount of embodied carbon consumed during the maintenance and repair phase. Furthermore, the lack of policy and legislations in carbon embodied consideration for heritage building conservation is considered a major challenge in this area. This finding also suggests that there is a lack of interest in this area among policy makers, so this area needs to be studied in depth to address this issue. The study recommends the development of a process that incorporates consideration of embodied carbon into the existing decision-making process for the preservation of historic buildings. The procedure should assist in selecting the best maintenance and repair approach that not only preserves the value of the structure, but also results in the lowest carbon consumption during the maintenance and repair phase. The developed procedure should be tested and evaluated in a heritage

building project to convince policy makers that life cycle carbon calculations should be included in regulations.

**ID 58**

## **A Foundational Study on Rational Optimization of Damping Ratio for Accurate Dynamic Simulation with Ultra Large Displacement**

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**Abstract.** The integration of dynamic simulation analysis has become widespread in general-purpose softwares, providing enhanced capabilities. However, accurately tracking deformations based on complete equilibrium solutions remains a significant challenge in problems characterized by strong geometric nonlinearity. This study examines the accuracy of the combined Newmark  $\beta$  method and Tangent stiffness method in dynamic analysis with ultra large displacements and evaluates the utility of Rayleigh proportional damping in numerical simulations compared to experimental models. An experimental model of a slender steel plate undergoing free vibrations after being released from a deformed state was created. Video footage capturing the deformation histories was compared to computational simulations to verify accuracy. The study also examines the appropriate values of the damping ratio ( $\zeta$ ) and the Newmark  $\beta$  value in the simulations. The results indicate that a damping ratio of  $3.0 \times 10^{-5}$  and a  $\beta$  value of  $1/2$  yield more realistic simulations with longer conservation of mechanical energy. The findings suggest that incorporating numerical damping into actual damping settings can achieve a more realistic simulation of dynamic behavior with ultra-large displacements. Further improvements in time increment and stiffness evaluation can overcome the remaining challenges and enhance the accuracy of simulations.



**ID 59**

**Spatial and temporal analysis of marine water pollution in port:  
Developing a GIS database for assessing patterns and trends**

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**Abstract.** This study focuses on the assessment of marine water quality in Port Klang, with a particular emphasis on the spatial and temporal analysis of water quality parameters. The research investigates the sources of water pollution in the area, including industrial waste, non-point sources, heavy metals, and land use. The study utilizes geographic information systems (GIS) and the Inverse Distance Weighted (IDW) interpolation technique to map marine water quality parameters and analyze their spatial distribution. Additionally, a temporal analysis is conducted to identify trends, seasonal variations, and irregularities in water quality over an eight-month period. The study reveals TSS and O&G exceeding the allowable limits in certain locations. However, the analysis demonstrates a decreasing trend in TSS and O&G concentrations over time, indicating positive developments in water quality. The findings underscore the importance of continued monitoring and the implementation of pollution control measures to ensure sustainable and healthy marine water ecosystems in Port Klang.

**ID 60**

**Rainfall Projection Using CMIP6 Models of Extreme Area in  
Johor**

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**Abstract.** This paper explores the impact of climate change on rainfall patterns, particularly extreme intensity, in Johor, Malaysia. The study focuses on addressing uncertainties in climate change projections by selecting suitable Global Climate Models (GCMs) based on location and topography. Four CMIP6 models (GFDL-ESM4, IPSL-CM6A-LR, MIROC6, and MRI-ESM2-0) were chosen for analysis. The research employs statistical downscaling, using historical observed data (1988-2020) and GCM output data, with a bias correction through linear scaling. The performance of the GCMs is assessed using various metrics including Root Mean Square Error (RMSE), Coefficient of Determination (R<sup>2</sup>), Percentage of Bias (Pbias), and Nash-Sutcliffe Efficiency (NSE). The IPSL-CM6A model is identified as the most suitable for rainfall projection in Johor. Under the severe climate scenario (SSP5-8.5), the analysis indicates increasing rainfall intensity in January from 2025 to 2054, notably at the Pusat Pertanian Endau station with a significant 50% increment. However, for the projected period 2055 to 2084, most stations experience a decrease in rainfall from January to June, with the Ladang Sg. Plentong station showing the largest reduction of about 40% in January. Conversely, the latter half of the year shows increased rainfall for all stations. The Mann-Kendall Test method highlights a significant decreasing trend in rainfall across all stations from 2025 to 2084 under the SSP5-8.5 scenario. This suggests that without mitigation efforts, the area will likely experience decreasing rainfall intensity due to the effects of climate change.

**ID 61**

**Application of Fish-Integrity Biological Index and Water Quality Index to Assess the Ecological Health of the Pahang River, Malaysia**

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**Abstract.** The development along the river has tremendously affected the ecological health of the river environment where, the changes and disturbance of environment could lead to deterioration of water quality as well as the habitat destruction. Then, this study was conducted with the aim to assess the ecological health of the Pahang River thru the integration of Fish-Base Index (FBI) and Water Quality Index (WQI). The fish community, habitat conditions and water quality survey were conducted monthly from 2007 until July 2010 at twenty-one sampling sites. The fish characteristics such as (i) species richness and composition (ii) trophic composition, (iii) habitat and spawning area and (iv) fish health and abundance were used to calculate the fish index, and 8 parameters were measured and used to compute the water quality index. Based on the survey result, most of the sampled fish species are native to the Pahang River with cyprinid family as the dominant species. The water column species have decreased from upstream to downstream while the demersal and/or benthic species has shown an increasing pattern toward the downstream area. Based on the IBI result, it clearly shows that the value is high at the upstream area follows by downstream and middle stream area. The IBI result is consistence with the WQI results that clearly explicit the WQI is higher at the upstream and lowest at the middle stream area. Human activities were identified as one of the factors that lead to the reduction of the biotic composition and water quality in certain area especially KM3. While the extensive human activities such the logging activities, land use changes, wastewater discharge, and

agriculture and aquaculture activities were recognized as the main pollution sources in the middle and downstream area. From the analysis result, F-IBI and WQI has shown a positive correlation with the increasing of human activities and perturbation. Thus, the combination between the fish base index and water quality index could be used to assess the ecological health of this river. Furthermore, this integration assess could provide a better and safe ecological assessment.

**ID 62**

## **Chemical Characterization of Asphalt Binder Containing Palm Oil Mill Sludge**

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**Abstract.** Modification of asphalt binder is continuously explored due to its escalating cost and increasing demand for this non-renewable material. As an alternative, the potential of waste materials was assessed for use as a modifier in asphalt binder. This study focuses on investigating the physical properties of unmodified and modified asphalt binders, with a specific emphasis on the chemical properties of palm oil mill sludge (POMS) modified asphalt binder. In this investigation, the control sample employed was PEN 60/70, while the POMS content ranged from 0% to 5% with an increment of 1%. Penetration and softening point tests were conducted on the POMS-modified binder, and Fourier Transform Infrared Spectroscopy (FTIR) tests were conducted to assess the chemical properties of both un-aged and short-term aged asphalt binders. The results revealed that the addition of POMS modified the asphalt binder by inducing a softening effect proportional to the percentage of POMS. The aging process was found to be significantly delayed in the POMS-modified binder with increasing POMS content.

**ID 63**

## **Relationships between Crisis Management and Risk Management Using Big Data Analytics Towards Safe And Sustainable City**

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**Abstract.** In order to bring together the various discussions around big data, this paper began by reviewing what was meant by big data and identifying the primary difficulties associated with it. The utilization of big data analytics to derive meaningful and valuable insights from vast amounts of data has been the primary focus of this research for the purpose of improving the efficiency of crisis management in the field of policing. The lack of expertise to deal with big in law enforcement domain is the main obstacle to the successful implementation of big data analytics in policing, while the potential of Dubai police in using big data analytics and risk management to control a security crisis has not been reported in the past. Therefore, the objective of this paper is to measure the degree of correlations between big data analytics, risk management, and crisis management using quantitative data collected through questionnaire aiming towards building a safe and sustainable city of Dubai. Pearson correlations analysis is then used in this study to make a primary identification to the existence of relationships between these variables regardless of the direction of the cause and effect between them. The scope of this study is personnel in Dubai Police. This paper reveals that big data analytics, risk management, and crises management are closely interconnected and their correlation that is crucial in today's complex and rapidly changing business landscape. These three fields work hand in hand to enhance decision-making processes, mitigate risks, and effectively respond to unexpected events. This comes from the result of correlation analysis indicating that the highest level of correlation is found between big data analytics and risk management. A correlation coefficient  $r = 0.653$  suggests a strong positive correlation between these two variables. While between crises management and risk management = 0.512. However, the magnitude of this correlation is still acceptable and shows a satisfactory degree of association between the independent

variable and dependent variable. All correlations are significant ( $p < 0.05$ ,  $p = 0.000$ ), which reveal a valid relationship does exist between the variables, these relationships will be further examined in the large-scale study where the full-scale survey will be conducted. The findings of this paper will help police department in Dubai as well as globally by providing an evidence on the substantial role of big data analytics in managing crisis efficiently which contribute to the safety of the community.

**ID 65**

## **The Effect of Aggregate Micro and Macro Texture on Pavement Skid Resistance of Malaysia Road Network**

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**Abstract.** The skid resistance of the surface of the highway is controlled by its microtexture and macrotexture. Microtexture refers to irregularities in the surfaces of the stone particles (fine-scale texture) that affect adhesion and make the stone particles feel smooth or rough to the touch. Macrotexture refers to the larger irregularities in the road surface (coarse-scale texture) that effect hysteresis and associated with voids between stone particles. This paper evaluates the effect of aggregate microtexture, macrotexture and influence of pavement surface under dry and wet condition to skid resistance. Three (3) different types of pavement surface were selected to obtain friction value on Continuously Reinforced Concrete Pavement (CRCP), Hot Mixture Asphalt pavement (HMA), and Ralumac Micro-Asphalt. In addition, skid resistance value was calculated from British Pendulum Tester and texture depth by using sand patch method. From the field test conducted and statistical analyses of the data, there were strong relationship between microtexture, macrotexture and types of surface pavement subjected to different dry and wet conditions.



**ID 66**

**Redefining User Experience: A Study of Free-Fare Buses and Its Service Quality in Johor, Malaysia**

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**Abstract.** In Malaysia, public transport is well renowned for assisting its residents with getting from place to place while also working to lower the cost of travel. However, from the perspective of the bus supplier, maintaining a high level of service is primarily concerned with costs. Free-fare bus service may have significant fuel, maintenance, personnel, and infrastructure costs that might not be met by money from passenger fees. In the long run, this can have an impact on the service's viability and financial sustainability. Given the fund's restrictions, the free-fare bus service might have to live up to the passengers' demands for comfort, safety, and accessibility. The Malaysian government has committed significant resources to enhance the standard of bus services, including free-fare bus services, in an effort to promote public transportation use among its citizens. In order to assess the return on an investment that does not anticipate a monetary return, a study of passengers' opinions of the performance of free-fare bus service operations was conducted in Johor, Malaysia. Thus, a satisfaction study among 375 passengers of the free-fare bus service running in Johor, Malaysia was conducted. The survey covered five aspects of service quality, including comfort, responsiveness, facility, safety, and information availability. Through the usage of 5-point Likert-scale questions, frequency and descriptive analyses were included. According to a population sample taken at random, more than half of those who use the free-fare buses are female, teenagers or students who does not own a driving licence and without a source of income, making it impossible for them to acquire a motorized vehicle. All five factors had a mean score of greater than 3.50 in terms of the service quality supplied, indicating that users are satisfied. The study's

conclusive finding is that the service provider may continue to give a high quality of service even while the revenue earned by the offered bus service is perceived as being very low. This is advantageous because it demonstrates how government funding can result in the best service possible for users. In other way, the good free-fare bus services can attract more passenger hence reducing the use of private vehicles on the road. So, this can help in embracing the sustainability strategy to promote ridesharing that can be advantageous to improve the traffic flow.

**ID 69**

## **The Optimization of Photosynthetic Bacteria (PSB) for Water Quality Improvement**

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**Abstract.** UTHM lakes has being surrounded by an open environment exposed to passing vehicles, oil palm plantation effluent and precipitation of rainwater and the lakes may be vulnerable to the emission of various pollutants that will degrade the water quality. Photosynthetic Bacteria (PSB) give benefits to aquaculture which can affects aquatic life like fish and it also keeps the pond bottom clean and aids in the degradation of organic trash. This study aims to determine the optimum value of PSB needed to improve water quality of the lake and the limitation of this study only related to groundwater and surface water contamination that get into the lake only. Laboratory experiment was conducted to record the water quality such as pH, Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD) and Ammonia Nitrogen. The standard method and instrumentation based on National Water Quality Standard (NWQS) used to measure the parameters. As a results, Sample B can get the optimum value of reduction for COD and Ammonia Nitrogen within seventh day and Sample D got the optimum value of reduction for BOD experiment in the seventh day. PSB helps to decompose many toxic matters such as ammonia and helps reduce the chemical and antibiotic usage as it could prevent aquatic life from diseases. Photosynthetic Bacteria's biomass can be explored more in future study as mentioned by various researchers as PSB succeed in dark-fermentation process to boost their capacity to produce hydrogen.

**ID 70**

## **A Simulation of Flood Hazard Map to Mitigate Heavy ARI Flood in Sungai jijan, Negeri Sembilan, Malaysia**

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**Abstract.** Forests and soils absorb rainwater naturally. New colonies were established without proper environment evaluations in cities and isolated areas. Hydrology analysis uses meteorological data and catchment physical characteristics to estimate discharge in river and drain systems. A few 2D hydrodynamic software, such as HECRAS and ICM, can produce flood hazard maps for urban and river catchments. By combining 1D and 2D modelling, catchments can be fully modeled, including below-ground and above-ground elements. The river and flood plain model have three main components: hydrology, 1D, and 2D models. River and 2D model for flood plain with sub-catchment info imported to create hydrological and hydraulic components. The IFSAR 3D ground model is supplied by the Department of Irrigation and Drainage and offers crucial information for 2D hydraulic analysis. Emphasize accurate ground model data for future service providers. Therefore, the flood area in Sg. Jijan is 2922.316m in current land (CL) for 100 ARI and after future land (FL) 391.185m in 100 ARI. Lastly, the number of houses affected by the flood is 148 houses in 100 ARI future land.

**ID 71**

## **Augmenting Project Management Knowledge Areas through Technological Mediation: Contractor Perspectives**

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**Abstract:** Construction is an industry that covers many processes starting from planning, designing, erection, alteration, repairs and maintenance of buildings until its demolition. Project management in the construction industry involves different fragments to ensure the entire process goes smoothly according to its several stages: project initiation, project planning, project monitoring and controlling, and project closing. Lack of clear information in managing construction projects and lack of knowledge regarding technological mediation will influence the expansion of project management knowledge areas. This research aims to identify the challenges in the project management knowledge areas; project resource management and project integration management, towards the improvement of project management in the construction industry. The objective of this study was to identify the challenges in the project management knowledge areas and to propose an improvement of the project management knowledge areas by using technological mediation. The scope of this study is limited to the construction industry in Selangor, Malaysia. The quantitative method and random sampling technique using a survey questionnaire are adopted in this study. The survey involves a total of 250 respondents from the top and middle-level construction management with Grade 7 Construction Industry Development Board (CIDB) registered contractors. Descriptive analysis is used to analyse the data from the questionnaire by using SPSS version 26 software. This study found that from the contractors' point of view, the challenges in project management knowledge areas are the

lack of skilled workers with adequate function in project resource management area; and in project integration management area, the limited resources and budgetary allocations for monitoring and evaluation is the main challenge. This paper also found that contractors agreed that technological mediation, namely BIM technology and project management software, are required in order to augment these project management knowledge areas. This research has provided recommendations to assist the construction industries to augment project management knowledge areas through technological mediation.

**ID 72**

## **Retention Pond as an Alternative to Mitigating Runoff and Sustainable Water Source at Jember University**

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**Abstract.** Surface runoff volume and groundwater consumption have increased because of development activities and increasing groundwater consumption at the University of Jember (UNEJ). Rainwater and runoff, on the other hand, can be used as alternative water sources to meet clean water needs and encourage sustainable campus growth. Retention ponds (RP) are excellent stormwater management solutions, which is part of the Low Impact Development (LID) practises. Low-lying areas or natural basins are suitable locations for RP, yet in some circumstances, like as flat topographic settings, RP placement is typically determined by available land. However, to efficiently capture and maintain rainfall, RPs should be strategically situated around peak runoff source areas, according to LID principles. As a result, this study examines the RP's response as well as the possibility for rainwater harvesting depending on various capacities and locations. At terms of location, RPs at peak runoff sources are more successful than other locations in preventing inundation and storing water. Based on capacity, RP with 60% of maximum total intake performs better than the other. However, for optimal harvesting it is better to use RP with 80% of the maximum total intake.

**ID 76**

**Compressibility Behavior of Marine Clay Treated by Combination of Coal Ash and Cement**

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**Abstract.** In the geotechnical field, any soft ground area that has construction on it will face a major challenge. A lot of engineering problems could arise either during or after the construction phase due to low shear strength and high compressibility of this soil in the form of excessive settlement, slope instability or bearing capacity failure. The real challenge with marine clay is stability and settlement when construction takes place. To solve this problem, study of compressibility of stabilized marine clay will be performed. The soil stabilization study aims at improving the compressibility of marine clay by adding of coal ash and cement as the stabilizer. The aim of this study is to verify the physical properties of soft marine clay soil. Then, to determine the effect of compressibility of untreated and treated soft marine clay soil with addition of coal ash and cement (OPC) at different curing periods. The samples are classified as clayey silt with slightly plasticity since the value of plastic index (PI) is less than 7. The result of the maximum dry density is 1580 kg/m<sup>3</sup> while for the optimum moisture content (OMC) is 20%. The void ratio of the sample decreases as the curing periods increases and the optimum ratio of fly ash to bottom ash is 50:50. Compression index and swelling index value signifies the compressibility of a soil and the value of compression index and swelling index decreases as the curing time increases. Thus, through this research the compressibility of marine clay can be improved to support load and decrease the problem of settlement on construction of soft soil.



**ID 77**

## **Predictive Model for Corrective Maintenance Costs: Empowering Decision-Making in Building Renovation**

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**Abstract.** The prediction of corrective maintenance costs is significant given the predominant use of a corrective maintenance approach in building maintenance. Accurately estimating the costs associated with corrective maintenance at an early stage holds substantial implications for cost allocation, maintenance budgeting, cost effectiveness, and efficient planning, all of which are vital factors contributing to the overall success of building maintenance. However, the utilization of historical data to predict future maintenance costs remains underutilized. To contribute to this gap, this study aims to develop a prediction model for the number of building defects and their associated costs based on past data of defects and building age. The study encompasses 40 buildings and employs regression analysis to develop a predictive model. The predictive model was coded in Python to validate and ensure logical outputs and alignment with expected outcomes while also utilizing the Pearson product-moment correlation coefficient between variables and model output accuracy. The resulting model can provide logical outcomes, enabling accurate predictions of corrective maintenance costs for each building. Furthermore, it assists decision-making regarding cost considerations, such as determining whether an aging building should be renovated or if repairing specific defects based on a corrective approach is more beneficial. In summary, this study contributes to enhancing maintenance planning and informed decision-making, providing significant benefits for maintenance cost estimation, and building renovation decisions.

**ID 78**

## Measurement Uncertainty Evaluation in Soil Liquid Limit Testing

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**Abstract.** Measurement uncertainty provides an indication of the quality of test result and very often also adopted in laboratory proficiency testing activities. Soil mechanical properties testing for example plastic and liquid limits conventionally do not provide uncertainty figure; however due to laboratory accreditation requirement, laboratory is required to provide it in the test report for some specific purposes for example Proficiency testing and quality validation. Conventional approach to derive measurement uncertainty is too difficult or mathematically unable to justify for the figure derived because liquid limit is not obtained experimentally instead it is estimated through linear regression method. Thus it becomes a problem to report accurate and reliable measurement uncertainty figure in the test report. This research focuses into estimating the water content of liquid limit with relative uncertainty approach through estimation from the regression curve. It suggested the technique for estimation of water content and dry weight resulting in uncertainty component different treatment from conventional approach. Error of regression, a Type A component becomes one of the key component dominating the final answer. This study suggests the control of quality and improvement of measurement uncertainty evaluation through curve fitting observing the value of  $R^2$  should not be less than 0.95. This uncertainty figure can be used in proficiency testing and inter-laboratory comparison purpose.

ID 79

## Towards Greener Concrete: A Comprehensive Review of Waste Glass Powder as a Partial Fine Aggregate Substitute

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**Abstract.** Concrete typically emerges as the superior choice in terms of strength, adaptability, longevity, noise reduction, energy efficiency, and it additionally possesses the advantage of being fully recyclable. The excessive consumption of natural resources such as sand in traditional concrete production poses environmental concerns and makes concrete production as a significant contributor to greenhouse gas emissions. By using waste glass powder as a partial substitute for fine aggregate, the study explores the potential to lower the carbon footprint of concrete, to reduce the reliance on virgin materials, minimize waste generation, and promote sustainable practices in the construction sector and finally contributing to climate change mitigation and environmental stewardship. Also, it can offer cost savings, as waste glass is often readily available at low cost, reducing the dependence on expensive virgin materials. This article assesses the workability, durability, compressive, flexural, and tensile strength of concrete when waste glass powder is used as a partial substitute for fine aggregate. Additionally, it provides a comprehensive summary of the current state of knowledge on this topic, evaluating the outcomes of previous studies, methodologies, and limitations. This review paper aids in understanding the progress made in this field and identifying areas that require further investigation. Overall, preparing a review paper on the performance of waste glass powder as a partial substitution of fine aggregate in concrete consolidates existing knowledge, evaluates performance, identifies benefits, challenges, and guides future research.

**ID 80**

## **The Performance of Steel Fibre Reinforced Concrete with Waste Glass as Partial Replacement of Fine Aggregate**

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**Abstract.** This paper discusses the performance of steel fibre reinforced concrete with part of substitution of sand with waste glass in concrete mix. Glass consists mainly of silica, which is a natural raw substance like sand. Glass is completely recyclable, and it can be recycled indefinitely without losing any of its quality or purity. Waste glass powder was utilized as a partial replacement of fine aggregate with 0%, 10%, 20 and 30% by the volume in C30 grade of concrete and addition of 0.5 % steel fibre by volume fractions of hooked end steel fibre and 0.5 water cement ratio. All samples were evaluated following 28 days curing period. The aim of this study is to investigate the workability of concrete, to determine the compressive and tensile strength of concrete and to identify the optimum percentage of steel fibre reinforced and waste glass. From the experimental results, it was found that the study achieved a maximum compressive strength of 32.9 N/mm<sup>2</sup> at 30% replacement of fine aggregate with waste glass, slightly surpassing normal concrete. Additionally, the highest tensile strength of 3.9 N/mm<sup>2</sup> was achieved at 20% replacement, surpassing normal concrete. The optimum percentages determined were 20% for fine glass replacement and 0.5% for steel fiber addition. It can be concluded that scenario of waste glass concrete approach could be perceived as a sustainable and environmentally friendly product in the near future.

**ID 81**

## **What Influences Parents' Decisions to Use Sustainable Mode (Public Bus) with Their Children? A Case Study in Batu Pahat, Johor**

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**Abstract.** Malaysia is facing a challenge on how to improve the quality of public transportation system along with the city's urbanization since public transport is one of the sustainable approaches to minimise the use of private vehicles on road that mainly contributes to CO<sub>2</sub> emissions that affect the environment, negatively. The lack of public transport services has become a barrier for people to access all the facilities and socialize among the community. Studies on the use of public transport by children are rarely discussed and has lack of attention among community. Thus, this study aims to determine parents' perceptions in using sustainable mode such as public bus with children in terms of accessibility, affordability, safety and comfortability, as well as to analyse the subjective factors affecting parents' decisions to use public bus with their children based on the Theory of Planned Behaviour (TPB). The survey method via questionnaire has been distributed through face-to-face (self-administered questionnaire) and online method (via Google Form) among 100 adults (aged 18 and above, and married) who lives in Batu Pahat, Johor. Then, the data were analyzed by applying Mean Score Method and multiple linear regression analysis using Microsoft Excel. The results show that safety is the main aspect influencing parents' decisions to use public buses with their children. In addition, Attitudes and Perceived Behavioural Control are found to be the significant components influencing Intention, and the Intention influences parents' decisions to use public bus with children for all activity types.

**ID 82**

## **Risk Evaluation of Health and Safety Procedures in Oil Refinery and Onshore Pipeline Construction Projects: Structural Equation Modelling Approach**

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**Abstract.** Health and safety are important for large-scale building projects, as most worker incidents happen in complex buildings. Oil refinery and onshore pipeline building projects are complex, large-scale projects with a prominent history of work safety accidents and even deaths. Various risk factors exist that negatively influence the health and safety of workers in oil refineries along with pipeline development projects. Using petroleum products building operations in Malaysia as a case study, this paper identifies important risk factors affecting project safety to present suggestions for reducing risks. This research aims to identify common risk variables and how they affect gas and oil infrastructure project operations. Using quantitative research methodology and analysis approach consisting of Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM), a risk-management framework for gas and oil building is developed, showing the possible hazards of building an inland pipeline and an oil company. This work adds to current efforts to enhance health and safety results in the construction industry and offers a solid foundation for future research in this area.

**ID 83**

## **Reviewing The Benefits to Promote Sustainable Retirement Villages in Malaysia**

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**Abstract.** Retirement Village is a care retirement community that supports independent living among older adults and is tailored to meet the diverse needs of these older residents. Malaysia is fast approaching becoming an aging country; it is estimated that by 2050, the country's population aged above 65 will be more than 15 percent, and thus, the demands for senior citizens' homes are predicted to be on a tremendous rise. Notwithstanding those various studies started gaining traction among researchers, it is still considered a relatively new idea in Malaysia. Along these lines, this paper aims to look at the benefits of social, economic, and environmental aspects of promoting retirement villages in Malaysia through an extensive and intensive literature review. The findings of the study indicate that there are various benefits of a retirement village in terms of the economic value; it is affordable and has lower cost, whereas the social aspect it encourages social interaction which helps to improve health conditions and from the environmental aspect it enhances the quality of life of these older adults. Hence, this study revealed that a retirement village made affordable with a high-quality environment that enhances the residents' well-being is an ideal living concept that can influence the attitude and willingness of older adults to move into a retirement village.

**ID 84**

## **Tsunami Risk Mapping in Tempurejo District, Jember Regency based on BNPB Criteria using TOPSIS Method**

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**Abstract.** Tempurejo District is one of the areas directly adjacent to the Indian Ocean, where three active tectonic plates meet. This is evidenced by the 1994 tsunami in Banyuwangi, the impact of which was felt by the people of Tempurejo District, Jember Regency. In an effort to mitigate the risk of tsunami disaster that may occur in Tempurejo District, a tsunami risk map is needed in the area. There are very few studies on tsunami risk mapping in Tempurejo District. A previous study utilized only hazard and vulnerability parameter while capacity parameter is not taken into account while in this study, three parameters mentioned before are used to estimate the tsunami risk level. Furthermore, two methods are utilized to produce a tsunami risk map in Tempurejo District. The first method utilizes the Indonesian National Board for Disaster Management (BNPB) method, while the second method employs TOPSIS as a modified weighting method for tsunami risk mapping. The results of this study provide a map of the levels of hazard, capacity, vulnerability, and risk at the research location.



**ID 85**

## **Blockchain technology in Building Information Modelling (BIM): Potential, Challenges, and Strategies**

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**Abstract.** Blockchain technology is well known for its decentralized server, able to keep records of transactions and having the ability to perform tracing. It has been widely used as it provides benefits to many sectors, and it is perceived to solve traceability and transparency problems and further improve Building Information Modelling (BIM)'s adoption. Hence, the aim of this study is to identify the potential of blockchain technology in BIM. This research adopted a qualitative approach as there is a lack of literature review on blockchain potentials in BIM. Semi-structured interviews were conducted with four (4) construction players and four (4) blockchain experts. Content analysis was then adopted to analyse the interviews data collected. From the findings, three (3) potentials of blockchain technology in BIM, six (6) challenges and five (5) strategies towards adopting blockchain technology in BIM were identified. Recommendation was provided for future research to go in depth on how blockchain technology can integrate with BIM and the potential challenges during the blockchain-based BIM deployment processes.

**ID 86**

## **The Effect of External Load to Slope Stability using Slope/W at FT 006, Section 61.50, Pulau Pinang**

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**Abstract.** Sustainability in slope protection is very important to reduce environmental impact and loss of property and life. Landslides and slope failure frequently occur due to a variety of factors. The factors that contribute to the slope failure are the external load such as heavy machinery and also rainfall. The study area for this study is slope at FT006, Seksyen 61.50, Pulau Pinang. The objective of this study is to identify the factor of safety (FOS) of original slope and also factor of safety after slope protection applied. The soil nailing and also sheet pile were chose as a slope protection. The 2D modelling using Slope/W software was created and analysed. This slope consists of multi-layers soil properties with the steepest angle of 52°. This model is applying with external load to stimulate the real situation of existing slope. The result shows that the minimum FOS for slope without any external load is 0.58 and the FOS decrease to 0.28 when the external load was applied. When the soil nailing was applied to the slope, it is increase to 3.74 without external loading and 1.247 with external load. Meanwhile, when sheet pile was applied the FOS increases to 3.88 without external load but with external load it is dropping to 0.39. Therefore, the soil nailing was proposed to this slope as effective slope protection.

ID 89

## Stabilization Of Soft Soil with Rice Husk and Coconut Fibre

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**Abstract.** This study focuses on the stabilization of soft soil, which has a low bearing capacity and is prone to significant deformations and high moisture content. Soft soil is one type of soil with a poor bearing capacity, and when loaded, it significantly reduces the likelihood of a nonuniform decline. As a result, problems such as significant settlements, floods, infrastructure damage caused by soil subsidence, foundation collapse caused by lateral soil movement, and others are widespread. The aim is to determine the physical properties of soft soil and to determine the mechanical properties of soft soil mixture with rice husk and coconut fibre with curing days of 14, and 21 days. The significance of this study lies in its contribution to establish a strong foundation and stabilizing soil, which plays a crucial role in constructing solid and durable structures, ensuring their stability and longevity. By utilizing rice husk and coconut fiber as soil stabilizers, the study also addresses environmental concerns by substituting natural resources with unwanted or discarded materials. Furthermore, this approach offers an economically viable solution for soft soil stabilization. The study involved two types of soil samples. The first type served as a control sample without any rice husk or coconut fiber, while the second type included rice husk and coconut fiber. The second type of sample was further divided into two ratios, with curing durations of 14 days and 21 days. A soil sample was collected from a paddy field in Sg Balang, Muar, Johor. The rice husk was burned at temperatures below 800 °C, resulting in silica-rich ash. The physical and mechanical properties of the soft soil mixture with rice husk and coconut fiber were determined through various tests. The preliminary tests were conducted to assess the physical qualities of the soil, including the Atterberg Limit Method, Compaction Test, and Direct Shear Test. The results showed

that the Liquid Limit (LL) was 20.1%, with moisture content ranging from 15.56% to 27.38%. The compaction test indicated that a ratio of 2 with a 21-day curing duration achieved a maximum dry density of 0.56 and an optimum moisture content of 47.8%. The Direct Shear Test demonstrated that a ratio of 1 with a 21-day curing period exhibited the highest shear strength and shear stress at 3.25 kg and 10.45 kPa, respectively. Moreover, the cohesive and friction angle increased with longer curing days, with the mixture of ratio 1 and 21 days showing the highest values at 4.7 kPa and  $35.03^\circ$ , respectively. In summary, the presence of rice husk and coconut fibre significantly improve the soft soil stabilization. The study suggests that further research should explore longer curing periods of 30 days and 60 days to enhance shear strength.

**ID 90**

## **The Effect of Different Degree of Compaction Towards Electrical Resistivity Value for Cohesive Soil**

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**Abstract.** Electrical resistivity is a non-destructive method used to measure the resistivity of ground properties, which is related to soil properties such as porosity and degree of saturation, as described in Archie's law. In road construction, soil compaction is a crucial process that requires quick quality assessment. Traditional methods, such as sand replacement tests, are timeconsuming, limited in coverage, and labour-intensive. Therefore, incorporating electrical resistivity techniques on the current quality control practices may significantly improve efficiency. To achieve this, it is essential to establish the relationship between soil density, moisture content, and electrical resistivity. This study focuses on industrial and natural soil samples compacted using standard proctor moulds using 2.5 kg and 4.5 kg hammers. Resistivity measurements were conducted using the Miller 400A device using Wenner array and 1 cm electrode spacing. The impact of different compaction degrees on electrical resistivity values were compared for the two soil samples. The findings showed that soil dry density increased with the increment of water content until it reached maximum dry density. However, as water content continued to increase, the dry density decreased. Based on the results, electrical resistivity was higher at low water content but reduced with the increments of water contents. The resistivity value for industrial soil decreased from 164 to 12 Ohm.m and 200 to 13 Ohm.m. For natural soil the resistivity value decreased from 45 to 9 Ohm.m and 126 to 11 Ohm.m. The comparison of electrical resistivity values between the two different compaction methods indicated the moisture content limited the capability of the electrical resistivity method to identify the compaction effect in the

proctor soil testing. This study demonstrates the potential applicability of electrical resistivity techniques in assessing soil compaction.

**ID 93**

## **Developing a Conceptual Framework of Building Maintenance Driving Factors for Effective Heritage Building Maintenance Programme in Malaysia**

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**Abstract.** The purpose of this paper is to display the initial development process of a conceptual framework of building maintenance driving factors for effective heritage building maintenance programme. Maintenance programme is the most important in arranging the building maintenance management. The heritage building value also will decrease within a period of time. Failure to detect the causes of building deterioration will also give a significant impact to the durability and strength of heritage building. This research is proposed to study further on the significant effective maintenance criteria which can be indicators in supporting the loose based in heritage building maintenance programme and their framework. The aim of this research is to model the significant driving factors of effective building maintenance programme for heritage building in Malaysia. The research objectives are to investigate the influencing factors which are involve in maintenance programme and to determine the significant relationship between the significant factors in developing an effective maintenance programme for heritage building in Malaysia. The relevant research data collection has been obtained by

conducting the expert opinion interviews and findings from literature reviews. Several factors have been identified as the enablers of the effective heritage building maintenance programme, and clustered into 4 main factors (Human Factor; Management Factor; Organisational Factor and Technology Factor). In conclusion, the research will be able to give the significant findings regarding to the driving factors involve in development of conceptual framework for effective heritage building maintenance programme.



**ID 97**

## **Detection of Mainland Kedah's Shoreline Changes (2013-2020); A Case Study**

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**Abstract.** Shoreline erosion and accretion are natural processes that involve the gradual change in the shape and position of coastlines due to the movement of water, sediment, and geological factors. These processes have significant implications for coastal environments, ecosystems, and human activities. Therefore, it is essential to frequently assess the shoreline changes for effective coastal management, sustainable development, and safeguarding valuable ecosystems. In the present study, shoreline condition along mainland Kedah (109 km) was investigated through remote sensing and geographical information system (GIS) techniques. The assessment was performed over the period of 7 years (2013 and 2020) by analysing the satellite images captured by Landsat-8 satellite Operational Land Imager (OLI) at 15 m resolution. Preprocessing was established by performing image geometric correction and registration. Next, the Support Vector Machines (SVMs) toolbox was used for image classification to define the water and non-water fields. Later, the shoreline was extracted from the classified images and overlaid in a geodetic base in ArcGIS software to detect shoreline changes. The results showed that the majority of mainland Kedah's shoreline did not experience extensive erosion or accretion at which 54% of the shoreline (58.8 km) was found to be stable. Erosion was observed at 6 locations with a total length of 10.1 km (9% of the total shoreline length) which was

mainly concentrated in the nonprotected areas. On the other hand, shoreline accretion was observed at 19 locations with a total length of 40.1 km (37% of the total length). It is worth highlighting that the erosion areas were concentrated in the southern part of the coastline, while the accretion areas were distributed between the middle part and the north side of mainland Kedah's shoreline.

**ID 98**

## **Potential Groundwater Investigation Using Electrical Resistivity Imaging for Industrial Facilities in Gebeng, Malaysia**

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**Abstract.** In dry regions with limited access to surface water, groundwater is an essential source of freshwater supplies. This is especially true in areas where there is limited availability of surface water. Industries such as manufacturing make extensive use of water for various purposes, including cleaning, heating, and cooling, the production of steam, use as a solvent, transportation of substances that have been dispersed into it, and as a component of the manufactured product itself. Because of its large size, the groundwater reserve has the potential to become an additional source of water supply for the country, particularly in industrialized regions. The geophysical approach, which geophysicists dominate, has become one of the most prominent methods researchers use to offer the best technique in mineral or resources exploration. Electrical Resistivity Imaging, more commonly referred as ERI, is one of the geophysical techniques that offers a very intriguing method for determining subsurface profiles across a wider region. The primary purpose of this assessment is to assess a potential groundwater aquifer and determine whether it might be economically viable in industrial development facilities. The method described above is suitable for investigating various subsurface conditions. ERI's groundwater investigation using alternative methods, which enhance standard methods, could provide complete and convincing findings, increase efficiency in costing and timing. The ERI survey was carried out with the assistance of an ABEM LS2 Terrameter, which featured 61 electrodes that were planted along a line 400 meters long Line 1, with an electrode spacing of 5 meters (inner) and 10 meters (outer). When the survey was

done on Line 2, the electrode spacing was set at 2.5 meters (inner) and 5 meters (outer). The results of the ERI tests indicate that Lines 1 and 2 are good indicators of groundwater presence. Line 2 was undertaken with a length of 200 meter rather than 400m, resulting in less data (shallow depth) being obtained. Furthermore, groundwater would have low resistivity (20-200  $\Omega$ m) and chargeability. As the resistivity and chargeability readings could be compared and complimented on each other, the combination of resistivity and chargeability readings would provide a better understanding of the outcome. The uncertainty rate would be high since this project did not conduct the induced polarization survey (chargeability).

**ID 99**

## **Exploring Lift Car Defects: An Examination of Common Defects and The Possible Causes**

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**Abstract.** The maintenance of a lift system, which is a highly specialized machinery, requires professionals with a wide range of knowledge in the mechanical maintenance area. While obtaining accurate information about lift malfunction has grown difficult, this study has filled the gap by compiling management-maintenance problems and operational lift system defects. The general objective of the study is to identify the maintainability issues of lift systems. Firstly, interviews with the industry experts- six (6) Facility Managers and two (2) Lift Supplier Personnel were conducted to identify the system operation defects and management issues. The data collected from the interview comprising the system operation defects were then tabulated in a defect library whereby the explanation of the defects was discussed, and the possible causes of the defects. With regard to identify the key challenges in maintaining the lift system, the prime factor that drives a challenge in maintaining the lift system is the deficiency of knowledge and skills among the lift technicians that were sent to do servicing work. In conjunction, the respondents agreed that conducting training with the purpose of improving skills and knowledge and providing a comprehensive maintainability scoring system will be effective in improving the maintainability of the lift system. Finally, responding to the prime challenges mentioned above, by providing a comprehensive explanation of the lift system's defects, this research paper has theoretically improved the knowledge base on the maintainability of the lift system.

**ID 100**

## **Predictive Analytics Multinomial Logistic Regression Toward Criteria Adaptive Reuse of Pre-war Shophouses**

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**Abstract.** Pre-war shophouses are among national heritage buildings which require conservation efforts, among other through adaptive reuse. Adaptive reuse of building assets is considered to be a sustainable bypassing the wasteful process of demolition and reconstruction (UNEP DTIE Sustainable Consumption and Production Branch, 2009). However, adaptive reuse is not an easy decision because there are many factors affecting adaptive reuse. Therefore, the criteria of adaptive reuse need to be consider before choose the potential adaptive reuse. There are six broad aspects in the criteria of adaptive reuse which are economic, environment, social, architecture, technology, and legislative. A questionnaire survey among five (5) different background of respondents also known as stakeholder consist of town planner from local authorities, valuer from valuation and property service department (JPPH), architects, researchers and building owners are conducted to achieve the objectives. From the analysis, three (3) potential new uses which are new shophouses, restaurant and hotel are identified as a very suitable alternative and represent as independent variable. This paper aims to identify the relationship between the decision by stakeholder and the potential alternative adaptive reuse.

**ID 101**

## **The Implementation of AutoCAD® Civil3D for Highway Geometric Redesign: A Case of Indonesia Toll Road**

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**Abstract.** Transportation infrastructure is one of the primary needs in increasing a country's economic growth. In the last decade, Indonesia has continued to build toll roads to accelerate the provision of these needs. In some toll road development projects, a redesign is required as a form of field adaptation. The redesign process requires accuracy, speed, and convenience, so the development process goes according to plan. This paper discusses the implementation of using AutoCAD® Civil 3D for toll road redesign in Indonesia. The data is taken from the construction of toll roads in the Greater Jakarta-Indonesia area in 2023. The research method was carried out by comparing manual calculations and AutoCAD® Civil 3D. The study results show that some adjustments to the toll road design must be implemented faster and more precisely according to field needs. The selection of these applications makes it easier for designers to determine various options for planning the toll road. The conclusion of this paper shows that the use of AutoCAD® Civil 3D increases the efficiency and effectiveness of toll road redesign.

**ID 102**

## **Deformation of Peat Soil Reinforcement Settlement Using Single-Layer Bamboo Dendrocalamus Asper**

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**Abstract:** As a unique soil, peat soil has extreme characteristics such as very high compressibility when any load applies to it. It has the condition of partially decomposed plant and animal make it unsuitable used as a foundation for construction. Due to this, the reinforcement of peat must be improved or stable. The stability of peat was more stable when the reinforcement is held or tied with a strong material that can be used for the long term. Therefore, this study to identify the deformation settlement of single-layer bamboo *Dendrocalamus asper* that using as reinforcement for the peat. The testing at the laboratory and physical model were conducted to fulfill the objective of the study which is to identify the physical properties (water content, specific gravity, organic content, fiber content, degree of decomposition), mechanical properties (consolidation test), and displacement of settlement through physical modeling at the laboratory. The result shows that the soil collected at Kampung Parit Puteri Menangis, Benut, Johor has a moisture content of 672%, specific gravity of 1.23, organic content of 88.34 – 96.19%, fiber content of 38.1%, and categories H4 to H6 (Hemic). The compression index ( $C_c$ ) was determined in the range of 0.13 to 1.54, the consolidation coefficient ( $C_v$ ) was determined in the range of 0.62 to 4.925, while the coefficient of compression ( $C_\alpha$ ) was determined in the range of 0.02 to 0.048. For the displacement of the settlement of peat show the bamboo reinforcement reduce the settlement under different load. The settlement decreased by 59% of the final load 4 kg/m<sup>2</sup> during 2 hours in the displacement 9.543 mm to 3.867 mm. It is shown that the properties of peat react with the soil and began to settle down slowly until the reading remained constant.



## ID 103

### Strengthening RC Beams with Circular Post-Opening in Shear Zone by Externally Bonded CFRP

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**Abstract.** An installation of post-drilled openings in existing reinforced concrete (RC) beams may result in an abrupt change in the beam's cross-sectional dimensions, which could reduce the beam's capacity and integrity of the beam. A variety of methods have been developed to adequately reinforce the area around the opening. This study investigates the efficacy of Carbon Fibre Reinforced Polymer (CFRP) sheets for strengthening RC beams with circular post-opening at shear zones. A total of five beams measuring 150 mm width, 300 mm depth and 1550 mm length were casted and tested under four-point load until failure. The beams were consisted of one solid beam used as a control beam, two beams having 100 mm diameter circular openings and another two beams were strengthened using externally bonded CFRP sheets around the openings. The ultimate load capacities, deflections, strain distributions, cracking propagation and failure modes of the tested beams were measured and compared. According to the test results, beams with openings had lower load capacity and less stiffness compared to solid beam. Increasing the number of openings significantly reduced the ultimate load of the beams up to 25%. There are also significant differences between beams without and with strengthening in terms of beam capacity, stiffness and strain distribution.

**ID 104**

**Coastal erosion monitoring along the coast of Negeri Sembilan, Malaysia**

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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 the overview of coastal erosion monitoring along the coast of Negeri Sembilan, Malaysia. The coastal erosion assessment approach includes the creation of sediment cells for the coastal area, as well as the collecting and examination of secondary data related to the research areas. Categorization of erosion has been concluded based on locations of study area. Category 1 erosion was discovered along the coastline at the PD Waterfront, Batu 1, Jalan Pantai Port Dickson, The Regency Tanjung Tuan Beach Resort (Batu 5), Tanjung Gemok, Kampung Gelam, and Pantai Teluk Kemang (Batu 8). Pantai Tanjung Gemok, a prominent recreational beach, is currently experiencing groyne erosion downdrift. Apart from that, a groyne is being eroded downdrift in Pantai Regency Batu 5, Negeri Sembilan.

**ID 105**

## **The Study of Cement Sand Brick Containing Kenaf Fine Particles as Sand Replacement Materials**

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**Abstract.** Besides concrete, bricks are the most fundamental building materials used in the construction of buildings, such as a partition walls. For cement-sand bricks, the used of sand as a main ingredient had triggered a big concern to the environment impact, a shortage of sand resources and the rise in the cost of the material. To address this problem, many researchers have been exploring the use of kenaf fiber as an alternative, renewable resource for fine aggregate in construction. This study is focused on the cement sand brick that containing kenaf fine particles. Due to its unique properties and availability, kenaf has gained much attention among researchers. The main objective of this study was to determine the optimum amount of kenaf fine particles as sand replacement in cement sand brick. Seventy-two brick of 215 mm x 102.5 mm x 65 mm has been produced. In this investigation, a brick with a cement sand ratio of 1:3 and a water-cement ratio of 0.4 with and without superplasticizer, and 0.5 has been tested. The replacement of kenaf fine particles was ranging from 10% to 30% by volume. The cement sand brick was tested to investigate mechanical parameters such as density, compressive strength, and water absorption capabilities of the brick. The results shows that 20% kenaf replacement gave an acceptable condition in term of strength and density.

**ID 106**

**Assessment of the sub-urban drainage system resilience on the increased flooding scenario using Storm Water Management Model (SWMM)**

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**Abstract.** This study aims to provide technical support for decision-makers by presenting an evaluation of flood in Tanjung Bundong, Kota Samarahan, Sarawak, Malaysia. Storm Water Management Model was utilized to simulate the existing drainage network until it reached the main outlet of Sabang River. The hydrological and hydraulic parameters which included rainfall and tidal effects of Sabang river were determined to assess the cause of flooding series since 2015. The mapping of the drainage network was carried out to evaluate the existing drainage. The site investigations showed about 31% of the earthen canals and 5% of concrete drains were obstructed due to the trash accumulation, overgrown vegetation along the drain, and accumulation of soil sediments. Therefore, these occurrences shallowed the invert levels of the drain. This had resulted in 15 nodes flooded when simulated with 2-year average recurrence interval design rainfall and rose to 29 nodes with 50-year average recurrence interval design rainfall. With the combination of high tidal levels, the flood volumes reached 241,579 m<sup>3</sup>, especially during intense rainfall. The results showed the importance of periodic maintenance on the drainage network to ensure its resilience against nuisance flooding.

## ID 107

### High-density geopolymer using slag and POFA-based geopolymer concrete: Engineering properties

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**Abstract.** This research aims to determine high density geopolymer concrete, utilising abundance industrial waste material such as FA, GGBS and POFA as binder content of the concrete producing high density geopolymer concrete. This will provide for a more sustainable alternatives and ecofriendly option for construction structure. The concrete tested for various testing to assess its quality and engineering properties such as density, compressive strength and some of durability tests such as water absorption and soroptivity. The results indicated that the compressive strength of the POFA/slag-based concrete was in range of 33 to 45 MPa, whereas the density was found about 2700 kg/m3. The increase of POFA replacement the increase of the water absorption.

**ID 108**

## **Review on Metakaolin Impact on the Workability and Compressive Strength of Concrete**

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**Abstract.** The utilization of supplementary cementitious materials (SCMs) in concrete production has gained considerable attention in recent years, driven by the need for sustainable construction practices and improved concrete performance. Among these materials, metakaolin has emerged as a promising mineral admixture due to its pozzolanic properties and potential to enhance various aspects of concrete behavior. This review examines the extensive research conducted to evaluate the impact of metakaolin on both the workability and compressive strength of concrete. Metakaolin's influence on compressive strength is due to its pozzolanic reactivity, which contributes to the formation of additional calcium silicate hydrate gel and refined microstructure. Metakaolin addition enhances concrete's workability and compressive strength, improving ease of mixing and placement. It absorbs water and increases viscosity but can reduce workability by up to 20% and the optimum replacement ratio is between 5% and 15%. Metakaolin significantly impacts concrete workability and compressive strength, with its high reactivity and pozzolanic characteristics causing challenges. However, careful mix design adjustments and incorporation strategies can effectively address these issues. Metakaolin's contribution to supplementary cementitious reactions and microstructural refinement highlights its potential as a valuable addition to concrete mixtures. Metakaolin's contribution to supplementary cementitious reactions and microstructural refinement enhances compressive strength, making it a valuable addition to concrete mixtures. Further research on metakaolin's interactions with concrete constituents will contribute to sustainable and high-performance concrete solutions in the future.

**ID 110**

## **Damage Plasticity Model for Green Concrete Material**

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**Abstract.** Concrete damage plasticity (CDP) material model is a constitutive material model used to describe the behaviour of reinforced concrete under stress. This model is particularly useful for simulating the response of concrete structures subjected to a wide range of loading conditions. These studies aim to develop the CDP material modelling for green concrete mixture. The mixture proportion of the green concrete material was obtained from previous literature study. The material was then casted into cylindrical specimen purposely to investigate both of their elastic and plastic deformation through axial compression testing. The value of their deformation is measured by the strain gauges attached at their both sides of failure zone. The results shows that the concrete damaged plasticity (CDP) material model value in terms of their compressive crushing and tensile cracking damage. The value for compressive crushing damage was 0.0000000, 0.0000000, 0.0000000, 0.2087821, 0.4888152, 0.6959403, 0.8077879 and 0.9113505. Meanwhile, the value for tensile cracking damage was 0.00000, 0.12705, 0.25410, 0.45492, 0.56635, 0.62295, 0.68415, 0.74118, 0.79098, 0.85371 and 0.90164. By using this green concrete damage plasticity (CDP) material model, engineers and researchers can make more accurate predictions about the performance of green concrete structures, leading to safer and more cost-effective designs.

**ID 111**

## **A Review on Consideration Need for Ventilation System in Commercial Kitchen**

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**Abstract.** The important of ventilation system for building occupant has been recognized many centuries ago. This was improved by researchers who demonstrated the requirements for buildings to provide comfort and good air quality indoors. Later on, this need evolved to address the additional energy requirement for buildings to achieve the indoor environment quality levels stipulated by those previous researchers. However, many parties in Malaysia overlooked on the need of proper ventilation system for commercial kitchen. There is a need therefore for assessing current methods of commercial kitchen ventilation and developing ventilation systems that are capable of providing good IAQ and energy performance to satisfy building occupants and meet new building energy codes. This article gives a brief overview of ventilation system commercial kitchen; highlighting on Air flow rate for kitchen, ductwork design and exhaust hood placement. The aim of this paper to provide some insight on consideration need for ventilation system in a commercial kitchen and for the research community to continue research in this area in order to develop new ventilation concepts and deliver the desired performance.



**ID 112**

## **Strengthening the Resilience Adaptability for Port Terminal Risk Management**

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**Abstract.** Managing critical assets is crucial because it supports a country's economic and social growth. Besides, the functions and operations of critical assets are irreplaceable. The critical assets need to comply with comprehensive protection, excellent risk management and a mitigation plan to protect the physicality and functions of the critical asset. Thus, the main issue in managing the risk for critical assets is to manage and minimise the impacts of any threats (natural, man-made, or technological threats) that are possible to occur. The elements of resilience adaptability are focused on in this research as a strategic approach to risk management for critical assets. The research objective is to identify and analyse the resilience elements for critical asset risk management, which this research focused on port terminals. The methodology adopted in this research is based on a quantitative approach by distributing questionnaires to 75 respondents who engaged within the port terminal industry. The data are analysed using the Relative Importance Index (RII) to detail the resilience elements according to their significance level. Thus, this research contributes to the critical asset stakeholders and management in prioritising their action plan towards strengthening the resilience adaptability for an effective critical asset risk management.

**ID 114**

**Mechanical and Thermal Performance of Pineapple Leaf Fibre (PALF) as Admixture in Interlocking Compressed Earth Brick (ICEB)**

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**Abstract:** Nowadays, the use of Interlocking Compressed Earth Bricks (ICEB) has taken a dominant position in the construction industry due to the constant quest to reduce carbon dioxide emissions that are harmful to the environment. ICEB is a brand-new, alternative technique that has been created to enhance the green attributes of conventional bricks. As opposed to conventional brick, ICEB are manufactured using a compression method and thus do not need to be fired, thereby reducing carbon emissions. The compaction process and the content of the stabiliser added to the mixes give the ICEB its strength. This study focuses on determining the effect of pineapple leaf fibre (PALF) inclusion and mix ratio on the ICEB performance. Three (3) distinct PALF percentages of 0.05, 0.10, and 0.15 percent were investigated. All ICEB samples were tested for compressive strength and water absorption at ages 3, 7 and 28, while the optimal ratio was further investigated in term of its thermal properties. It was found that the ICEB with 0.10 percent PALF contents has a maximum compressive strength that is greater than the minimum requirement specified in BS3921:1985 (5 N/mm<sup>2</sup>), but the water absorption exceeds the permitted limit of 15% based on MS 76:1972. Whereas ICEB with a PALF content of 0.1 percent has a good

heat conductivity value which is k-value 0.201, while for the heat resistance value, R-value is 0.622. It is proved that PALF-ICEB perform well compared to ICEB without any admixture with k-value and R-value is 0.724 and 0.173, respectively. This study could be useful to serve as a guide for the PALF-ICEB's mix design.

## ID 115

### Potential application of landfill leachate as the substrate for electricity generation

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**Abstract.** Environmental pollution by wastewater is a prominent crisis in the modern world, and currently, available treatments consume high amounts of electricity, leading to another global crisis of resources. Present system designs in Malaysia focus mainly on treating municipal effluents. This leaves a wide scope for treating other substrates such as landfill leachate effluents. Landfill leachate is one of the alarming pollutants of water reservoirs due to the presence of high concentrations of contaminants such as chemical oxygen demand, ammonia, phosphate, nitrogen, and harmful heavy metals. This raises an immediate focus to modernize its' treatment system in Malaysia by using sustainable biological treatment with minimal use of energy. Thus, this research targets treating leachate landfill wastewater using an anaerobic digestion process by bacteria that will not only remove the high chemical oxygen demand contents of the wastewater but also utilize them to generate electricity. The two anaerobic electrogenic bacteria, *Shewanella oneidensis* and *Klebsiella pneumoniae* were used in this study at 10%, 30%, and 50% concentration, presenting a substantial removal of chemical oxygen demand (COD) from landfill leachate wastewater, in turn, producing a power output of 0.09 $\mu$ A to 0.36 $\mu$ A on a microliter scale, measured using a compact paper-based electro-fluidic array that mimics a microbial fuel cell. However, the bacterial digestion of landfill leachate was found to be inhibited due to the presence of high concentrations of ammoniacal nitrogen and phosphate.

**ID 116**

## **Crack Width Behaviour of High-Performance Fiber Reinforced Concrete Slabs Affected by Steel Fiber Composition**

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**Abstract:** When a bending failure occurs, the crack width formula of a reinforced concrete element usually requires a parameter of relative crack depth ( $\xi$ ) or a span-to-depth ratio ( $L/h$ ). Using High-Performance Fiber-Reinforced Concrete (HPFRC) increase material performance so the element thickness can be cut down and the relative crack depth can be raised. The research aims to investigate the HPFRC slab's crack width, which is affected by a variation of steel fiber composition as a pure bending element based on the linear elastic fracture mechanics. The HPFRC materials use Portland pozzolana cement, sand, gravel, silica fume, water, superplasticizer, and the composition of steel fiber of 0,4%, 0,6%, 0,8%, and 1,0% based on the prediction weight of HPFRC slabs. The research generates the stress intensity factor and the crack width equation as a function of the relative crack depth of the HPFRC slab less than 0,90. The comparison between the crack width analysis on the HPFRC slab and the flexural test result on the HPFRC slab shows well conformity.

**ID 118**

## **20 Years of Air Pollutant Index Trend Analysis in Kuching, Sarawak, Malaysia (2000-2019)**

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**Abstract.** Sarawak is expected to face environmental challenges due to air pollution arising from industrial emissions and urbanisation as it strives towards achieving developed and highincome status by 2030. Therefore, it is important to conduct a comprehensive Air Pollutant Index (API) trend analysis. There are currently limited studies on API trend analysis that focus on Kuching, the capital known for its extensive industrial zones and densely populated urban centre. The main focus of this study is to perform a comprehensive analysis of the API trends in the Kuching region over a period of 20 years, specifically from 2000 to 2019. The research employs a contour plot as a visual representation of fluctuations in air quality over time and suggests a five-term Fourier model for predicting missing API data using Matlab software. Elevated API readings, signifying highly detrimental air quality, were primarily identified as a result of haze episodes stemming from uncontrolled fires in neighbouring countries, particularly during El Niño events. A five-term Fourier model used to forecast missing API data provides a strong correlation with the API readings. The findings of this study contribute to a better understanding of air quality trends in Kuching by means of the contour plot.

## ID 119

### Analytical study on effect of groundwater table and rainfall infiltration on the stability and performance of Muar Trial Embankment by using PLAXIS 2D

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**Abstract.** Stability and performance of embankment is crucial throughout its service life especially when subjected to various environment factors namely rainfall and fluctuation of groundwater table. The environmental factors are normally site dependent and vary from time to time. Thus, it is critical to assess the stability and performance of embankment when subjected to environmental factors. The geometry and soil profile of well documented Muar Trial embankment was utilized as base model with the aim to determine the effect of water table and rainfall infiltration on its stability. The impact of these factors on embankment stability is investigated numerically via Plaxis 2D. The findings highlight the importance of considering fully coupled flow-deformation analysis in PLAXIS 2D when simulating rainfall infiltration on the embankment slope. Stability of simulated slopes was determined via strength reduction technique which is known as one of the FEM methods to determine slope stability. The findings showed that the short-term safety factor of slope is slightly increased with 0.4 by taking into consideration possibility of water table raise due to poor drainage. However, simulated 1-day rainfall event didn't significantly affect the stability of embankment slope. Future work should explore consolidation process after drawdown of water table and incorporating long-term rainfall data to validate the practical assessment of embankment stability in engineering scenarios.

**ID 120**

## **Degradation of Chemical Oxygen Demand, Suspended Solids and Ammoniacal Nitrogen from Sewage by Sweet Potato Peel Coagulant under the Influence of pH**

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**Abstract.** Coagulation is a common treatment stage included in conventional sewage treatment. Various chemical, synthetic and natural coagulants in the form of single, dual and composite were applied in this treatment stage. However, the application of natural coagulants made from food waste is still uncommon. Thus, this study compares the ability of sweet potato peel as a composite coagulant (PACSPP), dual coagulant (PAC+SPP) and single coagulant (SPP) under the influence of pH in removing chemical oxygen demand (COD), suspended solids (SS) and ammoniacal nitrogen (AN) from sewage wastewater. Raw sewage sample before primary treatment was collected from University Tun Hussein Onn Sewage Treatment plant by using grab sampling method. Optimization study was conducted by using jar tester. At the optimum condition of PACSPP (pH 7), the percentage removal of COD, SS and AN was 54%, 95% and 39%. While a single SPP coagulant, at its optimal pH of 9, achieved 24%, 16% and 17% removals of COD, SS and AN, respectively. Meanwhile, optimisation of dual coagulant (pH 9) demonstrated 39%, 73% and 42% removals of COD, SS and AN, respectively. Thus, SPP, as a composite coagulant, outperformed the dual and single coagulant of SPP.



**ID 121**

## **Teachers' perception of urban noise in the classroom: Case Study in Mukah, Sarawak**

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**Abstract.** Environmental noise is an unwanted sound created by urbanisation and industrialisation processes, which has been linked to problems of teachers in the school such as lack of concentration, annoyance, speech interference and low performances. The impact of noise in the classroom during the teaching session can cause increased stress and fatigue to teachers. This study aims to identify the noise factor in the school and the impacts of urban noise on teachers during the teaching session through subjective evaluation. In the present study, a questionnaire survey was distributed to the teachers at three secondary schools in Mukah, Sarawak. The developed questionnaire was evaluated by the experts and pilot study was carried out prior to the actual survey. A total of 204 respondents from secondary schools named as school A, school B and school C were participated in this study. The questionnaires were sent to all teachers in three schools in the form of Google Forms and sent by using the WhatsApp application. The main factor of environmental noise that affects teachers from all schools studied came from transportation. Most of the teachers agreed that they need to raise their voice and walk around inside the classroom during the class in order to make sure students can hear their message clearly.

**ID 122**

**Effect of Green Mussel (*Perna Veridis*) Shell Powder as Partial Fine Aggregate Replacement on the Mechanical Properties of Concrete**

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**Abstract.** Depletion of natural resources is one of sustainability problem which requirement to address in efficiently. Nowadays, the trend in construction industry is to use the alternative source of construction materials which can substitute the use of new materials. The aim of this attempts is to reduce environmental impact in terms of energy consumption, pollution, waste disposal and global warming. As an alternative solution to reduce waste quantity by utilizing it in construction materials. Thus, this study was carried out to identify the physical properties of the mussel shell powder as partial fine aggregate replacement and to define the optimum percentage of mussel shell powder in concrete based on its physical and mechanical properties. The percentage of mussel shells powder used in this study were 0%, 10%, 20% and 30% (C100, C10MSP, C20MSP and C30MSP). The total 48 cubes sample size, 100mm x 100mm x 100mm were used and tested on its compressive strength and capillary water absorption test for 7 and 28 curing days. The result shows that specific gravity of fine aggregate is lower than mussel shells powder which was 2.76 and 2.90. Based on compressive strength resulted, C20MSP has high strength (35.9 MPa) compare to another concrete mixes. While for the water capillary absorption resulted that C30MSP has the low average water capillary absorption (0.12cm/s). Therefore, for the mechanical properties of this research, it can be concluded that mussel shell replacement should be in average between 20% to 30% of fine aggregates. Furthermore, the high

content of calcium carbonate ( $\text{CaCO}_3$ ) in chemical composition of mussel shell powder act as a filler in concrete and promoting early hydration process.

**ID 123**

## **Determinants of Project Time Extension Factors in the Construction of Building Projects in Pakistan**

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**Abstract.** Building construction projects are vital for a country's resource utilization and economic growth. Timely project completion is crucial for success, while delays can lead to financial instability. One key challenge in the construction sector is efficient time management, with project delays being a major issue. This study investigates the causes of such delays in Pakistani building projects. Through a comprehensive approach, this research reviews existing literature, develops a targeted questionnaire, and gathers responses from experienced practitioners. The findings reveal key factors, including late financing by clients, non-standard procedures by authorities, compressed schedules and inadequate project planning, lack of coordination among involved departments, and protracted procedures. These insights provide valuable guidance for policymakers, engineers, and project stakeholders to address and prevent these delay-inducing issues, ultimately fostering successful construction outcomes.

**ID 124**

## Exploring the Effects of Reinforcement Ratio on Concrete Rigid Pavement Structure in Malang, Indonesia: Experimental Study and Analysis

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**Abstract.** Rigid pavement refers to the construction of concrete pavements, exhibiting significantly higher stiffness in comparison to flexible asphalt pavements. The deflection characteristics within rigid pavement necessitate careful consideration. Inadequate calculations of concrete quality, slab thickness, and reinforcement levels can lead to substantial deflection, thereby inducing issues like slab cracks, pumping, and pavement faulting. This research aims to assess deflection behavior and its extent in rigid pavement under various reinforcement ratio variations through experimental analysis using a monotonic static line load. A concrete slab measuring 2 m x 0.6 m x 0.2 m is positioned on soil with a CBR value of 6% for support. The reinforcement ratio variations include  $\rho = 0.004$ ,  $\rho = 0.007$ ,  $\rho = 0.01$ , and  $\rho = 0.02$ . Concrete quality is denoted as  $f_c' 30$  MPa, and steel quality is indicated as  $f_y 580$  MPa. The findings reveal that deflection ( $\delta$ ) in rigid pavement is influenced by the reinforcement ratio ( $\rho$ ). For a given load, higher reinforcement ratios result in reduced deflection within the rigid pavement structure. The most significant deflection is observed in rigid pavement with a reinforcement ratio of  $\rho = 0.004$ , subjected to a load of 210 kN and stress of 625 MPa, measuring 10.12 mm. The deflection in rigid pavement resulting from experimentation and reinforcement ratio variations can be approximated using the formula  $\delta = -61.053\rho + 5.3829$  for  $P = 100$  kN and  $\delta = -98.014\rho + 9.7821$  for  $P = 200$  kN. Assessing stress magnitude ( $f_s$ ), it is evident that higher reinforcement ratios lead to lower stress levels for the same deflection. The deflection behavior of rigid pavement in relation to stress value ( $f_s$ ) is characterized by a sharp increase in deflection between 0 - 20 MPa stress range, expressed by the linear equation  $\delta = 0.2811f_s + 1.599$ . In the 20 - 220 MPa stress range, the deflection increment exhibits a gentler slope with the linear equation  $\delta = 0.0204f_s + 4.3447$ .

**ID 125**

## **Factors Influencing Students' Choice of Sustainable Transportation Modes on University Campuses**

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**Abstract.** The increased number of registered vehicles among students at the universities, such as cars and motorcycles, were causing some problems on the campus and around the hostels, such as traffic congestion, crowded parking, which also lead to disturbances in universities communities. The aims of this study were to identify the types of transportation preferred among Universiti Tun Hussein Onn Malaysia (UTHM) students, and to analyze the factors that influence mode choice among UTHM students. The study was carried out using a self-guided questionnaire with a determined sample of 120 respondents among undergraduate students that included those who lived on campus nor off-campus residences. The data collected were analyzed using descriptive statistics and multiple regression, and the tools used were Microsoft Excel and SPSS (Statistical Package for the Social Sciences). The Finding of this study showed that the preferred mode choice was bus. However, only a few independent variables were statistically significant for each transport mode, respectively, in multiple regression analyzes. Generally, the main factors that affected the mode choice among UTHM students were security and convenience. In utility functions, walking was predicted to have the highest preference among UTHM students.

**ID 126**

## Utilization of Dry Tailing as Mortar Filler in Bricks

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**Abstract.** Tailing is a hazardous waste generated from the gold mining process. This research was conducted in Poboya Village, Central Sulawesi, with the aim of reducing environmental impact and utilizing hazardous waste (B3 waste). The tailing processing method employed the dry stacking technique with a filter press, resulting in dried tailings with a moisture content of 5%-20% And already meets the target moisture level during the filter press process, which is 18 - 25%. In this study, laboratory tests were conducted to examine the mechanical characteristics of dry tailings as a cement mixture in the production of bricks. The tests included sieve analysis, hydrometer tests, moisture content, weight volume, specific gravity, unit weight, cement hydration binding time, and compressive strength. Brick composition variations involved the use of 0%, 10%, 20%, and 30% dry tailings as partial sand substitutes. The test results indicated that the use of dry tailings up to 30% as a sand substitute did not meet the brick compressive strength standards set by the SNI 03-0349-1989 standard. Variations in compressive strength results among samples displayed significant differences, potentially due to factors such as molding, environment, and testing procedures. The utilization of a significant amount of tailings tended to decrease brick compressive strength. Despite not achieving the desired compressive strength values in bricks, this study showcased the potential to utilize dry tailings as a mixture material in construction. With further research and optimization of mixture compositions, the potential for reusing dry tailings in construction materials could be maximized.

**ID 127**

## **Stability of Orthotropic Runway Plate under The Combination In-Plane and Transversal Dynamic Loads on Kerr Foundation Soil Modelling**

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**Abstract.** Runway pavements are subjected to dynamic loads from aircraft landing and take-off, which can cause vibrations and lead to cracking and instability. The existing method for designing runway pavements, the ACN-PCN method, does not consider the effects of vibration, deflection, and external loads. This research proposes a new approach for designing runway pavements using a numerical method that accounts for these factors. The method uses differential and Kerr foundation equations with the Levy method to determine the deflection of the plate structure. The soil parameters are obtained from soil sampling, and the loads are designed based on previous studies and government regulations. The results of the research show that the soil characteristic has the greatest impact on the deflection of the plate. A harder soil will result in less deflection, which is important for the safe operation of the runway. A thicker plate also exhibits increased stiffness and reduced deflection. In-plane compressive loads can increase the potential for plate bending, which can compromise the structural integrity of the plate.



**ID 128**

## **Dynamic Response of Orthotropic Plate Due to Local Friedlander Blast Loads On Kerr Foundation Soil Modeling**

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**Abstract.** The development of infrastructure design is getting more advanced, there are more and more things that need to be considered in designing an infrastructure and a building, the effect of blast loads needs to be considered. Explosion load itself is one of the dynamic loads that can burden a structure beyond its normal loading conditions. Therefore, it is necessary to have special planning for an infrastructure and building so that if an explosion occurs it can minimize serious damage to the structure of the infrastructure and building. In this study, the focus is on orthotropic plates with semi-rigid bearings on the Kerr foundation soil model due to local Friedlander blast loads. Variations in plate thickness and soil type were carried out to determine the dynamic response on the plate that would arise due to the local Friedlander blast load. Utilizing the Modified Bolotin Method (MBM) analysis technique to solve it through the Wolfram Mathematica program. Based on the numerical tests that were conducted, it is found that the type of soil is directly proportional to the natural frequency value, indicating that stiffer soil types result in higher natural frequencies, signifying a stiffer response to floor plates. Thicker plates result in smaller deflections with the same soil type. These numerical results can serve as design guidelines for structures under blast loads.

**ID 129**

## **Optimization of Floor Plate Design for Building under Human Activity Loads to Achieve Occupant Comfort**

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**Abstract.** This study explores the optimization of floor plate design to ensure occupant comfort in response to human activity loads. The relationship between floor plate thickness, natural frequency values, and maximum deflection is investigated. Seven models, with variations in plate thickness and secondary beams, are analyzed using the Modified Bolotin Method with software Wolfram Mathematica program. The study establishes a correlation between plate thickness and natural frequency, indicating that thicker plates result in higher natural frequencies. The addition of secondary beams has minimal impact on this relationship. Maximum deflection analysis demonstrates reductions ranging from 7.06% to 77.11% when comparing models with varying plate thickness and secondary beams. Time history graphs indicate significant deflection changes upon load application. Thicker floor plates are found to enhance occupant comfort, while the addition of secondary beams has limited influence. In conclusion, the floor plate's thickness is a key factor in improving comfort, while secondary beams play a minor role in achieving this objective.

**ID 130**

## Utilization of Dry Tailings as Filler in Concrete Mixtures

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**Abstract.** Tailing waste is a hazardous and noxious substance (B3) that has the potential to pollute the environment in terms of both its volume and concentration. PT XY is a gold mining enterprise in Poboya, Palu City, Central Sulawesi that generates 500 tons of tailings per day. The sediments produced by PT XY are dry and have similar physical properties to fly ash. Therefore, they can be utilized as construction material, specifically as a concrete additive or filler. This research involves using dried tailings as a filler in concrete mixtures to reduce the amount of cement required. Several dry tailings mixture variations are prepared, including 0%, 5%, 10%, and 15%. Laboratory experiments, such as evaluating the characteristics of dry tailings and concrete materials, are part of the research methodology. After performing concrete mix design calculations and preparing test specimens, compressive strength tests are conducted to evaluate the characteristics. The objective of this study is to determine the effect of dry tailings infill and cement on the compressive strength of concrete. The test results indicate that the compressive strength values for the 0% and 10% variations satisfy the requirements. In the 10% dry tailings variation, the ideal compressive strength is attained. Thus, dry tailings material can be used as a filler (additive) in concrete formulations with a 10% dry tailings substitution requirement.

## ID 131

### The Utilization of Dry Tailings as Filler for Concrete Bricks (Paver Blocks)

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**Abstract.** Sustainable waste management research has centered on the utilization of dried tailing, a byproduct of gold mining, as a filler in the production of concrete bricks (paver blocks). Tailing is the remaining material after valuable ore has been extracted, and it typically contains toxic heavy metals. PT ABC has developed technology to transform wet tailing into dry tailing using a filter press. Because dried tailings can pass through a No. 200 sieve, they have the potential to be used as filler. This research aimed to ascertain the concentration of pollutants in dry tailing as well as the impact of adding dry tailing to concrete bricks on their compressive strength and water absorption. Compressive strength testing was conducted on hexagonal pavers at 14 and 28 days, while water absorption testing was conducted at 28 days. The results demonstrated that adding up to 15% dry tailing to the concrete brick mixture increased compressive strength to 48.46 MPa while decreasing water absorption to 12.19%, although it did not meet quality standards for water absorption.

**ID 132**

## **Integrated Sustainable Performance Analysis of Roundabouts using SIDRA: A Micro-Analytical Software Approach**

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**Abstract.** Intersections affect the safety and capacity of urban traffic. Therefore, the design and selection of the type of intersection need to be made very carefully. According to the demand level, a different intersection can be designed. Modern roundabouts are one of the types of circular intersections that provide advantages over other types of intersection in terms of smooth operation and safety. Modern roundabouts exist in several types today worldwide. In practice, the distinction about the kinds of roundabouts would not be fully clarified; as a result, queuing and delay can be seen as negative effects. The aim of this study was to analyze the operational performance of the roundabout at Jalan Mutiara Emas Utama in Mount Austin, Johor Bahru, during peak hours. The traffic volume was also measured for a 1-hour peak-hour period in the morning and evening. The geometric data and performance of roundabouts in the year 2020 were taken from Majlis Bandaraya Johor Bahru (MBJB). and analyzed using the SIDRA version 9 software. As result the performance analysis indicated that the demand flow of vehicles at the south lanes, Jalan Mutiara Emas Utama (R3), and west lanes, Jalan Mutiara Emas Puteh, (R10), exceeded the capacity and resulted in LOS F. The roundabout's performance in 2020 was compared to the current year, 2022, with both left-turn lanes achieving a free-flow speed resulting in Level of Service (LOS) B in 2020 and LOS A in 2022. Specifically, the north lane (R2) and east lane (R1) transitioned from LOS B to LOS A in 2020 and 2022, respectively. However, the south lane (R3) and west lane (R1) require capacity and LOS improvements to alleviate traffic conditions. Overall, the project's success is expected to benefit MBJB by enhancing traffic management in Mount Austin, Johor Bahru.

**ID 134**

**The Use of Coffee Waste in Bio-Foamed Concrete Brick (B-FCB) to Reduce the Penetration of Carbon Dioxide (CO<sub>2</sub>) into Concrete**

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**Abstract.** This article aimed to study the ability of coffee waste (CW) to reduce carbonation depth of B-FCB. CW was used as replacement materials of cement by 1%, 5% and 10% and *B. tequilensis* was used for self-healing purpose. Statistical analysis using 2<sup>k</sup> factorial comprising 11 runs were used to optimize the carbonation depth of B-FCB incorporating by CW for 28 days. Three main factors were selected namely, density of concrete(D), coffee waste (CW) and *B. tequilensis* (B) respectively. The high and low levels of each factor were 1300 kg/m<sup>3</sup> – 1800 kg/m<sup>3</sup>, 1% - 10% and 3'10<sup>5</sup> cell/ml - 3'10<sup>7</sup> cell/ml respectively. The optimum carbonation depth was 8 mm, which was determined at conditions; 1300 kg/m<sup>3</sup> of concrete D, 1% of CW and 3'10<sup>5</sup> cell/ml of B at 28 days. On the other hand, the carbonation depth was zero when the cement was replaced by 10 % CW at the following runs 5,6,7 and 8 respectively. This result reflected the effect of CW to reduce carbonation depth in B-FCB and make it more sustainable.

## ID 135

### Green Roof Thermal Performance of Small-Scale Prototype using IES-VE Simulation in Tropical Climatic Condition

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**Abstract.** This study investigates the thermal performance of green roof systems in a tropical climate, focusing on the small-scale building prototypes. Batu Pahat, Malaysia is experiencing the increasing temperatures due to climate change. Green roofs are considered a potential solution, but their effectiveness depends on various factors such as building orientation, solar shading, and thermal resistance (R-value). Therefore, modeling and simulation are crucial for understanding green roof thermal behaviour. This study employs the Integrated Environmental Simulation Virtual Environment (IES-VE) software for analysis. Three identical small-scale buildings were constructed, one with *Portulaca Grandiflora* (PG) plants, another with *Alternanthera Paronychioides* (ATN) plants, and a control roof with no vegetation. The Rvalues from the on-site green roofs were measured at 0.8899 m<sup>2</sup>K/W for PG and 1.1477 m<sup>2</sup>K/W for ATN, while the control roof had an R-value of 0.1 m<sup>2</sup>K/W. Green roofs with higher R-values demonstrated a substantial reduction in indoor temperatures, making them a valuable solution for improving thermal comfort in tropical climates. This study underscores the importance of green roofs in mitigating rising temperatures in tropical climates. Simulation using IES-VE approved that green roofs can potentially reduce indoor temperatures, demonstrating their suitability for tropical regions. These findings have significant implications for sustainable building design and urban planning in hot and humid climates.

## ID 136

### Thermal Comfort Of Student In Classroom With Elevated Set Point Air-Conditioner Temperature: Objective and Subjective Measurement

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**Abstract.** This study investigates the impact of a high set point air conditioning temperature of 27°C on the thermal comfort of students in educational spaces, specifically the Geology Laboratory and Computer Laboratory 3 at Tun Hussein Onn University Malaysia. Both objective and subjective measurements were used to assess thermal comfort. Objective measurements included air temperature, relative humidity, air velocity, and mean radiant temperature, while subjective measurements involved surveys to gather student feedback. Based on the objective measurement, the estimated indoor condition was warm condition with average PMV value of 0.8 and 0.9. Meanwhile, direct response from the students' showed that most of the time they felt comfortable and accept the indoor condition. However, maintaining a 27°C set point temperature during learning process will affecting their focus and acceptance rate. This is believed due to the lack of wind speed to overcome the warm sensation felt by the respondent. This research enhances our understanding of thermal comfort in classrooms, particularly in hot and humid climates, and provides a reference for future studies in similar contexts.



**ID 137**

## **Ability of Ceramic Composite Bead for Metals Removal from Laundry Greywater and Optimization of the Process**

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**Abstract.** This study is dedicated to the optimization of metal removal (specifically  $Zn^{2+}$ ,  $Pb^{2+}$ , and  $Fe^{2+}$ ) from laundry greywater using ceramic composite beads through the application of response surface methodology (RSM) and central composite design (CCD). The independent variables under investigation in this study encompass pH (ranging from 6 to 8), initial concentrations of  $Pb^{2+}$ ,  $Zn^{2+}$ , and  $Fe^{2+}$  (varied between 10 % and 100 %), as well as the dosage of ceramic composite beads (ranging from 1 to 3 g/L). Chitosan, derived from shrimp shell waste in combination with ceramic waste, was employed in the process. The results of this study unveiled that the optimal conditions for removing heavy metals were achieved at a pH of 6.85, an initial concentration of 78.77 %, and the addition of 2.9 g/L of ceramic composite beads. Under these conditions, removal rates of 29.87 % (actual) and 30.05 % (predicted) for  $Zn^{2+}$ , 38.89 % (actual) and 39.91 % (predicted) for  $Pb^{2+}$ , and 32.5 2% (actual) and 99.98 % (predicted) for  $Fe^{2+}$  were attained. These findings underscore the remarkable efficiency of ceramic composite beads in removing heavy metals from laundry greywater, facilitating its safe disposal.

**ID 138**

## **Green Concrete Toward Sustainable Construction: Utilizing Waste Glass as Alternative Replacement Material**

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**Abstract.** The importance of the construction sector, particularly in emerging nations, is highlighted by the widespread recognition of its contribution to economic growth and longterm national development. The usage of various building materials has increased along with the construction sector. Most buildings utilize concrete as one of the main materials in construction like precast concrete, reinforced concrete, and concrete brick. Hence, this is opportunity to recycle waste as fine aggregate replacement in concrete. Therefore, this study tends to investigate the effectiveness of crushed glass as a replacement material in concrete and to develop a suitable concrete mixture using recycled glass as a replacement material. Under varied curing ages of 7, and 28 days, the slump, unit weight, compressive strength, density, and water absorption were examined in relation to waste glass content (0 percent, 5 percent, 15 percent, and 20 percent). It was discovered that the concrete slump contained discarded glass. This research discovered that when the amount of glass aggregate replacements increases, the percentage rise in compressive strength with age increased. Same goes to water absorption where increased glass aggregate in concrete resulted in lower water absorption across the board for all curing ages.

**ID 139**

## **Predictive Modelling for Concrete Strength Prediction using Linear Regression Algorithm**

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**Abstract.** The strength of concrete is predominantly gauged by its ability to resist compression, known as its compressive strength. This study emphasizes predicting this strength using machine learning, specifically the Multiple Linear Regression (MLR) algorithm. Utilizing the KNIME Analytics Platform version 4.0, a model was developed using a dataset comprising 202 records with 26 attributes, sourced from 16 reputable journals indexed by Scopus and WoS. The feature selection process, pivotal for such intricate datasets, was anchored on correlation analysis, considering all features were numerical. The selected model, a linear regression trained on the ordinary least squares algorithm, was assessed through various metrics, with an R-squared value of 0.557 being achieved. This underlined a moderate fit, capturing over half of the variance. Other metrics, including MAE, MSE, and RMSE, further provided insights into the model's predictive accuracy. While the model demonstrated promise, the error metrics indicated areas for potential refinement. This research marks a step towards bridging the gap between construction engineering and data science, emphasizing the role of data-driven approaches in advancing construction practices.