



**ICONCEES**  
2021

**6th International Conference on Civil and  
Environmental Engineering for Sustainability**

15-16 November 2021

Universiti Tun Hussein Onn Malaysia  
(Virtual Conference)

<https://intl-conference.com/iconcees2021>

BOOK OF  
**ABSTRACTS &  
PROGRAMME**



**6th International Conference on Civil and  
Environmental Engineering for Sustainability**

15 – 16 November 2021

Universiti Tun Hussein Onn Malaysia (UTHM)  
Johor, Malaysia

Organiser



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



<https://intl-conference.com/iconcees2021>

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## Foreword from the Patron



Assalamualaikum wrm wbt and good day

Distinguished delegates and participants.

It is a glorious moment to extend my warm wishes on behalf of Universiti Tun Hussein Onn Malaysia. I want to convey my sincere gratitude to the keynote speakers and presenters for accepting the invitation and attending the 6th International Conference on Civil and Environmental Engineering for Sustainability (IConCEES 2021). Our conference is completely conducted on a digital platform for the first time to remain safe from the COVID 19 infection. For us, all of you are valuable, and your health is our priority.

The theme of this conference is Realizing Sustainable Development Goals Through Engineering. The beauty of Sustainable development goals is that everyone can contribute, and every contribution, small or big, will impact our world. Considering this advantage and keep pushing towards achieving Sustainable development goals, a better world is sure in the future. By working together and supporting the Sustainable development goals, I am confident that we can enhance sustainable development and create a new opportunity for a new approach towards sustainability. Therefore, I hope this effort will not be a one-off exercise; rather, this will be a stepping stone for future collaborative activities towards achieving Sustainable development goals.

I must express my gratitude to Associate Prof Ts. Dr Rafidah Hamdan for helping us to make this conference a reality. Also, to my colleagues under the leadership of Associate Prof Sr Ts. Dr Mustaffa Anjang Ahmad for organizing this conference and thank all of you for being here.

I hope all of you will have productive two days of deliberations, and the outcome of the conference will benefit the sustainable development goals.

With that, thank you

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

## Foreword from the Conference Chairman



Assalamualaikum wrm wbt and good day

On behalf of the Faculty of Civil Engineering and Built Environment, Universiti Tun Hussein Onn Malaysia, I am pleased to welcome you all to The 6th International Conference on Civil and Environmental Engineering for Sustainability (IConCEES 2021).

I am happy to welcome our great keynote speakers, Prof Dr Magda Sibley, Cardiff University, Wales; Prof Dr Roslan Zainal Abidin, Elite International College, Malaysia and Associate Prof Ts. Dr Aeslina Abdul Kadir; Universiti Tun Hussein Onn Malaysia. We want to thank you sincerely for honouring our invitation despite your very busy and tight schedule.

The IConCEES 2021 can be made possible with the commitment of all committee members as well as our respected reviewers across the globe. This conference provides academia and industrial personnel a platform to share knowledge, opinions, and ideas regarding sustainable development goals through engineering, particularly civil engineering and Built Environment. The Sustainable development goals were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The Sustainable development goals explicitly call on all to apply their creativity and innovation to solve sustainable development challenges.

Today's conference has about 120 participants, mostly from the university across Malaysia. The presenter from Australia, France, Indonesia, Jordan, the Philippines, and Uganda joined this conference, making this conference a truly international conference in spirit. We are proud to announce that this conference is also being sponsored by our industrial partner, who have consistently supported our research.

Last but not least, I wish you an enriching experience during this conference: to feed and strengthen our commitment. I hope all the delegates to participate in the presentations and discussions through digital platforms for the next two days. I wish everyone a successful, safe and fruitful conference. I am looking forward to seeing your return in the next two years with even more colleagues for IConCESS 2023! Thank you

Assoc. Prof. Sr Ts. Dr. Mustaffa Anjang Ahmad

## Keynote Speakers

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**Prof. Dr. Roslan Zainal Abidin**  
Elite International College, Malaysia

*Riverbank Failure in Relation to Soil Erodibility  
Classification: Case Study on Langat River,  
Malaysia*



**Assoc. Prof. Ts. Dr. Aeslina Abdul Kadir**  
Universiti Tun Hussein Onn Malaysia

*Leaching of Heavy Metals from Waste  
Recycling in Building Materials*



**Assoc. Prof. Dr. Nangkula Utaberta**  
Universiti Tun Hussein Onn Malaysia

*Rethinking Masjid and Islamic Architecture:  
Between Value and Object Centered Discourse*

## Programme

15 November 2021 (Day One)	
Time	Room
	1
9.00 am	<p><b>Recitation of Doa</b></p> <p><b>Welcoming Remarks</b> by Conference Patron Prof. Ir. Ts. Dr. Mohd Irwan Juki</p> <p><b>Welcoming Remarks</b> by Conference Chairman Assoc. Prof. Sr. Ts. Dr. Mustaffa Anjang Ahmad</p>
	<p><b>Keynote Address 1</b> Prof. Dr. Roslan Zainal Abidin Elite International College, Malaysia</p> <p><i>Riverbank Failure in Relation to Soil Erodibility Classification: Case Study on Langat River, Malaysia</i></p>
	<p><b>Keynote Address 2</b> Assoc. Prof. Ts. Dr. Aeslina AbduKadir Universiti Tun Hussein Onn Malaysia</p> <p><i>Leaching of Heavy Metals from Waste Recycling in Building Materials</i></p>
	<p><b>Keynote Address 3</b> Prof. Dr. Magda Sibley Cardiff University, Wales</p> <p><i>The Post-Pandemic Smart "Eco-Mosque": Advances in Engineering and Directions for Sustainable Development</i></p>
11.00 am	Break

15 November 2021 (Day One)					
Time	Room				
	1	2	3	4	5
Parallel Technical Sessions 1					
11.30 am	061-029	003-011	096-059	051-017	116-078
	076-040	038-015	025-039	044-025	088-053
	080-049	050-016	010-107	064-031	033-019
	110-070	055-024	048-012	094-055	042-009
	115-077	003-030	053-021	099-060	043-010
	075-079	063-032	052-027	092-061	034-013
	129-097	142-116	065-033	101-062	036-014
	139-112	084-050	001-034	105-065	125-092
	140-118	030-054	072-037	106-066	040-020
037-089	073-099	048-038	091-068	019-022	
1.00 noon	Break				
Parallel Technical Sessions 2					
2.00 pm	058-072	085-051	111-083	126-094	066-035
	020-080	087-052	123-085	126-096	068-036
	119-082	095-056	124-086	117-100	069-041
	120-084	028-003	083-087	082-102	069-043
	122-088	102-063	097-090	131-104	060-044
	139-119	107-067	121-103	136-109	081-046
		103-075	128-105		079-047
		100-081			049-048
					148-123
4.00 pm	End of Day One				

Note:

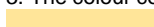

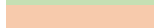


1. The 6-digit code indicates the presenter's Paper ID.
2. Scroll below to see Paper Titles and ID's.
3. The colour code indicates the thematic area.

	Architectural and Design Engineering
	Building and Construction Engineering
	Infrastructure and Geomatic Engineering
	Structural and Material Engineering
	Water and Environmental Engineering

16 November 2021 (Day Two)					
Time	Room				
	1	2	3	4	5
Parallel Technical Sessions 3					
9.00 am	007-002	021-007	032-006	112-073	054-023
	030-004	135-108	067-045	086-093	056-028
	104-064	077-110	118-121	137-111	039-008
	093-071	077-114	147-122	138-113	109-074
	078-057	146-120	006-106	141-117	031-005
	078-042				062-091
					026-018
					127-095
					130-101
					070-115
1.00 noon	End of Day Two				

*Note:*

1. The 6-digit code indicates the presenter's Paper ID.
2. Scroll below to see Paper Titles and ID's.
3. The colour code indicates the thematic area.

	Architectural and Design Engineering
	Building and Construction Engineering
	Infrastructure and Geomatic Engineering
	Structural and Material Engineering
	Water and Environmental Engineering

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>11.30 am to 1.00 noon</b>
Room: 1		
Chairperson: <b>Ts. Dr. Noor Dina Binti Md Amin</b>		
Paper ID	Paper Title	Presenter
061-029	A Seasonal Field Investigation to Perceive Outdoor Thermal Comfort and Thermal Adaption at Malacca Tourist Area-A Pilot Test	Golnoosh Manteghi
076-040	Responsive Design Approach towards the Sustainable Mosque Architecture	Nurul Syaheera Aziz
080-049	A Performance-Based Framework to Prioritize Adaptive Reuse Gallery: A Review On Sustainable Industrial Heritage Building in Malaysia & Australia	Nur Amalina Binti Hanapi
110-070	Environmental benefits achieved from project management of sustainable green buildings (SGBs) during the life cycle	Farah Ahram
115-077	Key Factors on Knowledge and Financial Related to the Uncertainties of BIM Adoption in the Interior Design Firms	Abu Bakar Abd Hamid
075-079	Perspectives in double-skin faade DSF advantages and disadvantages	Eman Al-Awag
129-097	Sustainability Assessment of Mosque: A Case Study of Design Proposal in Bandar Bertam Jaya, Penang	Khairul Asyraf
139-112	Community Perception on Third Place Generation and Planning for Enhanced Neighbourhood Interaction at Pengkalan Kubor, Malaysia	Nayeem Asif
140-118	Simulation Study on Natural Lighting Projection Through Faade Optimisation For A Proposed Disaster And Relief Center	Noor Dina Md Amin
037-089	The Impacts of Individual Characteristics and Workplace Politics on Work Productivity in Construction Projects	Mohd Amizan Mohamed @ Arifin



## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>11.30 am to 1.00 noon</b>
Room: <b>2</b>		
Chairperson: <b>Ir. Dr. MOHD NORAZAM BIN YASIN</b>		
Paper ID	Paper Title	Presenter
003-011	Relationship Model of Competitiveness and Productivity of the EPC Company in Indonesia	Mairizal Zainuddin
038-015	Approaching to energy delivery services model for Royal Belum Orang Asli community	Abdul Muhaimin Mahmud
050-016	Trends of the Compositions of Occupational Health and Safety Management Systems.	Kamoli Adetunji
055-024	Natural Hydraulic Lime Mortars for Hot-Humid Climates: Effects of Oyster Shells as Seeding Compound	Nadia Razali
003-030	Safety Factors Affecting School Buildings in West Sumatra - Indonesia	Mairizal Zainuddin
063-032	Comparison of the main factors of drowning/asphyxiation in construction projects using multi-decision criteria	Aminu Darda'u Rafindadi
142-116	A Factor Analysis To Establish A Group Of Causes Of Deferred Maintenance At Malaysia Public University Buildings	Mohd Norazam Yasin
084-050	Critical Risk Factor Affecting Cost Overrun in Highway Project of West Sumatera	Deddy Kurniawan
030-054	Conceptual Framework of Information exchange Processes in Building Information modelling (BIM) for Facilities Management	Nor Mahirah Samsuddin
073-099	Learning The Real Estate Market Resilience: The Effectiveness Of Internet Platforms In Marketing Strategy	Ezdihar Hamzah

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>11.30 am to 1.00 noon</b>
Room: <b>3</b>		
Chairperson: <b>En. SAIFULLIZAN BIN MOHD BUKARI</b>		
Paper ID	Paper Title	Presenter
096-059	Analysis Of Types Of Severity Level And Trends In Road Accident Cases At Johor Inter State Road Using Analytical Hierarchy Process (Ahp) And Gis	Saifullizan Mohd Bukari
025-039	Slope Mass Rating (SMR) Classification for Rock Slope Stability and Geohazard Vulnerability Assessment	Aniza Albar
010-107	Volumetric Properties of Asphalt Mixture Containing Fly Ash Geopolymer	Hazirah Bujang
048-012	Evaluation of optimum asphalt content and engineering properties of asphalt mixture containing irradiated waste plastic bottles granules as aggregates	Aliyu Usman
053-021	The Impact of Deforestation On Land Surface Temperature: A Case study Highland Kundasang, Sabah.	Ricky Kemarau
052-027	Numerical analysis of embankment resting on floating bottom ash columns improved soft soil	Almando Bin Abbil
065-033	Effects of Seasonal Precipitation on the Amount of Seepage-A Case Study of Tunnel 3 of Bazai Irrigation Project Khyber Pakhtunkhwa	Arshad Ullah
001-034	A Literature Review Use of Steel Fibre in Asphalt Concrete Mixture in Hot Mix Asphalt	Sinatu Sadiha Shapie
072-037	Geopolymer utilization in the pavement industry: A review	Nura Shehu Aliyu Yaro
048-038	Waste Polyethylene Terephthalate granules modified by gamma irradiation and their effect as aggregates on moisture damage of asphalt mixtures	Aliyu Usman

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>11.30 am to 1.00 noon</b>
Room: 4		
Chairperson: <b>Ts. Dr. SHARIFAH SALWA BINTI MOHD ZUKI</b>		
Paper ID	Paper Title	Presenter
051-017	Effect of Span Length on the Seismic Design Modification Factors of Steel Frames with High Ductility	Mohammadreza Vafaei
044-025	Mechanical Properties of Concrete with Recycled High-Density Polyethylene Macro Flat Fiber and Rice Hull Ash as Partial Replacement to Cement	Neslyn Principio
064-031	Influence of the Malaysia's National Annex for Seismic Design on the Size and Reinforcement Weight of Short Buildings	Sophia C. Alih
094-055	Short Term Ability of Concrete Containing Palm Oil Fuel Ash Exposed to Sodium Sulphate	Mohd Hanif Ismail
099-060	Mechanical Behaviour of Concrete Containing Crumb Rubber as Partial Fine Aggregates Replacement	Sharifah Salwa Mohd Zuki
092-061	Review on Application of GGBS as a Partial Cement Replacement in Concrete	Adek Ainie Mat Dom
101-062	Drying Shrinkage Properties and Initial Bonding Strength of 3D Printing Mortar	Koh Heng Boon
105-065	The Study of Aerodynamic Performance of Tall Buildings by Utilizing Aerodynamic Modifications - Review	Aiman Hasan Hamood Al-Masoodi
106-066	Performance-Driven Evaluation and Parametrical Design Approach for Sustainable Complex-Tall Building Design at Conceptual Stage	Fadi Hassan Mohammed Al-Khatib
091-068	A Review of Strength Performance of EFB ash and Mussel Shell ash as Replacement Material in Concrete	Fikri Omar

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>11.30 am to 1.00 noon</b>
Room: <b>5</b>		
Chairperson: <b>Assoc Prof Ts. ChM. Dr. RADIN MAYA SAPHIRA BINTI RADIN MOHAMED</b>		
Paper ID	Paper Title	Presenter
116-078	Flood Analysis and Non-Structural Approach for Flood Protection in Sg. Kelantan	Nurul Fatimah Bt Nor Azlan Sha
088-053	Study on Ammonia and Colour Removal from Leachate via Aerated Electrocoagulation (Ferum and Aluminium Electrode)	Nur Shaylinda Mohd Zin
033-019	Mapping of Potential Groundwater Using Electrical Resistivity Imaging (ERI) at Low Land Area of Parit Raja Johor	Akhtar Izzaty Riwayat
042-009	Study of the Waste Generation and Composition in Traditional Markets in the New Normal Era in Malang Regency, Indonesia	Hardianto
043-010	Assessment, Monitoring, and Reduction Strategy Development for Non- Revenue Water (NRW) of Calamba Water District (CWD), Calamba City, Laguna, Philippines	Kristine Cervancia
034-013	Study of Water Quality Based on Diversity of Macroinvertebrates Using Average Score Per Taxon Method in Corporate Social Responsibility Program Approach at Gunung Belumut and Gunung Lambak Waterfall	Aqilah Zakiah Jahani
036-014	Statistical Modelling of Extreme Temperature in Peninsular Malaysia	Jing Lin Ng
125-092	Microbial Growth Rate and Distribution of Doubling Time at Different Concentration of Oil Sludge Medium	Nur Zaida Zahari
040-020	Pre-Treatment of Laundry Greywater by Steel Slag for Safe Disposal	Radin Maya Saphira Radin Mohamed
019-022	Characteristics of sediment transport after morphological changes at Palu estuary as the impact of the 2018 tsunami	I Gede Tunas

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>2.00 pm to 4.00 pm</b>
Room: <b>1</b>		
Chairperson: <b>Dr. AZMAL BIN SABIL</b>		
Paper ID	Paper Title	Presenter
058-072	Assessing the Impact of Housing Attributes on Housing Prices through a Hedonic Regression Analysis	Nur Asyikin Mohd Sairi
020-080	Comparative Study between Prefabricated Prefinished Volumetric Construction (PPVC) and IBS 2D: A Case Study of School Extension Project at Federal Territory of Putrajaya	Muhammad Afiq Tambichik
119-082	The Technology Landscape of Construction Material in The Indonesian Construction Industry	Rani G. K. Pradoto
120-084	Evaluation Criteria of Facilities Management through Public-Private Partnership (PPP) Scheme	Nurul Aqilah Binti Samsudin
122-088	A systematic review of studies examining the relationship between resilience and physical asset management for water system	Ahmad Tajjudin Rozman
139-119	The Application of Photogrammetry in Architecture Historical Documentation: The measured drawing of Tanjung Sembrong Mosque and Teratak Selari Bonda	Azmal Sabil

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>2.00 pm to 4.00 pm</b>
Room: <b>2</b>		
Chairperson: <b>Assoc Prof. Ts. Dr. KAMARUDIN BIN AMBAK</b>		
Paper ID	Paper Title	Presenter
085-051	A Study On Factors Influencing Universiti Tun Hussein Onn Malaysia (UTHM) Postgraduate Students To Use Bicycle In Campus	Nursitihazlin Ahmad Termida
087-052	Probability Liquefaction On Silty Sand Layer On Central Jakarta	Putera Agung Maha Agung
095-056	Performance Of Cuplump Modified Binder (CBM) - HMA Containing Sasobit Wax.	Mazlina Mustafa Kamal
028-003	An Analysis of Accidents Involving Public Transport Along Highways	Fatin Najwa Mohd Nusa
102-063	A Systematic Review Of Marine Risk Assessment: The Fuzzy Analytic Hierarchy Process (Fahp)	Ayati Parmen
107-067	Influencing Factor To Use E-Hailing Transport For Food Delivery Service	Wan Azfizatul Az-Zahra Wan Muhammad Yusoff
103-075	An Overview of Speed Model Study under Different Types of Facilities in Malaysia Roadway System	Syed Khairi Syed Abbas
100-081	Travel Behaviour Among Essential Services Workers During Covid-19 Pandemic	Nurshahira Sobri

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>2.00 pm to 4.00 pm</b>
Room: <b>3</b>		
Chairperson: <b>Sr Dr. NAZIRAH BINTI MOHAMAD ABDULLAH</b>		
Paper ID	Paper Title	Presenter
111-083	Technology Landscape for Surveying and Mapping in Construction Industry	Felix Hidayat
123-085	Utilizing Hydraulic Modelling and Geographical Information System in Developing a Water Distribution Network for Reclaimed Water	Muhammad Nur Aiman Adnan
124-086	Analysis of Passenger Satisfaction with MRT Jakarta Services during the Covid-19 Pandemic	Widodo Budi Dermawan
083-087	Empirical Shear Strength Criteria for Filled Jointed of Metasedimentary Sandstone	Mohd Mustaqim Mohd Nordin
097-090	GIS Communicate Emergency Preparedness Mapping: The Usability for Rural Area	Nazirah Binti Mohamad Abdullah
121-103	Impact of Emulsifier on Physical Properties of Emulsified Bitumen Residues	Syed Abdul Ghafar
128-105	Experimental Study of Using Recycled Waste Tyre for Sustainable Clay Soil Stabilisation	Nor Hazwani Md Zain

## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>2.00 pm to 4.00 p,m</b>
Room: <b>4</b>		
Chairperson: <b>Ts. Dr. AHMAD FAHMY BIN KAMARUDIN</b>		
Paper ID	Paper Title	Presenter
126-094	A Preliminary Study on Vibration Response of Profiled Steel Sheet Dry Board (PSSDB) System under Heel-drop Test	Masni A Majid
126-096	An Overview on Physical and Mechanical Properties of Bamboo as a Natural Reinforcement in Concrete	Masni A Majid
117-100	The effect of Thermal Contact Conductance (TCC) between aggregate inclusion and matrix on thermal conductivity of cement-based material	Sokvisal MOM
082-102	Effect of Palm Oil Fuel Ash and Eggshell Waste Powder on Compressive Strength and Heat of Hydration for Concrete	Zalipah Jamellodin
131-104	Investigation on material physical properties for application in seawater-RHA concrete added with coal bottom ash	Rabiatul Adawiyah Waliyo
136-109	Preliminary Study of Sago Fine Waste as a Sand Replacement Material for Cement Brick	Suraya Hani Adnan



## Presentation Schedules

### DAY ONE (15 NOVEMBER 2021)

Date: <b>15 November 2021</b>		Time: <b>2.00 pm to 4.00 pm</b>
Room: <b>5</b>		
Chairperson: <b>Ts. Dr. SABARIAH BINTI MUSA</b>		
Paper ID	Paper Title	Presenter
066-035	Rainwater harvesting at places of worship: a case study in Australia	Mohammad Abu Hurayra
068-036	Characterisation of hot days and heatwaves: A case study for Queensland State in Australia	Orpita Urmi Laz
069-041	Application of Coastal Protection Structure for Mangrove Rehabilitation & Rejuvenation of West Coast Johor. Case Study: Tanjong Labuh, Batu Pahat, Johor.	Mohd Adib Mohammad Razi
069-043	Flood Modelling Studies Using River Analysis System (HEC-RAS) For Flood Plain Area in Muar City	Mohd Adib Mohammad Razi
060-044	Concentrations of heavy metals in wood chips from wood-based manufacturing industries	Syafiq Ayob
081-046	Frequency Analysis on Groundwater Consumption and Water Billed to the Community in Kelantan	Sabariah Musa
079-047	Effect of Spent Tea Leave Dosages on the Removals of Chemical Oxygen Demand and Total Phosphorus from Synthetic Food Processing Wastewater	Nur Adila Ab. Aziz
049-048	Innovative Trend Analysis of Reference Crop Evapotranspiration in Peninsular Malaysia	Stephen Yong Luo Sheng
148-123	Understanding the Alternative Evapotranspiration Estimation Methods for Batu Pahat Climatic Condition	Hartini Kasmin

## Presentation Schedules

### DAY TWO (16 NOVEMBER 2021)

Date: <b>16 November 2021</b>		Time: <b>9.00 am to 1.00 noon</b>
Room: <b>1</b>		
Chairperson: <b>Ts. Dr. NOR HASLINDA BINTI ABAS</b>		
<b>Paper ID</b>	<b>Paper Title</b>	<b>Presenter</b>
007-002	Factors Influencing The Purchasing Of Affordable Housings: Housing Purchasers Perspectives	Phui Fung Wong
030-004	Economic Model Of Green Building Construction: A Conceptual Model	Nur Khairina Khairul Hisham
104-064	Conceptual Framework in Mitigating Construction Dispute	Suriana Yussof
093-071	Defining The Existence Of Housing Submarkets For The Terraced Properties In Johor Bahru, Malaysia.	Wendy Wen Xin Lim
078-057	Advantages and Challenges of Implementing Building Information Technology (BIM) in Industrialised Building System (IBS) Construction Project in Malaysia	Peniel Ang Soon Ern Ang
078-042	Acceptance on Building Information Modelling (BIM) Training in Selangor Construction Industry: Current Trend and Impediments	Peniel Ang Soon Ern Ang

## Presentation Schedules

### DAY TWO (16 NOVEMBER 2021)

Date: <b>16 November 2021</b>		Time: <b>9.00 am to 1.00 noon</b>
Room: <b>2</b>		
Chairperson: <b>Pn. NOORLIYANA BINTI OMAR</b>		
<b>Paper ID</b>	<b>Paper Title</b>	<b>Presenter</b>
135-108	A Study of Traffic Congestion Influenced by the Pattern of Land Use	Noorliyana Omar
021-007	Reliability of 15-minute UAV footage volume for estimating urban traffic flow rates: A preliminary study	Mohd Erwan Bin Sanik
077-110	Assessment on permanent deformation of hot mix asphalt contained Crystalline Waterproofing Additives as a filler	Rosnawati Buhari
077-114	Road profile generation based on real road profile for the Whole life pavement performance input data	Rosnawati Buhari
146-120	A Study on Check Dam Design at Peat Soil Area for Peat Fire Management	Nor Azizi Yusoff

## Presentation Schedules

### DAY TWO (16 NOVEMBER 2021)

Date: <b>16 November 2021</b>		Time: <b>9.00 am to 1.00 noon</b>
Room: <b>3</b>		
Chairperson: <b>Dr. MOHAMMAD NASIR BIN MOHAMAD TAHER</b>		
<b>Paper ID</b>	<b>Paper Title</b>	<b>Presenter</b>
067-045	Simulating the Impact of Vehicle Speed on the Life of Bituminous Pavement	Muhammad Imran Khan
118-121	Adhesion Characterization of Palm Oil Mill Sludge Modified Asphalt Binder	Nurul Hidayah Mohd Kamaruddin
032-006	Structural Behavior of Different Fill Materials for Low Cost Housing Earthbag Sustainable Construction: Case Study of Budaka District, Uganda	Ainomugisha Safiki
147-122	Investigating the Properties of Asphalt Mixes Containing Recycled Polyethylene Terephthalate Fiber	Mohamad Yusri Aman
006-106	Dynamic Creep Performance of Hot Mix Asphalt Mixture Incorporating Fibre	Mohammad Nasir Mohamad Taher

## Presentation Schedules

### DAY TWO (16 NOVEMBER 2021)

Date: <b>16 November 2021</b>		Time: <b>9.00 am to 1.00 noon</b>
Room: <b>4</b>		
Chairperson: <b>Dr. NURAZUWA BINTI MD NOOR</b>		
<b>Paper ID</b>	<b>Paper Title</b>	<b>Presenter</b>
112-073	A review: Study on spent garnet as construction material	Shahrul Niza Mokhtatar
086-093	Prediction of Vibration Criteria Assessment on Floor due to Human Walking	Tuan Norhayati Tuan Chik
137-111	Strengthening of reinforced concrete beams with circular opening at flexure zone by various types of Fiber Reinforced Polymer	Noor Azlina Abdul Hamid
138-113	Surface Temperature Profile of Cement Mortar with Infiltrated Water	Mariana Dina Anak Malong
141-117	Initial properties of 3D printing concrete using Rice Husk Ash (RHA) as Partial Cement Replacement.	Siti Radziah Abdullah

## Presentation Schedules

### DAY TWO (16 NOVEMBER 2021)

Date: <b>16 November 2021</b>		Time: <b>9.00 am to 1.00 noon</b>
Room: <b>5</b>		
Chairperson: <b>Dr. NOR AMANI FILZAH BINTI MOHD KAMIL</b>		
Paper ID	Paper Title	Presenter
054-023	Treatment of Fiberboard Industrial Wastewater Sludge by using Bioaugmentation and Solidification and Stabilization (S/S) Method in Short Duration	Nor Amani Filzah Mohd Kamil
056-028	Removal of Phosphorus from Domestic Wastewater by Using L-shape Semi Aerated Steel Slag Filter System	Nur Ain Nazirah Mohd Arshad
039-008	The Effectiveness of Non-Woven Geotextiles As A Filter Media For Total Suspended Solid Removal	Suzana Ramli
109-074	MSMA Implementation Factors in Integrated Stormwater Management	Mohd Luqman Bin Ismail Ismail
031-005	Adsorption Isotherms of DMP, DEP, DBP and BBP Compounds in Synthetic and Sembrong River Sediment	Krystabel Jonya Anak Rapok
026-018	Evaluation of rainwater harvesting systems in three major cities of New South Wales	Preeti
062-091	Preliminary Assessment on Water Quality of Different Wastewater Using Solar Water Distillation Technique	Zaizatul Zafflina Mohd Zaki
127-095	Assessment of Specific Methanogenic Activity from Cow Dung	Fariyah Fadzil
130-101	Food waste type and moisture content influence on the <i>Hermetia illucens</i> (L.), (Diptera: Stratiomyidae) Larval Development and Survival	Dzulaikha Khairuddin
070-115	The Application of Total Maximum Daily Load (TMDL) Approach in Water Quality Assessment for The Batu Pahat River	Mohd Shalahuddin Adnan

## Abstract

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061-029

### **A Seasonal Field Investigation to Perceive Outdoor Thermal Comfort and Thermal Adaption at Malacca Tourist Area-A Pilot Test**

**Golnoosh Manteghi**

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**Abstract.** Season plays a role in the development of outdoor spaces for pedestrians. This research studies the influence of seasonal variations on pedestrian thermal comfort using meteorology and field observations at selected footpaths around the major tourist areas of Malacca in Malaysia. For the experiment, preselected sunny days, indicating each of the seasons, were chosen. Meteorological transects were hourly from 10:00 am to 17:00 pm. 200 Respondents were questioned to record their thermal awareness, comfort level, and preferences. Besides meteorological information, adaptation, thermal comfort vote and preference, age, season, and hour of the day were significant non-meteorological factors. The findings show that the thermal experience and expectation existed in different seasons and people changed perceptions of the outside thermal environment. Almost 80% local tourist and 55 % international tourist was accepted Physiologically Equivalent Temperature (PET), influenced by the local climate and thermal adaptation. The subjective thermal sensation on PET generated an acceptable ranging from 32.6C to 36.8C, based on the seasonal variations. These findings elucidate the optimal design of outdoor spaces for increasing the utilization rate. The seasonal variation must take into account to design outdoor landscape design for different seasons to communicate with the atmosphere and enhance thermal comfort.

## Abstract

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**076-040**

### **Responsive Design Approach towards the Sustainable Mosque Architecture**

**Nurul Syaheera Aziz and Alice Sabrina Ismail**

*Universiti Teknologi Malaysia*

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**Abstract.** The primary purpose of this paper is on designing a sustainable mosque for communal development that adapts to the surrounding area. Using a single case study approach, Cambridge Mosque was selected as a prominent case study emphasising the study of form and space. Thus, this study summarises new ways of describing mosque design, using structural and semiotic paradigms as a methodological approach to studying the relationship between mosque design and sustainable aspects. The guidelines developed from this study are helpful for designers, builders, developers and relevant authorities to build mosques as sustainable community development in the future.



## Abstract

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080-049

### **A Performance-Based Framework to Prioritize Adaptive Reuse Gallery: A Review On Sustainable Industrial Heritage Building in Malaysia & Australia**

**Nur Amalina binti Hanapi**

*Universiti Tun Hussein Onn Malaysia  
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**Abstract.** According to United Nations Educational, Scientific and Cultural Organization (UNESCO) (2007) heritage building is a tangible man made environment with its cultural (heritage) significances. Those significances are the value of aesthetic, historic, scientific, and social which is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places as well as its related objects[1]. However, there been lack of comparative studies being done to how Malaysia and Australia accentuate their historical industrial land as mining cities to the sustainable adaptive reuse gallery. Thus this research aims to point out the comparisons study between these two countries since both were historically developed mining as the main industry in early city development era. The method use will be using secondary types of data and the discussed on the general public perspective, policies, body participation and its application in the current building functions. The research shown that Australia approach of adaptive reuse towards industrial heritage give an impact to the community and become an iconic building compare to Malaysia.

## Abstract

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110-070

### **Environmental benefits achieved from project management of sustainable green buildings (SGBs) during the life cycle**

**Farah Hussain Ahram**

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**Abstract.** As a consequence of the rapid increase of construction industry development, many local and global environmental issues have arisen in recent years. Green building technology is one of several sustainability practices and technologies that have been developed with the goal of achieving environmental sustainability. The benefits of establishing sustainable green buildings (SGBs) were numerous and mirrored various parts of the building's life cycle. One of the factors that benefit from the deployment of SGBs is the environmental component. This study intends to demonstrate the environmental benefits achieved by project management of sustainable green buildings (SGBs) throughout their life cycle, based on the results of the in-depth semi-structured interviews with 25 professionals in the field of the built environment. The result for this research was obtained by content analysis of data acquired using Atlas ti software. The findings of this article demonstrated that project management of SGBs during their life cycle provides numerous environmental benefits. As a result, it demonstrates the relevance of green building technology adoption as an important topic for further study and studies in the built environment.

## Abstract

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115-077

### **Key Factors on Knowledge and Financial Related to the Uncertainties of BIM Adoption in the Interior Design Firms**

**A B Abd Hamid, M D Ismail and M R Embi**

*Universiti Teknologi MARA*

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**Abstract.** Building Information Modelling (BIM) is redesigning the approach in the construction projects to delivered the effectiveness implementation while collaboration process. Poor uncertainty is the key factors on knowledge and financial have been significant problem in BIM adoption in the interior design firms. With BIM implementation it is can be a solution to these problems, nevertheless, it is not easy and cannot avoid from risks and challenges. The aim of this paper is to investigates the key factors on knowledge and financial issues that hesitancy of BIM implementation in the interior design firms. A questionnaire survey is designed and distribute to interior design firms which is the selection of firms are registered and recognised by LAM (Lembaga Arkitek Malaysia) through sixty-three respondents in Klang Valley provided valid responses was chosen. Based on the data collection, the relative four key factors are examined including Knowledge, Financial, Software and Hardware and Human Resource and Documentation but for this paper only two key factors will be focusing the findings which is Knowledge and Financial. Thus, it is expected the finding shall bring a better understanding and significant of the essential elements of key factors and will be produce the guide to the interior design industry of the BIM adoption in developing proper process.

## Abstract

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075-079

### **Perspectives in double-skin faade DSF advantages and disadvantages**

**E A Naji and I A Wahab**

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**Abstract.** Double-skin facades application has positive and negative effects on the buildings behavior and performance. However, there is disagreement about the pros and cons of this system due to the lack of reliable data on the DSF's actual performance. This paper aimed to present the Pros and Cons of the DSF through a review of the previous studies to investigate the benefits and limitations of using this system based on the parameters related to this system, namely, the DSF components and types. We find a general agreement that reaching the appropriate design gives the DSF's application a positive effect either in raising the level of building performance or on the environment, despite the general agreement on the high maintenance and construction costs of this system compared to the individual faade.

## Abstract

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129-097

### **Sustainability Assessment of Mosque: A Case Study of Design Proposal in Bandar Bertam Jaya, Penang**

**Khairul Asyraf Mohd Rodzi, Mohamad Zelman Mohamoud,  
Nur Amalina Hanapi**

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**Abstract.** Due to high-density residential development, location of the nearest mosque and sense of unity among Muslims in the area, a local community was proposing a new mosque in Bandar Bertam Jaya, Penang to Majlis Agama Islam Negeri Pulau Pinang. A self-sustained mosque with phased development was proposed by Arkitek ICB Sdn. Bhd. With VELUX Daylighting Simulation and basic ventilation principle, the aim of the research is to study the sustainability of the design including daylighting and ventilation aspects respectively and how the proposal can give an impact to energy and resource management. The findings will also be reflected to Malaysian Standard MS 1525 and MS 2680 to value the sustainability aspect performed by the mosque. The findings of the research can be a reference to the architecture firm and local community on the performance and sustainability of the proposal.

## Abstract

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139-112

### **Community Perception on Third Place Generation and Planning for Enhanced Neighbourhood Interaction at Pengkalan Kubor, Malaysia**

**M I M Azamli, A Sabil, A A Rahim and N Asif**

*University Tun Hussein Onn Malaysia, International Islamic*

*University Malaysia*

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**Abstract.** Pengkalan Kubor at the east coast of Peninsular Malaysia is affected by limited neighbourhood interaction and liveability. A proper and good place is essential for neighbourhood interaction. There is a lack of places for social interaction, and the existing places are in poor condition and maintenance. This research aims to evaluate the impact of generating the Third Place to enhance neighbourhood interaction at Pengkalan Kubor. This paper seeks to identify the factors that obstruct neighbourhood interaction and evaluate the effectiveness of third place to resolve the neighbourhood interaction and improve the study context's liveability. The questionnaire survey used for this research evaluates neighbourhood interaction. Since the study area is in Pengkalan Kubor, the respondents selected for this study were within the community. In addition to defining the neighbourhood, the survey aimed to define the third places within the study context. The findings from the public perception of neighbourhood interaction and third place at Pengkalan Kubor may be useful for many stakeholders for public places' future planning.

## Abstract

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140-118

### **Simulation Study on Natural Lighting Projection Through Faade Optimisation For A Proposed Disaster And Relief Center**

**Noor Dina Md Amin**

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**Abstract.** Natural and artificial lighting is essential for humans to carry out and support daily routines from simple to complicated tasks. However, insufficient lighting in buildings leads to poor task performance and visual discomfort and may cause Sick Building Syndrome (SBS) such as itchy, watering eyes, and eye irritation. On the other hand, excessive light, particularly natural lighting, may contribute to heat gain in buildings and thermal discomfort and glare among occupants if a building is not well designed. Previous scholars found that a comfortable indoor environment with proper lighting improves occupants performance and satisfaction. Therefore, as a passive design strategy that promotes sustainability, natural lighting projection through faade optimisation is implemented/ studied for a proposed design of the Pontian Disaster and Relief Center. Revit Architecture software is used to develop 3D modelling of the design and simulate the interior solar pattern. Consequently, the application of shading devices is investigated along with on-site data collection to determine the climate pattern and other measurements to create more accurate data. Moreover, a case study on the Diamond Building was referred to assist the researcher for an appropriate pattern or form to maximise the solar radiation image, ultimately creating a new construction system. Finally, the implication of the study is highlighted and improvement for future research is identified.

## Abstract

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037-089

### **The Impacts of Individual Characteristics and Workplace Politics on Work Productivity in Construction Projects**

**Mohd Amizan Bin Mohamed @ Arifin**

*Universiti Teknologi MARA  
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**Abstract.** In the dynamic and competitive business environment, work productivity is a vital aspect of ensuring the accomplishments and competitiveness of a company. Therefore, work productivity needs to be developed and improved in ensuring the company can compete at a higher level. This research examined the relationship between individual characteristics and workplace politics with work productivity in construction projects and determined how to improve productivity. This research is conducted quantitatively, where a questionnaire survey was distributed to 192 construction project employees, including project managers, engineers, assistant engineers, and supervisors, selected from CIDB's list of registered contractors. Statistical Package for the Social Sciences (SPSS) was used to analyse the survey data. A reliability test with Cronbach's Alpha Coefficient had been adopted in the research. The results revealed that both individual characteristics and workplace politics significantly impact employee productivity in construction projects. The impacts include work satisfaction, lack of information sharing, stress level, decrease capabilities of management to function, and hinder projects from successfully achieving targets and goals. Based on these findings, management's initiative to control characters and politics can help improve work productivity among employees in construction projects.



## Abstract

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003-011

### **Relationship Model of Competitiveness and Productivity of the EPC Company in Indonesia**

**Mairizal Zainuddin**  
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**Abstract.** Laws Number 18 of 1999 and Number 2 of 2017 concerning Construction Services including integrated construction service companies or EPC (Engineering, Procurement, Construction). Productivity growth of EPC company in Indonesia, increases by an average of +/- 1 billion rupiah per year, with a maximum figure of 10.04 billion rupiah and a minimum of 2.6 billion rupiah. This research aims to determine the factors of competitiveness that affect productivity, determine the factors that influence from the internal side of productivity itself, and to see the model of the relationship between competitiveness and productivity. Qualitative and quantitative methods are used in this study and using SPSS and Smart PLS. Data were taken from the results of interviews, observations and documentation. Data analysis was carried out using 4 (four) stages, namely data collection, data reduction, data presentation, and drawing conclusions. Theoretically, the results of this study will add to the repertoire of knowledge, especially in the field of employee productivity development for EPC companies in Indonesia. Result finding are the competitiveness factor is influenced by Performance Theory, Career Theory, Problem Analysis Skills, Oral Communication, Team Collaboration Skills and Customer Orientation factors. Meanwhile for Productivity, it is strongly influenced by Materials and Equipment.

## Abstract

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038-015

### **Approaching to energy delivery services model for Royal Belum Orang Asli community**

**A M Mahmud, H Shaffii, M S Mohamed Yunus**

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**Abstract.** As the nation continues to develop to become developed country, the need for rural area development is essential to ensure no one is left behind. Development for rural area requires improvement in basic infrastructure such as road, electricity and water; and growth in economic that to enhancing the lifestyle of rural community and to preserve the ecosystem, culture and heritage values. Even though so much rural development programs and initiatives has been in place for many years now, some part of the Orang Asli community is still undeveloped such as those who lives in Royal Belum Park. Their basic needs of energy, clean water and road access are considered lacking as compared to other populations and poverty is the main issue that need to be addressed properly. The research aim was to examine, understand and align the Orang Asli community needs, opportunity & constraint for sustainable livelihood in terms of socio-economic, technology, cultural & heritage context. It was found that the needs and demand of the Orang Asli community in Royal Belum shall focus on the requirement to having electricity supply to the village that gives direct influence on other needs and demand in term of socio-cultural context. Subsequently, the study concludes with a list of approaches and strategies of action plan to establish an energy delivery services model that inclusively utilize all factors and context in socio-cultural, environmental and support services.

## Abstract

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050-016

### **Trends of the Compositions of Occupational Health and Safety Management Systems.**

**Adetunji Kamoli, Razali Adul Hamid, Syamsul Hendra Bin Mahmud**

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**Abstract.** Occupational illnesses and accidents have adverse consequences; employees are injured, the quality and quantity of production decreases, equipment are destroyed, there are monetary losses due to early retirement and employees' absence, all of which negatively influence the organizations competitiveness and reputation. Many efforts had been made in the past to solve these problems through a series of legislations. The laws have to be passed in the parliament after the damages have been done. Sometimes the legislation brought its problems, thereby making the entire health and safety issues in the workplace to be complicated. But presently, there has been increasing awareness about occupational safety and health management system (OSHMS) in its ability to solve health and safety problems and essential for the prevention of illness and accidents in the workplace. Over the past three decades, series of OHSMS have been developed globally. The aim of the study is therefore to explore the main compositions of OHSMS in each standard globally. The study review OHSMS standards globally. The study identified twenty-six OHSMS standards, each with its component. From the result of the study, the top three-element of OHSMS commonly used are planning, management review, and implementation and operation. This study can be used in the future development of other models and frameworks of OHSMS for accidents and illness prevention in the workplace.

## Abstract

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055-024

### **Natural Hydraulic Lime Mortars for Hot-Humid Climates: Effects of Oyster Shells as Seeding Compound**

**Nadia Razali**

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**Abstract.** This study aims to study the effects of calcareous modifications on Natural Hydraulic Lime (NHL) mortars exposed to hot temperature and high humidity conditions and the early development of mortars chemical and physical properties. The modified mortars were seeded by replacing 10% (by volume) of sand with oyster shell powder. The mortar samples underwent a curing period of 56 days with five observation days (7, 14, 28, 42, and 56). The pH, carbonation depth, flexural strength, compressive strength, sorptivity, and morphology analysis were studied. The results indicated seeded mortars were more successful at setting and hardening high humidity settings. In addition, curing the mortars at higher temperatures hastened the hydration reaction significantly. The data indicate that seeded mortars can improve performance in several areas, notably carbonation rate (25%-45%), flexural strength (16%-60%), compressive strength (20%-55%), and sorptivity (18%-25%). The experimental protocol shows that the hardened mortar pore system is affected by water-binder ratio, binder type, hydration level, relative humidity, and carbon dioxide concentration. This circumstance is significant in our comprehension of modified lime mortars and seeding compounds, especially hot-humid climates environments.

## Abstract

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003-030

### **Safety Factors Affecting School Buildings in West Sumatra - Indonesia**

**Mairizal Zainuddin**  
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**Abstract.** Construction of public service facilities building is specially designed to be equipped with complementary facilities for potential hazard services so that in the event of an emergency all workers, personnel and people in the building can be evacuated properly and safely. Therefore, it is necessary to know the safety factors for the comfort and security of the building which must be started from the initial planning and design process, so that the problems caused can be minimized so that the building can provide shelter. This study aims to determine the safety factors that affect buildings, determine the critical factors that have a very high influence and the strategies needed in planning, construction and operations. The methods used in this study are qualitative and quantitative methods and use SPSS and Smart PLS. Theoretically, the results of this study will increase the knowledge base, especially in the field of developing safety standards for school buildings in West Sumatra - Indonesia. The findings of this research are Operation & technical maintenance factors which are influenced by Systematic Programs and Information Systems. As for Safety Factors, it is strongly influenced by Building Services, External Environment and Operations & technical maintenance.

## Abstract

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**063-032**

### **Comparison of the main factors of drowning/asphyxiation in construction projects using multi-decision criteria**

**Aminu Darda'u Rafindadi, Madzlan Napiah , Idris Othman and Hamzh Alarifi**

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Corresponding Author Email*

**Abstract.** There is a lack of studies dealing directly with the factors and sub-factors responsible for drowning/asphyxiation in Malaysia's construction industry. This paper developed an Analytic Hierarchy Process (AHP) model for the factors and sub-factors for drowning/asphyxiation and determined their relative weights and priorities. Worker's unsafe actions have a maximum weight of about 80.98% for the significant factors based on the proposed AHP model, followed by hazardous site conditions with 10.89% and management factors with 8.13%. Financial constraint carries the most weight with 20.22% for the management factors, unsafe working and operating procedures in a confined space, and water bodies have the most weight with 26.97% for hazardous site conditions. Rushing to complete the job and failure to comply with standards working procedure in a confined space or water bodies have the most weight with 17.24 % each. This study can help safety practitioners understand the primary factors and sub-factors responsible for drowning and asphyxiation, and they can reduce the risk of fatal accidents on-site, and how they can make prompt safety decisions. The proposed model also provides a tool to determine the appropriate and effective drowning/asphyxiation prevention methods.

## Abstract

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142-116

### **A Factor Analysis to Establish a Group of Causes of Deferred Maintenance at Malaysias Public University Buildings**

**M N Yasin, R Mohamad Zin, Mairizal, S Nagapan, M A Zakaria, A T Balasbaneh and M F Hasmori**

*Universiti Tun Hussein Onn Malaysia  
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**Abstract.** The building has deferred the maintenance activities either planned or scheduled and delayed from the original schedules by some factors and therefore cause dissatisfaction of the building users commonly become a familiar issue. The public university buildings are an important place, everyone gathers to learn and share knowledge. They are producing future leaders, engineers and industry players. Therefore, it is also the heart of the development of a country. Hence, this study is intended to establish a group of causes factors of deferred maintenance of public university buildings in Malaysia. The questionnaires were carried out amongst the targeted respondent and the Statistical Package for the Social Sciences (SPSS) software were used to analyze 220 data collections for factor analysis. The study reveals 42 factors of causes are then classified into 3 groups. Group 1 is the organization and it displays 20 factors, group 2 is the resources which display 13 factors and group 3 is financial display 9 factors. This study also sharing useful information and a better knowledge of deferred maintenance of public university buildings in Malaysia.

## Abstract

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084-050

### **Critical Risk Factor Affecting Cost Overrun in Highway Project of West Sumatera**

**Deddy Kurniawan**

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**Abstract.** Infrastructure is a form of public capital formed from an investment made by the government. The intended infrastructure includes roads, bridges, irrigation, and others. In Indonesia, there is currently a slowdown in the implementation of infrastructure development which is marked by the lack of quality and quantity of the infrastructure. Infrastructure work is the responsibility of the construction industry players who have a very dynamic nature with various threats to be faced. In practice, every construction project is subject to risk, unless the owner can transfer it to another party by paying compensation. Risk greatly affects the productivity and performance of construction project implementation. This study aims to identify critical risks that occur in infrastructure development projects, especially roads in West Sumatra, which affect the cost overrun in implementation. The study used literature review, data collection and questionnaires which were analyzed using quantitative statistical analysis. The findings of this research are Cost Overruns Factors that occur in the Implementation of the Highway Project in West Sumatra consist of 12 (twelve) factors causing delays. The cause of the highest of the twelve factors of delay is the Lack of Contractors' Experience.



## Abstract

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030-054

### **Conceptual Framework of Information Exchange Processes in Building Information Modelling (BIM) for Facilities Management**

**Nor Mahirah Samsuddin, Afzan Ahmad Zaini**

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**Abstract.** The current research shows that Building Information Modelling (BIM) is emerging as a plausible alternative for construction sector, however industry adoption in FM has not been acknowledged yet. It is still driven by traditional processes that affect development and slow down economic competitiveness. There is a lack of understanding of what information is needed and how to require it because the process of exchanging BIM information in FM systems shows complexity during the project life cycle. Regardless the numerous benefits offered by BIM, its application for facility operations remains notably limited. The bottom line is that to prepare BIM in FM is a complex challenge. Hence, this paper aims at developing a framework of BIM competency process data flow in facilities management using questionnaire survey and semi structured interview. Specifically, the objective was to determine the current level of BIM adoption in Facilities Management, to investigate the information required by FM in BIM Model, to examine the process for information exchange between BIM and FM systems, to investigate the challenges and strategies of BIM implementation in FM and to develop a framework of BIM competency process data flow in facilities management. The framework could then be utilized to guide the stakeholders to enhance their current BIM requirements, improve workflow efficiency and accelerate the successful implementation process of BIM in Malaysia.

## Abstract

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073-099

### **Learning the Real Estate Market Resilience: The Effectiveness of Internet Platforms in Marketing Strategy**

**Siti Munirah A G. Ezdihar Hamzah**

*Universiti Teknologi Malaysia*

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**Abstract.** In the era of unprecedented pandemic corona virus disease (COVID-19), many sectors are affected especially for tourism, aviation and sharing accommodation industry. The sharing accommodation industry includes hotel industry or peer-to-peer accommodation industry. The pandemic situation has also reflected to the real estate market as a whole and the real estate agents need to become more creative in marketing strategy in the way they reach imminent clients. Digital trend technology, the Internet, and social media appear to have a huge impact on business and have created new marketing chances. Due to that, this research aims to study the effectiveness of internet platforms in marketing strategy by real estate agents. Quantitative analysis is adopted by using Relative Importance Index analysis. This study benefits to the body of knowledge and real estate industry in term of marketing strategy for real estate. This research result in Facebook as the main platform where businesses conduct their marketing strategy for sales or promoting the property. Furthermore, in order to lead to sales, estate agent need to post important component in social media and post as much as they can to achieve the engagement and maximize the profit.

## Abstract

096-059

### **Analysis of Types Of Severity Level And Trends In Road Accident Cases At Johor Inter State Road Using Analytical**

**Nur Azreen Farahin M.F, Saifullizan M.B, Nazirah M.A, Mustaffa A.A, Anuar M.S**

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**Abstract.** Road traffic accidents are usually happened and keep increasing year by year in Malaysia. It will give a adverse impact at the road also to the road user. It has been announced every day in the social media, television broadcast, radio and newspaper. There are several causes that contribute to the accident such as faulty vehicle, uneven roads, driver behavior and many more. So, with all these causes, it might be the reason why the road accidents keep on increasing. The purpose of this case study is to determine the highest road accident ranking based on the types of injuries at the state road, Johor. Another purpose is to identify the current traffic accident trends. To accomplish the first purpose of study, secondary data which is from Balai Polis Traffic, Batu pahat are used to get an accident data and the Analytical Hierarchy Process (AHP) will be proceed to find the road accident ranking based on the types of injuries. The case study used the five years as from 2016 until October 2020 of road accident data. Geoda as GIS application is used to insert the data about the road accident trends. The highest road accident ranking based on the types of injuries and the road accident trends were obtained and achieved all the objective of this case study. The hierarchy structure has state the factor which is the highest ranking by types of injuries has been found, which is the highest is Wreckage injuries that has the consistency ratio 2.92 which is the highest then the other value. The fatal injury has the second highest value which is 1.31, the minor is 0.88 and the lowest value is in the serious injuries which is 0.70 in consistency Ratio. For the conclusion, by using the AHP it is more easy to find the ranking at any of problem issues and by using this method it can use primarily used to weigh the parameters and pick and rate the alternatives that have been chosen. Besides that, it will be useful as a reference to any party in the future for the road traffic management.

## Abstract

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025-039

### **Slope Mass Rating (SMR) Classification for Rock Slope Stability and Geohazard Vulnerability Assessment**

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**Abstract.** Quantitative classification from the Slope Mass Rating (SMR) has introduced an empirical assessment for rock slope stability rating. This stability classification enables us to foresee the magnitude and susceptibility of rock mass failure towards adjacent infrastructure and human life. In this study, the stability of quarry rock slope was classified using SMR classification system and kinematic stability analysis before being correlated with geohazard vulnerability assessment. Geological formation study with site geographical survey from aerial photogrammetry technique provided comprehensive data for the study area. Fieldwork to evaluate the SMR assessment parameters was conducted by discontinuity mapping using scanline method. In-situ evaluation of rock mass such as rebound surface hardness and discontinuity characterization was carried out with rock material sampling for laboratory testing. Kinematic stability analysis presented an estimation for the direction and mode of rock slope failure. The SMR classification that constitutes geomechanics attributes had introduced the global stability rating of rock mass structure, thus facilitating the prediction of potential failure magnitude. Hence, the integration of these stability indications provides sufficient empirical estimation for geohazard vulnerability zoning for the studied area.

## Abstract

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010-107

### **Volumetric Properties of Asphalt Mixture Containing Fly Ash Geopolymer**

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**Abstract.** Countries around the world face challenges to maintain their existing road networks with the increasing development of the transportation industry in the past few decades. In Malaysia, dense graded asphalt has been paved extensively in most of the major road network. This paper presents the volumetric properties of asphalt mixture incorporating fly ash geopolymer. Superpave<sup>TM</sup> mix design method was employed with the nominal maximum aggregate size 12.5 mm to obtain the optimum binder content. In the respect, binder 80/100 and 60/70 penetration grade with 0%, 3%, 5%, 7%, 9% and 11% fly ash geopolymer by weight of asphalt binder were prepared. Bulk specific gravity and maximum theoretical specific gravity were determined to meet criteria asphalt binder at 4.0 percent air voids. The results indicated that, the optimum binder content for binder grade 80/100 and 60/70 is in range 5.02% - 5.83% and 5.03% - 6.00% respectively. The outcomes of this research significantly used for further performance test and analysis on asphalt mixture.

## Abstract

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048-012

### **Evaluation of optimum asphalt content and engineering properties of asphalt mixture containing irradiated waste plastic bottles granules as aggregates**

**A Usman, M H Sutanto, M Napiah, S E Zooro2, and N S A Yaro**  
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*Corresponding Author Email*

**Abstract.** The massive volume of polyethylene terephthalate waste (WPET) creates serious environmental complications. A popular way to reuse WPET is as aggregates substitute in a densely graded asphalt concrete mixture. However, both positive and negative impacts on Marshall stability were found when PET particles were used as modifiers. This mixed outcome indicates that when a certain amount of PET was used, an improvement was observed in Marshall stability. There was, however, a decrease in Marshall stability following the use of PET particles. One potential means to solve this is the usage of gamma radiation treatment. In this regard, gamma radiation treatment influences on the WPET granules were investigated on modified asphalt mixtures volumetric and strength properties. The findings illustrate that the application of treatment with gamma rays on WPET granules enhances stability, decreases optimum asphalt content (OAC), boosts rigidity, and the modified asphalt mixture meets all the Marshall mix design requirements. Therefore, the proposed modification of the waste plastic bottles granules by exposing to gamma radiation might be an efficient avenue for repurposing waste with improve engineering properties.

## Abstract

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063--021

### **The Impact of Deforestation on Land Surface Temperature: A Case study Highland Kundasang, Sabah.**

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**Abstract.** In the past few decades, forests and land cover have undergone rapid changes, especially due to large-scale deforestation, in tropical forests. The main factors causing changes are to meet the needs of agricultural intensification and the growing rural population settlement and urbanization. Monitoring forest cover and vegetation is essential for the detection of regional and global environmental changes. This study assesses the impact of deforestation on Land Surface Temperature (LST) of the highland Kundasang, Sabah in 1990, 2009, and 2021. This study utilized Landsat 5 and Landsat 8 to analyze the changing trend of forest cover over 31 years. The data remote sensing Landsat 5 and Landsat 8 satellite images to map the sequence of forest cover changes with the measurement of deforestation and its relationship with LST as the objective of study. To achieve the objective of the study required to determine the relationship between the areas of forest loss with LST. The results of the study showed that nearly 76% (36.56) of forest coverage in highland Kundasang, Sabah transforms into agriculture and built-up human during these 27 years. The correlation between LST and areas of forest in km and where LST and NDVI are negatively correlated. This shows that the reduction in vegetation area leads to an increase in the ground surface temperature. The resulting forest change map will help forest management to identify highly vulnerable areas. In addition, it can help local governments to formulate land management plans.

## Abstract

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**052-027**

**Numerical analysis of embankment resting on floating bottom  
ash columns improved soft soil**

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**Abstract.** The construction of embankment over soft clay is quite a challenging job for the geotechnical engineer, which may results in a large settlement, bearing failure and stability issues. Stone columns can be used to minimize the settlement and increase the bearing capacity in such conditions. This study was carried out to investigate the behaviour of bottom ash columns underneath embankments using numerical modelling. The soft soil improved with bottom ash columns under the embankment subjected to traffic-induced loading was simulated in Plaxis 3D foundation software. The study variables include three area replacement ratios ( $A_r$ ) of 10%, 15% and 20% and two columns length of 5m and 7.5m. The results indicated that enlarging the  $A_r$  and length of columns significantly reduced the settlement and accelerate the consolidation process. The maximum settlement reduction of 58% was reported for the  $A_r$  of 20% with 7.5m column depth. The study suggests that bottom ash columns can be used to improve soft soil underneath the embankment.



## Abstract

065-033

### **Effects of Seasonal Precipitation on the Amount of Seepage-A Case Study of Tunnel 3 of Bazai Irrigation Project Khyber Pakhtunkhwa**

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**Abstract.** Infiltration of water into tunnel within a harsh geological formation is a vital issue in tunnelling. The consequence impacts due to seepage include tunnel rock instability, pore-water pressure imposition and diminution of operational capacity. The spatial variation in rainfall due to climate change intensifies the threat to tunnel stability. Likewise, to understand the impacts of climate change scenarios on the seepage of tunnel 3 of the Bazai irrigation project was numerically simulated in SEEP/W software by manipulating the rainfall data. The net annual precipitation is followed by two sets of rainfall data i.e., dry and wet season precipitation depending upon the magnitude of rainfall. The analysis revealed that most of the seepage occurred in the unlined portion. In order to determine the future impacts of precipitation on seepage quantity, the wet season precipitation was further increased by 10% and 50% for A1B and B2 conditions respectively. The seepage quantity into the tunnel increases with variation in precipitation patterns. To reduce the risk to tunnel stability, the model was also treated with cement-bentonite grout and bentonite slurry containing 6% solids. The performance of both grouting techniques leads to noticeable seepage deduction. The study further suggests that cement-bentonite is more effective in seepage remediation.

## Abstract

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001-034

### **A Literature Review Use of Steel Fibre in Asphalt Concrete Mixture in Hot Mix Asphalt**

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**Abstract.** The purpose of this paper is to overview the use of steel fibre in asphalt concrete mixture in hot mix asphalt, explore the evolution of steel fibre reinforced asphalt concrete (SFRAC), highlights current trends in research and industry and to recommend future areas of research. The study will focus onto the steel fibre industry and steel fibre generated from waste tyre applied in asphalt pavement. This review involving the perspective of the application and performance of these fibres in affecting the performance of asphalt pavement in terms of concentration of fibre, fibre length and also the effect of integrating steel fibre in asphalt pavement. Based on the literature, the presence of steel fibre in the asphalt pavement is significant in providing positive changes in improving the properties studied, especially in providing higher durability, yet there are still less studies that provide conclusions related to the relationship between fibre length and steel mixture concentration fibre in influencing the ability, strength and durability properties of this asphalt concrete pavement. This study will enhance the awareness of the need to study the relationship between fibre length and morphological properties in influencing the bridging mechanism in the content of asphalt concrete pavement.

## Abstract

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072-037

### **Geopolymer utilization in the pavement industry: A review**

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**Abstract.** The significant quantity of wastes has raised concern for their management and environmental effects. One of the alternatives ways is the reuse of waste in the construction industry through geopolymerization technology which incorporates waste materials with silica or/and alumina content with activator solution to form a matrix of geopolymers material. This process has attracted attention due to its successful application in different disciplines, influenced by its enhanced properties. This review paper focuses on available research articles on geopolymers' utilization in the pavement industry. The study analyzes available works of literature on various geopolymer materials, composition, processes, and the use of geopolymer as artificial aggregate, aggregate substitute, or modifier for the asphalt mixtures. The review shows that sodium hydroxide or phosphoric acid solution molarity, liquid-to-binder ratio, duration of curing, and temperature affect the properties of geopolymer produced. Also, geopolymers show exceptional performances compared to conventional materials. Though, there is still limited literature about geopolymers pavement long-term performance as well as its response to extreme environmental conditions. Furthermore, there is no standard for the design and preparation of geopolymer modified pavements. From the review, it was ascertained that geopolymers have great potential to be utilized in the pavement industry, as evidenced by the positive and affirmative performances from various studies. In conclusion, it is recommended and encouraged that the pavement industry should explore and utilize more geopolymer materials during construction to promotes sustainability.

## Abstract

048-038

### **Waste Polyethylene Terephthalate granules modified by gamma irradiation and their effect as aggregates on moisture damage of asphalt mixtures**

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**Abstract.** Recently, the excessive quantity of waste polyethylene terephthalate (WPET) creates a significant environmental concern globally. One way to reuse WPET is in the pavement industry. Nevertheless, based on works of literature review on the use of WPET in asphalt materials, inconsistent findings were reported with an increase and decrease in mechanical properties. To overcome this issue, gamma radiation has been utilized on the WPET. This study investigated the effect of using non-irradiated and irradiated WPET on some engineering properties of asphalt mixes. Marshall Samples incorporating a various amount of WPET (Plastiphalt); 0%, 0.5%, 1.0%, 1.5%, 2.0% and 2.5% by weight of total aggregates were tested based on Marshall Stability (MS), indirect tensile strength (ITS), and resistance to moisture damage. The results of x-ray diffraction (XRD) on the irradiated WPET showed that the degree of crystallinity had increased. The results of Marshall Stability (MS) showed an enhancement with increasing WPET content up to 2.0% for the plastiphalt mixes. Resilient modulus (Mr), MQ, and ITS show a decreasing trend with increasing WPET amount for the plastiphalt mixes. Furthermore, results on moisture damage resistance indicated that indirect tensile strength and Marshall Stability ratios were marginally increased for plastiphalt mixes compared to the reference mixture. Comparing the results for the plastiphalt mixes shows that irradiated WPET plastiphalt mixes had a better outcome than non-irradiated WPET plastiphalt mixes.

## Abstract

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051-017

### Effect of Span Length on the Seismic Design Modification Factors of Steel Frames with High Ductility

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**Abstract.** Seismic design modification factors play a significant role in the estimation of imposed force and displacement to structures during seismic events. Seismic design codes recommend similar seismic design modification factors for short and long-span structures. Therefore, this study investigated the effect of span length on seismic design modification factors of steel frames with high ductility. For this purpose, nine steel frames with three different span lengths of 5, 10, and 15 m were selected and designed according to the specifications of ASCE/SEI 7-16. The designed structures were single, double, and three-story frames. The obtained results showed that the values of response modification factor ( $R$ ), overstrength factor ( $O$ ), and deflection amplification factor ( $C_d$ ) were increased as the span length was increased. Besides, an increase in the number of stories decreased the value of  $R$  and  $O$  factors.

## Abstract

044-025

### **Mechanical Properties of Concrete with Recycled High-Density Polyethylene Macro Flat Fiber and Rice Hull Ash as Partial Replacement to Cement**

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**Abstract.** This study determines the mechanical properties of concrete with the addition of recycled High-Density Polyethylene (HDPE) Macro Flat Fiber (MFF) and Rice Hull Ash (RHA) as partial replacement to cement. The objective of this study is to identify the optimum mix ratio for compressive and flexural strength of concrete. Various percentage of HDPE MFF (0.5%, 0.75%, and 1.0%) and 10% partial replacement of RHA to cement is incorporated in the mixture. The RHA is obtained through uncontrolled burning while HDPE MFF is collected through shredding and manual cutting. The results showed that the addition of HDPE MFF had a positive effect on the compressive and flexural strength of concrete. The optimum value is achieved on concrete with 0.5% HDPE MFF and no RHA, as it had showed an average of 31.87 MPa with a 18.04% increase in compressive strength, and an average of 4.532 MPa with a 17.78% increase for flexural strength. Moreover, the combination with RHA had not showed promising results. It had been concluded that the addition of recycled HDPE MFF with no RHA increases the compressive and flexural strength of concrete.

## Abstract

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064-031

### **Influence of the Malaysia's National Annex for Seismic Design on the Size and Reinforcement Weight of Short Buildings**

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**Abstract.** In early 2017, Malaysia's national annex for the seismic design of structures was published and led to some concerns regarding the increase in the construction cost of buildings. This study investigated the change in the reinforcement weights of beams and columns due to seismic design based on Malaysia's national annex. For this purpose, buildings with different numbers of stories (i.e., 3- and 6-storey), ductility classes (i.e., low and medium), and soil types (i.e., stiff and soft soil) were designed through two different methods. The first method followed the conventional design practice in Malaysia, in which the BS 8110 code was used to design structural elements only for gravity loads. However, the second design method was based on Malaysia's national annex and Eurocode 2, and buildings were designed for gravity loads and seismic actions. The results showed that buildings with low ductility class constructed on the soft soil had the largest increase in the reinforcement weights compared to the conventional design. On the other hand, the buildings with medium ductility class constructed on stiff soil exhibited a decrease in their reinforcement weights compared with the conventional design.

## Abstract

094-055

### **Short Term Ability of Concrete Containing Palm Oil Fuel Ash Exposed to Sodium Sulphate**

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**Abstract.** Uncontrolled palm oil waste disposal can lead to environmental problem and by recycling palm oil waste can assist in reducing disposal problem. On another side, concrete exposed to sulphate normally will loss it strength after some period of time. By replacing cement with palm oil fuel ash (POFA) can reduce the disposal issue and may help reduce the concrete strength losses. The main objective of this study is to investigate the short term effects on the strength of concrete containing POFA exposed to sulphate solution. The POFA was prepared by drying in an oven for 24 hours at 105C and sieved passing through 300m sieve. Then, the POFA had been refined using ball mill for two hours. The percentage of POFA as cement replacement used on this study is 10%, 20% and 30% by volume of cement. Two type of specimens were prepared which was cube specimen (100mm x 100mm x 100mm) and prism specimen (500mm x 100mm x 100mm) which were fully immersed in water and in 3.5% sulphate solutions. Density test, water absorption test, compression strength test and also flexural strength test were conducted after 7 and 28 days of exposure period. A total of 144 specimen was subjected to this tests. The results of experiments shows that, concrete with 10% replacement of POFA had higher slump value while density test showed that the 10% POFA mixture had a lower density than the other specimens. Furthermore, water absorption test showed that more POFA in concrete contributes higher water absorption when exposed to sulphate solution compared to water. The compressive strength and flexural strength test recorded replacement of 10% POFA is the highest strength of concrete containing POFA exposed to sulphate solution and water.



## Abstract

099-060

### **Mechanical Behaviour of Concrete Containing Crumb Rubber as Partial Fine Aggregates Replacement**

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**Abstract.** As the transportation industries increase around the world, the waste tires from this industry became a critical issue for many countries. Worn-out tires will be discarded and depending on the waste management program of the country, these tires either becoming an environmental threat or resourceful end product. Therefore, this study aims to investigate the mechanical behaviour (compressive and tensile strength) of concrete containing crumb rubber as partial fine aggregates replacement. Based on the mechanical behaviour, the optimum content of crumb rubber as partial fine aggregates replacement in concrete is determined. The size of crumb rubber used in this study was between 2 mm and 3 mm with 5% to 15% replacements. The targeted strength of concrete at 28th days is 35 MPa with 0.32 water to cement ratio. The slump test was conducted to measure the workability of the mix. 24 concrete cubes with dimension of 150 mm x 150 mm x 150 mm were tested for compressive strength after 7 and 28 days of water curing. In addition, 12 cylinders (100 mm x 200 mm) were prepared for tensile strength test. Based on the results of compressive and tensile strength, generally both strengths decreased as the percentages of replacement increased. However, for 5% and 10% replacement, the targeted strength is still achieved. Hence, it can be concluded that, the optimum percentages of fine aggregates replacement are 10%.

## Abstract

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092-061

### **Review on Application of GGBS as a Partial Cement Replacement in Concrete**

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**Abstract.** Numerous infrastructures have been effectual on the list with the demands of Malaysia's economic growth due to the country's explosive growth. As a result, demand for cement has increased, prompting one of the country's largest cement producers to increase production. Cement production necessitates a significant quantity of non-renewable resources, such as raw materials and fossil fuels which is expected to produce 5-6 percent of all carbon dioxide greenhouse emissions. This paper emphasizes the viability of GGBS as a partial cement substitute in concrete, as implied by earlier studies. GGBS is a waste product deduced from the iron and steel industries, and it is made by cooling molten slag in water and then grinding it into a fine powder. The use of GGBS as a cement replacement in concrete is desirable since it has equivalent cement fineness and cementitious properties. The specific gravity, specific surface, chemical composition and impact of GGBS on water absorption were discussed in this study. Implementing GGBS in concrete production reduced the highest point heat of hydration rate and time to reach at the identified peak heat of hydration rate measurably. The usage of GGBS in range of 30% to 60% as partial cement replacement in concrete resulted in higher strength at later age of curing.

## Abstract

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101-062

### **Drying Shrinkage Properties and Initial Bonding Strength of 3D Printing Mortar**

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**Abstract.** 3D printing has emerged in the construction industry provide an effective and productive alternative construction methods. Cement-based material is the main choice in 3D printing construction due to its low cost and easy availability. This paper presents the drying shrinkage properties of hardened 3D printing mortar and the bonding strength of fresh mortar under the delayed phenomenon. Eight types of mortar mixtures in two series with varying percentages of sandy clay replacement ranging from 0% to 75% for both 1:1 and 1:2 cement sand ratios were used in the trial mix. Basic physical properties of 3D printing mortar such as workability, extrudability and buildability were conducted on the trial mix. Four mortar mixtures that complies with the basic 3D printing properties were used to conduct the drying shrinkage properties and the initial bonding strength test. The initial bonding strength test was conducted under delayed phenomenon for 0 minutes, 10 minutes, 20 minutes and 30 minutes. The experimental results showed a significant increase in drying shrinkage for mortars containing 75% sandy clay. However, the highest initial bonding strength is also achieved by mortars containing 75% sandy clay. The initial bonding strength of 3D printing mortar was decreased over the delaying time.

## Abstract

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105-065

### **The Study of Aerodynamic Performance of Tall Buildings by Utilizing Aerodynamic Modifications -Review**

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**Abstract.** Since the beginning of this century, the trends in urban development have accelerated, as well as the demands for professional designers and planners have also been changed. A major shift came in the construction of mega-tall buildings due to advancement in construction and engineering techniques. Therefore, the rapid development in tall buildings has brought many challenges and issues that required systematic research and development. One of the major issues of the tall building to the structural designers is the wind load effect. thus, the building shape and configuration should be determined based on the considerations of building form and function for wind effect facilitated by bluffing the structure shapes. Various approaches are required to maintain the functional needs for reducing the vortex shedding phenomenon of the wind, such as aerodynamic modification techniques, which cause discomfort for the occupants. Aerodynamic modifications are classified into two categories; corner modifications, like rounded corners, recessed corners, chamfered corners, etc, and outer shape modifications, such as taper, set-back, twist of building form, etc. This paper reviews extensively the latest /previous aerodynamic modification techniques for tall buildings and concludes that aerodynamic techniques should be used at early stage of the project to mitigate the wind effects and provide optimal design.

## Abstract

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106-066

### **Performance-Driven Evaluation and Parametrical Design Approach for Sustainable Complex-Tall Building Design at Conceptual Stage**

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**Abstract.** Tall buildings with irregular forms are gaining popularity in creating the vertical city model, and they are designed and built today with the help of computational technologies. This paper aims to highlight the significant link between the architectural and structural conceptual design of tall buildings with irregular geometries by using performance-driven evaluation and parametric design approach at conceptual stage to develop a sustainable design. Initially the review of previous research shows how the form of tall building is be defined. Furthermore, the parametric design approach is investigated for generating alternative options to satisfy building aesthetic and structural performance criteria with the aid of aerodynamic optimization technique to generate an optimum solution for decision-making at an early stage, as well as allowing modifications in the later stages of design, and making it possible to handle the design process in a repetitive manner. Finally, a framework is proposed where computational techniques are integrated and an effective collaboration between professional designers is achieved in order to produce an optimal complex-tall building conceptual design that is architecturally pleasing, structurally efficient, and environmentally sustainable.

## Abstract

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091-068

### **A Review of Strength Performance of EFB ash and Mussel Shell ash as Replacement Material in Concrete**

**M F Omar, N A A Hamid, N H Othman, S S Ayop, and N Sulaiman**

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**Abstract.** Building with eco-friendly concept has become a focus of many recently. The application of green natural sources is one of the alternatives of this concept. Oil palm Empty Fruit Bunch (EFB) is one of the byproducts for the oil plantation whereas the improper disposal of these materials can give negative impact to the environment. To utilize waste from agricultural, can be applied as a replacement material in concrete which known as modified concrete. The modified concrete with partial replacement of waste material must meets the material performance such ordinary concrete. This will indirectly reduce the usage of raw materials and, become as a sustainable construction material. Therefore, the objective of this paper is to study the application of natural fiber of (EFB) as replacement construction materials for building. It shows that research using EFB as material replacement in concrete still have not been discovered yet. EFB was mostly used to make cement board, roof insulation, cement brick, etc. Hence, future work should be targeted over the wide application of this byproducts in the construction area. The process of making cost-effective adoption applications will also be considered for further studies to create a sustainable environment by reducing the negative impact towards the environment.

## Abstract

116-078

### **Flood Analysis and Non-Structural Approach for Flood Protection in Sg. Kelantan**

**Nurul Fatihah Nor Azlan Shah, Nur Wajihah Abd Hakim, Md Noor Salleh, Maisarah Ali, Moh Fairullazi Ayob, Thayalam A/L Sekaran, Dato Mohd Azmi Ismail and Mohd Zaki Mat Amin**  
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**Abstract.** Generally, flooding is categorized as a natural disaster that occurs due to climate change. If a flood happens at a zone, then drought may happen at the opposite as El Nino and La Nina give different impacts based on the country's climate either if it is at the dry climate, temperate climate, continental climate, polar climate, or tropical climate. Malaysia is a lucky country as it experiences a tropical climate. Hence, it is protected from extreme drought and flood caused by climate change. However, some states located at the east coast of Peninsular Malaysia such as Kelantan, Terengganu, and Pahang always experienced a heavy flood, especially during the monsoon season due to high intensity of rainfall. The worst incident in Malaysia history is during the critical flood hits Kelantan at the end of December 2014. The objectives of this paper are to simulate Flood Hydrographs for Various Storm Duration by using Hydrologic Engineering Centre-Hydrologic Modelling System (HEC-HMS), to investigate the location of floodplain at the catchment area of Sg. Kelantan by using River Analysis System (HEC-RAS), to identify the non-structural approach that can reduce the rate of flood based on its topography and changes of climate at Sg. Kelantan. By using HEC-HMS and HEC-RAS software, the peak discharge from each rainfall stations for difference average recurrence interval (ARI) and the location of floodplain at the catchment area of Sg. Kelantan can be identified. The results shows that river at rainfall station 5722057 contribute the highest outflow discharge compared to the other rainfall stations due to its rainfall intensity and less vegetation planted at the riverbank. This research has shown that planting a vegetation that is highly resist to flood like the Vetiver grass is very important especially at the area that has high rainfall intensity.

## Abstract

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088-053

### **Study on Ammonia and Colour Removal from Leachate via Aerated Electrocoagulation (Ferum and Aluminium Electrode)**

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**Abstract.** Untreated landfill leachate is harmful to the groundwater resources, environment, and human health. Therefore, proper treatment is needed. This study investigates the efficiency of the aerated electrocoagulation (AEC) method in removing ammonia (NH-N) and colour in leachate under the influence of current density and to review the data from previous research on the removal of NH-N and colour in AEC under the influence of pH and aeration rate. In this research, leachate samples from Simpang Renggam Landfill are used, and characterisation for biochemical oxygen demand (BOD), chemical oxygen demand (COD), pH, suspended solids (SS), colour, and NH-N had been conducted. Ferum and aluminium electrodes with a dimension of 200 mm 50 mm 1 mm are used in this experiment. From the data obtained, the optimum current density for the removal of NH-N and colour using AEC was at 200 A/m with the percentage of removal 40.66% and 85.91%, respectively. For optimum pH and optimum aeration rate, the data was reviewed from the previous studies, and the maximum efficiency of NH-N and colour removal from stabilised leached occurred at optimum conditions of pH 7 to 8 and 0.5 L/min-1.5 L/min aeration rate). Based on the observation and previous studies reviewed, aeration can increase the efficiency of NH-N and colour removal in the electrocoagulation process.



## Abstract

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033-019

### **Mapping of Potential Groundwater Using Electrical Resistivity Imaging (ERI) at Low Land Area of Parit Raja Johor**

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**Abstract.** Electrical Resistivity Imaging (ERI) has emerged as an important technique in geophysical surveys for gaining more information and locating hidden water. This method was used at Parit Raja to investigate the location of underground water storage. Two-dimensional (2D) geoelectrical imaging has been used for this study. The imaging method was used at three different locations in the study area to identify potential aquifer and suitable locations for boreholes that would serve as observation wells. A Schlumberger array was set up during data acquisition since it can imagine deeper profile data and is suitable for areas with a homogeneous layer. For 2D subsurface images, the raw data were processed with the RES2DINV software. According to the ERI results, this area was dominant with low resistivity values of less than 10 m and potential shallow aquifer depths ranging from 10 to 30 m. Furthermore, the chargeability value obtained from Induced Polarization supported this point (IP). According to the IP data, the chargeability at that point was between 0 and 1 ms, indicating the presence of groundwater in the study area.

## Abstract

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**042-009**

### **Study of the Waste Generation and Composition in Traditional Markets in the New Normal Era in Malang Regency, Indonesia**

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**Abstract.** The traditional market waste includes household waste. Handling of waste helps reduce the burden of Temporary Disposal Site (TPS). This study aimed to analyze the generation and composition of market waste as well as traders' perceptions of health protocols in various market classes in Malang Regency. Calculation of the number of samples with the Slovin method. The method of measuring solid waste generation and composition is using SNI 19-3964-1994 for 8 consecutive days. Measurement of generation in weight/volume based on the source of solid waste. Waste sorting is based on the composition of the waste. The maximum market waste generation is in class 1 of 17.402 kg/m<sup>2</sup>/day in the vegetable stall, while the minimum waste generation is in class 3 of 0.01 kg/m<sup>2</sup>/day in the plastic stall. The composition of the existing waste is divided into 11 groups, namely compostable solid waste, paper, plastic, diapers, cloth, glass, wood, cans, metal, hazardous waste, and styrofoam. The results of the questionnaire showed that 75% of market traders have implemented the health protocol well.

## Abstract

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043-010

**Assessment, Monitoring, and Reduction Strategy Development  
for Non- Revenue Water (NRW) of Calamba Water District  
(CWD), Calamba City, Laguna, Philippines**

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**Abstract.** NRW is a portion of water supply that is lost and consequently, a wasted revenue for water distributor. This study develop reduction strategies of NRW in CWD through the assessment of the companys operating practices by conducting interviews and determining the relationships between the real loss and the range of variation of pressure, and between the apparent loss and the number of service connections using simple linear regression method. Results shows that significant relationship was only shown between the number of service connections and apparent losses. Furthermore, the apparent losses came from the number of service connections is the highest contributor of water loss. Hence, the recommended reduction plans are to start and monitor the record of the age of infrastructure, to manage inaccurate meter readings, to establish a water meter repair and replacement program, and to have a regular monitoring for water theft to address the problems in NRW. Finally, it is also recommended to establish a new department that focuses in NRW reduction through standardizing zones and areas for assessment and monitoring purposes.

## Abstract

034-013

**Study of Water Quality Based on Diversity of  
Macroinvertebrates Using Average Score Per Taxon Method in  
Corporate Social Responsibility Program Approach at Gunung  
Belumut and Gunung Lambak Waterfall**

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**Abstract.** Imbalanced ecosystems will lead to many problems in the future. This study aims to focus on the water quality properties such as temperature, pH, Dissolved Oxygen, and the bio-indicator method by evaluating macroinvertebrates diversity using the Average Score Per Taxon (ASPT) method. Besides, a Corporate Social Responsibility (CSR) program was conducted with an approach with primary school students of Sekolah Kebangsaan LKTP Ulu Dengar, and Sekolah Kebangsaan Abdul Rahman Yassin, Kluang as a pilot program as it is effective in student learning platform and knowledge transfer program. The water quality according to ASPT analysis for upstream of Hutan Lipur Gunung Belumut waterfall is scored 7.94 (very clean water) while for downstream of Hutan Rekreasi Gunung Lambak waterfall scored 5.53 (rather clean to clean water). It is a relevant outcome of water quality level based on the diversity of macroinvertebrates in the river using the ASPT method and the correlation with the in-situ analysis has been supporting the preferred properties of water condition for the macroinvertebrates cycle. In conclusion, the result of water quality in the upstream is probably good compared to the downstream. The methods and approaches applied are significant and reliable in estimating the water quality level of the river.

## Abstract

036-014

### **Statistical Modelling of Extreme Temperature in Peninsular Malaysia**

**J L Ng, K H Chan, N I F Md Noh , R Razman, S Surol, J C Lee  
and R A Al-Mansob**

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**Abstract.** Extreme temperature events bring significant effects on the environment and society. Consequently, investigating the best fit for extreme temperature data is important for hydrological study and event forecasting. The main aim of this study is to determine the best fit probability distribution for monthly and annual extreme temperatures. The maximum temperature data at monthly and annual time scales were obtained from MMD (Malaysia Meteorological department). The temperature data for 40 years were fitted to the 10 probability distributions for each station. The parameters of the distributions were estimated by the maximum likelihood method and L-moment method. Besides, three goodness of fit tests, namely Kolmogorov-Smirnov (KS), Anderson-Darling (A2) and Chi-Squared Error (CSE) test were applied to evaluate the performances of the distributions. The best fit distribution was selected based on the lowest test scores from the summation of the three goodness of fit tests. The results of this study showed that GEV distribution was selected as the best-fit distribution, followed by LP3, 3PLN, GLL and Gamma distributions. The results of this study can be used as a reference for development planners, agricultural sector, water management agencies in hydrological planning and disaster management.

## Abstract

125-092

### **Microbial Growth Rate and Distribution of Doubling Time at Different Concentration of Oil Sludge Medium**

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**Abstract.** Microorganisms play crucial role in maintaining ecosystem and biosphere to develop sustainable environment. As microorganisms become more concerned in environmental technology, the understanding of the microorganisms life cycle and its factor influencing its life span must fully understand. The generation time, which varies among bacteria is controlled by many environmental conditions and by the nature of the bacteria species. In this present work, we reported the different growth profile of five consortia locally isolated beneficial microorganisms (LIBeM) in the mixtures of *Candida tropicalis*-RETL-Cr1, *Chromobacterium violaceum*-MAB-Cr1, *Pseudomonas aeruginosa*-BAS-Cr1, *Sphingomonas paucimobilis*-RETOS-Cr1, and *Stenotrophomonas maltophilia*-RAS-Cr1 respectively. A laboratory field scale was conducted in a conical flask to observe the doubling time (dt) recorded for each consortia LIBeM at different concentration levels of oil sludge (2%, 5%, 10%, 15% and 20%) v/v. After 24 hours of incubation, the growth of microorganisms was determined using spectrophotometer at 600nm and the standard growth profile were plotted according to the concentrations studied. The results demonstrated that consortia LIBeM at 2% and 5% v/v of oil sludge showed the same growth pattern in sigmoid curve within 24 hours periods. However, at 10%, 15% and 20% (v/v) concentrations, the growth trend is increased and showed constant over the time of the incubation. Study on growth rate and doubling time (dt) had showed that Consortia 3 consists of *C. tropicalis* "RETL-Cr1+ *S. maltophilia*-RAS-Cr1+ *P. aeruginosa*-BAS-Cr1 performed the highest growth rate with 0.16 hour<sup>-1</sup> and lowest doubling time (dt) of 4.41. This finding is very important to evaluate the efficiency and tolerance of LIBeM towards different concentration levels of oil sludge for petroleum degradation in real field application.

## Abstract

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**040-020**

### **Pre-Treatment of Laundry Greywater by Steel Slag for Safe Disposal**

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**Abstract.** Direct discharge of laundry greywater without any water pre-treatment in the drainage system had become a common practice in Malaysia. The study was aimed to utilise steel slag as an adsorbent material towards Commercial Laundry Shop Runoff (CLSR) to reduce the value of Chemical Oxygen Demand (COD) and Total Phosphorus (TP). Optimisation of the pollutants removal efficiency was run by Research Surface Methodology (RSM) using independent variables of different percentages of CLSR with tap water and contact time. It is found that the highest removal efficiency towards the value of COD was 54.49% at 100% of CLSR with tap water and 60 minutes of contact time. Meanwhile, TP removal efficiency was 45.45% at 10% of CLSR with tap water and 90 minutes of contact time. This study has discovered that steel slag is capable to increase the pH value, reducing the value of COD and TP from CLSR in a short period. Hence, steel slag had the potential to be included in the pre-treatment system for CLSR based on its performance at COD and TP removal efficiency.

## Abstract

019-022

### **Characteristics Of Sediment Transport After Morphological Changes At Palu Estuary As The Impact Of The 2018 Tsunami**

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**Abstract.** The tsunami triggered by the 2018 Palu Earthquake has not only caused the collapse of public infrastructure, but also damaged beaches along Palu Bay. Based on direct investigation at several sites, the inland coastline reaches 30 meters. This shoreline change was caused by the attack of the tsunami waves at high speed followed by massive abrasion. Another impact of the wave attack is a change in the morphology of the beach bed, including in the Palu Estuary. This study aims to investigate the impact of changes in bed morphology around the Palu Estuary as a result of the tsunami attack on transport sediment characteristics, as one of the determinants of bed morphology. Quantitative analysis was carried out by numerical simulation based on 2D hydrodynamic modeling using the Surface-water Modeling System (SMS). The geometry of the model is formed from the mesh generated from the bed elevation based on the after-tsunami bathymetry survey. Two boundary conditions and one main input data are applied to this model: discharge data, tidal data and bed load data. Discharge data as an upstream boundary condition consists of minimum discharge, average discharge and maximum discharge. The downstream boundary is defined by a tidal curve predicted from 15 daily data. The bed load data is presented in the form of a gradation curve that describes the distribution of sediment grains. The simulation output indicates that sediment settles intensively downstream of the river mouth at high discharge and low tide. At low discharge and high tide, sediment tends to settle before the flow reaches the river mouth. Referring to the results of previous studies, the direction and velocity of sediment motion changed slightly after the tsunami. Changes in the direction and speed of movement are related to changes in bed morphology at the river mouth due to the 2018 Palu Tsunami.



## Abstract

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058-072

### **Assessing the Impact of Housing Attributes on Housing Prices through a Hedonic Regression Analysis**

**N A Mohd Sairi, B Burhan and E E Mohd Safian**

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**Abstract.** The housing price reflects the maximum willingness of home buyers to pay for multiple housing attributes and represents the composite characteristics of the housing. One way of understanding the house price variation is by utilizing the housing characteristics as variables in a regression model which is widely known as the hedonic regression model. Thus, this study aims to assess how each housing attributes influence the housing prices in Johor Bahru through the hedonic regression analysis. This study involves a total of 43, 610 residential housing data. The results successfully identified the building size, age, condition and property types as the structural variables which positively influence the property prices. On the other hand, the floor level and types of construction negatively influence the property prices. For the locational characteristics, distance to airport, primary school, sport complex and fire station positively influence the property prices whereas the distance to CBD, hypermarket, golf course, bus terminal and highway has a negative influence on the property prices. The findings of this study can assist developers in determining the housing preferences of future home buyers in Johor Bahru.

## Abstract

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020-080

**Comparative Study between Prefabricated Prefinished Volumetric Construction (PPVC) and IBS 2D: A Case Study of School Extension Project at Federal Territory of Putrajaya**

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**Abstract.** Prefabricated Prefinished Volumetric Construction (PPVC) is a modular construction system that adopts modern practices in the construction industry. It is an innovative approach introduced to increase construction productivity and reduce high reliance on on-site manpower. PPVC uses prefabricated technology whereby the production of 3-dimensional (3D) modules complete with building finishes and fittings is carried out under controlled conditions at the factory before being brought and installed at the construction site. Therefore, this study is conducted to evaluate the effectiveness of PPVC method in the construction industry in Malaysia. The objective of this study is to make a comparison, in terms of time and cost, between PPVC method and the conventional Industrialized Building System (IBS) 2D method. The results show that the PPVC method was able to shorten the construction period up to 34.9%. However, the construction cost per classroom using PPVC method was 10.5% higher than that when using IBS 2D.

## Abstract

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119-082

### **The Technology Landscape of Construction Material in The Indonesian Construction Industry**

**R G K Pradoto, B W Soemardi, A Gazali, A T Putri, R P Purba, I Mahardika**

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**Abstract.** The Indonesian construction industry is one of the main sector to support the economic growth in country. According to a report published by the World Economic Forum, the construction industry currently accounts for about 6% of the world's GDP and is expected to reach around 14.7% by 2030. But on the other hand, the image experienced by the construction sector is dominated by something low-tech, still relying on craft-based methods, characterized by poor performance and low quality. Therefore, it is very important that to better support the nation's development, it is necessary for the Indonesian construction industry to invest more in the adoption, development, and application of technology. Material technology plays an important role in construction projects. Based on a survey conducted to 40 Indonesian contractors, it was found that the priority of using concrete and steel materials ranked at the top during normal conditions and during the covid-19 pandemic. Therefore, data and information about the history of development, utilization, and potential of construction technology especially concrete and steel materials in Indonesia is almost non-existent, while the information data is considered important to help formulate policies regarding the development and utilization of construction technology in Indonesia. Therefore, this study will try to map the landscape of technology material in Indonesia. The methodology to be used is literature studies, interviews, and questionnaires. This study aims to present technological landscape of concrete and steel construction material, which would provide the overall view of the historical development of the utilization, contribution, and the strategy for the development of the future construction material technology in Indonesia.

## Abstract

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120-084

### **Evaluation Criteria of Facilities Management through Public-Private Partnership (PPP) Scheme**

**Nurul Aqilah Samsudin, Hariati Abdullah Hashim, Ezdihar  
Hamzah and Nurul Nadiah Zainol**

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**Abstract.** The delivery of facilities management (FM) services through public-private partnership scheme has been increasing in recent years. The long-term success of this partnership depends mainly on the choice of the best-suited private partner. However, an issue regarding the unavailability of evaluation criteria was discovered when selecting the best FM service providers within this scheme. Preliminary research showed that evaluation criteria are the fundamental elements for the FM procurement process; yet little attention is given to this subject. The evaluation criteria are fundamental to choose the most qualified FM service providers especially in a complex project like PPP. Thus, this research aims to identify the evaluation criteria of FM through the PPP scheme. An in-depth literature review was conducted in this paper. The focus of the review is associated with the evaluation criteria of FM service providers in the PPP scheme. This paper identified four criteria that should be considered, namely clients requirements, external environment/ factor, project characteristics and financial advantages. The outcome of this paper can be used as a theoretical base for the development of the FM procurement framework for the PPP scheme.

## Abstract

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122-088

**A systematic review of studies examining the relationship  
between resilience and physical asset management for water  
system**

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A Ismail and N A Azmi**

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**Abstract.** Water system is one of critical infrastructure that play important role in the society. The water system can be fail after hits by disruption or interruption either by climate change, natural hazard or aging. Resilience concept is the ability of a system to bounce-back from failure to desire state. Asset management is the body that control the system are responsible to make sure the system in good condition to supply water continuously with minimum casualty. The study investigate the relationship between resilience and physical asset management practices in water system based on the article in the scientific database. The manuscript that discuss regarding the relationship between resilience and physical asset management practices in water system are only eight articles.

## Abstract

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139-119

### **The Application of Photogrammetry in Architecture Historical Documentation: The measured drawing of Tanjung Semberong Mosque and Teratak Selari Bonda**

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**Abstract.** Architectural measured drawings refer to the process of on-site constructed building documentation in the form of presentable set architectural drawings. The drawings are produced by executing the on-site measurement before converting it into an appropriate architectural drawing scheme. Traditionally, the process begins by obtaining the measurement of the building wholly with the aid of standard measurement tools. With this method, there are issues and challenges identified in obtaining accurate measurement. The process is complicated due to human limitations in getting the measurement on the highest peak of the building. With the assistance of geomatics tools, the photogrammetry method assisting in obtaining such measurements, specifically the roof of the building. This publication explains the integration process of the traditional measurement method and photogrammetry through the measured drawing exercise of Tanjung Semberong Mosque and Teratak Selari Bonda located at Parit Raja, Johore. The procedure involves the common measurement technique using standard measurement tools integrated with the photogrammetry methods with UAV usage to capture the coordinated aerial image of both buildings.

## Abstract

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**085-051**

**A study on factors influencing Universiti Tun Hussein Onn  
Malaysia (UTHM) postgraduate students to use bicycle in  
campus**

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**Abstract.** Increasing dependence on the private vehicles and motorised transport in the university campus have resulted in a growing traffic congestion and more demand for parking, air pollution and thus, contribute to high energy consumption. It is very necessary to encourage the use of active transportation such as cycling in campus among university students as higher education has been seen as a role model to outside community and has its own impact to community, socially and economically. The objective of this study is to identify students perceived current bicycle facilities in campus areas. The questionnaire in a Google Form were distributed through a social media platform (e.g. Facebook and WhatsApp) in order to avoid social interaction during pandemic COVID-19. A total of 328 respondents among postgraduate students in Universiti Tun Hussein Onn Malaysia (UTHM) was chosen to answer the questionnaire. Furthermore, data was analysed using Descriptive Analysis and Importance-Performance Analysis (IPA). The Statistical Packages of Social Sciences (SPSS) software version 26 was used to do the statistical analysis of the sample data. Results show that students perceived some of the bicycle facilities in campus that have a high level of importance value for students, are having a low-level performance, such as improper cycling paths and poor lighting at night.

## Abstract

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**087-052**

### **Probability Liquefaction on Silty Sand Layer on Central Jakarta**

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**Abstract.** Indonesia has a strong earthquake risk. The effects of saturated sand liquefaction during earthquakes can be very damaging. Liquefaction is the threats to the safety of structures, and the evaluation of liquefaction potential is essential in potentially liquefiable sites. Cone penetration test (CPT) is widely used for the site specific evaluation of liquefaction potential. Small to medium project like BPJS Branch Office building project in Central Jakarta was designed to have 7 floors, there is a limitation of soil investigation works. CPT test used in this study provides reliable in situ continuous soundings of subsurface soil. This research was conducted by analyzing the potential of liquefaction based on CPT test. Based on the results of analysis using this method, the soil layers classified by zone A shows susceptible to liquefaction.



## Abstract

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095-056

### **Performance of Cuplump Modified Binder (CBM) - HMA Containing Sasobit Wax.**

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**Abstract.** Increase in traffic loads in combination with an insufficient degree of maintenance in recent years has caused an accelerated and continuous deterioration of the road network globally. Hence, several types of measures may be effective in combatting these matters, such as, improved roadway design, use of better quality of materials and the use of more effective construction methods. The influence of warm mix additive (Sasobit) on the performance of Natural Rubber Modified Binder based on cuplump was acquired. In this work, the influence of warm mix additive loading on cuplump modified binder (CMB) on softening point, penetration properties Marshall Stability, flow and Marshall Quotient (Stability to flow ratio) were acquired. The dosage of natural rubber and additive was kept at 5% to 6% and 1% to 2% respectively for all binders. Results showed the softening point increases while the penetration property decreased indication stiffness effect with addition Sasobit wax. In addition, Cuplump modified asphalt (CMA) results in a considerable increase in the Marshall Stability (strength) value and a Marshall Quotient value (resistance to deformation). MQ increased to 40% compared to mixture without additive. It can be said that the additive provides greater resistance against permanent deformations due to their high stability and high Marshall Quotient.

## Abstract

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**028-003**

### **An Analysis of Accidents Involving Public Transport Along Highways**

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**Abstract.** For years, Malaysia is known as one of the countries that has the highest figure of fatality accident. The staggering number of fatality accidents usually involved private transportation. There are a lot of studies that focus on the causes of the accidents and therefore, a lot of policies and law enforcement have been implemented in order to reduce fatality figure in private transportation. Unfortunately, studies in public transport are not at par with private transportation. Therefore, this study is aimed to analyse the accidents involving public transport specifically, express busses along selected Malaysian highways. The analysis starts at describing the potential effects of physical factors namely locations, types of vehicles and time. Details statistical analysis on the effects of the two factors locations and types of vehicles on the number of accidents are done. Results show that for the accidents that involve buses and express busses in 2018 and 2019, locations of the accidents have significant association. Hence, this result should help bus drivers to be more alert when driving through the identified locations.

## Abstract

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102-063

### **A Systematic Review Of Marine Risk Assessment: The Fuzzy Analytic Hierarchy Process (FAHP)**

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**Abstract.** This systematic review examines the marine risk assessment (MRA) by identifying the most viable method in assessing marine risks using the latest technology. This paper centers on the Fuzzy Analytic Hierarchy Process (FAHP) where the techniques and advantages of FAHP in facilitating important decisions were analyzed. A systematic review of the literature was conducted to highlight the significance and potentials of FAHP in providing a comprehensive risk assessment analysis which serves as a standard applicable guideline in the marine industry. Firstly, a systematic search in three electronic databases (Mendeley, Scopus and ScienceDirect) was performed to collect relevant literature. They are database. Upon finalizing the data, a systematic review was conducted accordingly. Drawing from various disciplines of risk assessment, this paper presents the analysis and findings of several studies employing different analytical methods using FAHP. The results of this review offer further insights and alternatives concerning hierarchical decision-making especially in the field of risk assessment.

## Abstract

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107-067

### **Influencing Factor to Use e-hailing Transport for Food Delivery Service**

**Nuraisha Arissa Mohd, Wan Azfizatul Az Zarah Wan Mohamad,  
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**Abstract.** E-Hailing services are considered as on-demand vehicles that affect the efficiency of food delivery. This system improves the process of collecting and sending orders from customers in a short period of time. This study aims to determine the level of consumer acceptance or satisfaction with food delivery services using the e-Hailing system. The objective of this study is to identify the factors that influence the community to use e-Hailing food delivery services and to determine the most dominant factor in e-Hailing services according to Technology Acceptance Model (TAM). The location of the study is in the urban area and also semi-urban in the districts of Johor. A self-administrated online questionnaire was distributed among 258 respondents in the study area. Part of the questionnaire was constructed based on the TAM. Correlation and regression analysis were used in the analysis of this study. The results of this study show that the relationship between variables TAM, perceived ease of use and perceived usefulness are strongly correlated. Among the suggestions to increase consumers of food delivery services among e-Hailing users is to reduce delivery charges for nearby areas so that consumers can buy food at various stores. This can help other vendors and riders in this e-hailing food delivery service.

## Abstract

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103-075

### **An Overview of Speed Model Study under Different Types of Facilities in Malaysian Roadway System**

**Syed Khairi Syed Abbas, Jezan Md Diah, Muhammad Akram Adnan, and Adi Yazid Rosli**

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**Abstract.** The present paper reviewed past studies related to highway capacity studies, especially free-flow speed studies, and the measured parameters used by other researchers. The purpose of the paper is to discover the relationships between free-flow speeds with the differences in roadway characteristics, traffic composition, driver behavior and to propose a research gap related to the future study of Malaysian highway conditions. Fundamental relationships were observed over different parameters and were found to be significantly different. However, under uninterrupted flow facilities, using free-flow speed as a prediction for highway capacity analysis and determining the level-of-service (LOS), the time headway threshold, and the speed of observations at certain flow rates must be carefully studied to represent the free-flow speed in ideal conditions. The finding from the paper reviewed was used in a future study on developing a free-flow speed model based on the basic section of highways in Malaysia. Therefore, in the future, the study's findings could be used as part of an analysis that can assist practitioners with highway capacity design, planning, monitoring, and operational analysis purposes.

## Abstract

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100-081

### **Travel Behaviour Among Essential Services Workers During COVID-19 Pandemic**

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**Abstract.** During the COVID-19 pandemic, the implementation of the Movement Control Order (MCO) throughout Malaysia aim to curbing the spread of the COVID-19 pandemic has influenced ones travel behavior especially for workers who are in the essential services sectors. This essential services sectors play a very important role in facing daily needs of society during pandemic. This study was to identify the changes in travel behaviour among essential services workers before and during pandemic as well as to compare the travel risk perceptions of essential services workers during the COVID-19 pandemic. Data were collected through an online questionnaire survey and inferential and descriptive statistical data were analyzed using SPSS V25 program by selecting Chi-Square and Spearman Correlation tests. This results of this study show that there were different in significant value for this objectives and it can help owners of transportation services companies such as e-hailing or taxi to use this information to restructure and re-plan their services and operations better based on the travel needs of workers during pandemic.

## Abstract

111-083

### **Technology Landscape for Surveying and Mapping in Construction Industry**

**F Hidayat, A Arifin, M A A Farrosi, B W Soemardi, R G K Pradoto, E R Putri**

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**Abstract.** Over time, the construction industry has faced many challenges, and in the future it will even be greater. By 2030, globally it is estimated that the number of construction projects will increase by 85%, which are also demanding higher productivity but efficiency. These challenges often arise from how the construction industry able to capitalize technology and its willingness as well as ability to respond new technology. Yet, the information regarding the dynamic of technology in the Indonesian construction industry is often too limited. To provide a comprehensive view on how the technology is evolving the construction, a construction technology landscape is needed. A technology landscape, among other can assist to describe the historical utilization and development of a particular construction technology. This paper discusses a study in an attempt to illustrate how the technological landscape was developed, especially for surveying and mapping technology in the Indonesian construction industry. The study includes the collection and analysis of data through literature studies, both at the national and global levels, as well as through surveys to construction practitioners in the industry. Although it has been applied since the 15th century, the utilization and development of survey and mapping technology in Indonesia is still quite far behind the construction industry in other countries. This study shows that Surveying and mapping technology has been applied in Indonesia since the 15th century. This study shows that although in the early development of this technology is quite far behind the development of the world, the industry adaptation to survey and mapping technology in Indonesia has experienced quite significant developments. Currently, advanced technology (hardware and software) is increasingly used in various construction projects in Indonesia.

## Abstract

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123-085

### **Utilizing Hydraulic Modelling and Geographical Information System in Developing a Water Distribution Network for Reclaimed Water**

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**Abstract.** Rapid development has increased water demand, combined with population growth, water scarcity, climate change, and rapid economic growth, which are likely to be driving factors for the industrial use of reclaimed water. This paper will review previous research on developing a water distribution system for delivering reclaimed water in order to mitigate the industry's growing water demand. As a result, reclaimable wastewater should be identified in order to establish links between urban and industrial infrastructure planning and water reclamation. Correspondingly, it is tasked with the responsibility of developing appropriate low-cost water treatment solutions for industrial water reclamation. Simultaneously, a reliable water distribution network is required to deliver reclaimed water. This can be accomplished through the use of hydraulic modelling and GIS to analyse, manage, and develop the water distribution network in response to growing supply demand. Hydraulic modelling is used to calculate and analyse the demand for water supply over a specified time period based on daily water use. Additionally, it determines the appropriate parameter for the pipeline in order to deliver an adequate amount of pressure to the consumer efficiently. The developed hydraulic model was then integrated into a Geographic Information System (GIS) to facilitate the network layout and visualization of the water distribution system. Apart from that, in order to fully implement the concept of reclaimed water and its delivery via a water distribution system, several factors must be considered, including public acceptance, economic viability, environmental stewardship, technical operation, and health risk.



## Abstract

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124-086

### **Analysis of Passenger Satisfaction with MRT Jakarta Services during the Covid-19 Pandemic**

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**Abstract.** Mass Rapid Transit (MRT) Jakarta is one of the transportation mode that has an important role in supporting daily activities because of its effectiveness. In the midst of high public activity to use MRT Jakarta, the public is surprised by the epidemic that is currently engulfing Indonesia, namely the Coronavirus Disease (Covid-19). This has an impact on the issuance of policies to handle the outbreak, thus affecting the operational policies of MRT Jakarta. The purpose of this study is to find out the level of passengers satisfaction with MRT Jakarta services during the Covid-19 pandemic based on Minimum Service Standards and to analyze alternative operational policies for MRT Jakarta during the pandemic. Data collection was carried out by distributing questionnaires. To measure respondent satisfaction, the Importance Performance Analysis (IPA) and Customer Satisfaction Index (CSI) methods are used. The results showed that the index of passenger satisfaction at MRT Jakarta station got a value of 91.25% and during trips got a value of 92.40%. This shows that the level of customer satisfaction is in the "Very Satisfied" category and the implementation of the health protocol has met the health protocol set by the Minister of Health of the Republic of Indonesia

## Abstract

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083-087

### **Empirical Shear Strength Criteria for Filled Jointed of Metasedimentary Sandstone**

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**Abstract.** Rock joint shear failure criteria constitute numerical simulation that significantly governs the calculation for rock mass stability analysis. The presence of joint infilling potentially reduces the estimation accuracy for the deformation of rock joint. This study discovers the role of infilling thickness in governing the empirical calculation of linear Mohr-Coulomb failure criterion and non-linear Barton-Bandis failure criterion. A series of direct shear tests with constant surface roughness and controlled infilling material composition facilitates the joint shear strength with various infilling thicknesses. The results indicate that the joint shear strength decreases primarily with infilling material within the joint aperture. Although all the friction angles are closely similar, different cohesion values show the influence of infilling material thickness on shear strength characteristics. The joint shear strength values indicate significant differences where the filled joint shear strength reduction depends on associated infilling thicknesses and the adopted failure criterion. Multiplication to the Filled Joint Factor (FJF) normalized from the filled joint / cleaned joint ratio will precisely evaluate the filled joint shear strength. Hence, the shear strength estimation from Mohr-Coulomb and Barton-Bandis failure criteria to the various thicknesses of joint infilling will provide sufficient filled joint deformability characteristics.

## Abstract

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097-090

### **GIS Communicate Emergency Preparedness Mapping: The Usability for Rural Area**

**Nur Syazana Johari, Nazirah Mohamad Abdullah, and Saifullizan Mohd Bukari**

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**Abstract.** The importance of geographic information system (GIS) in daily life is well known as it is really helpful and eases the user. GIS is basically a database system with software that can analyse and display data using digitized maps and tables for planning and decision-making. Unfortunately, there are people in rural area that far from unreachable to apply this GIS tool in life. Thus, this reviewed study aimed to provide further understanding of the application of GIS in emergency preparedness for rural areas. It also will be able to recognize a management information system for rural planning. This systematic literature review concentrates on previous research starting from 2015 to 2020 to evaluate the application of GIS in mapping, transportation planning and network service. From 16 papers that have been analysed under eligibility test, 37.5% of them reviewed on the application of GIS, another 37.5% on emergency preparedness and 25% for rural area. The result shows there is a common type of knowledge and the way it can respond to emergency preparedness. Nevertheless, there are fewer cases related to rural areas and it shows the need for more case studies and experimental research to support this promising field. In conclusion, to meet present day and future information needs for emergency preparedness, more attention needs to be given to evaluate the effectiveness of GIS in rural areas.

## Abstract

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121-103

### **Impact of Emulsifier on Physical Properties of Emulsified Bitumen Residues**

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Norhidayah Abdul Hassan**

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**Abstract.** Enhancement of physical properties of emulsified bitumen residues are the prime concerns of researchers in order to improve the performance of cold mixture since several additives and polymers are incorporated for this purpose. However, the surfactant is used as emulsifying agent in emulsions in order to accommodate the interaction between bitumen and water particles, but the impact of surfactant on physical and rheological properties of bitumen emulsions residues is never studied. In this study, different types of bitumen with pen 80/100, 60/70 and polymer modified bitumen were emulsified at particular emulsifier content. Physical tests such as penetration, softening point and viscosity were carried out on bitumen residues to investigate the effect of emulsifier. The results indicate that emulsifier has positive impact on physical properties of bitumen emulsion residues and these results show better agreement with viscosity results.

## Abstract

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128-105

### **Experimental Study of Using Recycled Waste Tyre for Sustainable Clay Soil Stabilisation**

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**Abstract.** Clay presents construction challenges to geotechnical engineers as this material shows high compressibility, low shear strength and high level of volumetric changes. The properties of clay need to be improved before being used in any type of construction. Clay soil stabilisation either using mechanical or chemical methods are normally adopted to improve its properties. However, some of the methods are reported to be ineffective, expensive and harmful to the environment. In Malaysia, it is estimated that 8.2 million waste tyres are being produced annually. The dumping of such tyres will soon lead to a long-term environmental concern. Hence, it is proposed to reuse waste tyres as additives for sustainable clay soil stabilisation. This research investigates the effect of recycled waste tyres on the compaction and strength properties of clay soil. Clay soils were mixed with 0, 5, 10, 15 and 20% additives and the results depict that the optimum moisture content (OMC) increases while maximum dry density (MDD) decreases with increasing waste tyre additives. Unconfined compressive strength (UCS) is maximum at 15% tyre additives and then decreases with further increment of tyre additives. Waste tyre is potential to be used as additives for clay soil stabilisation.

## Abstract

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126-094

### **A Preliminary Study on Vibration Response of Profiled Steel Sheet Dry Board (PSSDB) System under Heel-drop Test**

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and N A Sutiman**

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**Abstract.** This paper aims to evaluate the vibration response of the profiled steel sheet dry board (PSSDB) composite system under heel-drop test. A total of three (3) specimens were prepared with a dimension of 840mm width and 2000mm length. The specimen consists of a sample without concrete infill (P45HL), foamed concrete infill (P45FC), and normal concrete infill (P45NC). The specimen was erected using profiled steel sheet (PSS), 1mm thickness, and connected to a dry board (DB), 16mm thickness using self-drilling screws at 200mm screw spacing along the longitudinal direction. A heel-drop test was conducted, and modal analysis was performed using MEScope software. From the analysis, the natural frequency and mode shape were obtained. The natural frequency of the first mode shape is 17.7Hz, 13.9Hz, and 4.46Hz respectively for specimen P45H, P45FC, and P45NC. It shows that the natural frequency of the specimen without infill and foamed concrete as infill is above the human comfort limitation value of 8Hz, hence it can be concluded that P45HL and P45FC will be comfortable for the building occupants.

## Abstract

126-096

### **An Overview on Physical and Mechanical Properties of Bamboo as a Natural Reinforcement in Concrete**

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**Abstract.** Bamboo regained popularity as a reinforcement for concrete, especially in simple construction because of its high in tensile strength. Bamboos material that have a fast reproduction which increases its suitability to use as a sustainable source especially in construction works. However, when bio-based materials in general, and bamboo in particular, are expected to be used in construction, the sensitivity to moisture and their durability are usually questionable. Physical and mechanical properties bamboo should be improved by treated with chemical to prevent the bamboo from insects, pesticides and ensure the longevity of bamboo. Bamboo fibres are mainly used as a natural reinforcement in concrete that can minimize energy consumption, protect non-renewable natural resources, reduce pollution and maintain a healthy environment. Therefore, this study was to review and collect data for physical and mechanical properties of concrete containing bamboo as a natural reinforcement. The addition percentages of bamboo fibres 0.5%, 1.0%, 1.5%, 2.0% and 2.5%, used in the research were evaluated. Overall, the bamboo fibres as reinforced concrete for 1.0% to 1.5% are the best ratio of mix designation that have significant increase in compressive and tensile strength that tested and reviewed after 28 days of curing. Meanwhile, the density test for concrete is shown lower compared to the British Standard of steel as reinforced in concrete. The treated bamboo that used chemical treatment were improved the bonding strength and reduced water absorption more than 50% compared to the untreated bamboo. From the review that have been done, bamboo as reinforces in concrete are suitable for lightweight construction building.

## Abstract

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117-100

**The effect of Thermal Contact Conductance (TCC) between aggregate inclusion and matrix on thermal conductivity of cement-based material**

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**Abstract.** The effect of Thermal Contact Conductance (TCC) on thermal conductivity has been studied between the interface between the limestone and cement paste of mortar. A novel methodology has been proposed involves using scanning electron microscope (SEM) to scan the image of the interface on mortar, then transform it to PlotDigitizer to create a set of points of the interface and transferred the points to Abaqus/CAE to reconstruct the interface. Moreover, several hypotheses have been proposed at the interface such as the gaps, flaws, and ITZ. In order to understand the effect of TCC, temperature drop, thermal conductivity, and the TCC coefficient have been calculated for each model. The results have shown that the temperature drop at the interface is very low and the TCC coefficients are too large except for the air gap at the interface. Thus, it could be concluded that the TCC has no influence on the thermal conductivity of mortar.



## Abstract

082-102

### **Effect of Palm Oil Fuel Ash and Eggshell Waste Powder on Compressive Strength and Heat of Hydration for Concrete**

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**Abstract.** The increase in population leads to increase in construction of building to accommodate the people. Extensive use of concrete for building purposes adds to carbon dioxide (CO<sub>2</sub>) gas being emitted into the atmosphere, leading to global warming that has already been intensified. These waste materials that are disposed of in sites may impact the environment. Similarly, carbon dioxide is emitted into the atmosphere from cement manufacturing, which is a significant environmental issue. Palm oil fuel ash (POFA) and eggshell waste powder (ESP) are two main agricultural waste produced in Malaysia in abundance. In this study, POFA and ESP were used as additives to substitute a proportion of OPC in concrete and thereby to minimize the use of OPC. The effect of concrete containing POFA and ESP on compressive strength and heat of hydration was investigated. These materials were sieve passing through 45 m to obtained the similarly OPC particles. The cement replacement of 20% with POFA and ESP was considered. Based on optimum results, the mix proportion of POFA 10% + ESP 10% achieved the optimum compressive strength of POFA-ESP at 28 days. However, the OPC concrete had the highest compressive strength. In hydration reaction of concrete, the concrete incorporating of POFA 10% + ESP 10% has recorded with the highest peak temperature, while the temperature of OPC concrete recorded lower than POFA 10% + ESP 10%. It different to the concrete containing POFA 20%, that shows the lowest temperature gains than OPC concrete. It has been found that the POFA is known has a low composition of CaO. The higher content of CaO is known to be taken place in ESP. This led to higher calcium hydroxide, Ca(OH)<sub>2</sub> produced during the hydration process and therefore did not control the heat released from the hydration temperature.t.

## Abstract

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131-104

### **Investigation on material physical properties for application in seawater-RHA concrete added with coal bottom ash**

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**Abstract.** Results are presented of a laboratory investigation to determine the properties of the material used for seawater-RHA concrete. Seawater, rice husk ash and coal bottom ash were introduced as eco-material in concrete to totally or partially replace conventional material as an effort to introduce environmental-friendly material to the construction sector. Testing was carried out on sieve analysis, fineness modulus, specific gravity and water absorption which complies with the standard available. In addition, a scanning electron microscope and X-ray fluorescence were conducted on ordinary Portland cement, rice husk ash, coal bottom ash and sand to study the surface topography and element composition of the material. It was found that specific gravity for seawater is slightly higher than tap water. Meanwhile, rice husk ash and coal bottom ash having a specific gravity lower than conventional materials. From the XRF test, rice husk ash is the type F pozzolans with silica oxide more than 90 percent and coal bottom ash has more voids compare to normal sand. These measurements are important for the mixed design to ensure reliable results during the strength performance test.

## Abstract

136-109

### **Preliminary Study of Sago Fine Waste as a Sand Replacement Material for Cement Brick**

**I Hadi Izaan, A Suraya Hani, A.W Norhayati, O Mohamad Hairi, J Zalipah, AH Noor Azlina, S Norhafizah. Mia Wimala**

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**Abstract.** This paper presented a preliminary results of utilization sago fine waste as a sand replacement material for cement bricks. Sago waste is a by-product of the extraction of sago starch. Usually, the bark is not utilized for other products and being dumped directly into the rivers or left for natural degradation. About 32,250 tons of sago bark waste annually. Sand however usually obtained by using having machineries at the riverbank which greatly contribute to damaging the ecosystem of the river and contributing to global warming. For environmental protection and sustainable development, extensive research has been conducted on production of bricks from waste materials. The replacement percentage of SFW are 0%, 5%, 10%, 15%, 20% and 25% with water content of 50% and 60%. Density, water absorption and compressive strength are the properties that has being investigated. From the results obtained, both density and compressive strength are decreasing as the percentages of SFW increasing. On the other hand, from the data of water absorption it was found that the percentage of water absorption of brick was increased correspond to the increasing percentages of the SFW. Based on the findings, the optimum brick properties are SFW1W0.6 with the strength 5.18MPa that can be used as a non-load bearing bricks and the optimum percentages of water absorption is at 13.33%. From this study, it was found that the replacement of sand by SFW give significant impact towards density, strength, and water absorption performance of concrete brick.

## Abstract

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066-035

### **Rainwater harvesting at places of worship: a case study in Australia**

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**Abstract.** Water has a special place in most of the worlds culture and religions. Most of the religions and cultural beliefs use holy water for healing and other spiritual practices. There are many countries in the world where religions are playing a great role to preserve water and care our environment. Due to the importance of religions in preserving water, religious leaders from different background met together at the United Nations and signed for the Commitment to Global Peace to ensure a better environment for present and upcoming future. That international conference also emphasized that the religions can play a significant and ethical role to preserve water in this challenging time. There are many ways of preserving water covering technical, legal and cultural aspects. Besides these, Rainwater Harvesting (RWH) is one of popular means of water saving. A few studies on RWH system at places of worship have been undertaken in some countries; however, there has not been any detail study in Australia. This research aims to explore how Islamic scripture can be used to promote water conservation among the Muslim community. Specifically, this study will examine the feasibility of a RWH system for St Marys Islamic Centre, New South Wales, Australia where a RWH system is proposed to supplement water for regular uses such as washing, gardening, and socio-religious functions. Visitors to St Marys Islamic Centre will also be surveyed to gather their perceptions of using harvested rainwater in the Centre. Based on local daily rainfall data, a water balance model will be developed to estimate water savings and financial benefits at the proposed site under different climatic conditions. The results will be useful to understand the effects of Islamic motivation and RWH on water preservation. It is expected that the outcomes of this research will promote water conservation in places of worship and community centres across the world.

## Abstract

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068-036

### **Characterisation of hot days and heatwaves: A case study for Queensland State in Australia**

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**Abstract.** Due to climate change, temperature is increasing; however, its spatial and temporal distribution and trend are less understood. To fill this research gap, this study examines nature of temperature rise in Queensland State of Australia. Based on the daily maximum and minimum temperature data of 17 weather stations covering 1969-2018, the geographical patterns as well as the temporal variations of hot days and heat waves over the State are examined. The Mann Kendall trend test and simple regression methods are employed for detecting trends. Majority of the stations show a significant increase in temperature indices, indicating the warming of the State. Out of 17 stations, 12/14 display a significant increase in the annual frequency of warm days/nights and 2/11 reveals a significant decrease in the frequency of cool days/nights. The rest of the stations show no change, except two stations showing upward trend for cold nights. The Excess Heat Factor (EHF) index is used to identify the heat waves. Over southern Queensland, frequency, total duration, and maximum duration of heat waves are found to have increase significantly with a greater magnitude compared to other parts of the State. These findings will be useful for climate adaption and mitigation measures in Queensland.

## Abstract

069-041

**Application of Coastal Protection Structure for Mangrove  
Rehabilitation & Rejuvenation of West Coast Johor. Case Study:  
Tanjung Labuh, Batu Pahat, Johor.**

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Ahmad Suhaimi, Mohd Shalahuddin Adnan, Mohd Azlan Mohd  
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**Abstract.** Tanjung Labuh beach was a muddy beach along the Malacca Strait and the shoreline was the land-sea border. The shoreline has an irregular existence and shifts because of human activities and nature, resulting in erosion and sediment eradication on the shore. The aim of this study is focuses on mangrove rehabilitation and coastal erosion assessment using application of revetment coastal protection structure. DJI Phantom 4 Pro (UAV) is a method used to identify the shoreline change in Tanjung Labuh. Measuring large-scale land recovered by land survey methods such as the complete station and GPS however demands a great deal of time and job investment. Analysis such as specific gravity, hydrometer test and sieve analysis will be carried out to obtain results on the characteristic of sediment for identified coastal erosion. The goal of this analysis was to identify the coastline change from the image taken by using drone and to analyse the data from the image by using ArcGIS mapping software and to determine soil properties, coastal properties and analyse the movement of sediment transport. The result shows during the low tide between November 2020 and May 2021 the shoreline changes are visible. This research would allow organizations or some other group to shed light on problems and the construction of this coastal structure can give a significant impact on the ecosystem of mangrove area

## Abstract

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069-043

### **Flood Modelling Studies Using River Analysis System (HEC-RAS) For Flood Plain Area in Muar City**

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**Abstract.** Floods are the most frequent type of natural disaster and occur when heavy precipitation for days or even weeks. Floods will cause extensive destruction, resulting in loss of life and disruption to personal property and vital infrastructure for public health. In this study, HEC-RAS model was used to identify the flood prone area and to determine cross section at floodplain area along the stream network. The study was conducted in the area Muar, Johor. The methodology involved collection of parameters such as length of stream, lateral & elevation of coordinates, streamline and flow data to perform a hydraulic simulation. Different value of flowrate had been used by using the manning equation to estimate the drainage or channel capability to manage the flowrate. The number of station for each cross section need to locate in order to simulate the cross section along the river or channel. Meanwhile, the result outcome will show the cross section for each station. From the result, the analysis of the cross section include with the affected area of floodplain was identified. According to the hydraulic model generated by HEC-RAS software, 7 of 20 stations found will be flood for the 10 years return period since they were unable to accommodate the water flow. By doing this research, the flood model will be developed and HEC-RAS software is one of the tool that can analyse and model for the floodplain area. In a meantime, the government can control and give an early warning about the flood incident.

## Abstract

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**060-044**

### **Concentrations of heavy metals in wood chips from wood-based manufacturing industries**

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**Abstract.** The use of groundwater in Malaysia is a natural thing because of its high frequency among the community. The study surveyed northern Kelantan due to the water problem. The majority was use groundwater among the local community. Therefore, this study aims to determine the factors that affected the frequency of groundwater use and the paid costs incurred. In the state of Kelantan, a total of 89 correspondents from 10 districts living in the state participated in this survey. Studies show that the frequency of using groundwater is high (94.4 %) among the community with low cost of electricity bills charged when getting a high percentage value (98.9 %) that supports the statement. The Chi-square test was applied to determine some of the relationships studied as groundwater knowledge in the community, frequency of groundwater use, electricity bills charged to each house, and groundwater quality. The results show that the p-value is more than 0.05 shows that the analysis has relationships between groundwater knowledge and groundwater use. Then, the result also has relationships between groundwater quality and groundwater use. However, the relationship between groundwater consumption and electricity bill, knowledge about the benefits of groundwater with groundwater consumption, and the relationship between groundwater color and groundwater odor is less than 0.05. Thus, it can prove that groundwater is very high in use to the community, and the water bills charged are very cheap and affordable. Therefore, the groundwater needs to be highlighted that its use is more widespread in Malaysia.



## Abstract

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081-046

### **Frequency Analysis on Groundwater Consumption and Water Billed to the Community in Kelantan**

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**Abstract.** The use of groundwater in Malaysia is a natural thing because of its high frequency among the community. The study surveyed northern Kelantan due to the water problem. The majority was use groundwater among the local community. Therefore, this study aims to determine the factors that affected the frequency of groundwater use and the paid costs incurred. In the state of Kelantan, a total of 89 correspondents from 10 districts living in the state participated in this survey. Studies show that the frequency of using groundwater is high (94.4 %) among the community with low cost of electricity bills charged when getting a high percentage value (98.9 %) that supports the statement. The Chi-square test was applied to determine some of the relationships studied as groundwater knowledge in the community, frequency of groundwater use, electricity bills charged to each house, and groundwater quality. The results show that the p-value is more than 0.05 shows that the analysis has relationships between groundwater knowledge and groundwater use. Then, the result also has relationships between groundwater quality and groundwater use. However, the relationship between groundwater consumption and electricity bill, knowledge about the benefits of groundwater with groundwater consumption, and the relationship between groundwater color and groundwater odor is less than 0.05. Thus, it can prove that groundwater is very high in use to the community, and the water bills charged are very cheap and affordable. Therefore, the groundwater needs to be highlighted that its use is more widespread in Malaysia.

## Abstract

079-047

### **Effect of Spent Tea Leave Dosages on the Removals of Chemical Oxygen Demand and Total Phosphorus from Synthetic Food Processing Wastewater**

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**Abstract.** In the food processing industries, enormous amounts of water are utilized in the manufacturing process. Therefore, wastewater discharged from food industries must be characterized to assist in developing various viable treatment technologies. In this study, the adsorption method is used throughout the investigation and spent tea leave is used as a potential adsorbent to remove the concentrations of chemical oxygen demand (COD) and total phosphorus (TP). The synthetic wastewater sample containing COD, TP, suspended solids, and ammoniacal nitrogen was prepared to mimic the actual food processing wastewater as reported in the literature. The synthetic wastewater samples were formulated using analytical grade chemicals such as glucose anhydrous, sodium dihydrogen phosphate, kaolin, and ammonium chloride. The concentrations of the targeted parameters in the synthetic samples were first identified using the calibration curves. Then, this study was carried out in batch adsorption technique to identify the removal of COD and TP using varied adsorbent dosages between 100 mg/L to 500 mg/L. This study found that TP and COD were removed up to 75.04% and 15.5%, respectively, at the adsorbent dosage of 500 mg/L. Furthermore, the trend of TP and COD removals is increased as the adsorbent doses increased due to the availability of binding sites being higher at higher adsorbent dosage. Therefore, the results from this study suggest that spent tea leave has the potential to be used as an adsorbent to treat wastewater containing organic pollutants such as COD and TP.

## Abstract

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049-048

### **Innovative Trend Analysis of Reference Crop Evapotranspiration in Peninsular Malaysia**

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**Abstract.** The inconsistencies in reference crop evapotranspiration (ET<sub>0</sub>) trends due to the occurrence of climate change have been detected over the world. This has substantially affected both the local and global water resources. The objective of this study is to investigate the historical trend of ET<sub>0</sub> and its meteorological variables in Peninsular Malaysia. The meteorological data in daily scale, such as minimum, maximum and mean air temperature, relative humidity, wind speed and solar radiation covering the 2000-2019 period were obtained from Malaysian Meteorological Department and used to compute the ET<sub>0</sub> estimation using FAO-56 Penman Monteith model. Then, innovative trend analysis was used to detect the variations trends in ET<sub>0</sub> and its meteorological variables. The results showed that significant positive ET<sub>0</sub> trends were found at Ipoh, Kuantan and Pulau Langkawi stations respectively and no significant negative ET<sub>0</sub> trend can be found in the study area. The finding of the study can be used to achieve support and improvement in the efficiency of irrigation regions and optimal water resources planning and utilization.

## Abstract

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148-123

### **Understanding the Alternative Evapotranspiration Estimation Methods for Batu Pahat Climatic Condition**

**Hartini Kasmin, Khairul Azhar Abd Razak, Amy Syahira Buzaimi,  
Hanani Naqibah Mohd Azman, Amirul Faiz Muhammad Suhaimi,  
Noor Aliza Ahmad**

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**Abstract.** Urbanisation had replaced the vegetation and soil cover, hence increasing the heat retention by reducing the benefits of natural cooling mechanisms provided by evapotranspiration. The objective of this study is to investigate and to understand the performance of the alternative estimation for selected evapotranspiration (ET) methods for Batu Pahat station. Since the data is limited, ET estimation using temperature-based used are Thornthwaite, Blaney-Criddle (original) and Blaney-Criddle by FAO86. Online data collection for radiation data were used to estimate ET using basic radiation-based, the Penman (original) and Turc methods. Correlation results shows that all three temperature-based method could be used to estimate ET. However, for radiation-based method, the Turc method seems slightly overestimated than the other four methods and does not correlated with the Penman.

## Abstract

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007-002

### **Factors Influencing the Purchasing of Affordable Housings: Housing Purchasers**

**P F Wong, Z F Eng, F Y Y Yong, F C Chia, and Z Q Li**

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**Abstract.** The housing affordability crisis has been a severe issue in many countries including Malaysia. In Malaysia, the provision of affordable housings by the government was unattractive in terms of its attributes. Numerous previous studies were conducted on the preferences of housing in Malaysia. However, there are limited studies dedicated to the preferences of affordable housings from B40 and M40 house purchasers' perspectives. Therefore, this study aims to investigate the factors influencing the purchasing of affordable housings by B40 and M40 house purchasers. Four main attributes identified that influencing the purchasing of affordable housings, which are financial, general, accessibility, and neighbourhood. Questionnaires were distributed to B40 and M40 house purchasers in Klang Valley. 119 responses were received and analysed by Arithmetic Mean, Mann-Whitney U Test, and Kruskal-Wallis. This study discovered that house purchasers would prioritise financial attribute more than other attributes when purchasing affordable housings. This study also revealed that different social demographics of house purchasers have different prioritisation in purchasing affordable housings. The findings of the research are useful to policymakers, local and housing authority, and property developers in the provision of affordable housing with attributes that are aligned with the preferences to house purchasers.

## Abstract

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030-004

### **Economic Model of Green Building Construction: A conceptual Model**

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**Abstract.** The current research shows that green building received inadequate support from industry parties due to its high up-front cost. There are no existing guidelines focussing on how to minimize the issues of high up-front cost and for that reason, not all clients willing to get involved in green building construction. Hence, to increase their interest in investing in the green building, this research aims at formulating an economic model of green building construction using Structural Equation Modelling (SEM). The research objectives are to identify the green buildings elements, examine the most expensive elements, recommend the strategies in minimizing the cost of green building construction and to formulate and validate an economic model of green building construction. The model is one of the strategies to minimize the total cost, increase the client's interest to invest in green building as well as facilitate construction stakeholders from inception to completion stage; in line with the Twelve Malaysia Plan "Economic Empowerment and Environmental Sustainability".

## Abstract

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104-064

### Conceptual Framework in Mitigating Construction Dispute

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**Abstract.** Construction dispute is a common issue in the construction industry. Moreover, Construction projects are increasingly complex to suit the current requirement and design, resulting in a complicated contract document between stakeholders. Thus, complex construction can likewise lead to a complex dispute, which arises from the sophistication of the work, multiple prime contracting parties, poorly executed contract documents, inadequate planning, financial issues, and even communication problems. Hence, this paper aims at developing a model for mitigating the construction dispute in Malaysia using the questionnaire survey and semi-structured interviews. Specifically, the objective was to classify the attributes of the current construction dispute in the Malaysian construction industry, examine the construction dispute resolution available under the various Malaysian standard form of contract, and determine the strategies of construction dispute mitigation management. Thus, the model will be validated using Structural Equation Modeling and could then guide the stakeholders to mitigate their future disputes.

## Abstract

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093-071

### **Defining the Existence of Housing Submarkets for the Terraced Properties in Johor Bahru, Malaysia.**

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**Abstract.** Research on housing submarkets has been developing since decades ago and the needs to segregate the heterogeneous property market into several distinct submarkets is obviously important in real estate field. Housing submarkets can be interpreted as a set of dwellings that are reasonably close substitutes for one another, yet relatively poor substitutes for dwelling in other submarkets. Housing submarkets analysis aids to improve the predictive accuracy of housing price and explore dynamic changes in the property market. The structure of housing submarkets is basically determined by the spatial diversities in a bundle of housing structural, locational and neighbourhood attributes. This study attempts to define and explore the existence of housing submarkets for the terraced properties in Johor Bahru by using the housing transaction database obtained from the Malaysian Valuation and Property Services Department (JPPH). The database records 63,036 cases of housing transaction from year 2009 to 2018 with thirteen independent housing structural and locational attributes. This research proposes an objective approach of data-driven methodology by integrating Principal Component Analysis and Cluster Analysis in delineating the housing submarkets. Results suggest that there is significant and clear existence of housing submarkets within the property market. Two particular submarket effects were delineated and the results can be used by property valuer, analyst and urban planners to expand their understanding on the current real estate condition.



## Abstract

078-057

### **Advantages and Challenges of Implementing Building Information Technology (BIM) in Industrialised Building System (IBS) Construction Project in Malaysia**

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**Abstract.** BIM acts as a digital representation of constructed facility and offers an important line of integration which is crucial in IBS. Researchers believe that BIM can lead to cost reduction and improve budgeting and cost estimating capabilities in IBS construction project. BIM also has the potential to improve the designing process in IBS project. However, the development of construction industry in Malaysia are not looking up to expected which has the lowest contribution in economic productivity levels and adaption is needed in construction industry to make it up to expected. Hence, this research is aimed to identify the advantages of implementing BIM in IBS construction and investigate challenges of BIM implementation in IBS construction in Malaysia construction industry. A questionnaire survey was distributed to Grade 7 IBS contractors with BIM experience in Wilayah Kuala Lumpur and 44 respondents were received. The data obtained by frequency analysis by using SPSS software. Based on the results, the most agreed advantages are visualization of design, improve budgeting and cost estimating, monitoring and controlling cost and cash flow, installation process, and initial work process while the most agreed challenges of implementing BIM in IBS construction industry in Malaysia are high cost required for BIM training, for BIM experts and tools, lack of protection for intellectual property right, insurance applicable to BIM implementation in IBS and BIM standard.

## Abstract

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078-042

### **Acceptance on Building Information Modelling (BIM) Training in Selangor Construction Industry: Current Trend and Impediments**

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**Abstract.** Building Information Modelling (BIM) is known as one of the innovations of Information Technology (IT), globally used as a platform to promote collaborative and integrated working environments in the construction project management. The main objectives of this study are to determine the current BIM training trend of contractors in the Malaysia construction industry and to identify impediments of BIM training acceptance in the construction industry in Malaysia. Out of 90 questionnaires distributed to G5 to G7 contractors, 60 responded fully to the questionnaire, giving 67% of response rate. The data were analyzed using statistical package of social science (SPSS) version 26 and Microsoft Excel to obtain frequency, percentage and mean value. This findings from the current trend of BIM training shows that very little company are actually implementing BIM. Majority of the company do not have any clear strategies BIM training. There are impediments of BIM training acceptance in construction industry such as high cost of software and updates, implementing process and technology and lack of support and incentive from government and professional bodies. This research justifies the need for more strategic provision by the government to ensure greater acceptance of the construction industry towards BIM training.

## Abstract

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135-018

### **A Study of Traffic Congestion Influenced by the Pattern of Land Use**

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**Abstract.** Traffic congestion has contributed to economic loss and increased the number of traffic accidents. Previous studies have revealed that the land use pattern in Kuala Lumpur is dispersed and leads to traffic congestion. Thus, this study is to investigate the type of land use that affect the traffic congestion in Kuala Lumpur and the relationship between land use and traffic congestion. The data in this study was collected by using 384 design questionnaires and analysed by using descriptive analysis and regression analysis. The results showed that the high proportion of commercial land use causes the highest level of traffic congestion. This study makes contributions as a reference for the students to gain knowledge on how traffic congestion is influenced by the land use pattern and appropriate land use planning such as mixed-land use or grid plan are important to reduce traffic congestion.

## Abstract

021-007

### **Reliability of 15-minute UAV footage volume for estimating urban traffic flow rates: A preliminary study**

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**Abstract.** This study discusses the reliability of 15-minute data collection from the unmanned aerial vehicle footage as an alternative for conventional 1-hour data collection for traffic analysis. The selected study locations are five urban intersections along Jalan Bakri, Muar, Johor. The 12-hour data was obtained from a manual commuter counting to identify the peak hour along Jalan Bakri. Based on the time series analysis, the peak hour was identified which is from 5.30 to 6.30 p.m. with a peak hour factor of 0.94. The actual flow rate during peak hour and the volume from 15-minute unmanned aerial vehicle footage multiply by 4 and peak hour factor value were compared using the t-test. The P-value obtained is 0.732 which is greater than 0.05 for 95 percent confidence. Therefore, the difference between the means is not statistically significant. In summary, there is evident to prove that the outcome from the unmanned aerial vehicle footage data during the peakiest 15-minute interval has no significant difference with the outcome from 1 hour data collection during peak hour. This verification result shows that the 15-minute data collection during peak hour can be applied to facilitate the intersection performance analysis besides can enhance the use of unmanned aerial vehicle in traffic study.

## Abstract

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077-110

### **Assessment on Permanent Deformation of Hot Mix Asphalt Contained Crystalline Waterproofing Additives as A Filler**

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**Abstract.** This study investigated the rutting performance of asphalt mixtures through its deformation measurement in the laboratory. In total, four different asphalt concrete mixtures were tested that containing 50%, 75% and 100% crystalline waterproofing agent replacement of the total weight of filler and one more sample is control asphalt mixture without CWA. The asphalt concrete mixtures samples with NMAS 12.5 were prepared by referring to Superpave mixture design method. The rut depth of dry and wet samples were measured using wheel tracking machine and compare with control sample. The results show rut depth of wet sample containing 100% crystalline waterproofing agent replacement is the lowest compare to other samples of wet and dry condition. Therefore, it can be concluded that by modifying filler with crystalline waterproofing agent was significantly improved samples resistance to rutting compare to control.

## Abstract

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077-114

### **Road Profile Generation Based on Real Road Profile for The Whole Life Pavement Performance Input Data**

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**Abstract.** Road profile is one of the inputs for whole life pavement performance (WLPP) model. It used to predict the dynamic loading from vehicles. In this study, few road profiles were generated and compared with the measured road profiles. Two samples of 300 m road profiles were determined from road scanner. For profile generation, Profile Viewing, ProVAL Analysis software and Matlab were used to filter unwanted wavelength, visualize the measured road profile data and obtain profile International Roughness Index (IRI) and generate road profile base on Power Spectral Density (PSD) approximation equation. Calibrations between generated and measured road profiles were done by computing the correlation coefficient values. As a result, all generated road profiles are applicable to be use in WLPP models

## Abstract

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146-120

### **A Study on Check Dam Design at Peat Soil Area for Peat Fire Management**

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Mohammad Ifratshim Muhamad Saed and Mohd Afezan Yahya**

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**Abstract.** In the past decade, incidents of peatland fires have occurred in Malaysia, especially during the prolonged dry weather between February to May and July to October of each year. The canal blocking system or check dam is commonly used in to control water table in peatland. The objectives for this paper are to review the common check dam used for peat fire management. Next to propose a suitable check dam for peat fire management and to prepare Sketchup model. The case study at Ayer Hitam Forest Reserve (AHFR) is located in the district of Muar, Johor State, with a total area of 3,797 hectares (ha.). There are four phases in designing a check dam. Phase I is to review the check dam that have been produced before. Next, phase II is a design concept for check dam that suitable for construction on peatland areas. Phase III, engineering design involves calculations related to engineering, Auto- CAD drawings and construction price estimates. Phase IV is the last phase which is to produce a model using paper model or Sketchup software. In conclusion, the study manage to innovate a check dam for peat fire management at Ayer Hitam, Muar.

## Abstract

067-045

### **Simulating the Impact of Vehicle Speed on the Life of Bituminous Pavement**

**Muhammad Imran Khan, Siti Yusrina Binti Zainal Abidin,  
Muslich Hartadi Sutanto, Fadhli Wong and Mastura Bujang**  
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**Abstract.** Due to visco-elastic nature, the performance of flexible pavements depends on temperature and loading conditions. This study investigates the influence of different speed of vehicle and binder type on stiffness modulus and the corresponding pavement life. The filed data was collected from pavement section at Bukit Mertajam, Penang, Malaysia. The data were used to determine the stiffness of binder and corresponding stiffness of wearing and binder courses at different speed of vehicle (30, 50, 70 and 80 km/h) using analytical equations. The data of layer properties (stiffness and poisons ratio) and axle loading (wheel load, tyre configuration) were incorporated in BISAR software to determine the horizontal tensile strain at bottom of binder layer and vertical compressive strain at top of subgrade. The strains were then used to predict pavement life passed on fatigue and rutting failure criteria. It was concluded that increasing speed of vehicle (from 30 km/h to 80 km/h) causes about 24% increase in stiffness modulus of wearing course. Similarly, asphalt mixture with Pen 80/100 grade bitumen has lower stiffness modulus compared with Pen 60/70 grade bitumen. Furthermore, reducing speed of vehicle (i.e., increasing loading time) causes reduction in fatigue and rutting life of pavement. Therefore, it is required to consider speed of vehicle while designing flexible pavement in addition to other mix design consideration.



## Abstract

118-121

### **Adhesion Characterization of Palm Oil Mill Sludge Modified Asphalt Binder**

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**Abstract.** The adhesion of mineral aggregates to asphalt binder is an important characteristic that describes the quality of the asphalt mixture, the performance of the asphalt pavement, and the resistance to distress. The lack of bonding can cause considerable harm to the asphalt pavement. Generally, the adhesion is depended on the source or type of aggregate and asphalt binder. This study aims to investigate the adherence coverage of palm oil mill sludge (POMS) modified binder with aggregate. Base asphalt binder of penetration grade 60/70 was blended with 1%,2%,3%,4%,5% of POMS to produce the modified asphalt binder. POMS modified binder then mixed with the granite aggregate to produced loose mix sample. In this study, boiling test procedure was used to reduce the adhesive bonding of the loose mix sample. Then, Image J software was used to evaluate stripping area. The result from image analysis revealed a difference in stripping area, as the difference amount percentage of POMS in modified asphalt binder. Up to 4% POMS modified asphalt showed a better resistance toward moisture compared to un-modified asphalt. Image J helped to produce a clear stripping result compared to visual observation. In conclusion, POMS can be used as an asphalt modifier with satisfied adhesion.

## Abstract

032-006

### **Structural Behavior of Different Fill Materials for Low Cost Housing Earthbag Sustainable Construction: Case Study of Budaka District, Uganda**

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**Abstract.** Earthbag construction has been identified as one of the methods of construction which is cheap, strong, and quick to build. However, there is still uncertainty, on which kind of fill materials to use. Therefore, this study looks at the behavior of different soil fill materials in Budaka district, Uganda. Four samples were randomly obtained from the case study area. Hydrometer test was carried out with results analysed as per ASTM D 421 and ASTM D 422. The sieve analysis is conducted with reference to the Unified Soil Classification System (USCS) (ASTM D2487-11) for soil characterization. A total of sixteen samples were prepared by varying the percentage of clay treatment at 15%, 30%, 40% & 50% for compressive strength and plasticity index tests. The results indicate that the soil constituent with the least composition percentage is silt at 12.1%, whereas the highest is sand at 71.9%. The sampled soil was classified as sandy loam soil based on textural triangle. There was no significant change in compressive strength as it varied from 4.44 " 4.77 MPa for clay treatment from 15 " 50%. The lowest and highest plasticity indices are 10.3% and 58.2% at 15% and 50% clay treatment, respectively.

## Abstract

147-122

### **Investigating the Properties of Asphalt Mixes Containing Recycled Polyethylene Terephthalate Fiber**

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**Abstract.** A large volume of traffic loading on asphalt pavement at high temperature frequently resulted in pavement deterioration due to reduction in strength and loss of structural integrity. This paper presents the effects of recycled polyethylene terephthalate fiber prepared with 0%, 0.5% and 1.0% by the weight of mineral aggregates. Conventional bitumen 60/70 penetration grade was used as the base binder. In this study, the size of recycled polyethylene terephthalate fiber used was in the ranges of 1.18 mm to 2.36 mm. Specimens were compacted and tested for dynamic creep, resilient modulus and resistance to rutting. It was found that the creep stiffness specimens prepared with 0.5% recycled polyethylene terephthalate fiber tested at 1800 and 3600 load cycles has increased by 11.7% and 23.8% and reduced permanent deformation by 8.7% and 8.4%, respectively. Furthermore, the resilient modulus specimens containing 0.5% recycled polyethylene terephthalate fiber also has increased by 10.0% and 55.1% while the rutting values decreased by 13.7% and 13.9%, correspondingly. In addition, specimens containing 0.5% recycled polyethylene terephthalate fiber exhibits higher mixes stiffness, low rutting and permanent deformation irrespective of test temperature. Thus, incorporation of 0.5% recycled polyethylene terephthalate fiber in asphalt mixture contributes higher resistance to rutting. It can be concluded that specimen containing 0.5% recycled polyethylene terephthalate fiber promotes better asphalt mixture performance compared to conventional mix.

## Abstract

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006-106

### Dynamic Creep Performance of Hot Mix Asphalt Mixture Incorporating Fibre

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**Abstract.** Rutting is one of the distress that develops gradually as the number of load applications increases and appears as longitudinal depressions in the wheel paths and small upheavals to the sides. For this reason, numerous studies conducted on modification asphalt binder or mixture by various fibre. This paper presents the evaluation of creep modulus and permanent deformation of modified asphalt mixture with fibres. In order to envisage the modified asphalt mixture, Forta-fi, Kenaf and PET was blended to estimate the creep properties and rut depth value at different loading pattern. Superpave mix design method was employed with NMA 12.5mm to obtain the optimum bitumen content established at 4% air void. In the respect, bitumen 60/70 penetration grade with 0.5% of Forta-Fi, 0.1% Kenaf fibre and 0.5% PET by weight of asphalt mixture were prepared. Dynamic Creep Test was performed in accordance to the EN 12697-25:2005 guidelines using the Universal Testing Machine (UTM). As the result, the minimum value of permanent deformation was found at 0.5% of PET. Based on these studies, adding a minimum percent of PET in the asphalt mixture shows a better resistance to rutting deformation and enable a better understanding of the properties in modified asphalt mixtures.

## Abstract

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112-073

### **A Review: Study on Spent Garnet as Construction Material**

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**Abstract.** Numerous environmental problems are mitigated by natural resource depletion, with an annual global use of nearly 25 billion tonnes, including aggregates. Fast industrial growth has witnessed the ever-increasing exploitation of sand from rivers for various construction resolves, which caused an over-exploitation of rivers beds and disturbed the eco-system. This issue also relates to waste generated each year. The bulk of waste was estimated to increase, which can reduce space in the world and can cause pollution. Many researchers have come up with inventions and ideas to manage that situation. Some researchers use the spent garnet in a concrete mix as a partial fine aggregate replacement. The alternative in a concrete mix depends on the properties of the spent garnet that is used and the appropriateness. In this paper, a critical review of spent garnet were discussed in detail.

## Abstract

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086-093

### **Prediction of Vibration Criteria Assessment on Floor due to Human Walking**

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**Abstract.** The rapid growth occurs today in urban area increase the risk of having disturbing vibration in building. The development of concrete material technology and structure design in Malaysia may not consider the effect of vibration from seismic and other sources. Floor vibration generally makes people anxious and in long term effect it can damage the structure of building. The main purpose of this study was to run a dynamic analysis at the first floor of Faculty of Technology Management and Business (FPTP) to achieve the natural frequency, mode shape and time history. From the result of analysis, it is compared with the vibration criteria guideline by Gordon (1998) to identify the sensitivity of the floor. This study is mainly focus on the vibration induced due to human walking by using Finite Element Modelling (FEM) in ANSYS and MATLAB software to perform modal analysis and transient analysis. From dynamic analysis the natural frequency and mode shape is achieve and time history achieve from transient analysis. The result was compared with the guideline to identify the sensitivity. The floor that was use in this study falls at VC-E according to the vibration criteria guideline which is categorized as the lowest level of vibration.

## Abstract

137-111

### **Strengthening of Reinforced Concrete Beams With Circular Opening at Flexure Zone By Various Types of Fiber Reinforced Polymer**

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**Abstract.** This paper aims to investigate the flexural behaviour of reinforced concrete (RC) beams containing circular opening at mid-beam span and strengthened using externally bonded Textile Reinforced Concrete (TRC) sheets, Carbon Fibre Reinforced Polymer (CFRP) sheets and Carbon Fibre Reinforced Polymer (CFRP) plates. The flexural behaviour including ultimate load, deflection, crack pattern as well as failure mode was investigated. Five RC beams with the dimension of 1700 mm length and cross section of 200 mm x 250 mm with design concrete strength of 64 N/mm<sup>2</sup> were tested under 4-points loading. The tested RC beams consists of solid beam as a control beam, unstrengthened RC beam with circular opening and strengthened RC beams with circular opening. The circular opening with ratio of 0.32 is classified as small opening with diameter of 80 mm was kept constant for all beam specimens. The inclusions of circular opening at the middle of beam span slightly decreased the ultimate load of beam about 6.2% compared to control beam. The reduction of stiffness was also experienced in RC beam with opening. The application of strengthening in beams with circular openings manages to re-gain the beam capacity about 17.5 to 22.6% higher than the unstrengthened RC beams with opening.

## Abstract

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138-113

### **Surface Temperature Profile of Cement Mortar with Infiltrated Water**

**Mariana Dina, Nickholas Anting, Alvin John Meng Siang, Nor Hazurina, Faisal Sheikh Khalid and Joewono Prasetyo**

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**Abstract.** Leakage detection in concrete is one of interesting field materials engineering. The conventional approach such as using ultrasonic device, are only effective to identify the source due to piping burst. However, leakage due to crack and microcrack that presence in the concrete slab is hard to detect, and its effect only can be observed after long period of time. The main objective of this research is to determine whether there were have significantly difference or not between the surface temperature of the mortar sample. Parameters that will be measure is a surface temperature. This experimental work is conducted by using a mortar size 200mm x 200mm and its thickness is fixed on 50mm. The presence of leakage will be stimulate using the five locations of point at the bottom of the mortar. This experimental work will conduct for 6-hours and the samples will be evaluated based on the surface temperature in every 5 minutes, continuously using a data logger (Graphtec 200) that connected to Thermocouple Type-T as a temperature sensor. The constant variables in this experiment are fixed in water cement ratio and thickness of mortar, and the manipulated variable is a various point of leakage. The differences between the surface temperature whether it is significantly or not will be determined at the end of study.



## Abstract

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141-117

### **Initial properties of 3D printing concrete using Rice Husk Ash (RHA) as Partial Cement Replacement**

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**Abstract.** 3D printing concrete is an alternative technology for construction industry that are gaining interest among the developers and contractors worldwide. 3D printing concrete requires a good quality printing material that are buildable, strong and durable to be used as construction material. This present study uses Rice Husk Ash (RHA) as cement material replacement in in 3D printing concrete. Initial investigation was carried out to assess the suitability of RHA as cement replacement by conducting basic cement test such as cement consistency, setting time and workability of the mortar. The amount of RHA was constant at 20% used as cement replacement. From this study, the appropriate water-binder ratio of RHA cement replacement was 0.45:1. As for setting time, the time required for mortar mix to be transport and delivered through the nozzles for 3D printing was achieved by implemented the 20% RHA as cement replacement which are initial time at 155 minutes and final time at 312 minutes. The flowability of the mortar with RHA were found to be printable and fulfill the requirements of mortar for 3D printing. Hence, RHA exhibits promising material to be used as cement replacement in 3D printing construction.

## Abstract

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054-023

**Treatment of Fiberboard Industrial Wastewater Sludge by using  
Bioaugmentation and Solidification and Stabilization (S/S)  
Method in Short Duration**

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**Abstract.** Fiberboard industrial wastewater sludge is a type of waste produced as a by-product of the wastewater treatment plant, which consists of organic matters that can turn into toxic and hazardous forms if left untreated. Hence, this study aims to remediate the sludge by using fungi bioaugmentation and solidification and stabilization (S/S) method in 7 days. This study focuses on the degradation of organic contaminants based on leaching behaviour of Chemical Oxygen Demand (COD). Besides, the compressive strength was also measure for safe disposal. *Aspergillus brasiliensis* ATCC 16404 was used for fungi bioaugmentation of sludge and Portland cement was used as the binder in the S/S method. After a week, bioaugmentation method shows the lowest COD concentration (467mg/L). Whereas, by using S/S method, COD concentration was higher compare to bioaugmentation (550 mg/L). By using both method, COD concentration was detected higher than single method (570 mg/L). Since both methods were less successful in removing COD, it is highly recommended to conduct in longer duration for future work.

## Abstract

056-028

### Removal of Phosphorus from Domestic Wastewater by Using L-shape Semi Aerated Steel Slag Filter System

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**Abstract.** Excessive amount of phosphorus in wastewater is a major cause of the eutrophication phenomenon. It is essential to remove phosphorus from wastewater before discharge into the environment. However, removing phosphorus from treatment plants required a high cost for the chemical treatment system. Thus, this study was conducted to investigate the effectiveness of L-shape semi aerated filter with steel slag as a media to create an alternative solution to remove phosphorus from domestic wastewater. The L-shaped semi aerated filter was constructed and installed onsite at Sewage Treatment Plant (STP) UTHM. Then, the laboratory test was conducted twice a week to analyse five parameters including pH, turbidity, dissolved oxygen (DO), chemical oxygen demand (COD), and total phosphorus (TP). The results obtained show that the effluent from the L-shape steel slag filter was alkaline with a pH value range between (7.22 to 9.71) because of the nature of steel slag, which an alkaline media. Turbidity value at vertical effluent was higher than horizontal effluent as it was affected by the concentration of the steel slag. In the aeration system, the DO value was higher (1.5 to 6.9mg/L) due to the presence of oxygen, while, in the unaerated system, the DO value was decreased to (1.27 to 5.5mg/L) due to limited oxygen induced into the filter system. The removal efficiencies of COD concentration are ranged from 10% to 76%. Therefore, it indicates that the L-shape filter system was efficient in removing the concentration of COD of domestic wastewater. Lastly, the removal efficiencies for total phosphorus were in the range of 29% to 68%. From the results obtained, steel slag with high-Ca content showed excellent potential in removing phosphorus from domestic wastewater.

## Abstract

039-008

### **The Effectiveness of Non-Woven Geotextiles as A Filter Media for Total Suspended Solid Removal**

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**Abstract.** Water with high turbidity can significantly reduce the aesthetic quality of lakes and streams, having a harmful effect on recreation and tourism. Besides, it may harm fish and other aquatic life by reducing food supplies and affecting the functioning of the gill. Likewise, total suspended solids, this refers to small solid particles which remain in suspension in water. It is used as one indicator of water quality and is the main cause of turbidity. The objectives of this study are to remove total suspended solid (TSS) concentration and turbidity (NTU) by using Non-Woven Geotextiles (NWG) as a filter media. Other parameters plus such as BOD, COD, DO, pH and NH<sub>3</sub>-N were also taken into account to determine the quality of Penchala River. Performance of NWG was also assessed with Water Quality Index (WQI) calculation. The baseline data showed the TSS value was 150 mg/L (Class III) and the value for turbidity was 154 NTU (highly turbid). NWG properties used are 100% polypropylene materials, with properties design of 190m (0.19mm) AOS, 2.2mm thickness and permittivity 2S-1. Results showed that the NWG was effectively removed TSS and decreased the NTU level by 70% reduction, therefore, significantly improved the river classification from Class III to Class II. Other parameters that showed improvement was COD, with average percentage improvement of 17.2%. Meanwhile data such as BOD, pH and NH<sub>3</sub>-N were remained unchanged throughout the study period. As overall, the WQI for Penchala River during prior time of study was in range 83.78 " 86.70 (Class II) and will be transformed to Class I after continuous treatment with NWG filtration media.

## Abstract

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109-074

### **MSMA Implementation Factors in Integrated Stormwater Management.**

**Mohd Luqman Ismail, Sharifah Meryam Shareh Musa, Narimah Kasim and Rozlin Zainal**

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**Abstract.** The Department of Irrigation and Drainage Malaysia (DID) released the Urban Stormwater Management Manual for Malaysia (MSMA) in 2000 as a guideline to address long-term national goals and priorities in ensuring that sustainable urban drainage systems are properly used. MSMA's emphasis on control at source approaches may be divided into three categories: water quantity control, erosion and sediment control, and water quality control. As highlighted in the manual, a successful implementation of its principles and techniques though calls for involvement of various professionals including engineers, urban planners, environmental scientists, landscape architects and other professionals. Apart from civil engineers, not much known about the other professionals involvement in execution of MSMA. Taking this into consideration, this paper discusses the findings of a survey carried out to assess the levels of understanding and involvement of urban planning professionals in the implementation of MSMA. The study was conducted using a questionnaire form approach in obtaining feedback from the respondents involved. Questionnaires designed to assess the levels of understanding and involvement of the urban planning professionals in MSMA were distributed to randomly selected urban planning professionals from government agencies and private firms. The responses were then tabulated and analysed using the Statistical Package for Social Sciences (SPSS) software. The findings of the study are based on the highest mean values for each category in order of priority: policy management and action (3.8000), education and marketing (3.7317), cost and maintenance (3.6463), and technological design (3.8171). Based on this order of priorities can indicate the main factors that are obstacles to the effectiveness of the implementation of MSMA.

## Abstract

031-005

### **Adsorption Isotherms of DMP, DEP, DBP and BBP Compounds in Synthetic and Sembrong River Sediment**

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**Abstract.** This adsorption experimental study determines the maximum percentage adsorption of the final concentration of DMP, DEP, DBP, BBP, DEHP, and DNOP compounds adsorbed onto Sembrong river sediment and synthetic sediment at a fixed weight of dosage over some time and initial concentrations. The approach of this study is to optimize the time of contacts and initial concentrations of DMP, DEP, DBP, BBP, DEHP, and DNOP compounds on synthetic and river sediment at a fixed dosage weight of 0.01g. The times of contact and initial concentrations ranged between 0.5 hours to 24 hours and 8 ppm until 35 ppm. Both synthetic and river sediments adsorbed most PAEs compounds at 24 hours which indicated that PAEs compound reaches optimum equilibrium adsorption at 24 hours. The size of the sites weighing 0.1g adsorbed an optimum 8ppm concentration of PAEs. Both synthetic and river sediment followed the Langmuir and Freundlich isotherms. Comparison of both Langmuir and Freundlich adsorption isotherm models showed adsorption isotherms are favourable. Sembrong river sediment is adsorbent sediment storage of PAEs compounds. The adsorption of the PAEs on sediments is effective because the removal percentage of concentration is high. The adsorption process occurs quickly because PAEs compound is hydrophobic and tends to bind to sediment effectively.

## Abstract

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026-018

### **Evaluation of rainwater harvesting systems in three major cities of New South Wales**

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**Abstract.** Rainwater harvesting (RWH) systems are increasingly being embraced as an alternative fresh water source to reduce pressure on mains water. Australia is a big continent with highly variable rainfall from location to location, so there is a greater need to assess and identify its potential at specific locations, which helps in better planning of rainwater utilisation and other relevant water resources management issues in Australia. This paper presents reliability and water-saving potential of a RWH system in three major cities namely Sydney, Newcastle and Wollongong of New South Wales (NSW), Australia. A python-based tool is developed to evaluate a RWH system using daily water balance modelling approach which uses input data like daily rainfall, roof area, overflow losses, daily water demand, and first flush. Three different water uses (toilet and laundry, irrigation and combined use) and five tank sizes ranging from 1, 5, 10, 20 and 30 kL are considered to enable selection of optimum rainwater tank size for all the three locations. It is found that the sizing of the rainwater tanks is influenced by a number of factors including catchment area, number of households, water demand and rainfall patterns. This study will help in the decision-making process regarding implementation and optimization of a RWH system in these three major cities. It also provides insights of a RWH system regarding water savings, use case scenarios and demand/supply capability according to a given set of inputs/requirements. This research will contribute towards achieving water related sustainable development goals.

## Abstract

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062-091

### **Preliminary Assessment on Water Quality of Different Wastewater Using Solar Water Distillation Technique**

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**Abstract.** In rural and isolated areas, there might be limited access for fresh water sources. Thus, this study evaluates the water quality of two different wastewater using solar water distiller and to determine whether the treated water comply to the standard limit of drinking water from the Ministry of Health, Malaysia (MOH). The wastewater such as stormwater and greywater were used as water samples. The physical properties investigated were temperature, colour, and odour while the chemical properties were total dissolved solids (TDS), ammonia, chlorine, hardness and pH value. The performance of solar water distiller was examined by considering the quality as well as the quantity of treated water. Correlation of surrounding temperature and humidity to the volume of water collected were observed and recorded. The results demonstrated that the solar water distiller has potential as one of the methods of water treatment in sustainable approach.



## Abstract

127-095

### Assessment Of Specific Methanogenic Activity From Cow Dung

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**Abstract.** The specific methanogenic activity (SMA) is a test to measure the producing potential of an anaerobic bacteria until its allowing a relevant organic loading rates to be applied for a selected substrate. Commonly, acetate is used as substrate for the SMA test. Anaerobic bacteria were mostly taken from an anaerobic digester and cow dung was also implemented as a source of an anaerobic bacteria. However, the results of SMA of cow dung was less reported. Therefore, this study is initiated to determine the potential of methane production from the cow dung by using the SMA test. Prior the SMA test, the cow dung was characterized for solids where the results showed that the cow dung is having 12.00 g L<sup>-1</sup> for total solid and 10.50 g L<sup>-1</sup> for volatile solid. The SMA test was conducted at mesophilic condition by using an automatic methane potential system test (AMPTS II) and the SMA of the cow dung was found as 0.04 in unit g COD-CH<sub>4</sub> g<sup>-1</sup>VS-1d<sup>-1</sup>. The significance of this research is to determine the anaerobic bacteria potential of cow dung for use in the anaerobic digestion process, which offers numerous advantages for manufacturing, particularly in industrial applications such as methane production (fuel).

## Abstract

130-101

### **Food Waste Type and Moisture Content Influence on The Hermetia Illucens (L.), (Diptera: Stratiomyidae) Larval Development and Survival**

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**Abstract.** Black Soldier Fly (BSF) or its scientific name *Hermetia Illucens* is saprophagous which able to consume almost any types of substrates and absorb it as a source of nutrient to help their growth. The composition of BSFL is important to observe as it can affect the quality of the harvested BSFL for further application. The conventional method of BSF bioconversion is to feed the BSF larvae with food waste directly without any moisture adjustment. This study aim to determine the most suitable moisture content of food waste in BSF bioconversion which able the assessment of the effects of the moisture content of the food waste on larval growth and the effect of the moisture content of the food waste on larval survival rate in BSF bioconversion. Results from this study suggest that larval growth was found to be the fastest using food waste at 80% moisture content for both VT food waste and LO food waste. The wet weight of the harvested prepupae also suggested that there is a significance impact of the moisture content of the food waste supplied with the wet weight of the larvae. Furthermore, the moisture content of the food waste was not found to have an impact on the survival rate in BSF bioconversion, and a high larval survival rate of at least 95% was achieved throughout the experiment using the BSF larvae composting container. The study provides valuable insights for the waste management industry on understanding the effects of moisture content when employing BSF bioconversion for food waste recycling.

## Abstract

070-115

### The Application of Total Maximum Daily Load (TMDL) Approach in Water Quality Assessment for The Batu Pahat River

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**Abstract.** An increased number of rivers that being categorized as polluted are alarming that their repercussions are so severe that the rivers no longer can be rehabilitated. This is caused by rapid urbanization and population growth, uncontrolled development which resulted in high volume of water pollution that discharge into the river. Rapid development has led to a large discharge of point source (PS) and non-point source (NPS) pollution into the water supply. As a result, the deterioration in water quality, decline of safe water supply as well as the difficulties to access the clean water has emerged as massive concerns for water authorities attempting to fulfil the increasing supply for clean water resources. To resolve these issues, implementation of several approaches was conducted to determine the best approach that could effectively control water quality pollution in Malaysia. One of the best methods that could be used to manage the water quality is Total Maximum Daily Load (TMDL). TMDL seeks to establish or restricted the amounts of pollutant allowed to enter the river and is assisted by the identification of physical, chemical, and organic qualities in the river water body. In this study, six parameters were measured such as dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), ammoniacal nitrogen (NH<sub>3</sub>-N), total suspended solid (TSS), and pH. QUAL2K software was utilised to model the water quality as well as to test several scenarios with the intention to reduce the pollutant concentration. Based on the analysis, it shows that the commercial sector poses the most contributor towards the pollution loading (kg/day) in Batu Pahat River, which mainly come from CP3, CP4, CP5, CP6, and CP7. In addition, low tide flow produced higher pollution load (kg/day) compared to low tide flow due to larger amount of discharge during high flow. As a conclusion, the development TMDL plan could improve water quality at the Batu Pahat River by analysing pollution loading reduction and for future management of watersheds area.