UNIVERSITI MALAYA IBCC BEURC

PROGRAMME BOOK

5TH INTERNATIONAL BUILDING CONTROL CONFERENCE (IBCC)

6TH INTERNATIONAL BUILT ENVIRONMENT UNDERGRADUATE RESEARCH COMPETITION (BEURC)

25-26 November 2021

Faculty of Built Environment,
Universiti Malaya,
Kuala Lumpur, Malaysia

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PROGRAMME BOOK

25-26th November 2021
Faculty of Built Environment, Universiti Malaya,
Kuala Lumpur, Malaysia

Organizer:

Department of Building Surveying
Faculty of Built Environment
Universiti Malaya

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Welcoming Speech

Opening and Officiating Speech

Keynote Address

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ORGANIZING COMMITTEE

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COMPETITION PROGRAMME
Faculty of Built Environment, University of Malaya, Kuala Lumpur

Day 1 (25th November 2021)	
07.30hrs – 08.30hrs	**Registration & Breakfast by Le Meridien Hotel** ***Level 1, Banquet Hall***
08.30hrs – 09.00hrs	**Arrival of VIPs & participants** ***Level 1, Auditorium***
09.00hrs – 09.10hrs	**Welcoming Speech** **by Vice Chancellor Universiti Malaya** **Professor Dato' Ir. Dr. Mohd Hamdi Abd Shukor**
09.10hrs – 09.30hrs	**Opening & Officiating Speech** **by Senior Minister of Works** **YB Dato' Sri Hj. Fadillah Bin Hj. Yusof**
09.30hrs – 10.00hrs	**Keynote Address 1** **Prof Mike Riley** **Pro Vice Chancellor** **Liverpool John Moores University** **Title: COVID-19 Pandemic & the UK Construction Sector**
10.00hrs – 10.05hrs	**Tech-Partner Session 1** **Microcorp Sdn Bhd**

10.05hrs – 10.35hrs	**Keynote Address 2** **Distinguished Professor (Scientia) Deo Karan Prasad** **University of New South Wales (UNSW) Sydney, Australia** **Title: Delivering on Net Zero Carbon Buildings 2030**
10.35hrs – 10.40hrs	**Tech-Partner Session 2** **Excel Test Sdn Bhd**
10.40hrs – 11.10hrs	**Keynote Address 3** **Professor Dr Sr Ts Syahrul Nizam Kamaruzzaman** **Universiti Malaya, Malaysia** **Title: BIM Facilities Management: A Quick Start**
11.10hrs – 11.25hrs	**Juries and IBCC Judges Appreciation Session**
11.25hrs – 13.00hrs	**IBCC & BEURC** **Plenary Session 1, 2, 3, 4 & 5: Oral/Poster presentation**
13.00hrs – 14.30hrs	**Lunch & Networking** ***Level 1, Banquet Hall***
14.30hrs – 17.00hrs	**IBCC & BEURC** **Plenary Session 1, 2, 3, 4 & 5: Oral/Poster presentation**

17.00hrs – 17.30hrs	**Tea Break and Adjourn**

Day 2 (26th November 2021)	
08.30hrs – 09.00hrs	**Registration & Welcoming refreshment**
09.00hrs – 13.00hrs	**RISM Awards and Prize Giving** ***RISM Building Surveying Awards***
13.00hrs – 14.30hrs	**Lunch & Networking**
14.30hrs – 16.30hrs	**Awards and Prize Giving** **IBCC** ***Best Paper Award*** ***Best Presenter Award*** **BEURC** ***Gold Awards*** ***Outstanding Undergraduate Awards*** ***BEURC Research Excellence Award*** ***Building Surveying Best Potential Research Award***
16.30hrs – 17.00hrs	**Closing Remarks**

IBCC 2021 PRESENTATION SCHEDULE

25th November 2021 (Morning session 11.30am to 1.00 pm)

Parallel 1
Subtheme: Management
Location: Studio BS 1 & 2, Level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Lee Minsern (minsern123321@gmail.com)
Technical: Loh Jhun Shen (jhunshenu@gmail.com)

Chair & Jury	Presenter	Email	Title
UTHM (Chair) Ts. Mohd Syafiq Syazwan bin Mustafa	NOORZAINI BINTI MOKTAR (UM)	17219487@siswa.um.edu.my	PREVAILING FACTORS WHEN PROCURING THE FACILITIES MANAGEMENT SERVICES
TAYLORS Puan Nurulhuda Hashim	SITI RASHIDAH BINTI MOHD NASIR (UITM)	sitir015@uitm.edu.my	CONSTRUCTION PROJECT DELAY DUE TO THE COVID-19 PANDEMIC
	MUHAMMAD ABDUL REHMAN (USM)	m-abdul-rehman@hotmail.com	INFLUENCE OF ACTIVE LEADERSHIP ON CONSTRUCTION RISK MANAGEMENT
	ILYA SUFAIRA BINTI HASBULLAH (UITM)	ilya.sufaira96@gmail.com	LEAN-BIM COLLABORATIVE FRAMEWORK FOR SUSTAINABLE CONSTRUCTION PROJECTS IN MALAYSIA

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 2
Subtheme: Surveying & Governance
Location: Studio BS 3& 4, Level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Wong Syu Yit (syuyit@gmail.com)
Technical: Gan Chin Chuan (chinchuan1571@gmail.com)

Chair & Jury	Presenter	Email	Title
Dr Anis Rosniza Nizam Akbar	PUTRI NABILA BINTI KAMARULZAMAN (UM)	bgc170004@siswa.um.edu.my	DISCREPANCIES BETWEEN NATIONAL AND STATE BY-LAWS IN MALAYSIA: A REVIEW
INTI Ts Nurul Aini Osman	NOR SYAZANA BINTI AZLI (UITM)	norsyazana.azli@gmail.com	THE STRATEGIC ROLES OF CLIENT FOR BETTER QLASSIC IMPLEMENTATION
	NAZIAH BINTI MUHAMAD SALLEH (USM)	naziahmsalleh@usm.my	A QUALITATIVE ASSESSMENT OF FIRE RISK MANAGEMENT FOR MALAYSIA GOVERNMENT HOSPITAL BUILDINGS
	SITI HAMIDAH BINTI HUSAIN (USM)	sitihamidahhusain@usm.my	REDEFINE THE COMPETENCIES OF BUILDING SURVEYORS IN THE TIME OF COVID-19

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 3
Subtheme: Building & Construction
Location: Studio BB5, Discussion Room 1, Level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Yong pooi Yin (yongyin0823@gmail.com)
Technical: Wong Yi Zheng (yizhengwong240@gmail.com)

Chair & Jury	Presenter	Email	Title
TAYLORS (Chair) Dr Myzatul Aishah Hj Kamarazaly	MOHD FAHMI BIN ABDUL RAHMAN (UTHM)	mohdfahmi@uthm.edu.my	ENVIRONMENTAL PERFORMANCE MEASUREMENT OF IBS MULTI-STOREY RESIDENTIAL BUILDING
INTI Sr Suhaida@Suhana Kamarudin	NUR KAMALIAH MUSTAFFA (UITM)	nurkamaliah@uitm.edu.my	KEY DRIVERS TOWARDS SUCCESSFUL LOW CARBON CAMPUS: THE CASE OF UITM SHAH ALAM CAMPUS
	SAKHIAH ABDUL KUDUS (UITM)	sakhiah@uitm.edu.my	INFLUENCE OF PALM OIL FUEL ASH ON MECHANICAL PROPERTIES OF ULTRA-HIGH-PERFORMANCE CONCRETE

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 4
Subtheme: Building & Construction
Location: Studio BB6, Discussion Room 2, Level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Chew Chin Hua (chinhua824@gmail.com)
Technical: Nur Ainaa (tangerineuyu@gmail.com)

Chair & Jury	Presenter	Email	Title
UiTM (Chair) Sr Dr Wan Zuriea Wan Ismail	ZUL-ATFI BIN ISMAIL (Uni Malaysia Perlis)	zulatfippkas@gmail.com	THERMAL COMFORT PRACTICES IN PRECAST CONCRETE BUILDINGS
TAYLORS Dr Kam Kenn Jhun	OW WEE FHONG (UM)	oscarow88@gmail.com	THE FEATURES OF ANGLICAN CHURCHES IN MALAYSIA AND THEIR MAINTENANCE PRACTICES
	MOHD ZAILAN SULIEMAN (USM)	mzailan@usm.my	PROCESS OF CONSERVATION OF HERITAGE SHOPHOUSE BUILDINGS, IN PENANG'S UNESCO WORLD HERITAGE SITE
	FATIMAH BINTI MOHAMED YUSOP (UTHM)	fatimahy@uthm.edu.my	ASSESSMENT ON DUCTING CLEANLINESS MONITORING FOR COMMERCIALS BUILDING IN MALAYSIA

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 5
Subtheme: All
Location: Auditorium, Level 1, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Marcus Chan (marcuschan9633@gmail.com)
Technical: Foo Zhi Chao (foozhizhao@gmail.com)

Chair & Jury	Presenter	Email	Title
UTHM (Chair) Sr Ts. Dr. Mohammad Ashraf bin Abdul Rahman	NAZIRUL FARIQ BIN MOHD KASSIM (UITM)	nazirulfariq@gmail.com	EFFECTIVE 5D BIM REQUIREMENTS FOR RISK MITIGATION DURING PRE-CONTRACT STAGE
UKM PM Sr Ts. Dr. Adi	NIK ELYNA MYEDA (UM)	elyna@um.edu.my	BUILDING INFORMATION MODELLING FACILITIES MANAGEMENT (BIMFM) COORDINATION FOR DIGITAL CONSTRUCTION PROJECT
	NOR ZAIMAH CHE GHANI (UM)	zaimahcg@gmail.com	DEVELOPING EFFECTIVE OPERATION AND MAINTENANCE FRAMEWORK
	RAHA SULAIMAN (UM)	rahasulaiman@um.edu.my	THERMAL ENVIRONMENT IN FOUR AIR-CONDITIONED MUSEUM GALLERIES: CASE OF MALAYSIA

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

25th November 2021 (Afternoon session 2.30pm to 4.30pm)

Parallel 6
Subtheme: Management; Computer Science & Engineering
Location: Studio BS 1 & 2, level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Lee Minsern (minsern123321@gmail.com)
Technical: Loh Jhun Shen (jhunshen@gmail.com)

Chair & Jury	Presenter	Email	Title
TAYLORS (Chair) Ts. Dr. Mohamed Rizal Mohamed	MOHAMMAD ASHRAF BIN ABDUL RAHMAN (UTHM)	ashrafr@uthm.edu.my	EMPLOYERS' PERCEPTIONS OF THE EMPLOYABILITY AND SKILLS OF BUILDING SERVICES ENGINEERING TECHNOLOGY PROSPECTIVE (BSET) GRADUATES
INTI Ts Nurul Aini Osman	AHMAD FARID AB AZIZ (UITM)	rauf@uitm.edu.my	AUGMENTED REALITY TECHNOLOGY FOR BUILDING 3D DESIGN AND VISUALIZATION IN MALAYSIA
	SITI NURFAZIRA FAZLI (UITM)	rauf@uitm.edu.my	ENVIRONMENTAL FACTORS AND COVID-19 EPIDEMICS: A SPATIAL EXPLORATORY ANALYSIS IN SELANGOR, MALAYSIA

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 7
Subtheme: Architecture & Planning Studies; Building & Environmental Science
Location: Studio BS 3 & 4, Level 7 FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Wong Syu Yit (syuyit@gmail.com)
Technical: Gan Chin Chuan (chinchuan@1571gmail.com)

Chair & Jury	Presenter	Email	Title
UTHM (Chair) Dr. Mimi Suliza binti Muhamad	AZLAN ARIFF BIN ALI ARIFF (UITM)	azlanariffwork@gmail.com	CONCEPTUAL FRAMEWORK OF HIGHLY ACCESSIBLE GREEN ROOF FOR MALAYSIAN PUBLIC
INTI Sr Suhaida@Suhana Kamarudin	NOOR AINI BINTI MISTAR (UM)	ainiemistar@gmail.com	INVESTIGATION ON THE PREFERENCES AND PERCEPTIONS OF ACOUSTICAL COMFORT IN EATERY PLACES: SUBJECTIVE ASSESSMENT
	NUR AQLIMA RAMLI (UITM)	nuraqlima@utar.edu.my	ASSESSING MEASUREMENT MODEL OF GREEN CLEANING COMPONENTS FOR GREEN BUILDINGS
	NUR AQLIMA RAMLI (UITM)	nuraqlima@utar.edu.my	ENVIRONMENTAL CLEANING BATTLING AGAINST COVID-19 INFECTION IN HEALTHCARE

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 8
Subtheme: Building & Construction
Location: BB5, Discussion Room 1, level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Yong Pooi Yin (yongyin0823@gmail.com)
Technical: Wong Yi Zheng (yizhengwong240@gmail.com)

Chair & Jury	Presenter	Email	Title
UITM (Chair) Dr Faridah Muhamad Halil	SITI AZURAH BINTI MOHD GHAZALI (UM)	sazurahg@gmail.com	OCCUPANTS AWARENESS AND CHALLENGES ON IMPLEMENTING ENERGY EFFICIENCY STANDARD IN BUILDINGS
TAYLORS Mr Khairool AizatBin Ahmad Jamal	AHMAD BIN ABD JALIL (UNIMAS)	ajahmad@unimas.my	ACCELERATING PREFABRICATED CONCEPT IN RESIDENTIAL PROJECTS; HURDLES AND DRIVERS
	MUNEERA ESA (USM)	muneera1204@gmail.com	BUILDING INFORMATION MODELLING AND COST MANAGEMENT: EXPLORING MALAYSIAN DEVELOPER'S EXPERIENCES

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 9
Subtheme: Building & Construction
Location: BB6, Discussion Room 2, level 7, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper: scientific: Chew Chin Hua (chinhua824@gmail.com)
Technical: Ainaa (tangerineuyu@gmail.com)

Chair & Jury	Presenter	Email	Title
UTHM (Chair) Ts. Mohd Syafiq Syazwan bin Mustafa	TAN JIN HONG (UM)	tanjinhongppp@gmail.com	BLOCKCHAIN AND BUILDING INFORMATION MODELLING (BIM) FOR THE CONSTRUCTION INDUSTRY
UIA Assistant Prof Aniza Abu Bakar	MOHD AFIQ AZINUDDIN BIN TAYIB (UITM)	afiqazinuddin@gmail.com	INDUSTRY 4.0 FOR THE SMES IN THE MALAYSIAN CONSTRUCTION INDUSTRY
	SHARIFAH NUR AINA SYED ALWEE (UM)	bva190004@siswa.um.edu.my	THE CURRENT PRACTICE OF BUILDING INFORMATION MODELLING (BIM) IN CONTRACT ADMINISTRATION - A CASE STUDY
	NORAZLIN BINTI ABD AZIZ (UM)	norazlinabdaziz86@gmail.com	SYSTEMATIC LITERATURE REVIEW ON COMMUNICATION IN CONSTRUCTION INDUSTRY: ISSUES, IMPACT, AND SOLUTIONS AMONG PROJECT PARTICIPANTS

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

Parallel 10
Subtheme: All
Location: Auditorium, Level 1, FBE UM
Online Link:
https://zoom.us/j/95157261549?pwd=dkFvVkVqb2FQYldBd2cwZW9sbGNhUT09
Timekeeper/Scientific: Marcus Chan (marcuschan9633@gmail.com)
Technical: Foo Zhi Chao (foozhichao@gmail.com)

Chair & Jury	Presenter	Email	Title
UITM (Chair) Sr Dr Wan Zuriea Wan Ismail	NURUL ASRA BINTI ABD. RAHMAN (UM)	mynurulasra@gmail.com	THE ENERGY EFFICIENCY ASSESSMENT FOR INTERMITTENT USE RELIGIOUS BUILDINGS
TAYLORS Mr Azim Sulaiman	AZREENA BINTI ZAHARIL AZLAN (UM)	azreenazaharil@um.edu.my	ELECTRONIC ENERGY BENCHMARKING SYSTEM (E-EBS) TOWARDS SUSTAINABLE BUILDING ENERGY PERFORMANCE
	NORHAYATI MAHYUDDIN/ LI YUAN (UM)	hayati@um.edu.my	THE IMPACT OF PHYSICAL ENVIRONMENT ON HEALTHCARE WORKERS' WELL-BEING IN CHINESE HOSPITALS DURING COVID-19 PANDEMIC
	ELI FARHANA BINTI ABD RAHIM (UM)	elifarhana96@gmail.com	YOUTH PERCEPTION ON CLIMATE CHANGE AND SUSTAINABLE CONSUMPTION
	NURUL AYUNI BINTI ABDUL AZIZ (UITM)	nurulayuniabdulaziz93@gmail.com	FIRE SCENARIO AND POSSIBLE CAUSES OF FIRE IN MALAYSIA MULTI-STOREY BUILDING
	SYAHRUL NIZAM KAMARUZZAMAN (UM)	syahrulnizam2011@gmail.com	DEVELOPING VISUAL/PROTOCOL 1 SUSTAINABLE CONDITION ASSESSMENT (BSUSCA) TOOL FOR NON-RESIDENTIAL EXISTING BUILDING
	INTAN BAYANI BINTI ZAKARIA (UM)	intanbayani@gmail.com	INDOOR AIR QUALITY (IAQ) IN MALAYSIAN KINDERGARTEN ENVIRONMENT: A THEMATIC REVIEW

Each presenter is allocated 20 minutes:

- **10 minutes pre-recorded presentation**
- **10 minutes Q&A from Jury and Audience**

UNIVERSITI MALAYA

IBCC

ABSTRACT

5th International Building Control Conference (IBCC)

25-26 November 2021
Faculty of Built Environment,
Universiti Malaya,
Kuala Lumpur, Malaysia

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Inti International University

Assistant Prof Aniza Abu Bakar
Universiti Islam Antarabangsa

LIST OF ABSTRACT

PARALLEL SESSION (ORAL)

Sub-Theme 1 : Surveying & Governance

Development, by-laws, building control, pathology, defects, condition assessment, inspection, professional practice, education, contracts

NO.	INSTITUTION	TITLE AND AUTHORS
1	UM	**Discrepancies Between National And State By-Laws In Malaysia: A Review** Putri Nabila Binti Kamarulzaman
2	UITM	**The Strategic Roles Of Client For Better Qlassic Implementation** Nor Syazana Binti Azli
3	USM	**A Qualitative Assessment Of Fire Risk Management For Malaysia Government Hospital Buildings** Naziah Binti Muhamad Salleh
4	USM	**Redefine The Competencies Of Building Surveyors In The Time Of Covid-19** Siti Hamidah Binti Husain
5	UITM	**Fire Scenario And Possible Causes Of Fire In Malaysia Multi-Storey Building** Nurul Ayuni Binti Abdul Aziz

6	UM	**Developing Visual/Protocol 1 Sustainable Condition Assessment (Bsusca) Tool For Non-Residential Existing Building** Syahrul Nizam Kamaruzzaman

DISCREPANCIES BETWEEN NATIONAL AND STATE BY-LAWS IN MALAYSIA: A REVIEW

[1]Putri Nabila Kamarulzaman, [2]Nur Farhana Azmi, [3]Raha Sulaiman,

and [4]Noor Suzaini Mohamed Zaid

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[3]Center for Sustainable Urban Planning & Real Estate (SUPRE), Faculty of Built Environment, University of Malaya, Kuala Lumpur, Malaysia

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ABSTRACT

Purpose - Malaysia's building regulation is mainly based on the Uniform Building By-Laws (UBBL) 1984 which provides guidelines on the procedures for building plans approval and other means of development control. However, the application of these by-laws varies between local authorities since they are gazetted by different state governments. The formulation of UBBL 1984 which was originally formulated to address the need for a standardized set of building regulations for the country is now perceived as inconsistent and complex. Therefore, this research attempts to examine the discrepancies between state by-laws, particularly Federal Territory of Kuala Lumpur and national UBBL 1984.

Design/methodology/approach – Critical review of the content of the Building (Federal Territory of Kuala Lumpur) By-Laws 1985 and national Uniform Building By-Laws 1984 was carried out to pinpoint discrepancies between the two by-laws.

Findings – Differences between national UBBL and KL By-laws fall into four (4) main categories particularly terminology, prescriptive requirements, presence of terms and by-laws. Three (3) editorial spelling and typing errors were also found in the national UBBL 1984. It is argued that the errors and differences lead to confusion and pose unnecessary regulatory burden to the construction industry which ultimately discourage people to disobey the rules. The identified discrepancies between these by-laws showed an urgent need to review the current building by-laws considering today's technologies, norms and citizen needs.

Originality/value – This study is the first of many fruitful contributions that examine discrepancies between by-laws that govern building control matters in Malaysia. Although

centered on legislation in Malaysia, the findings are relevant for governments around the world working towards improving public service delivery.

Keywords: Building regulations, By-laws, compliance, control, discrepancies, UBBL

THE STRATEGIC ROLES OF CLIENT FOR BETTER QLASSIC IMPLEMENTATION

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ABSTRACT

Quality Assessment System in Construction (QLASSIC) application has slowly increased over the years as quality has become one of the important keys in transforming the construction industry to be better in future. The implementation gives many benefits as the score can be used as the marketing tool, the indicator of quality, the reflection of project team performance and many others as outlined in its scheme. However, not all projects can achieve a good score. Implementing QLASSIC begins with the clients who play roles in driving their project to the level of satisfaction. Therefore, this study is aimed to propose a strategy through an action plan for the client in implementing QLASSIC. Through identifying the roles and the challenges, the potential area for improvement also can be determined. All data obtained from the survey questionnaire were analysed and summarized by using SPSS software. The important roles identified at every stage of the project were to begin by selecting the QLASSIC experienced project team and main contractor. Few challenges also were identified in the aspect of knowledge, project characteristics, issues with the main contractor, project team and also in the aspect of QLASSIC component itself. From correlation analysis, the findings were summarized as the action plan to strategize the QLASSIC implementation for the client. It is hoped that this study can contribute to the improvement of QLASSIC implementation among clients and become guidance for any client or project owner to implement QLASSIC in their project hence achieving a good QLASSIC score.

Keywords: QLASSIC, Quality Assessment System, Quality in Construction

A QUALITATIVE ASSESSMENT OF FIRE RISK MANAGEMENT FOR MALAYSIA GOVERNMENT HOSPITAL BUILDINGS

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ABSTRACT

Numerous fire incidents in public hospitals have doubtful these buildings comply with the local law and updated their fire safety compliance accordingly. Hence, the main aim of this paper is to evaluate the fire safety accomplished level with the legal requirements in Malaysia government hospital buildings by evaluating fire risk management. The descriptive-cross-sectional and applied study conducted at Penang General Hospital, Seberang Jaya Hospital, Balik Pulau Hospital, Bukit Mertajam Hospital and Sungai Bakap Hospital. Data collection emphasis on the hospital Fire Risk and Safety audit at 122 zones of the case studies. Checklists for fire risk assessment from the NFPA 101 standard were developed and compiled. The information collected analysed in the Computerized Fire Safety Evaluation System (CFSES) software for final evaluation of the buildings. This paper revealed that 84% of zones in the case study failed to comply the NFPA 101 requirements in terms of people movement in the building. Fire risk assessment score was unacceptable (Failed) in all hospital, and in the three areas mentioned general safety, egress/exit routes, and fire control. By resuming this research, it can create the attention to the policy makers and the government.

Keywords: Fire Risk Management, Public Hospital, CFSES, Fire Audit, NFPA

REDEFINE THE COMPETENCIES OF BUILDING SURVEYORS IN THE TIME OF COVID-19

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ABSTRACT

The construction sector, globally and locally, has been heavily impacted by the COVID-19 crisis since the beginning of the Movement Control Order in Malaysia in mid-March, 2020. This situation has deeply impacted construction practitioners and building surveyor itself even construction industry construction has great potential to stimulate recovery. Adaptations are necessary to continue updating professional needs and skillsets, while minimising the overcoming the challenges of the COVID-19 pandemic to the supply and demands of building surveying services. To inform continuous improvement of surveying practice, this study asks, "What are the new skillsets competencies that building surveyors in Malaysia required in the time of COVID-19?" Therefore, this study attempts to redefine a new set of competencies for Malaysian Building Surveyors in the time of COVID-19. Data for this study was collected using a qualitative method approach that involved the document analysis approach by review guidelines and policies from different professional bodies governing this profession locally and globally. Based on the document analysis approach, the study found that fourteen competencies are valued and emphasized by five professional bodies governing the building surveying profession. The study will be of significant benefits to building surveyors to improve their employability, to fresh graduates and students who are preparing for the world of work, as well as offers valuable insights for surveying institutions to structure an adaptations planning for overcoming the challenges of the COVID-19 pandemic for future building surveying practitioners.

Keywords: Building Surveying education, Building Surveyor, Competency, COVID-19, Malaysian Construction Industry

POSSIBLE CAUSATION OF FIRE FOR MULTI STOREY BUILDING IN MALAYSIA

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ABSTRACT

High and complex multistorey buildings have increase dramatically over the past 20 years which lead to a new and updated approached strategies in providing an appropriate building fire safety. Multistorey buildings have had the highest number of fire incidents compared to others types of buildings in Malaysia. Hence, this study aimed to investigate possible case of fire incident in multistorey building. A comprehensive literature review and interview was directed to explore the factors affecting to multistorey building fire by identifying the fire scenario (characteristic of fire, characteristic of building and characteristic of occupant), possible causes of multistorey building fire and how to reduce the possibility and cause of multistorey building fire incident. Besides, additional of qualitative method of data collection by mean of preliminary interview to three (3) respondents that involved in construction and maintenance of multistorey building in Selangor is being conducted. The three (3) respondents in this research consists of designer, maintenance personnel and local authority. The main and top possible causes of multistorey building fire that being identify consist of electrical failure, cooking, smoking, spark, and poor maintenance of building fire safety. The several methods on how to reduce possible causes of multistorey building fire involving increase fire safety awareness and human behaviour among building occupant, building layout and materials, improved and regularly maintenance of building active and passive firefighting equipment and knowledge, besides reducing of unsafe and defect electrical equipment. This study may help in adding a new information into the existing body of knowledge towards reducing the number of fire cases, fire injury and fire fatalities for multistorey in Malaysia.

Keywords: Causes of Fire, Fire Scenario, Multistorey Building Fire, Building Fire

DEVELOPING VISUAL/PROTOCOL 1 SUSTAINABLE CONDITION ASSESSMENT (BSUSCA) TOOL FOR NON-RESIDENTIAL EXISTING BUILDING

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ABSTRACT

Existing green building rating tools which is "Non-Destructive Inspections" which known as a protocol two (2) that directly measure the sustainability building criteria. People may face various difficulties, such as unforeseen incidents, the qualification process's difficulty, and urgent priority work, mainly when they are not familiar with the certification framework that needs to be applied. Developing Visual/Protocol 1 Inspection Tool for Building Sustainable Condition Assessment (BSusCA) is to formulate an appropriate formula for a pre-assessment benchmarking tool for the sustainability of non-residential existing buildings will be developed, along with the aim and objectives of the research, the methodology used, the scope of research, and limitation of the study. It can significantly affect the total evacuation time during a fire emergency. In this dissertation, the research study only focused on the Non-Residential Existing Building. Data gathered are also compared with the literature review done before this research. At the end of this research, the analyzed data was concluded, and a simplified method for pre-assessment on possible full accreditation on NREB is developed.

Keywords: Green Building Sustainable Building Assessment PHJKR SIRIM 2020

Sub-Theme 2 : Architecture and Planning Studies

Design, planning, architectural studies, legal, housing, geospatial, BIM

NO.	INSTITUTION	TITLE AND AUTHORS
1	UITM	**Conceptual Framework Of Highly Accessible Green Roof For Malaysian Public** Azlan Ariff Bin Ali Ariff
2	UM	**The Investigation On The Preferences And Perceptions Of Acoustical Comfort In Eatery Places: Subjective Assessment** Noor Aini Binti Mistar

CONCEPTUAL FRAMEWORK OF HIGHLY ACCESSIBLE GREEN ROOF FOR MALAYSIAN PUBLIC

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ABSTRACT

Due to its energy efficiency benefits, green roof has gained a worldwide reputation as a effective solution to sustainable building development. Despite the global trend, green roofs are rarely accessible by the public in Malaysia. Public accessibility is primarily influenced by the architecture of the building, the degree of safety and crime watch, and events that foster public interaction where it is shown in crowd density. The accessibility of the green roof as a public realm calls for further investigations into this subject due to the scarcity of published literature which presents the social improvement potential. This study reviews the existing green roof problems that limit public accessibility in Malaysia and compares the suitability of effective public implementations. Architecture, safety and surveillance, and active functions are the criteria that have been considered as study parameters. The analysis of available literature and field observations suggest a positive contribution of these attributes to public engagement in public space. This study highlights the core elements of the effective public realm that could be developed into potential guidelines in designing a highly accessible green roof for the public in the city area, in tandem with the projected increase in demand for green roof infrastructure in the future.

Keywords: green roof, architecture, public space, conceptual framework, accessibility

INVESTIGATION ON THE PREFERENCES AND PERCEPTIONS OF ACOUSTICAL COMFORT IN EATERY PLACES: SUBJECTIVE ASSESSMENT

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ABSTRACT

The acoustical environment of eatery places is determined by the typologies of the places, the physical environment, the diners and the noise source. The diners' characteristics in this paper is defined as the density of the diners in the restaurant and demography characters. A higher level of noise may distract people from having a fine dining experience and could interrupt their senses of smell and taste. Ultimately, long-term exposure to noise will affect not only a person's health and wellbeing but also his or her social interactions, communication and preferences for acoustic comfort during the dining experience. Therefore, the aim of this paper is to investigate the diners' preference and perception towards the noise and acoustical comfort during the casual dining period. Their relationship with diners' experience and significant impacts onto the diners' preferences and perceptions during casual dining will be analyzed. In this paper, the data was collected quantitatively with randomly distributed self-administrated questionnaires during the operating hours of the restaurants, 449 respondents who dined in at two casual dining restaurants in Melaka city area were participated. ANOVA tests revealed that majority of the diners were not adversely affected by the noise level, and they did not have difficulties on their conversations. The results also indicated that the respondents felt that the noise did not stop them from returning to the restaurants. The findings in this study would provide a basis reference to assess and classify the noise level in eatery places that suits the customers' perceived satisfaction.

Keywords: eatery places, noise, casual dining, dining time, perceived acoustical comfort

Sub-Theme 3 : Management

Building maintenance, asset, FM, POE, legal, risk, project management, property management, BIM

NO.	INSTITUTION	TITLE AND AUTHORS
1	UITM	**Prevailing Factors When Procuring The Facilities Management Services** Noorzaini Binti Moktar
2	UITM	**Construction Project Delay Due To The Covid-19 Pandemic** Siti Rashidah Binti Mohd Nasir
3	USM	**Influence Of Active Leadership On Construction Risk Management** Muhammad Abdul Rehman
4	UITM	**Lean-Bim Collaborative Framework For Sustainable Construction Projects In Malaysia** Ilya Sufaira Binti Hasbullah
5	UM	**Building Information Modelling Facilities Management (Bimfm) Coordination For Digital Construction Project** Nik Elyna Myeda
6	UM	**Developing Effective Operation And Maintenance Framework** Nor Zaimah Che Ghani

7	UTHM	**Employers' Perceptions Of The Employability And Skills Of Building Services Engineering Technology Prospective (Bset) Graduates** Mohamad Ashraf Bin Abdul Rahman

PREVAILING FACTORS WHEN PROCURING THE FACILITIES MANAGEMENT SERVICES

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ABSTRACT

The purpose of this study is to investigate underpinning factors for the procurement of facilities management (FM) within airlines corporate organisation. The research design is a qualitative method via case study. The chosen case study is an airlines corporate organisation which headquartered in Malaysia and had different branch of offices in Thailand, Philippines, and Indonesia. Data collection was made via semi-structured interview with the regional head of procurement department and regional head of facilities management department respectively. While Focus Group Discussion (FGD) was used with the Procurement Managers and Facilities Managers respectively. The data was then analysed via thematic analysis for both semi-structured interview and FGD separately and cross-sectional analysis for all. The study revealed dominant main reasons for the procurement of FM services, considerable factors during procurement stage and value adding criteria in a perspective of strategic management (head of department procurement and facilities management) and operational management (procurement managers and facilities managers) within the corporate organisation.

Keywords: procurement, facilities management, factors, airlines and qualitative

CONSTRUCTION PROJECT DELAY DUE TO THE COVID-19 PANDEMIC

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ABSTRACT

The COVID-19 pandemic that hit the whole world has harmed several industries including the construction industry. It has caused the operation of the construction industry had to be stopped for a while because the construction industry is reported to be one of the industries with a high risk of COVID-19 virus transmission. Due to that, many construction projects were delayed as a results of series of movement control orders by the government. The purpose of this study is to identify the main contributor factors to project delay due to Covid-19. In addition, this study identifies the mitigation actions to overcome the delays for building construction project in Malaysia. Quantitative method was used and online questionnaire survey were distributed to the target respondents involves clients, consultants, and contractors. The research area covers the conurbation of Klang Valley, Great Penang, and Iskandar city. Relative Important Index (RII) and correlation analysis were used to analyse the data obtained from the survey. The finding of this study identifies the main factors contribute to delay during COVID-19 pandemic are delay in material delivery; delay in decision making by the consultants; delay in revising and approving document; and unclear of Standard of Procedure (SOP) instructions by the government. As a results of the delay, project is suffering with cost overrun and the loss of skilled and unskilled labours. In order to overcome delay, the findings of this study suggest that proper planning and rescheduling; systematic and clear communication; getting help from government aid and completing worker's overdue payment are amongst the mitigation actions proposed by the respondents. The finding of this study shed lights on the impact of project delay to the construction players due to the COVID-19 pandemic.

Keywords: COVID-19, Construction project delay, Impact of delay, Mitigation actions.

INFLUENCE OF ACTIVE LEADERSHIP ON CONSTRUCTION RISK MANAGEMENT

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ABSTRACT

Contractors have given importance to risks in the construction process as it causes time and cost overrun, delays and total desertion in activities and events present in the construction project. The uncertainty in the completion time, cost and quality during construction relates to construction risks. As construction project is complex in nature involving challenges, which can only be tackled by active leadership. A project leader is the one who keep progressing the project even when emergency circumstances appear. Based on Organization Control theory, current research (quantitative in nature) discusses the influence of active leadership on construction risk management with the moderation role of government acts, laws and policies among 303 big size company contractors working in KSA using PLS-SEM technique. Survey questionnaires were distributed with valid response rate of 82% using 5 point Likert scale. PLS-SEM is a composite based approach, which provides parameter estimation with high efficiency with increased statistical power for analyzing complex models. Results depicts that government acts, laws and policies and active leadership positively influence construction risk management. In addition, moderation of government acts, laws and policies has positive relation among active leadership and construction risk management. Organizational management can reduce risk occurrence within project by building conditions for enhancing active leadership among their employees.

Keywords: Active Leadership, Construction Management, Risk Management, PLS-SEM, Government acts, laws and policies, Organization Control Theory

LEAN-BIM COLLABORATIVE FRAMEWORK FOR SUSTAINABLE CONSTRUCTION PROJECTS IN MALAYSIA

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ABSTRACT

Construction projects are always dealing with high-risk business activities, facing constant errors, and producing unwanted waste, leading to low productivity and sustainability. Lean Construction (LC) and Building Information Modelling (BIM) approaches have been recognized to resolve those issues, nonetheless, promising more efficient and effective practices within the construction industry. The implementation of both technologies is becoming popular amongst the industry practitioners across the globe, in claiming that they could also address the sustainability concerns in the construction industry. However, the usage of both innovations is mostly fragmented with their tools and processes are being manipulated separately. Therefore, the aim of this research is to develop a framework of Smart Lean-BIM collaborative approach towards establishing more sustainable construction projects, focusing the Malaysian construction industry. Questionnaire survey will be conducted to explore the impacts of Lean-BIM approach leading towards establishing more sustainable construction projects. Structural Equation Modelling (SEM) will be employed to examine relationships between the studied variables. This research will then adopt focus group discussion amongst expert panels to verify the surveyed results and findings, followed by strategizing a framework for incorporating Lean-BIM attributes within construction projects sustainability. Initially, in this paper, a conceptual framework will be developed as part of the research to introduce the variables that will be manipulated for the questionnaire survey. The overall research findings will contribute towards a framework development on Lean-BIM collaborative approach in harnessing sustainability for construction projects. This framework will establish a guideline to assist the stakeholders especially in the Malaysian construction industry to competently venture into Lean-BIM innovation.

Keywords: Lean construction, Building Information Modelling, Sustainability, Construction projects, Malaysian construction industry

BUILDING INFORMATION MODELLING FACILITIES MANAGEMENT (BIMFM) COORDINATION FOR DIGITAL CONSTRUCTION PROJECT

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ABSTRACT

Building Information Modelling (BIM) is widely known and used in the design stage of construction industry. BIM has developed rapidly in the industry and considered as one core concepts in the industry 4.0 revolution. Facilities Management (FM) plays an important role in maintaining and doing regular inspection for the buildings' facilities. However, most building and FM practice in Malaysia is considered not comprehensive. Hence, this research intends to leverage the implementation of BIM in FM. In order to help in improving the process of delivering and operating the built environment, the integration of BIM and FM should be explored. The objectives of this paper are to identify the information needed to implement BIM application in FM, to determine the level of implementation of BIMFM as well as to recommend BIMFM application mapping for Building Lifecycle. This study applied qualitative methodology, upon which a purposive sampling to 16 interviewees were done among professionals involved in any BIM, FM, BIMFM projects. Final analysis was conducted using thematical analysis by ATLAS.ti software. Findings have shown that the types of information required to implement BIMFM ranges from managerial information, commercial information, technical information and all full lifecycle data. It is also found that the implementation of BIMFM is agreed in the position where it is said to bring benefits and roles such as build up efficiency of building performance, able to close gap of loses information, help to improve FM in terms of data management, mitigate the problems, identify priority defects and to enhance the FM processes. However, it is noted that the respondents believed that the causes where there is no implementation of BIMFM in the event of two situations, which relate to process and cost, namely when everything was just in order and when it becomes very expensive. [NEMBNM1] In overall, this paper has managed to gather the essential elements towards leveraging the implementation of BIMFM in digital construction project which are in the means of information types, the needs of BIMFM

implementation and towards the end drawing the BIMFM implementation plan framework that could be used as a reference for the practitioners and industry.

Keywords: Building Information Modelling, Facilities Management, Project Lifecycle, Digital Construction Project

DEVELOPING EFFECTIVE OPERATION AND MAINTENANCE FRAMEWORK

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ABSTRACT

The research aims to improve O&M performance for residential buildings towards effective O&M management. Therefore, two correlative research objectives are devised to achieve the research aim accordingly, which is; a) to identify Operation and Maintenance (O&M) service performance at residential buildings and b) to investigate the Contributing Success Factors (CSF) towards the best O&M performance in residential buildings. The highlighted factors throughout this study for building characteristics are building age, building morphology, building materials, and building services. The factors for resident characteristics are demand and the expectation of users, reporting problems, use and accessibility to the property, regulation and compliance, and prevention of vandalism. The factors for O&M management are competent staff, well-planned maintenance management, budgetary and financial control, delivery and execution of work, spare part of materials, green technology implementation, regulation and compliance, and prevention of vandalism. The research methodology was organised and set up to have a smooth flow and connect each process involved in answering the research questions. Furthermore, combined qualitative and quantitative strategies create more vital research outcomes and enhance the research's validity and reliability. The results show that the prevention of vandalism is the most important element in determining the level of performance in residential properties. After a thorough discussion and findings from questionnaire survey and FGD, this study's new framework has been developed to get the effective O&M framework.

Keywords: facilities management, service performance, total productive maintenance, stratified residential building

EMPLOYERS' PERCEPTIONS OF THE EMPLOYABILITY AND SKILLS OF BUILDING SERVICES ENGINEERING TECHNOLOGY PROSPECTIVE (BSET) GRADUATES

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ABSTRACT

There are several challenges faced by Building Services Engineering Technology (BSET) prospective graduates. The challenges itself bring the need of BSET prospective graduates to equip themselves with the key competencies to be able to work effectively and efficiently with other professionals. Within the context of the current situation, the globalization is pushing BSET prospective graduates to become competitive in term of soft skills that they need to possess. Therefore, this paper aims to measure employers' perception towards BSET prospective graduates. A total of 120 questionnaires were distributed to employers selected based on where the final year students of Building Services Programme from UTHM undergo industrial training. The employers were asked to rate their views towards current level of importance of BSET prospective graduate's soft skills in Malaysia as well as to assess their level of satisfaction of these graduate's soft skills based on a five-point Likert scale. From the finding, the skill that employers most satisfied was team working while the skills gaps that are bigger and needs improvement were communication skills, responsibility, computer skills and language. This study provides universities with information to bring BSET graduates in line with the needs of the labor market.

Keywords: Skills Gap, Prospective Graduates, Building Services, Engineering Technology, Challenges

Sub-Theme 4 : Building and Construction

Design, structure, material, construction, engineering technology, risk, BIM

NO.	INSTITUTION	TITLE AND AUTHORS
1.	UTHM	**Environmental Performance Measurement Of Ibs Multi-Storey Residential Building** Mohd Fahmi Bin Abdul Rahman
2.	UITM	**Key Drivers Towards Successful Low Carbon Campus: The Case of UITM Shah Alam Campus** Nur Kamaliah Mustaffa
3.	UITM	**Influence Of Palm Oil Fuel Ash On Mechanical Properties Of Ultra-High-Performance Concrete** Sakhiah Abdul Kudus
4.	UNIMAP	**Thermal Comfort Practices in Precast Concrete Buildings** Zul-Atfi Bin Ismail
5.	UM	**The Features of Anglican Churches In Malaysia And Their Maintenance Practices** Ow Wee Fhong
6.	UM	**Occupants Awareness and Challenges On Implementing Energy Efficiency Standard in Buildings** Siti Azurah Binti Mohd Ghazali
7.	UNIMAS	**Accelerating Prefabricated Concept in Residential Projects; Hurdles And Drivers** Ahmad Bin Abd Jalil

8.	USM	**Building Information Modelling and Cost Management: Exploring Malaysian Developer's Experiences** Muneera Esa
9.	UM	**Blockchain And Building Information Modelling (BIM) For The Construction Industry** Tan Jin Hong
10.	UITM	**Industry 4.0 For The SMEs In The Malaysian Construction Industry** Mohd Afiq Azinuddin Bin Tayib
11.	UM	**The Current Practice of Building Information Modelling (BIM) In Contract Administration - A Case Study** Sharifah Nur Aina Syed Alwee
12.	UM	**Systematic Literature Review On Communication In Construction Industry: Issues, Impact, and Solutions Among Project Participants** Norazlin Binti Abd Aziz

ENVIRONMENTAL PERFORMANCE MEASUREMENT OF IBS MULTI-STOREY RESIDENTIAL BUILDING

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ABSTRACT

Industrialized Building System (IBS) is a construction approach that utilizes prefabricated components and on-site installation of procedures, materials, components, or construction systems. IBS components are made in-house, on-site, or off-site, and are installed and manufactured on-site with minimal additional project site. The primary aims of this research are to define the significant environmental performance requirements for multi-story IBS buildings and to assess occupant satisfaction with multi-story IBS building environmental performance in Forest City, Johor Bahru. This study employed quantitative research, and all data were acquired in the form of statistics. To determine the significance of the data, the Statistical Package for Social Science version 26 was used. This survey questionnaire technique is used to ascertain occupants' agreement on environmental performance requirements for IBS buildings and their level of satisfaction with those criteria for IBS buildings in Johor Bahru. This questionnaire surveyed a total of 123 occupants of the given place. The findings of this study indicate that all of the major factors were significant in predicting occupant satisfaction with the environmental performance of multi-story IBS buildings, since each item of the criterion was firmly agreed upon by respondents. Additionally, residents' overall satisfaction was moderate but slightly unsatisfied, as the majority of respondents were moderately satisfied with all factors pertaining to the environmental performance of the multi-story IBS building in Forest City, Johor Bahru. To summaries, while the IBS system was applied in the development of this high-rise apartment building, occupant satisfaction remains modest and does not achieve the maximum level**I.**

Keywords: Environmental performance, IBS building, Satisfaction

KEY DRIVERS TOWARDS SUCCESSFUL LOW CARBON CAMPUS: THE CASE OF UITM SHAH ALAM CAMPUS

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ABSTRACT

There is a growing awareness on the implications of climate change and global warming due to large energy consumption and associated greenhouse gas emissions. Campus university provides multiple opportunities for potential energy savings considering the huge number of populations and socio-economic activities driven in campus. Therefore, this paper aims to explore the current understanding and practices of the campus community and the key drivers' factors towards successful low carbon campus development. Responses from 116 respondents from UiTM Shah Alam campus were collected through survey questionnaire. The results were analysed using descriptive analysis. The findings showed that that lecturers and high-level campus management possess higher level of awareness and familiarity towards green and low carbon concept compared to students, administration and operation and maintenance staffs. Finding from the study also indicates that the implementation of low carbon practice has been taken place in UiTM Shah Alam Campus with most of the current programs and initiatives are based on low hanging fruits initiatives. Majority of respondents believed that incremental change is needed to approach low carbon development and the educational institution is recognized as an effective catalyst to educate and be a pioneer in promoting the transition towards low carbon development. By strengthening the culture and behaviours of the campus community through participate in green rating certification, organize the internal recognition and enhance education and outreach program is believed to boost low carbon initiatives in Malaysia. The findings of this paper provide insights to campus management and campus community in enhancing low carbon campus implementation by presenting the current understanding and practice of campus community in adopting low carbon and the key drivers associated with low carbon campus development in Malaysia.

Keywords: Green campus, key drivers, low carbon campus, green practices, sustainable development

INFLUENCE OF PALM OIL FUEL ASH ON MECHANICAL PROPERTIES OF ULTRA-HIGH-PERFORMANCE CONCRETE

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ABSTRACT

Palm oil fuel ash (POFA) is a by-product of the burning of waste material at the palm oil power plant. The disposal of POFA becomes an issue since Malaysia was among the largest palm oil producer. One thing led to another, improper waste management of POFA may cause air and water pollution. Therefore, the implementation of POFA in construction can help to reduce the problem of solid waste disposal as it was considered as a supplementary cementitious material. This research study was an effort to determine the mechanical properties of ultra-high-performance concrete (UHPC) with POFA addition. In this study, the percentage of POFA used as a cement replacement was 5%, 10% and 15% by binder weight. Several tests have been conducted to determine the results for several specific parameters. The results were collected from slump test and compressive strength test. Tabulation and graph illustration were the methods used to present the data. The workability test conducted showed that with the increase of POFA addition to the UHPC, the workability of fresh concrete was reduced. Meanwhile, the compressive strength at 28 days, UHPC with 5% of POFA addition showed the maximum value of compressive strength at 84.12 N/mm^2.

Keywords: Ultra-high-perfomance-concrete, palm oil fuel ash, workability, compressive strength

THERMAL CONCRETE PRACTICES IN PRECAST CONCRETE BUILDINGS

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ABSTRACT

Thermal Comfort (TC) practices are particularly problematic on PC building construction projects where natural ventilation levels do not coincide with occupants' thermal comfort and thermal sensation specifications. This research, therefore, investigate the current implementation of optimisation technique and their performance during implementing TCs, as information in these areas has a bearing on the poor performance and low levels of competitiveness of PC building construction companies. This paper reports on the early stages of research, which is identifying current problems within the Information and Communication Technology (ICT)- based approach and examine the performance of TC for meeting social and environmental objectives. The development of a Theoretical Framework is designed to recognise the potential results and longer-term benefits obtainable from implementing effective TCs.

Keywords: PC building, Construction projects, Thermal comfort, Optimisation, ICT

THE FEATURES OF ANGLICAN CHURCHES IN MALAYSIA AND THEIR MAINTENANCE PRACTICES

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ABSTRACT

This paper aims to explore the history of Anglican churches in Malaysia and discusses their typical features and their respective maintenance practices. It consists of an extensive but coherent literature review published between 1967 to 2020 on the development and features of Anglican churches in Malaysia, along with recommendations on maintenance practices from the asset and facilities management perspective. The exploration on churches' features follows three main disciplines in building maintenance according to the JKR Guideline for as-built Buildings in Malaysia. The findings of the study have then been tabulated to form a maintenance framework to recommend suitable maintenance practices on specific building components based on different materials. The paper argues that as places of worship, the assets of religious facilities are intangible compared to any other types of building that serve a tangible function (i.e., shelter, commercial or industrial operation). Throughout the exploration on their maintenance practices suggested by vast sources of literature, it is proven that the maintenance of churches is not as straightforward as to merely remedy the defects but it requires the maintenance to radically minimalize any disturbance on their aesthetics, thus making maintenance a more challenging task at churches. This paper proposes a maintenance framework for Anglican churches in Malaysia by categorising building disciplines and their corresponding building components, which supports future research to improve the maintenance practices of religious facilities.

Keywords: Places of worship, maintenance practices, asset management, facilities management

OCCUPANTS AWARENESS AND CHALLENGES ON IMPLEMENTING ENERGY EFFICIENCY STANDARD IN BUILDINGS

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ABSTRACT

The United Nations Environment Programme (UNEP) has reported that in 2010 the construction and building sector accounts for over one third of the global final energy use, and emitted 19 % of energy-related greenhouse gas (GHG) emissions, 32 % of global final energy consumption and 19 % of energy-related carbon dioxide (CO2) emissions and 51 % of global electricity consumption. Electricity consumption in building operations alone represents nearly 55% of the overall global electricity consumption. With Government of Malaysia's pledge targeting the reduction of 45% carbon emission by 2030, Malaysia has yet to include any energy efficiency (EE) legislation in its growing building sector. With the absence of such legislation, Malaysia is likely to experience lock-in inefficiency for decades into the future, which would potentially lead to further growth of GHG. The Malaysian Standard (MS) 1525 established in 2007 called Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings, is a reference which the stakeholders are able to refer for an EE building. This study adopted a quantitative methodology approach with the aim to discuss the findings on awareness towards application of MS 1525 and its impact on the occupants in a building

Keywords : awareness, building, energy efficiency, government organization.

ACCELERATING PREFABRICATED CONCEPT IN RESIDENTIAL PROJECTS; HURDLES AND DRIVERS

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ABSTRACT

Providing adequate proper housing is one of the Malaysian government agenda towards becoming a develop nation in Wawasan Kemakmuran Bersama 2030. In previous Construction Industry Transformation Plan (CITP) 2015, the government aims to provide enough and comfortable housing to all citizen, and achieve a new standard of construction where prefabrication concept will replace conventional in a target to reduce the dependency on foreign construction labours. To achieve this, the government has encouraged an alternative method of constructing houses known as prefabricated housing. Numerous efforts have been taken by Construction Industry Development Board of Malaysia (CIDB) and other local public and private agencies. However, despite of its various advantages, the uptake of prefabricated housing has been very slow and far behind target. To ensure our residential sector reach its target, there is an urgency for the industry to apply prefabrication. There is a need for government and industry players to know what are the difficulties that the industry facing and what steps can be taken to overcome them. This paper aims to discuss the barriers of implementing prefabricated in residential and the drivers that can speed up the application. The discussion is based on views from published journals and articles from different stakeholders including contractors, developers, clients and prefabrication manufacturers.

Key words: IBS, housing developers, contractors, residential projects Malaysia, construction project.

BUILDING INFORMATION MODELLING AND COST MANAGEMENT: EXPLORING MALAYSIAN DEVELOPER'S EXPERIENCES

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ABSTRACT

Construction industry is one of the sectors that stimulating the growth of the economy and since the construction industry is also acting as a backbone of a country, it is important to quickly adapt to changes as fierce competition due to globalization and liberalization in the local market. Along with Malaysia government plans such as CITP, Industry 4.0 and RMK-11, there is a revolution in the construction industry especially in technology that is well-known as BIM. However, the level of BIM adoption in Malaysia is still low due to challenges faced by developers and often being overlooked on the benefits of BIM in increasing efficiency in cost management which is predominant to the success of a construction project. This paper intends to explore how the developers utilizing BIM to overcome challenges in managing cost. To achieve this objective, a qualitative approach was adopted. The data was collected from three different developers in Malaysia which all of them are BIM adopters, to acquire in-depth, rigorous, and robust information from their experiences. Based on the results, BIM is able to manage cost-efficiently by preventing VO by effective coordination, scheduling, clash check, and good design review. This paper concludes that BIM adopters and consultants are able to consistently overcome challenges in utilizing the advantages of BIM in cost management. This study is significant to shed some light on developers out there to adopt BIM in their projects and learn how to utilize BIM in project cost management.

Keywords: Building Information Modelling (BIM), Cost Management, Developer, Malaysian Construction Industry.

BLOCKCHAIN AND BUILDING INFORMATION MODELLING (BIM) FOR THE CONSTRUCTION INDUSTRY

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ABSTRACT

A systematic review of building information modelling (BIM) and blockchain literatures have been carried out within the context of the construction industry. This review investigates the nature and possibilities of BIM and blockchain. Throughout this review, the upsides and downsides of both BIM and blockchain were critically discussed. BIM process produces a rich information model that serves as a shared knowledge resource, providing smooth flow of information throughout the project lifecycle, forming a reliable basis for decisions making. On another note, blockchain is a programming concept associated with the distribution of interlinked databases or records. Although BIM brings a lot of benefits and has open up the construction industry to many new possibilities, it is not without some challenges. Blockchain has the potential to resolve some of these problems. It has shown that blockchain and BIM can potentially work together in bringing various benefits to all project stakeholders. However, there is a lack of literatures in relation to blockchain-based BIM. Blockchain-based BIM has countless possibilities, ranging from simple tasks such as tracking of orders to automation of construction payment claims. The literatures have suggested that the several weaknesses that BIM possesses including trust issue, asset ownership issue, and data reliability issue could be resolved by incorporating blockchain into its processes.

Keywords: BIM, Blockchain, Building Information Modelling, Construction Technology, Review

INDUSTRY 4.0 FOR THE SMES IN THE MALAYSIAN CONSTRUCTION INDUSTRY

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ABSTRACT

Industry 4.0 (IR 4.0) is becoming a trend in a plethora of sectors despite being used for the manufacturing industry. The concept has even attracted the attention of the construction sector. In order to adopt this concept for the construction industry, focuses should be placed upon the small and medium-sized enterprises (SMEs) since they play a major part in influencing the economy. This paper aims to examine the challenges, enablers of IR 4.0, investigate the readiness and identify the ways to improve the implementation of IR 4.0 for the SMEs in the Malaysian construction industry. This study employed a survey questionnaire distributed amongst the local contractors and consultants around the Klang Valley. The collected data will then be analysed for descriptive statistics. The results from this research indicates that the main challenges in utilizing the IR 4.0 concept for the SMEs were the lack of financial resources, absence of a process change strategy and low experiences in utilizing skilled applications and technologies. Most of the respondents believed that the enablers for IR 4.0 in the industry were Building Information Modelling (BIM), modularization or prefabrication and augmented, virtual or mixed reality (AR/VR/MR). The readiness of the SMEs in implementing IR 4.0 were in the aspects of modelling and simulation, prefabrication and good access to internet. Last but not least, they agreed that regulatory framework and adoption of IR 4.0 in the company, providing roadmaps for the IR 4.0 adoption and doing a training to re-skill, up-skill, and enhance the knowledge of workforce were one of the ways to improve the success for implementing IR 4.0. The results from this research will help to produce a robust framework later to hasten the adoption of IR 4.0 for the construction industry SMEs.

Keywords: Construction industry, construction SMEs, Industry 4.0, IR 4.0

THE CURRENT PRACTICE ON BUILDING INFORMATION MODELLING (BIM) IN CONTRACT ADMINISTRATION- A CASE STUDY

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ABSTRACT

The era of digital construction, including Building Information Modelling (BIM), places a high demand on the seamless collaboration of people, technology, and processes in meeting the project delivery. All project actors involved in BIM processes must ensure that the regulations and contractual requirements are met when administering the construction project from the beginning. Although many studies have disclosed the various contractual implications arising from BIM implementation, there is still limited studies on the current scenario of BIM in contract administration practice, particularly in the Malaysian construction industry. This study explores the current context of BIM implementation with specific reference to a Design & Build construction project. The exploratory case study involving a public complex construction project was carried out whereby semi-structured interviews with the project actors and document analysis of the project's contractual guideline were examined to disclose the case study findings. The results from the thematic analysis revealed that the current emerging practice when BIM is implemented in contract administration was guided by five sequences of activities during pre and post contract stages, namely project inception, tendering, detailed design, construction and preparation for the handing over phase. Most of the activities were conducted to deliver the final BIM outputs with success. Nevertheless, there are still some lacking in project monitoring, validation process of the BIM deliverables, and competency level of the BIM players in fulfilling the specified BIM contractual requirements. The research contributes to a better understanding of how BIM implementation can affect contract administration throughout the delivery process. It is suggested that improving current understanding, evaluating BIM capabilities, and refining existing contractual guidelines could properly allocate contractual risks in future BIM implementation.

Keywords: Building Information Modelling (BIM), Design & Build, contract administration, pre-contract, post-contract

SYSTEMATIC LITERATURE REVIEW ON COMMUNICATION IN CONSTRUCTION INDUSTRY: ISSUES, IMPACT, AND SOLUTIONS AMONG PROJECT PARTICIPANTS

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ABSTRACT

Project communication is an important aspect that needs to be stressed in project management to ensure good project delivery in the construction industry. However, there is a lack of literature on these communication issues involving project participants. Furthermore, the impacts and solutions of these communication issues are also difficult to obtain from the literature itself. Furthermore, not many studies have looked at the impacts and solutions of communication issues that involve all project participants. As a result, to understand the communication challenges that project participants often face in the construction industry, which can endanger the project's actual progress, this research employs a systematic literature review of selected published indexed journals from Web of Science and Scopus. The findings identified several communication issues that can be categorized into different themes, which are; (1) accuracies, (2) timeliness, (3) distortions, (4) barriers, (5) under loading, (6) overloading, (7) misunderstanding, (8) gatekeeping, (9) procedures, and lastly (10) financial. The study also determines the significant impact of communication problems and several solutions to overcome these communication issues in the construction industry.

Keywords: project management, communication, systematic literature review

Sub-Theme 5 : Building and Environmental Science

Energy, simulation, IAQ, IEQ, BIM, materials, legal, building performance

NO.	INSTITUTION	TITLE AND AUTHORS
1.	UM	**Thermal Environment in Four Air-Conditioned Museum Galleries: Case of Malaysia** Raha Sulaiman
2.	UITM	**Assessing Measurement Model of Green Cleaning Components for Green Buildings** Nur Aqlima Ramli
3.	UITM	**Environmental Cleaning Battling Against Covid-19 Infection in Healthcare** Nur Aqlima Ramli
4.	UM	**The Energy Efficiency Assessment for Intermittent Use Religious Buildings** Nurul Asra Binti Abd. Rahman
5.	UM	**Electronic Energy Benchmarking System (E-EBS) Towards Sustainable Building Energy Performance** Azreena Binti Zaharil Azlan
6.	UM	**The Impact of Physical Environment on Healthcare Workers' Well-Being in Chinese Hospitals During Covid-19 Pandemic** Norhayati Mahyuddin/ Li Yuan
7.	UM	**Youth Perception on Climate Change and Sustainable Consumption** Eli Farhana Binti Abd Rahim

8.	UM	**Indoor Air Quality (IAQ) In Malaysian Kindergarten Environment: A Thematic Review** Intan Bayani Binti Zakaria

THERMAL ENVIRONMENT IN FOUR AIR-CONDITIONED MUSEUM GALLERIES: CASE OF MALAYSIA

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ABSTRACT

This paper investigates thermal environment through combination of questionnaire surveys and field experiments. Investigations were done in four fully air conditioned galleries in two museum buildings in Peninsular Malaysia. Malaysia has hot and humid climate throughout the years which continuous air conditioning system is needed in an enclosed gallery. The aim of this paper is to investigate the performance of thermal parameters which are the indoor air temperature (T_a) and relative humidity (RH) based on ASHRAE museum climate class of control and visitors PMV-PPD values. Air velocity (V_a) was measured to check the air conditioning efficiencies. A total of 5 sampling points have been taken inside the galleries which were recorded 9 hours daily in 7 consecutive days for each point. Results from field experiments revealed that all galleries are in risk of thermal discomfort. Only one gallery achieved PMV-PPD acceptance and within the comfort zone. Higher cooling capacity with fewer numbers of visitors and smaller gallery did not contribute to a better level of T_a and RH. The air velocities were far below the recommended level. T_a complied with ASHRAE climate class of control but not RH. Results from this study provide an eye opening on the current practice of air-conditioning management in Malaysian museum buildings.

Keywords: Thermal environment, museum indoor climate, thermal comfort, air conditioned gallery, museum

ASSESSING MEASUREMENT MODEL OF GREEN CLEANING COMPONENTS FOR GREEN BUILDINGS

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ABSTRACT

This paper aims to assess a measurement model of green cleaning for green buildings in Malaysia. Being one of the contributors to the indoor environmental quality (IEQ) performance, green cleaning has become one of the significant aspects that need to be considered for the well-being and performance of a building particularly in green building's operations and maintenance performance. Green buildings without green cleaning practices would hinder the benefits that should be rendered economically, socially and environmentally. However, the absence of a clear green cleaning components and requirements in Malaysia has become a motivation to undertake this research. A questionnaire survey involving cleaning service providers and Green Building Index (GBI) facilitators was carried out and the data were then analyzed using partial least squares structural equation modeling (PLS-SEM). However, this paper will be focusing on the measurement model assessment. Most of the green cleaning components and requirements are acceptable in the model except Integrated Pest Management (in Cleaning Procedure component) and Hand Soaps (in Product and Materials component) due to lower factor loadings. Therefore, these two requirements were removed from the measurement model. This finding will provide an initial insight of the green cleaning components and requirements to the industry especially cleaning service providers and the management teams of green buildings.

Keywords: Green building, green cleaning, components, requirements, measurement model

ENVIRONMENTAL CLEANING BATTLING AGAINST COVID-19 INFECTION IN MALAYSIAN HEALTHCARE FACILITIES

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ABSTRACT

Faced with a pandemic, all healthcare actions need to reflect best practices, in order to avoid high transmissibility, complications and even hospitalizations. For hospital environments, the product and processes recommended and authorized by regulatory institutions for environmental cleaning and disinfection need to be highly effective. This study was hence conducted to identify and validate the environmental cleaning elements and performance criteria to prevent Covid-19 infection in Malaysian healthcare facilities. Eight (8) elements and thirty-eight (38) performance criteria were identified from the literatures, and a questionnaire survey that involved environmental cleaning experts was carried out. Content Validity Index (CVI) were employed to validate the content of the environmental cleaning elements and performance criteria in this study. The result indicate that the performance criteria of "Finishes, furnishings" and "Equipment Maintenance Log" were not relevant to be applied in current fighting against Covid-19 infection in Malaysian healthcare. However, the remaining thirty-six (36) performance criteria were proved as relevant and acceptable. The findings of this study can provide significant contribution to the built environment industry. By knowing the environmental cleaning elements and performance criteria, efforts can be carried out to explore measures that can be taken to improve the environmental cleaning practice in Malaysian healthcare to battling against Covid-19 infection.

Keywords: Covid-19, Environmental cleaning, HCAI, Healthcare

THE ENERGY EFFICIENCY ASSESSMENT FOR INTERMITTENT USE RELIGIOUS BUILDINGS

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ABSTRACT

As a public building which run on public fund, mosques can play a big role in demonstrating how energy efficiency initiatives can contribute towards a holistic sustainable development. Intermittent occupancy profile of mosque has a unique energy consumption pattern unfortunately current practice in mosques lacks application of energy efficiency solutions and sustainable guidelines during conception, construction, and operation. The main objectives of this research are to identify compliance to energy efficiency criteria under 'Penarafan hijau Jabatan Kerja Raya' (phJKR) rating tool and standard for efficient building status under MS 1525:2019 for a selected mosque which recently had undergone energy retrofit initiatives. This research used questionnaire to gauge comfort level under qualitative method and content analysis from collected data for energy efficiency under qualitative approach. The result of study showed that this mosque had an above average score under phJKR energy efficiency criteria and achieved energy efficient building status under MS 1525:2019 without compromising on worshippers' comfort level. Their initiatives to implement energy retrofit with reduced electricity bills for post retrofit period had proven their success towards energy efficiency initiatives. However, some improvements are still needed to further improve the mosque energy performance. The study also revealed that there is an urgent need for BEI to be established for religious buildings including mosques as currently there is no specific BEI for this category of building.

Keywords: Energy saving measure, Energy Performance, phJKR, content analysis, religious building

ELECTRONIC ENERGY BENCHMARKING SYSTEM (e-EBS) TOWARDS SUSTAINABLE BUILDING ENERGY PERFORMANCE

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ABSTRACT

Taking into account the global scenario on energy use in, and the resultant carbon emission from buildings, there is a need to take an integrated approach to manage building carbon footprint by consolidating a comprehensive green building rating scheme and efficient building energy management and reporting tool into a robust benchmarking. However, currently there is no centralized system for energy performance that is integrated with green rating tool for government buildings in Malaysia. The aim of this paper is to explore the potential of an electronic energy benchmarking system (e-EBS) that integrates the assessment scoring of the pHJKR rating scheme with the JKR Energy Online System (JENOSYS) to give a more comprehensive energy performance benchmarking for a building. The pHJKR is a green building rating scheme that was created to assess the sustainable performance of buildings while considering the most recent legislative requirements. The system in this study consists of three (3) modules that automatically analyses data acquired from a user building and ultimately processes the final report, in accordance with pHJKR requirement. The e-EBS conceptual module and process flow were highlighted. The study also proposed the requirement specification for the e-EBS. The next phase is the validation of the module using government offices, university faculties, and mosques as case studies to evaluate the interfacing of the modules. Prior to the validation process, energy audit reports of the case study buildings will be compared and analyzed to indicate which case study building comes with the best energy benchmark according to the Malaysian Standards(MS) 1525:2019 and pHJKR.

Keywords: carbon emission, energy benchmarking system , green buildings in Malaysia, green rating, sustainable energy management, system integration

HEALTHCARE WORKERS' WELL-BEING IN CHINESE HOSPITALS DURING COVID-19 PANDEMIC

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ABSTRACT

In the wake of COVID-19 in 2020, healthcare workers (HWs) are working long hours every day facing high risk of infection and stress. This research investigates the satisfaction level and the difficulties experienced by HWs based on the current physical environment setting during COVID 19 pandemic. A total of 222 responses were obtained from a random sample of HWs from four hospitals in Changzhou City, Jiangsu Province. Three-fifth of the participants (n=133, 60%) are satisfied with hospital equipment and half (n=111.50%) of them are satisfied with the modern technology in place. About one-third (n=67, 30%) are satisfied with ventilation and only one-fifth (n=44, 20%) are satisfied with hygiene. Most HWs think it was necessary to provide tests for frontline workers. Employing a quantitative research method, HWs well-being was taken as the dependent variable while the two independent variables were physical quality and service environment. This study mainly focuses on the wellbeing of HWs in their physical environment.

Keywords: Covid-19; Healthcare Workers; Hospital; Physical environment; Wellbeing

YOUTH PERCEPTION ON CLIMATE CHANGE AND SUSTAINABLE CONSUMPTION

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ABSTRACT

This paper reviews the role of youth in sustainable consumption and their relationship with climate change, by exploring how today's youth views climate change and their reaction to it. It is imperative to discuss the surrounding support system that can enhance youth motivation in combatting climate change. However, the evaluation of this subject matter remains scarce. To address this matter, we evaluated 32 research articles that we obtain from scientific web databases like ScienceDirect, Scopus, and Web of Science (WoS). From this review, we identified that the present youth have a relatively elevated level of knowledge regarding the climate change crisis due to the vast and readily available information provided from the internet together with the increasingly popular social media platforms. Our findings suggest that future research should focus on methods to encourage and support youth efforts to overcome the alarming climate crisis. Furthermore, providing knowledge and information on climate change alone is no longer sufficient, instead, youth should be informed of the actions that they can immediately partake in.

Keywords: Climate change, energy conservation, sustainability, sustainable consumption, youth

INDOOR AIR QUALITY (IAQ) IN MALAYSIAN KINDERGARTEN ENVIRONMENT: A THEMATIC REVIEW

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ABSTRACT

Indoor air quality (IAQ) is an important component of a healthy indoor environment necessary for occupants' comfort and wellbeing. Poor IAQ in kindergarten has a detrimental impact on children's learning performance and increases the risk of asthma and other respiratory diseases, that can lead to absenteeism. Since children spend a significant amount of time in kindergarten, it is important to know what studies have been conducted and what improvements to indoor air quality are needed. Using a thematic review, this paper explores IAQ research patterns in Malaysia from 2010 to 2021. A themed review was conducted by analysing papers taken from four electronic databases: Web of Science, Science Direct, SCOPUS and Google Scholar. Information on IAQ in kindergarten was extracted from 22 studies where four final themes were identified: indoor air contaminants, indoor air exposure, physical environment and intervention. The findings will be useful in future study on IAQ in the kindergarten environment, as well as determining which areas require further investigation**.**

Keywords: indoor air quality, indoor environment, kindergarten, thematic review

Sub-Theme 6 : Computer Science and Engineering

Machine learning, data mining, artificial intelligence (AI), building engineering technology, big data, internet of things (IoT), geomatic, engineering studies

NO.	INSTITUTION	TITLE AND AUTHORS
1.	UITM	**Augmented Reality Technology for Building 3d Design and Visualization In Malaysia** Ahmad Farid Ab Aziz
2.	UITM	**Environmental Factors and Covid-19 Epidemics: A Spatial Exploratory Analysis in Selangor, Malaysia** Siti Nurfazira Fazli
3.	UITM	**Effective 5D BIM Requirements for Risk Mitigation During Pre-Contract Stage** Nazirul Fariq Bin Mohd Kassim

AUGMENTED REALITY TECHNOLOGY FOR BUILDING 3D DESIGN AND VISUALIZATION IN MALAYSIA

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ABSTRACT

The Department of Survey and Mapping Malaysia (JUPEM) has gone further afield in the way it conducts its cadastral business towards the development of 3D-smart cities in a sustainable manner. The 3D model can shows the detail from every side of the building, but by applying Augmented Reality (AR), the 3D model presentation will be more even realistic and making users to feels like living in a virtual world. AR is an environment that inserts 3D virtual objects into a real environment in real time. The aim of this study is to develop a AR application for 3D modelling and visualization process for the apartment building at Salak Maju, Selangor towards an informative media so that users can get instructive details about the virtual apartment. The main dataset required creating the AR-3D building and visualization was the building plans and floor plans. These 2D plans were processed using AutoCAD and Revit software to generate the 3D model. Unity3D software utilised to add the application of in the 3D building models. The results of the AR-3D model and visualization are interesting, in which the 2D building plan has been developed using the provided floor plan with a minimal cost-software and moderate accuracy. The integration of the 3D models and AR application has shown this alternative approach could examine the floor plan so that a user can better understand and engage with the building design. The study has also revealed that it help land surveyor and developers through the application of AR to them detect the condition, quality, and error in the plan. The benefits of this application has been introduced include the basic computations for 3D objects of building that can be calculated, AutoCAD data booking from the fieldwork can be directly imported into the 3D software and creating a fast, flexible, and interesting modelling of the building. This scenario can enable to quickly mockup designs of objects, homes, or something else dream up.

ENVIRONMENTAL FACTORS AND COVID-19 EPIDEMICS: A SPATIAL EXPLORATORY ANALYSIS IN SELANGOR, MALAYSIA

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ABSTRACT

Malaysia faced the COVID-19 epidemics which had a huge impact on the community in 2020. This study was conducted to analyse the feasible factors influencing the spread of the COVID-19 in Selangor using geographical information system (GIS) techniques. Two main objectives were carried out, namely i) to analyse the spatial-temporal distribution of COVID-19 cases by months and districts in the state ii) to identify the environmental factors that contribute to the increase of COVID-19 cases, including population, housing, urbanisation, gradient and industrial area. Natural break classification method in ArcGIS was used to produce the COVID-19 map and analysis, then the possible correlation between the cases and the selected risk factors were determined using correlation analysis. Every district had experienced with the epidemics, especially in the district of Petaling and Klang. The cases were highly increased on last three months of 2020 which were October, November and December. Although there were no dominant factors shaping the increasing cases as the correlation strength was mostly moderate and low trends, population was suggested as the main factor because there would be uncontrolled human movements and crowded conditions in the certain areas. GIS has also demonstrated its capabilities to spot the spatial distribution and correlation of COVID-19 cases with the potential risk factors.

Keywords: COVID-19, Spatial Environment, Risk Factor, Correlation, GIS

EFFECTIVE 5D BIM REQUIREMENTS FOR RISK MITIGATION DURING PRE-CONTRACT STAGE

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ABSTRACT

The implementation of building information modelling (BIM) can be challenging without proper processes, procedures and standards. As the development of BIM progresses, there are concerns related to the five-dimensional (5D) BIM procedures in producing deliverables from the cost aspects of the project that adopts BIM technology. While the concerns may expose to amount of risks that can influence the project cost, this paper is determined to investigate the technical risks of 5D BIM practice and explore risk mitigation strategies for the construction project that adopts 5D BIM technology. Three main groups of technical risks were identified and reviewed, namely modelling issues, poor execution procedures and design change issues. The population of this paper consists of quantity surveyors and the respondents come from consultancy firms, contractors and developers. This paper also found twelve critical issues and challenges of 5D BIM implementation that had been analysed with the relative importance index (RII) analysis. Risk mitigation strategies are proposed to make a positive impact on the 5D BIM implementation, which consist of regular checks and balances, improve skills and knowledge through training and acquire suitable 5D BIM applications. The use of a BIM execution plan (BEP) and BIM protocol are also being discussed in this paper.

Keywords: Digitalisation, Cost Management, BIM, Risk

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ABSTRACT

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LIST OF ABSTRACT

PARALLEL SESSION (ORAL)

Sub-Theme 1 : Surveying & Governance

Development, by-laws, building control, pathology, defects, condition assessment, inspection, professional practice, education, contracts

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	OR101	USM	**Appraisal Of Common Defects Of Reinforced Concrete Bridges** Nur Syaza Najwa Binti Alias and Md Azree Othuman Mydin
2	OR103	UM	**The Public's Perspective On Brownfield Redevelopment: A Case Study In Johor Bahru** Teh Shu Zen And Dr Sr Zahiriah Yahya
3	OR104	UM	**Critical Success Factors (Csfs) For Urban Redevelopment In Malaysia** Nurul Ain'ni binti Kamarulzaman and Dr. Sr. Hasniyati binti Hamzah
4	OR105	UM	**Investigating Exterior Defects Caused By Surrounding Factors: A Case Study On Tuanku Mizan Zainal Abidin Mosque, Putrajaya** Humaira Kamarul Saman and Sr Nor Haniza Ishak
5	OR106	UM	**A Study on The Control Of Ventilationin Covid-19 Quarantine Premises In Malaysia** Nurfadzillah Hanim Yusri Shamsul and Nur Farhana Azmi
6		UM	**Issues And Challenges Faced In The Implementation Of Fire Safety Measures**

	OR107		**For Shophouses That Had Repurposed Into Hotels Within The Secondary Heritage Zone: A Case Study Of Hotel In Kuala Lumpur** Yap Kah Kit
7	OR108	UM	**Surviving The Covid-19 Pandemic: A Time For Change For The Qs** Tan Kai Yin, Nur Mardhiyah Aziz

APPRAISAL OF COMMON DEFECTS OF REINFORCED CONCRETE BRIDGES

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ABSTRACT

Deterioration of superstructure and substructure of the bridge component is a common problem in Malaysia. The existence of bridge defects will affect the structural safety and the function of the bridges. This research will provide an understanding of common defects of reinforced concrete bridges, focusing on river and highway bridges in Johor State through visual inspection. Besides, a non-destructive test (NDT) via rebound hammer was conducted to determine the bridge strength. Both data were compared to establish correlation between the visual inspection rating and the non-destructive test results. In this study, 8 reinforced concrete bridges were chosen as a research sample where 4 bridges were located in the river area, while 4 bridges on federal highways. The chosen bridges were Sg. Benut Bridge, Sg. Berumbong Bridge, Sg. Parit Hj. Hashim Bridge, Sg. Linau Bridge and North-South Expressway (E2) Bridge, Exit 245 (Machap) – Exit 247 (Simpang Renggam) at 4 different checkpoints. This study found that the most common defects of reinforced concrete bridge for both river and highway are due to concrete spalling, concrete crack, water leaking and vegetation growth. Though, scour and erosion, honeycomb, concrete deterioration, and hydraulic problem were recorded as minor defects that occur on the bridge. Generally, this study indicates good correlation between the visual inspection rating and non-destructive testing.

Keywords: Bridge Defects, Non-destructive Testing, Rebound Hammer Test, Visual Inspection

THE PUBLIC'S PERSPECTIVE ON BROWNFIELD REDEVELOPMENT: A CASE STUDY IN JOHOR BAHRU

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ABSTRACT

Brownfield redevelopment is gaining attention these years. The potentials and threats of brownfields, along with the benefits of redevelopments, are the catalysts of brownfield redevelopments. To assure the sustainability and quality of the redevelopment, the public's involvement not to mention is a key element. However, their awareness level affects their willingness and consciousness to involve themselves in the redevelopment process. Hence, this study aims to study the public's perspective of brownfield redevelopment. This study aims to examine the importance of the public's perception of brownfield redevelopment; identify the public's awareness level of the brownfield redevelopment; and identify the public's preferences of brownfield redevelopments in Johor Bahru District. The quantitative method, particularly questionnaire survey, is adopted to collect primary data. The data is then analysed to determine the public's awareness level and their redevelopment preferences. The findings indicate that the respondents are at a relatively low level of brownfield awareness, especially their awareness of the potentials of brownfields. Besides, it is also discovered that the public value the benefits of redevelopment in the social aspect the most, and therefore, they welcome redevelopment of public amenities such as healthcare facilities and green spaces and recreational areas to be implemented. Conversely, economically beneficial redevelopments such as high-end residential project, hotel and shopping complex are those redevelopments they resist the most. This study provides an insight into the public's viewpoints in redevelopment issues, which aids relevant authorities in planning and designing future redevelopment that meets the public's desires.

Keywords: brownfield, Johor Bahru, public's perspective, redevelopment

CRITICAL SUCCESS FACTORS (CSFs) FOR URBAN REDEVELOPMENT IN MALAYSIA

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ABSTRACT

Urban redevelopment has become a hot topic among built environment professionals in Malaysia especially in the city centre. Therefore, it is crucial for developers to uncover and enhance the factors that ensure the success of an urban redevelopment in Malaysia. These factors also known as Critical Success Factor (CSFs) for urban redevelopment in Malaysia which will also be the aim for this research. The lack of guidance and knowledge on CSFs for urban redevelopment can increase the risk of redevelopment failure, which not only will result in major economic loss, but also possibly project abandonment. The objectives of this research are to outline perceived among built environment professional in Malaysia and to formulate a strategy for urban redevelopment based on the CSFs. The convergent parallel mixed methods approach was adopted in this study where the approach includes collecting and analysing both qualitative and quantitative data. Using desk research, twelve CSFs for urban redevelopment were revealed and then depicted by a fishbone diagram that further categorised the twelve CSFs into five main broad categories namely Governance, Stakeholders, Legal, System and Process. The CSFs where then used in questionnaire survey to determine the most important CSFs for urban redevelopment in Malaysia. The CSFs ranking in the close-ended question revealed financial/funding as the most important CSF for urban redevelopment in Malaysia. However, the open-ended question gave a different finding. Most of the respondents replied that effective governing authority was the most important CSF that needs to be present in urban redevelopment. Subsequently, the findings were used to formulate a two-pronged strategy for urban redevelopment. This research will be able to provide more knowledge and guidance on CSFs needed to ensure the success of urban redevelopment project in future so that they would succeed and be sustainable economically, socially and environmentally.

Keywords: Built Environment, CSF, Malaysia, Two-Pronged Strategy, Urban Redevelopment

INVESTIGATING EXTERIOR DEFECTS CAUSED BY SURROUNDING FACTORS: A CASE STUDY ON TUANKU MIZAN ZAINAL ABIDIN MOSQUE, PUTRAJAYA

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ABSTRACT

This research aimed to understand the surrounding factors that causes defects to an existing building which is crucial to achieve satisfactory building performance. The biggest contributor for defect to occur is surrounding of the building. Especially on exterior part of the building where it has been exposed to the surrounding environment that has been part of the agent that contribute to building defects. Therefore, it is important that this factor should be acknowledged and prevented to ensure the building performance quality is in satisfactory level. Thus, this research utilized a selected case study building to achieve objectives of this research. This research comprised two types of primary data collection and one type of secondary data collection. The primary data collection consists of building condition survey and interview while for secondary data collection is collected from literature review. After conducting building condition survey and interview, objectives of this research have identified. The types of exterior defects found on the case study building majority are staining, peeling paint, tiling defects, cracking, leakage and waterproofing defects, rusting and along with other findings. The surrounding factors of the defects found has determined such as extreme climate condition, construction activities, building design and orientation, and occupants and load factor. Also, adopting rating condition assessment tool allow researcher to identify the condition rating of the building defects. The findings of this research provide an understanding and awareness on the surrounding factors that can contribute to building defects. Any building with a maintenance management should be comprehensive in managing a building in order to meet its satisfactory level. Finally, it is hopefully that this study could improve the efficacy of defects management in the future.

Keywords: Building condition assessment, Building defects, CPBS 101, Surrounding factors

A STUDY ON THE CONTROL OF VENTILATION IN COVID-19 QUARANTINE PREMISES IN MALAYSIA

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ABSTRACT

Ventilation system is a very important system for a building. Ventilation system is a system that controls and distributes air in confined spaces such as homes, offices, hotels and etc. The main function of ventilation system is to supply and replace the air quality in a space with new and fresh air and the purpose of ventilation system in the building is to supply good air quality for occupants to breathe and removed the polluted air from the building. During this pandemic situation that happens in the world, quarantine premises can be medical and non-medical building that have been gazetted by the government under the act of Prevention and Control of Infectious Diseases Act 1988 [Act 342], have been occupied with infected and potentially infected patient all around the world. Besides, good ventilation system in a quarantine premises can avoid the spreading of COVID-19 virus. This study examines the existing policy and guidelines relating to establishment of COVID-19 quarantine premises, to examine the suitability of quarantine station for infected and potentially infected patient as well as to recommend the suitable approaches for setting up of quarantine premises or facilities for suspected and confirmed COVID-19 patients. Literature review and semi-structured interview have been used as the methods to achieve objectives of the study. In addition, the existing guidelines and policies that related to the establishment of quarantine premises is limited as well as the requirement for establishment of the local quarantine centre is not details compared to the international guidelines. Besides, the guidelines that related to establishment of COVID-19 are COVID-19 Management Guideline in Malaysia and guideline that has been established by World Health Organizations (WHO).

Keywords: COVID-19, Policy and Guidelines, Quarantine Premises, Ventilation System

ISSUES AND CHALLENGES FACED IN THE IMPLEMENTATION OF FIRE SAFETY MEASURES FOR SHOPHOUSES THAT HAD REPURPOSED INTO HOTELS WITHIN THE SECONDARY HERITAGE ZONE: A CASE STUDY OF HOTEL IN KUALA LUMPUR

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ABSTRACT

The aim of the paper is to investigate the issues and challenges in the implementation of fire safety measures for heritage shophouses that had repurposed into budget hotel within Kuala Lumpur secondary heritage zone. There are 3 objectives which are to identify fire safety requirements for shophouses that had repurposed into budget hotel based on Malaysian code, to investigate the compliancy of fire safety requirements when repurposing shophouses into budget hotels in Kuala Lumpur secondary heritage zone and recommend fire safety measures for hotel operator's reference when repurposing shophouses into budget hotel. A mixed method (quantitative and qualitative) is used to get research goals and to respond to research questions by using a research strategy. The qualitative methods adopted in this research are case studies, interviews, and observation while the quantitative methods are questionnaires, experiments, and surveys. The final stage consists of the study of outcomes which the results will be analyzed, and recommendations and conclusions will be drawn. The questionnaire survey is used to determine the challenges faced when undertaking repurposed exercise of their hotel. Semi-structured interviews used to obtain information regarding the issues and challenges faced. Qualitative observation is used to compare consistency correlations and distinctions between research data. In general, the aim of this study may be stated that by evaluating at the current building fire regulations it meets the problems of implementing fire safety standards for the buildings in a secondary heritage area. Since the difficulties facing in adoption the fire safety regulations are significantly related to both the understanding of the building owner to the building fire regulations and fire safety systems. The difficulties of implementing the fire protection criteria in a hotel building must thus be addressed that occur due to lack of understanding on laws and regulations.

Keywords: Budget hotel, Fire safety regulation, Fire safety system, Implements regulations, Secondary Heritage Zone of Kuala Lumpur

SURVIVING THE COVID-19 PANDEMIC: A TIME FOR CHANGE FOR THE QS

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ABSTRACT

The widespread of the covid-19 has made the new norm technology as one of the new trends in the construction industry. The COVID-19 pandemic which starts in December 2019 has caused a thread to humanity, forcing a global shutdown that affecting a lot of sectors. The outbreaks have severely disrupted the economy, with devastating effects on the construction industry and it has simultaneously affected the quantity surveying profession. Movement Control Order (MCO) was introduced to control the spread of the virus. During this time there are a lot of challenges faced by the consultant Quantity Surveyor (QS) especially in completing the pre-contract tasks. Tasks like taking-off which was perform using software that is available in the firm had to be done in conventional way when the QS are working from home. Other task like tendering process, site visits which requires physical interactions has to be put on hold. Thus, this research was carried out to suggest suitable technology that can be applied specifically during the pre-contract tasks. About 309 online questionnaires were sent to the consultant QS throughout Peninsular Malaysia. Data obtained were analysed and interpret using descriptive analysis, mean, inferential analysis, Relative Important Index. Findings shows that Building Information Modelling (BIM), AutoCAD Revit, Drone, Autodesk BIM and BuildSpace are the most suitable technology and software that can be used by consultant QS while carrying out most of the pre-contract tasks. The findings can act as a guidance for the consultant QS in choosing the suitable technology or software while carrying out pre-construction tasks

Keywords: consultant quantity surveyor, COVID-19 pandemic, new-norm technology, pre-construction task

Sub-Theme 2 : Architecture and Planning Studies

Design, planning, architectural studies, legal, housing, geospatial, BIM

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	OR201	USM	**Assessment And Design Of Autism Friendly Indoor Space And Environment** Aliff bin Abd Rahman and Md Azree Othuman Mydin
2	OR202	USM	**Uncovering Ipoh Old Town Legibility In The Light Of Kevin Lynch Theory** Hamza Alsheikh Mahmoud
3	OR203	UM	**Passive Design Of The High-rise Low-cost Housings In Warm Humid Climate Malaysia: Case Study Of Ppr Housings** Jasmine Pow Poh Ling
4	OR204	UM	**Passive Design Strategies And Its Application In Residential Building: Case Studies Of Ar. Lok Wooi's And Ting's Residence** Irene Sim Hui Ling

5	OR205	UM	**Walkability And Ridership Determinants Of Residents In Transit-oriented Development: The Case Study Of Mentari Court, Petaling Jaya** Aswin Kumar And Sr Abdul Ghani Bin Sarip
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7	OR207	UM	**Housing Values And Housing Expectations Of University Students In Klang Valley** New Lik Guan And Zafirah Al Sadat
8	OR208	UM	**Investigating Building Stakeholders Awareness And Understanding Of Biomimicry Implementation In Klang Valley** Muhammad Hazim Hamdan, Suzaini M. Zaid
9	OR209	UTP	**Analysing The Effects Of Marketing Communication Channel Via Extended Reality (Xr) Technology Among House Buyers** Wong Boying, Jacqueline Kueh Yi Woon and Fazdliel Aswad Ibrahim

10	OR210	UM	**Outdoor Spaces for Children in Residential Neighbourhood in Penang** Emelynn Toh Yee Lyn

ASSESSMENT AND DESIGN OF AUTISM FRIENDLY INDOOR SPACE AND ENVIRONMENT

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ABSTRACT

What role may interior design have in influencing autistic behavior? Many classifications of autism label people as "introverts" or "preferring to live alone." How might interior design help to alleviate this disorder? Interior design is responsible for creating environments that suit the needs of a diverse variety of individuals. People with disabilities are commonly underestimate and excluded in architecture design perspective. Autism is by far among the most difficult diseases that medical and psychiatry sector have ever confronted. People with autism have different ability to adapt to different sensitivities, symptoms, and cognitive integration. The learning environment is crucial for autistic children's development. When kids engage in skill-building activities, the environment may draw and encourage their attendance. Hence, the research aims to learn and design an interior space that fulfils all of the criteria for children with autism to adapt to the environment. The research consists of 3 objectives which were to study the existing body of knowledge to ascertain relevant criteria exist to design indoor space for children with autism; to evaluate three centers for children with autism concerning the body of knowledge examined; and to propose an autism-friendly indoor space and environment. Eight elements have been highlighted for consideration in space design, as well as the stimulus considerations that must be applied. Hence, creating a setting that allows these kids to utilize any of their faculties easily might contribute to greater learning efficiency.

Keywords: autism, behavioral impact, interior design, learning environment

UNCOVERING IPOH OLD TOWN LEGIBILITY IN THE LIGHT OF KEVIN LYNCH THEORY

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ABSTRACT

Ipoh is one of the significant tourist destinations in Malaysia. It is a living museum which still contains and display various periods of development through its age of more than 140 years. The most distinguishable part is the old town of Ipoh which constitutes the brightest aspect of the city identity and the most memorable built area. But what makes the old town this important? According to Kevin lynch one of the urban design pioneers, legibility of town is the most important pillar of the city identity and image. The aim of this research is to employ given lunch theory on legibility to uncover various aspects of Ipoh old town legibility. To reach this aim, this research starts with reviewing Kyven lynch theory "Image of the city. The outcome of this review guided the analysis of city legibility elements of path, edge, district, nodes, landmark and figure ground studies. The data for the analysis was collected through visual observation at various times, recording videos and photos and referring to relevant online sources. Content analysis and comparative analysis were employed to analyze the collected data. This research concludes that Ipoh old town is in line with Kevin lynch legibility criteria.

Keywords: Imageability, Ipoh old Town, Kevin Lynch, Legibility

PASSIVE DESIGN OF THE HIGH-RISE LOW-COST HOUSINGS IN WARM HUMID CLIMATE MALAYSIA: CASE STUDY OF PPR HOUSINGS

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ABSTRACT

High-rise housing is developed in the urban area to advocate more compact living in order to accommodate the increasing urban population in the country. In order to provide the people, especially the low-income citizens with adequate, affordable and quality housings in the cities, the government has launched the high-rise low-cost housings projects which includes People's Housing Project (PPR) since 1998. However, the quality of the indoor comfort in the low-cost housing has always been doubted as low budget construction and quantity might being prioritized over quality. Based on the research conducted, most of the low-cost housing residents dissatisfy with the living condition in the low-cost housing because the housing's design does not actually take account into the passive design and building performances.

Passive design is important to control the thermal comfort in the high-rise building, especially in high-rise low-cost housing. This research focuses on the studies of passive design in the high-rise low-cost housing in Malaysia, particularly in the flats under People's Housing Project (PPR) in Kuala Lumpur in Malaysia. The main objectives of the research are to identify the passive design factors implemented in high-rise housing in warm humid climate region and to compare the passive designs used in different generation of PPR housing in Malaysia with the reasons behind. Primary data is collected from the site visit to be further analyzed and compared along with discussions conducted with the experts. The outcomes of the research intend to find out the suitable passive design strategies that can be used in the high-rise low-cost housing in urban setting so the future designers can take into considerations of the passive design in order to achieve good thermal comfort and air quality for the occupants in the low-cost housing as well as reduce the energy consumption in the low-income family.

Keywords: building performance, high-rise low-cost housing, passive design, PPR housing, warm humid climate

PASSIVE DESIGN STRATEGIES AND ITS APPLICATION IN RESIDENTIAL BUILDING: CASE STUDIES OF AR. LOK WOOI'S AND TING'S RESIDENCE

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ABSTRACT

The aim of this study on passive design strategies of Ar. Lok Wooi's residential building designs, which using the elements from the traditional Malay house in response to Malaysia's climate is to identify the strategies that improve the thermal comfort and reduce the energy consumption. Case Studies of Ar. Lok Wooi's and Ting's Residence achieve thermal comfort by integrating the elements from the traditional Malay house which response perfectly to Malaysia's climate. As an aid in the justification of this research, the research is done by interview with expert, observations, and literature review on passive design strategies to enhance the process. Therefore, to produce a well-founded research, an in-depth study on the traditional Malay house is carried out to study about how it responds to the tropical climate and context in Malaysia to achieve thermal comfort by using climatic design. Through the research, the passive design strategies of Wooi Residence and Ting Residence are also investigated and compared with the traditional Malay house in this paper.

Keywords: hot and humid climate; Malaysia, passive design strategies, residential building, traditional Malay house

WALKABILITY AND RIDERSHIP DETERMINANTS OF RESIDENTS IN TRANSIT-ORIENTED DEVELOPMENT: THE CASE STUDY OF MENTARI COURT, PETALING JAYA

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ABSTRACT

Transit-Oriented Development is a relatively new strategy to overcome the arising phenomenon of urban sprawl in major cities worldwide. Although the concept of TOD is simply a good investment, citizens, however, either are clueless about the idea or have never even heard about it before. This situation is due to the limited number of TOD projects here in Malaysia. This study explores TOD in Malaysia, identifies factors for living in a TOD, and determines public transport ridership factors. The study is carried by identifying a development within 400 meters of a public transport station; in this case, development near Seri Setia KTM was chosen. To gain knowledge regarding the resident's perspective, a quantitative method was adopted. A questionnaire was made and distributed to the residents of Mentari Court, Sunway. It was identified that proximity to goods and services was the most important factor for residents to choose to stay in TOD. In contrast, covered walkways were the most crucial pulling factor towards public transport usage. In conclusion, developers and governmental agencies should be more aware of what the community wants out of TOD to maximize the utility of TOD and enhance the life of TOD residents. While TOD looks like the perfect answer for all urban problems, a poor execution would still fail to integrate among the components such as walkability. Therefore, each component involved in TOD must be well put, harmonize, and interact with each other component cohesively to make the integration tight and improve the residents' quality of life.

Keywords: Transit-oriented Development, Design of Urban Spaces, Walkability

HOW HAS THE COVID-19 PANDEMIC AFFECTED PRIVATE RENTAL TENANT IN KLANG VALLEY?

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ABSTRACT

Since the declaration of the COVID-19 pandemic, numerous research has pointed out the effect of the outbreak on the economy has been transferred to the tenants. As a homeownership-oriented country, the private rental sector in Malaysia has long not received adequate attention, which makes the condition of the private rental market during this pandemic to be vaguer and more uncertain. The Malaysian government has introduced various economic stimulus packages and supports for tenants in the public housing sector, but little assistance was provided for the tenants in the private rental sector. As such, this paper aims to provide an insight into the tenants in the private rental sector during the COVID-19 pandemic, particularly on the changes of their rental affordability, payment confidence and stress level in meeting the rental obligations. An online questionnaire was conducted on the private rental tenants in the Klang Valley area in April 2021, during Conditional Movement Control Order (CMCO) period. The study found the tenants are still confident to meet their payment on time as they are positive that the pandemic is temporary. However, the finding also found the tenants are moderately stress in meeting the rental obligations and majority of the tenants agreed that future assistance is extremely necessary during the post-pandemic period. The paper concludes with recommendations to policymakers on how to respond appropriately towards private sector tenants if crises arise in the future.

Keywords: COVID-19, Housing, Private Rental Sector, Rental Affordability, Tenants

HOUSING VALUES AND HOUSING EXPECTATIONS OF UNIVERSITY STUDENTS IN KLANG VALLEY

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ABSTRACT

Housing is one of the physiological needs for human being to survive and live. A house does not just provide shelter for one to protect one away from the danger, but it also gives the dwellers a sense of belongings, privacy, and other values. Meanwhile, a person's behavior, attitude and demand toward the housing are being guided by his/her housing values, these housing values are a set of internalized standards that a person hold, and it would affect the decision making related to housing behavior consciously or subconsciously. However, housing developers nowadays has occasionally ignored the human's motivational factors and the housing values of that people seek from their shelter. They just merely treat housing as a profit-making product. Additionally, university students are the prospective home buyers in the future after graduating from university. Their demand and perspective toward housing are being overlooked by the real estate industry player, implying that future supply might not fulfill the demand of these younger generation. Therefore, this study aims to determine the perception of housing values and housing expectations among university students, so that incoming housing supply and product could bring the housing values sought after by these prospective home buyers and meet their housing expectations as well. Quantitative analysis was used to design the questionnaire based on the objectives of this study. The main findings of this study shows that university students agree of that the most important housing value is Health & Safety followed by Comfort. Moreover, the proportion of university students who expect to access homeownership to who expect to rent a house in their 20s is almost even. Housing features such as bathroom sink, refrigerator, ceramic tiles flooring, white paint finishes wall and public transportation are extremely important to and expected by university students.

Keywords: homeownership, housing, housing expectation, housing values, university students

INVESTIGATING BUILDING STAKEHOLDERS AWARENESS AND UNDERSTANDING OF BIOMIMICRY IMPLEMENTATION IN KLANG VALLEY

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ABSTRACT

Biomimicry, the new field of research which examines and emulates natural forms for sustainable solutions to human issues, is becoming a worldwide phenomenon progressively. However, compared to other sectors, the paradigm is still in its infancy in the building sector. Various obstacles hinder the acceptance and implementation despite its potential for offering great new solutions. Nevertheless, the adverse environmental effects of the industry will be significantly reduced by expanding and saturating the building market with materials and technology with eco-friendly features. Thus, biomimicry studies that emulates forms, functions, and methods of nature to provide sustainable solutions. This study aims at assessing the awareness and understanding of biomimicry in the building sector by stakeholders. To measure their degree of awareness, a questionnaire was surveyed for construction professionals. The mean values of the selected variables were used for a quantitative approach to data analysis. There is a low degree of awareness and familiarity among construction professionals with biomimetic materials and technology. The research suggested the encouragement and integration of biomimicry through awareness, training, education, and inclusion in curricula at higher education institutions, government agencies, relevant professional organisations, and stakeholders. This maximises the biomimicry ability to contribute to innovative and sustainable production in the construction sector.

Keywords: Awareness, Biomimetic,Biomimicry, Ecosystem, Sustainable materials

ANALYSING THE EFFECTS OF MARKETING COMMUNICATION CHANNEL VIA EXTENDED REALITY (XR) TECHNOLOGY AMONG HOUSE BUYERS

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ABSTRACT

Marketing communication channels aim to deliver a message about products to the targeted buyers in order to entice them, by either changing their perception of a brand or product. Specifically, it develops avenues for reaching out and interacting and establishes the relationship between the company and customers. For instance, the adoption of gaming technologies in promoting products such as extended reality (XR) technology has become a boom approach among companies to compete in attracting the targeted buyers. The most common applications in relation to XR are augmented reality (AR) and virtual reality (VR). AR applications generate virtual information to overlay tangible objects in real-time while VR is the use of computer technology to create a simulated environment. However, both applications share similar characteristics where it simulates the real environment through the use of digital visual elements, sounds, or other sensory stimuli. However, the housing industry is lagging behind because they are still using conventional marketing communication channels such as brochures and 3D mock-up models that may deliver a poor sense of experience to buyers. Therefore, this research aim is to study the effect of marketing communication channels via XR technology in persuading the intention to purchase among the targeted house buyers. This research will embark on quantitative method which a set of questionnaires will distributed via Google Form as self-administrative approach seems impossible to be executed due to MCO. Furthermore, the respondents will be assisted with pre-recorded video of XR application which presents the housing model while answering the questionnaires. The targeted respondents in this study refer to person between 25 - 55 years old since this cluster is qualified in purchasing a home with appropriate financial income. It is expected that XR technologies will bring out an unimaginable modification and advancement in the way of promoting the housing projects.

Keywords: Extended reality, housing industry, intention to purchase, marketing communication channel

OUTDOOR SPACES FOR CHILDREN IN RESIDENTIAL NEIGHBOURHOOD IN PENANG

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ABSTRACT

The rapid growth and development of outdoor environments are likely to deny the children's basic needs as citizens. The wellbeing and physical activity of children in neighbourhood is decreasing due to the unfriendly design of outdoor spaces. Therefore, by understanding the design criteria of outdoor spaces for children in neighbourhood, this research aims to identify the needs and importance of outdoor spaces for children, as well as to investigate the quality of outdoor spaces for children in neighbourhood in Penang. This research also explores the concept that outdoor spaces in neighbourhood should be planned, designed and built with children in mind. The outdoor areas studied are streets and sidewalks, park and playground in residential neighbourhood. Qualitative data collection methods include site observation and photographic documentations, while quantitative data collection method includes questionnaires survey. The respondents are parents and children, who are the users of the outdoor spaces in neighbourhood area. Based on the findings, most outdoor spaces in this neighbourhood are found to fulfil the criteria of a child-friendly neighbourhood in terms of safety, comfort, design, accessibility, attractiveness and sociability. Several suggestions are also highlighted to promote a better quality of life and achieve a child-friendly neighbourhood. An inclusive and liveable neighbourhood is created for everyone to enjoy.

Keywords: Children, Child-friendly Environment, Outdoor Spaces, Residential Neighbourhood

Sub-Theme 3 : Management

Building maintenance, asset, FM, POE, legal, risk, project management, property management, BIM

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	OR301	UM	**Establishing Effective Operation And Maintenance That Enhances The Energy Performance Of Green Office Buildings In Malaysia** Anna Chen Siaw Ee and Au Yong Cheong Peng
2	OR302	UM	**A Study On The Implementation Of Facilities Management (Fm) Adaptations During Covid-19 Pandemic Crisis Among Higher Education Institutions (Heis)** Chan Eng Seng, Nik Elyna Myeda

3	OR303	UM	**Perception Of Hand Hygiene Facilities And Practises Among School Students In Kuala Selangor District** Nabiha Mohd Sopian
4	OR304	UM	**The Relationship Between The Maintenance Management Problems And The Maintenance Performance Of High-rise Residential Buildings** Tem Jing Yi and Au Yong Cheong Peng
5	OR305	UM	**Facilities Management Towards Flexible Work Arrangement (Fwa) Implementation During Covid-19** Teo Xi Yuan
6	OR306	UTHM	**Property Management of Home-Sharing Accommodation Through Website** Adlina Farahiyah binti Abdul Manap and Zarina binti Shamsudin

7	OR307	UiTM Shah Alam	**The Implementation of Zero Waste Index Towards Developing a Zero Waste City** Nurul Adiba Bohari and Shaza Rina Sahamir

ESTABLISHING EFFECTIVE OPERATION AND MAINTENANCE THAT ENHANCES THE ENERGY PERFORMANCE OF GREEN OFFICE BUILDINGS IN MALAYSIA

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ABSTRACT

The increasing concern of global warming occurring at an exceptional rate has led to a massive shift in the construction industry whereby the development of green buildings is on the rise. Along with the emergence of green buildings, the evaluation of sustainability of a project is a necessity to ensure that the building operates accordingly to the best practices. As such, various studies have shown that some green buildings are underperforming compared to its initial designs and some are even found to be performing even worse than conventional buildings. In addition, the operation and maintenance (O&M) aspect are often neglected in the initial design stages, despite it being a significant factor in operational energy consumption and the longer lifespan of a building. Therefore, this research aims to study the implementation of O&M in relation to the energy performance level of green office buildings in Malaysia. To achieve the objectives of this research, a qualitative method is used whereby the data are obtained through literature reviews, interviews, and physical data such as BEI from the selected green office buildings. The comparative BEI are used as a benchmarking tool in the Green Building Index (GBI) for assessment of the energy efficiency category. Qualitative data are analysed to determine the influence of O&M factors on the energy performance and its impact on the BEI measurement. It is found that green office buildings with better implementation of O&M factors have lower BEI measurement and are awarded with higher GBI ratings which indicates that the green office building has a smaller operational energy performance gap. From the findings, effective O&M strategies are also suggested to enhance awareness and provide a reference point for building stakeholders, policy makers and personnel to improve operational energy performance and energy efficiency of green office buildings in Malaysia.

Keywords: Building Energy Index, Energy Efficiency, Green Building Index, Green Office Buildings, Operation and Maintenance

A STUDY ON THE IMPLEMENTATION OF FACILITIES MANAGEMENT (FM) ADAPTATIONS DURING COVID-19 PANDEMIC CRISIS AMONG HIGHER EDUCATION INSTITUTIONS (HEIs)

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ABSTRACT

The outbreak of the global pandemic Coronavirus disease 2019 (Covid-19) has significant impact globally. Facilities Management (FM) services which provide multidisciplinary functions in business operations plays a significant role in supporting the core business during the pandemic crisis. In this respect, FM applies the approaches deeper within the context of Business Continuity Management (BCM). This paper explores the implementation of FM services at Higher Education Institution (HEIs) in terms of flexibility, adaptability and resilience during the Covid-19 pandemic, whilst evaluating potential areas of recommendation for improvisation in similar situation in the future. The study applied qualitative research approach in which semi-structured interviews with facilities managers or equivalent positions were conducted. The findings indicated that there are five main FM adaptations which are greatly implemented in the HEIs, namely step-up cleaning, redesign of spaces, safety personal protective equipment (PPE), Standard Operating Procedure (SOP) policies and remote working. The HEIs are exposed to the conceptual planning of Business Continuity Management (BCM) in relation to the services implemented with the aim to revert the business operation back to normal and create priorities towards sustainability and performance control through risk mitigation adaptations. Beyond the adaptations implemented, the paper also exposed the necessary recommendations based on the analysis conducted. HEIs are recommended to adopt a more comprehensible crisis management approach designated for niche areas in each department, create awareness of the importance of SOP policies among the people and resolve underlying issues such as overcrowding for more efficiency in the FM adaptations implemented. In short, the HEIs are introduced to the 'new normal' which cause a series of changes to workplace practice during the Covid-19 pandemic. The paper is anticipated to provide clear visual interpretation of the FM adaptations adopted throughout the pandemic for more detailed research to focus in the future.

Keywords: Adaptation, Business Continuity Management, Crisis Management, Facilities Management, Higher Education Institutio

PERCEPTION OF HAND HYGIENE FACILITIES AND PRACTISES AMONG SCHOOL STUDENTS IN KUALA SELANGOR DISTRICT

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ABSTRACT

Good hand hygiene is an important infection control measure as person-to-person contact via hands is a common mode of transmission for gastrointestinal and respiratory infections. The objectives of the study were to determine assessment model for handwashing behaviour practices among school student; to assess the relevance and the implementation of handwashing among student; and to study the relationship between the implementation hand hygiene at school and the students' habit of hand hygiene. The study was conducted from 24th April 2021 to 25th May 2021 at the public school of Kuala Selangor district. Data was collected using interview questionnaires. The data were gathered on school community which comprises of teachers, students, parents and administrator, responses to their perceptions of hand washing practice among student. From the study findings, it can be stated that the school community agree that hand hygiene is very important among school student but the implementation at school having a slightly less rating from the perception, which means that it only partly implemented at school. On top of that, a significant relationship was identified between the component from COM-B model and hand wash habit among student at school

Keywords: Hand hygiene, Implementation, Perception, School

THE RELATIONSHIP BETWEEN THE MAINTENANCE MANAGEMENT PROBLEMS AND THE MAINTENANCE PERFORMANCE OF HIGH-RISE RESIDENTIAL BUILDINGS.

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ABSTRACT

The ignorance towards the importance of building maintenance management is one of the main issues in the housing in Malaysia. In order to make sure the maintenance performances always meet the occupants' satisfaction, the maintenance management problems should be identified and given the proper treat. Therefore, this research aims to improve the maintenance performance by overcoming the maintenance management problems of high-rise residential buildings through identifying the maintenance management problem, assessing the relationship between the maintenance management problems and maintenance performance, and suggesting the measures that solving the maintenance management problems. This research focuses on the high-cost high-rise residential building located in Klang Valley. The research adopted both quantitative and qualitative approaches to achieve the research objectives. The quantitative approach was the questionnaire survey using google form; while the qualitative approach utilised the open-ended question. Based on the literature review, fourteen (14) maintenance management problems of high-rise residential building were identified and sorted into four (4) main categories. From the correlation analysis result, two (2) significance correlation were determined. The maintenance budget overrun significantly correlated with the ratio of actual maintenance spent to planned maintenance cost (cost variance) of high-rise residential building, and a significant correlation occurred between unavailability of spare parts and ratio of actual to planned maintenance downtime (equipment effectiveness) of high-rise residential building. Besides, the opinions and strategies on solving the maintenance management problems were provided, including educating the residents about the Strata Management Act 2013, selecting qualified maintenance contractor, outsourcing the maintenance services, implementation of preventive maintenance (PM), hiring specialist to perform special maintenance work, providing training for maintenance staffs, formulating the building maintenance regulation, ensuring transparency of financial account, and setting up maintenance policy.

Keywords: Building maintenance, High-rise residential building, Maintenance management problem, Maintenance performance.

FACILITIES MANAGEMENT TOWARDS FLEXIBLE WORK ARRANGEMENT (FWA) IMPLEMENTATION DURING COVID-19

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ABSTRACT

Since the outbreak of Covid-19, Flexible Work Arrangements (FWA) such as 'Work From Home' (WFH) and remote working have become the mainstream in the workplace, affecting how the workplace looks and feels as flexible working is fundamentally related to the flexible workspace. From FM perspective, FWA is the biggest consequence of Covid-19, but it also presents opportunities and certain challenges for FM to incorporate a new office environment and employees' needs in terms of FWA into the corporate culture. Hence, this study aims to improve the workplace for Malaysian industry under the support of FM by examining the key components to facilitate FWA and the issues and challenges arisen in preparing the workplace for FWA during Covid-19, and recommending a better approach to FWA implementation in workplace, through literature review and qualitative approach (case studies, interviews and observations). First, literature review determined the key components, issues and challenges of FWA implementation in workplace, and SOPs and guidelines that might be taken in the workplace during Covid-19, as well as recommendations that could be applied to contemporary real-world situations, and developed into the theoretical framework for drafting the interview questions. Following that, semi-structured interviews with 3 personnel who managing the workplace in Klang Valley were conducted. All data obtained were then analyzed and compared to the literature review. The findings revealed that flexible workspace, that features an open plan layout, task-oriented space, hot desking policy and IT infrastructure, was more essential than flexible furniture. Furthermore, the findings demonstrated that issues and challenges have resulted from the changes made to the flexible workspace in accordance with Covid-19 SOPs and guidelines. Further to that, the recommendations for a better approach of FWA were identified.

Keywords: Covid-19, flexible workspace, **Facilities Management (FM), Flexible Work Arrangement (FWA), office building**

PROPERTY MANAGEMENT OF HOME-SHARING ACCOMMODATION THROUGH WEBSITE

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ABSTRACT

In 2008, launching of Airbnb has boost home-layout model type of accommodation or home-sharing accommodation which allow customers to indulge in the comfort of home while being away. Home-sharing business needs a lot of attention to be managed and administrate by individuals. However, there is some question arise among industry players as the property performance might not be optimized as it is not managed professionally by a property manager. The objectives of this study are to identify issues faced by home-sharing owner in managing their property and to develop a website for the property management of home-sharing accommodation. This research was conducted in Kulim, Kedah area and qualitative method is used in this research. In order to achieve the first research objective, researcher carried out a structured interview with three home-sharing accommodation owners as respondent. The data gained from the interview was then analyzed through thematic method and the result shows that there were six scopes of issues that is majorly faced by home-sharing accommodation owner with key elements of guest relations, customer service, administration and management, maintenance, hygiene and other issues faced by home-sharing owner. The key elements gained from the interview used to achieve second objective, which is a website for the purpose of property management for home-sharing accommodation had successfully developed using website developer named Wix.com. Through this study, researcher aims that finding of this study will bridge the gap between home-sharing accommodation owner and professional property manager through website.

Keywords: Home-sharing accommodation, Property management, Website development, Wix.com

THE IMPLEMENTATION OF ZERO WASTE INDEX TOWARDS DEVELOPING A ZERO WASTE CITY

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ABSTRACT

The zero-waste index is a measurement tools for the implementation of waste management system in a city as there have been major developments in waste production. Although the waste generated recently has reached towards a crucial condition in terms of the amount and composition of materials, there were many challenges because Malaysia is still lacking in awareness and knowledge exposure to waste management system which can give a great impact to society as well as the environment. As the waste continues to brew, the failure to reduce the waste generated will contribute to harm the environment. This study aims to study the zero waste index practices towards developing a zero waste city. In order to achieve the aim, the following objectives of this study were developed: (1) to identify the practices, (2) to determine the barriers, and (3) to investigate the implementation of zero waste index strategy towards developing a zero waste city. A literature review is performed to get through the zero waste index components and several structured interviews were carried out on 12 respondents in Muar and Kuala Lumpur. The interview questions required of the subject of respondent demographic background, practices, barriers and implementations strategy. Descriptive analysis is used to describe the summarized of collected data. The findings revealed the respondents have varies approaches to perceive the practices which are public awareness, 3R, technology and waste segregation. The barriers were found such as lack of awareness and high cost. The outcome of the implementation strategies are raise awareness, extended producer responsibility and the application of 3R. The waste management in Muar and Kuala Lumpur may not meet the target of zero waste index performance. Kuala Lumpur has attained 0.87% of zero waste index in terms of total generated waste by this city and material substituted. This research can help organizations who are having trouble implementing the zero-waste idea.

Keywords: Waste management, zero waste, zero waste city, zero waste index

Sub-Theme 4 : Building and Construction

Design, structure, material, construction, engineering technology, risk, BIM

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	OR401	UM	**Potential Of Banana Fibre Strengthen Foamed Concrete For Mechanical And Durability Properties Enhancement** Mohamad Faiz Zufri and Md Azree Othuman Mydin
2	OR402	USM	**Appraisal And Design Of 'diy' Rainwater Harvesting System For Water-deprived Villages In Sarawak** Alia Nazira Suhaimi and Md Azree Othuman Mydin
3	OR403	USM	**The Impact Of Pandemic Covid – 19 Catastrophe On The Survival Of Construction Industry In Penang** Rekha Muniandy and Md Azree Othuman Mydin
4	OR404	UM	**Characteristics Of Historic Mortar: The Selected Case Studies In Melaka** Liyana Darwina Ajmal Abdul Manan and Rodiah Zawawi

5	OR405	UM	**A Study On Safety And Health At Construction Site For High Rise Building In Klang Valley During Pandemic Crisis** Muhammad Ariffin Bin Asli
6	OR406	UM	**Characteristics Of Historic Mortar:The Selected Case Studies In Seremban** Muhamad Izwan Bin Mohd Salleh

POTENTIAL OF BANANA FIBRE STRENGTHEN FOAMED CONCRETE FOR MECHANICAL AND DURABILITY PROPERTIES ENHANCEMENT

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ABSTRACT

The usage of foamed concrete with natural fibre is considered a good effort in maintaining sustainability. This technology is expanding due to changes in time where people tend to choose more eco-friendly material in construction. This effort aims to be minimizing the carbon footprint and greenhouse emission. Therefore, this research focuses on identifying the potential of banana fibre in foamed concrete with a density of 550kg/m3.This study aims to determine the mechanical properties of foamed concrete with the inclusion of banana fibre. On the other hand, this research also establishes the durability of foamed concrete with the addition of banana fibre. In this research, the foamed concrete will be tested with different volume fraction of banana fibre (0.15%, 0.30%,0.45% and 0.60%). The water-cement ratio used in this study is 1:1.5:0.45, which consist of cement, sand, and water. This research is aimed at the durability properties of foamed concrete. Thus, the experimental work on durability properties is conducted: water absorption, porosity, drying shrinkage, and UPV. The inclusion of banana fibre in the lightweight foamed concrete proved that it could enhance durability properties. This is due to the bonding between the fibre and materials in foamed concrete. Besides, the fibres acted as an anti-micro crack which is preventing cracks on the foamed concrete. On the other hand, the experimental test on mechanical properties also has been conducted: compressive strength, flexural strength, and splitting tensile strength. The addition of banana fibre helped improve the mechanical properties of lightweight foamed concrete at a certain amount of inclusion banana fibre. The data shows that the optimum percentage of banana fibre is 0.45%, with a density of 550kg/m^3 of foamed concrete.

Keywords: foamed concrete, banana fibre, mechanical properties, durability properties.

APPRAISAL AND DESIGN OF 'DIY' RAINWATER HARVESTING SYSTEM FOR WATER-DEPRIVED VILLAGES IN SARAWAK

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ABSTRACT

Water scarcity issue is a major issue in many developing countries. Rainwater harvesting system is a technology to overcome water scarcity issue all around the world. The alternative sources of water supply provide water to users for potable and non-potable uses. The system introduces method of harvesting runoff to benefits user for daily uses. Unfortunately, the conventional rainwater harvesting system received low number of community acceptance. Although in Malaysia the rainwater harvesting system is existing, it is still not commonly used in projects. The increasing of water demand affects the community where there is experiencing lack of water supply. An interview was conducted before this thesis was done; the respondent's information is collected to support the findings of this project. After many research and literature study was done, the main factor impact on water scarcity issue in study area is limited access to water supply to perform their daily basis. Therefore, the purpose of this thesis is to appraise the water supply in water deprived village in Sarawak and to design a 'DIY' rainwater harvesting system. The proposed 'DIY' rainwater harvesting system has been created is similar to working principle of conventional rainwater harvesting system which involved 3 basic main components, the catchment area, the portage system, and the storage tank. The design of the system is based on the villagers' concerns in term of functions, costs, size, and maintenance.

Keywords: Rainwater harvesting system, water scarcity, 'DIY' rainwater harvesting system.

THE IMPACT OF PANDEMIC COVID – 19 CATASTROPHE ON THE SURVIVAL OF CONSTRUCTION INDUSTRY IN PENANG

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ABSTRACT

Coronavirus (COVID – 19) is a diseases which outbreaks as pandemic in worldwide. Many countries were affected badly in many situation in terms of economic and business. This pandemic COVID – 19 leads to lockdown and restricted movement of people. There were many businesses across different type of sectors were shut down completely which was impacted severely in many countries. One of the sector is construction industry which faced many crisis in terms of development of projects. The overall aim for this research is to scrutinize the impact of pandemic COVID – 19 catastrophe on the survival of construction industry in Penang. The objectives of this research are two-fold: (1) to scrutinize the impact of COVID – 19 on the construction industry's survival in Penang; (2) to identify survival strategies based on the owners' perspectives. This study was carried out two methods for data collection which were questionnaire survey and structured interview. This questionnaire used in this study was structured and unstructured. The research results made clear that the most prominent impacts of COVID – 19 are work progress slow down and postpone ongoing projects. From the structured interview, it was highlighted that the delayed in construction works and hand over the property to purchasers. The project manager need to pay LAD to the purchasers. The company managed to work back after MCO and follow the SOP implemented by the government. Other than that, there is no any pending project. The company paid salary to labours by self – finance. The study helps the project stakeholders to be aware of sudden outbreak sequences and steel oneself against difficult challenges during the development project strategy planning stage.

Keywords: pandemic, COVID – 19, lockdown, construction industry

CHARACTERISTICS OF HISTORIC MORTAR: THE SELECTED CASE STUDIES IN MELAKA

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ABSTRACT

Lime mortar is a material used in old buildings built over 50 years ago. Lime mortars used in the past have many different types and compositions according to the area and history of construction. Lime mortar in modern times has ceased to be used due to the existence of cement which is easier to handle, cheaper to obtain and durable. Old building conservation works nowadays have replaced the original lime mortar with cement mortar. This has indirectly given the potential to the old building structure to be damaged due to the unsuitability of the materials used for the condition of the old building. The composition of lime mortar and cement mortar are very different making lime mortar irreplaceable with cement mortar. This old building that has stood for over 50 years needs to be cared for and preserved because it is an asset that has reflected the culture of the country and reflected the history of the country. This old building has contributed a lot to the national economy as it is an attraction for visitors from the tourism sector.

Therefore, secondary sources such as readings from the thesis, four (4) buildings around the city of Melaka were selected as a case study to study the composition of lime mortar. From the experimental results it has been found that there are differences in each lime mortar in different areas. This shows that each old building has its own uniqueness and to do conservation work on the old building must use lime mortar of the same composition used on the old building.

Keywords: Historic Buildings, Historic Mortar, Mortar Characteristics

A STUDY ON SAFETY AND HEALTH AT CONSTRUCTION SITE FOR HIGH RISE BUILDING IN KLANG VALLEY DURING PANDEMIC CRISIS

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ABSTRACT

The COVID-19 outbreak has been the world's most serious public health emergency in decades. The pandemic has caused economic slowdowns, broad business disruptions, and substantial suffering, in addition to the extraordinary number of deaths and hospitalizations. COVID-19 virus has had a major impact on construction, but it is important to the post COVID economic recovery. Construction, in particular, must maintain a constant awareness of safety and risk while also delivering projects on time. As a result, COVID-19 guidance must be implemented in a way that takes into account working practices and circumstances. This study focused on safety and health at construction site for high rise building in Klang Valley during pandemic crisis. The study objectives were achieved through five online interviews and ten face to face interviews with project managers, engineers, safety officer, and labourer that represented in Klang Valley. The interviewees shared details about their experiences with the pandemic, including the general and negative effects they've had, new obstacles they've faced, and their current safety and health condition.

Keywords: 3-5 keywords, 10 point size in, Bold, alphabetical order, separated by commas

CHARACTERISTICS OF HISTORIC MORTAR:

THE SELECTED CASE STUDIES IN SEREMBAN

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ABSTRACT

Historic buildings are important to sustainable development because it can improve the quality of the environment and limited resources, such as historic buildings and places, will be carefully managed through a process known as conservation works. In other words, the historic building will not only be used as a spectacle for future generations, but it will also be used continuously and effectively while providing economic returns to the country. However, in order to restore a building for a longer period of time, proper building conservation is required. The aim of this research is to identify the appropriate lime mortar composition for future masonry building restoration. A detailed discussion about performing three (3) main objectives which are to identify the lime mortar characteristics used in historic buildings, to determine the proportion of binder to sand for making repair mortar for repair mortar historic building in Seremban, and to recommend the composition of historic mortar and sand grading for historic mortar. Acid dissolution and sieving techniques were used to obtain this information. The historic mortar sample was taken from five different historic buildings in Seremban. The results show that the weight binder to sand ratio ranges between 1:13 and 1:28. This indicates that the mortars have significant hydraulic properties. An analysis of sieved sand reveals that the majority of the coarse sand particles are fine sand agglomerates with cement.

Keywords: Acid dissolution, Conservation, Lime mortar, Sand, Sieve analysis

Sub-Theme 5 : Building and Environmental Science

Energy, simulation, IAQ, IEQ, BIM, materials, legal, building performance

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	OR501	UTP	**Wave Energy Assessment in Dumaran Island, Palawan, Philippines** Arinah Aminudin, Teh Hee Min and Jonathan Pacaldo
2	OR502	UTHM	**A Portable Mini Solar Panel Design In Combination With A Micro Hydropower System For Power Generation** Muhammad Mawardi Bin Mohd Rani, Mariah Awang and Fadhilah Diyana binti Abdul Samad, M.M. Syafiq Syazwan
3	OR503	UM	**Investigating Energy Monitoring Approaches In Educational Building: A Case Study In Universiti Malaya's Faculty Of Built Environment** Ahmad Zakwan Zamzaini and Raha Sulaiman
4	OR504	UM	**A Study On Electronic Energy Benchmarking (E-ebs) For Religious Building Towards Sustainability Energy Management** Alyaa Anati Amran, Syahrul Nizam Kamaruzzaman, Nurul Asra Abd Rahman

5	OR505	UM	**Developing Visual/Protocol 1 Sustainable Condition Assessment (Bsusca) Tool For Non-residential Existing Building** Nurshazreen Binti Amirudin and Prof. Dr. Sr Syahrul Nizam Bin Kamaruzzaman
6	OR506	UM	**A Case Study On The Energy Consumption Of Government Office Buildings In Malaysia** Tan Xian Yun
7	OR507	UiTM Shah Alam	**The Implementation of Sustainable Green Roof System in Residential Buildings** Qamarul Azarin Rusli and Shaza Rina Sahamir
8	OR508	UiTM Shah Alam	**Improving Thermal Comfort: An Experiment On Aerogel Wall Panel Effect On Indoor Temperature** Norman Haiqal Dahlan and Norishahaini Mohamed Ishak

WAVE ENERGY ASSESSMENT IN DUMARAN ISLAND, PALAWAN, PHILIPPINES.

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ABSTRACT

Wave energy harvesting, if viable, is a potential energy resource for remote islands like Dumaran Island, Philippines. However, absence of high-resolution wave energy resource information in Dumaran waters hinders the development of Wave Energy Converter (WEC) to overcome current unsustainable means of supplying power, prolonging energy insecurity among its locals. The focus of this study is to assess wave energy densities for Dumaran Island using high-resolution and validated wave data for the selected sites in Sulu Sea within 100 km radius from the island by using statistical analysis. This was achieved by generating 3-hourly hindcast wave data for 40-year study period (1978 – 2018) in 6 selected sites, using MetOcean Solutions Ltd WW3 Tolman Chalikov (MSLWW3TC) numerical wave model. The wave model was then validated with MIKE 21 Spectral Wave Model FM (MIKE21SW), which generated 3-hourly wave energy data at 14 sites for 5-year study period. Subsequently, wave energy flux time-series was computed and statistically analysed. The validated wave model resulted in low RMSE and high CC results, which indicate good model performance. The study area has low wave energy content, with the average wave energy range less than 4.5 kW/m. High but unstable wave energy was observed during Northeast Monsoon across all sites, and reduction of wave energy near coastal areas due to sheltering effect of Palawan and offshore islands. The hotspot for wave energy is found in the northeast and southeast of Dumaran deep offshore waters, with average annual wave energy of 4.43 kW/m. As mean wave energy at the site is insufficient and grid connection is absent WEC implementation in Dumaran waters is not viable.

Keywords: Dumaran, MSLWW3TC, Palawan, Wave energy, Wave height.

A PORTABLE MINI SOLAR PANEL DESIGN IN COMBINATION WITH A MICRO HYDROPOWER SYSTEM FOR POWER GENERATION

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ABSTRACT

Power systems are traditionally designed to generate energy from high-voltage levels and distributing it to lower voltage level networks. Large generating units are linked to transmission networks. In the future, there will be an overabundance of tiny generators connected to distribution networks. The portable power generation system mainly contributes to the excessive energy transmitted particularly during the breakdown situation for the user. The problem is based in the very practical and applied disciplines of electrical and power engineering, namely the loss of integrity or the breakdown and failure of electrical power transmission networks. The objective of this research is to design and build portable power production systems that utilizes renewable energy that can deliver the effective power supplied by this renewable energy. The research also aims to determine the maximum and sufficient power consumption from solar energy and micro-hydropower systems to supply enough energy for the room during break down. The study design and execution include testing and data collecting. By using this approach, the research results are more accuracy and correspond to the procedure that has been developed to achieve the aims of producing portable power generation. The data in this study was collected using a Digital Multimeter, which was used to measure the Resistance (Ω), Voltage (V), Current (A) and Power (W). The test and the results that are obtained has shown that the portable power generation based on renewable energy has an enough power supply to generate the electricity during power breakdown situation and have enough power to supply within the suitable loads such as LED Light, Mini Fan and Phone Charger. This research may potentially be improved by constructing a higher voltage motor for the micro turbine and a larger solar panel for the solar system to increase the operation time.

Keywords: Micro Hydropower System, Power generation, Renewable Energy, Solar Panel.

INVESTIGATING ENERGY MONITORING APPROACHES IN EDUCATIONAL BUILDING: A CASE STUDY IN UNIVERSITI MALAYA'S FACULTY OF BUILT ENVIRONMENT

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ABSTRACT

Energy consumption is an important element and has become the lifeline for the social and economic development. The energy demand has been increasing for the last decade and one of the main contributors for this increasing energy demand is the building sector. Many energy savings or energy efficiency initiatives have been introduced, but it would not be effective without proper energy monitoring approaches. Submetering is one of the approaches that can provide insight into the energy efficiency and productivity of building operations. While there are a few energy monitoring methods available, collecting data itself is not a challenge. The real challenge is to collect data or monitor the energy used in such a way that it can result in actionable information, which leads to energy savings. This paper presents the methods used to monitor the energy consumption of case study building, the analysis of energy consumption, and the existing approaches that improved the energy monitoring methods. The findings were made based on case study conducted on Universiti Malaya's Faculty of Built Environment and also interviews from higher management personnel and maintenance staff.

In this study, it was found that bulk meter had been used previously to monitor the energy consumption in FBE. The total energy consumption of the whole FBE building for year 2020 is 1,335.27 kWh per year, and the highest consumer of energy in this building is air-conditioning system (57%), followed by lighting system (31%) and others (12%). For better energy efficient practice, submeters were installed in FBE to improve the energy monitoring approaches. The FBE building has implemented the submeters by sub-system approach, which includes systems such as air-conditioning and lighting system. This approach helped the building managers to monitor specific areas of their interest in the effort to reduce energy consumption and improve energy efficiency.

Keywords: Educational building, energy audit, energy monitoring, submeter

A STUDY ON ELECTRONIC ENERGY BENCHMARKING (E-EBS) FOR RELIGIOUS BUILDING TOWARDS SUSTAINABILITY ENERGY MANAGEMENT

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ABSTRACT

Mosques are buildings with a unique occupancy and particular energy consumption scheme. Generally, this type of building lacks the application of energy efficiency solutions and sustainable guidelines during conception, construction and operation. A detailed discussion about performing three (3) main objectives which are to identify energy consumption and sustainability in the building, to investigate energy performance in the building, and to determine the relationship between energy consumption and sustainability in the building. Next, the aim of this research work is to establish the significant intersection between energy consumption and sustainability assessment tools. This research is combination of secondary and primary method that has been employed to carry out this research. By collecting the data from the management team and thus to identify the importance of energy consumption development, current practices, methods and relationship between energy usage in the selected building with sustainability assessment tools that being created from the government sector which is 'penarafan hijau Jabatan Kerja Raya' (phJKR) document.

Keywords: Energy Audit, Energy Consumption, Energy Performance, Mosque, phJKR.

DEVELOPING VISUAL/PROTOCOL 1 SUSTAINABLE CONDITION ASSESSMENT (BsusCA) TOOL FOR NON-RESIDENTIAL EXISTING BUILDING

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ABSTRACT

Existing green building rating tools is a protocol two (2) that directly measure the sustainability building criteria, which is "Non-Destructive Inspections". Thus it is questionable if it can effectively tackle sustainability in the building sector with undisputed facts and how a core principle of sustainable construction has proved its value. Various difficulties, such as unforeseen incidents, the qualification process's difficulty, and urgent priority work, mainly when they are not familiar with the certification framework that needs to be applied. Developing Visual/Protocol 1 Inspection Tool for Building Sustainable Condition Assessment (BSusCA) is to formulate an appropriate formula for a pre-assessment benchmarking tool for the sustainability of non-residential existing buildings will be developed, along with the aim and objectives of the research, the methodology used, the scope of research, and limitation of the study.

First, Pasar Chowrasta is the first certified sustainable building in Penang. Second, Kompleks Dato Kailan, a building with its uniqueness, can achieve certification as a sustainable building. This study aims to develop a system that will allow stakeholders and practitioners participating in the construction industry to understand their minimum requirement to achieve green building certification. The methodologies used to achieve the research objectives are explained in detail, including the qualitative method. Data collection during site visit interview and visual analysis are combined with an analyzed literature review to be discussed. Data gathered are also compared with the literature review done before this research. At the end of this research, the analyzed data was concluded, and a simplified method for pre-assessment on possible full accreditation on NREB is developed. Snowball sampling among professional is to get clarification of the formula pre-assessment made. The last part of the report explains overall conclusions and some recommendations for future research.

Keywords: Building Assessment, Green Building, PHJKR, SIRIM 2020, Sustainable.

A CASE STUDY ON THE ENERGY CONSUMPTION OF GOVERNMENT OFFICE BUILDINGS IN MALAYSIA

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ABSTRACT

As Malaysia continue to develop at a vast pace, the numbers of buildings in Malaysia increases throughout the years (Hassan, 2014). Commercial buildings which include office buildings are one of the three major energy consuming sectors which includes industrial and transportation sector (Ding, 2017). Most of the Malaysian government office buildings tend to consume energy inefficiently due to lack of energy optimization (Mohamad, 2015). Hence, this study aims to study the energy performance and factors that influence the energy consumption in government office buildings. The chosen case study buildings for this study are six government office buildings which are located in Kuala Lumpur, the city center of Malaysia. This study is conducted by carrying out literature review on the common factors affecting energy consumption in office buildings. Next, the energy consumption data of the case study buildings were collected and analyzed and followed by calculation of Building Energy Index of each building. Literature review and the results from the case study buildings showed that air-conditioning system is the major energy consumer in office buildings, followed by lighting system while other office equipment consumed the least energy. The findings in literature review and case study buildings also highlighted that energy consumption in office buildings is affected by non-design factors such as building occupants' behavior, number of building occupants and outdoor temperature as well as passive design factors such as building orientation and window-to-wall ratio. Recommendations were derived based on the findings from literature review and the case study buildings for best practices to optimize energy consumption in government office buildings in Malaysia. As practical energy saving measures to be implemented in government office buildings, it is in view that the government office buildings will be on the track on being more sustainable in their energy consumption.

Keywords: Building Energy Consumption, Building Energy Index, Government Office Buildings in Malaysia.

THE IMPLEMENTATION OF SUSTAINABLE GREEN ROOF SYSTEM IN RESIDENTIAL BUILDINGS

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ABSTRACT

Green roofs, also known as vegetated roofs, have proven increasingly important in reducing urban heat islands and the global warming effect. According to numerous research findings, green roofs can help to improve the environmental and aesthetic qualities. Likewise, green roofs provide sustainability in the built environment and are becoming a powerful force for achieving social and environmental benefits in the building industry and for reducing adverse environmental impacts. However, the lack of awareness and difficulty of green roof projects make the implementation of green roofs still hindered. The goal of this research is to study the implementation of green roofing systems in Malaysia. The objectives of this study are (1) to identify the advantages of implementing a green roof system in residential buildings; (2) to determine barriers to the implementation of green roofs in residential buildings; and (3) to examine the motivation factors for implementing a green roof system in residential buildings. This study used a quantitative approach with a close-ended questionnaire as a research instrument and involved 44 respondents through snowball sampling. Both critical and descriptive analyses were carried out and SPSS Software were used to analyse the data. The conclusions of this study indicate that the advantages of implementing green roof were increased property value, thermal performance improvement, and psychological well-being. High maintenance and initial construction costs are the biggest barriers to the implementation of green roofing. Last but not least, the survey indicated that urban heat island mitigation and energy efficiency are among the top motivation factors for sustainable green roofing in residential buildings.

Keywords: environment, green roof, residential, sustainability.

IMPROVING THERMAL COMFORT: AN EXPERIMENT ON AEROGEL WALL PANEL EFFECT ON INDOOR TEMPERATURE

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ABSTRACT

Aerogel, is a material with tremendous potential in green construction that is relatively uncommon with low density, high permeability and low thermal conductivity as well as fire resisting properties. However, the material degradation can be affected by humidity and moisture as well as freezing and ice on the material. Therefore, a panel as the cover for the material is applied to counter-act this problem to protect the aerogel layer. This study investigates the thermal performance aerogel wall panel and its workability to be considered as an insulating panel. This study, carried out by experimentation conducted according to relevant iso standards, as well recommended methods from previous researchers on the matter. The thermal performance is measured by conducting a hot box experiment which comprises of the measuring chamber and the climatic chamber. Some of the parameters observed from the experiment are the thermal conductivity (k-value), thermal conductance (c-value), thermal resistance (r-value) & heat transfer coefficient (u-value). A total of 5 specimens were tested which are brickwall (sample 1), brickwall & rockwool (sample 2), brickwall & aerogel (sample 3), brickwall & rockwool filled wall insulation panel (sample 4), and brickwall & aerogel filled wall insulation panel (sample 5). A theoretical model for the analysis and design of the aerogel filled wall insulation panel were proposed and evaluated. Results shows that the insulation performance brickwall & aerogel (sample 3) gave the best result in terms of almost all the perimeters compared to all the other samples except the temperature difference which aerogel filled wall insulation panel (sample 5) shows the most positive result. The aerogel wall panel requires more research even though aerogel proves highly effective for thermal insulation. Therefore, the use of the material is highly recommended.

Keywords: Aerogel, Aerogel Wall Panel, Insulation, Thermal performance.

POSTER CATEGORY

Sub-Theme 1 : Surveying and Governance

Development, by-laws, building control, pathology, defects, condition assessment, inspection, professional practice, education, contracts

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	P101	UiTM Shah Alam	**Investigation of Building Defect in Kolej Kemahiran Tinggi Mara, Sri Gading, Batu Pahat** Nuraini Sabihah Nikmat AW and Mohd Ashraf Mohd Fateh
2	P102	UiTM Shah Alam	**Defect Inspection Report In New Residential Terrace House** Khairunnisa Salleh and Nadia Kamaruddin
3	P103	UiTM Shah Alam	**Mould Prevention Strategies for Student Accommodation in Universiti Teknologi Mara (UiTM) Shah Alam** Syabil Arissa binti Azizi and Nor Rima Muhamad Ariff
4	P104	UM	**Navigating The 'new Normal': Covid-19 Adaptive Strategy For Quantity Surveying Practices** Tan Shi Yen And Nurshuhada Zainon
5	P105	UiTM Shah Alam	**Consultant's Level Of Awareness On The Implementation Of Dispute Avoidance Procedure (Dap) In The Malaysian Construction Industry** Siti Suhana Binti Abu Hassan And Suhana Binti Judi

6	P106	UiTM Shah Alam	**Contractors' Perspectives On Change Order In Commercial Building Projects** Nur Syazana Omar Sarib And Siti Suhana Judi
7	P107	UiTM Shah Alam	**Opportunities Of Quantity Surveyor In Alternative Dispute Resolution In The Malaysian Construction Industry** Norhafizah Mohmed Noren
8	P108	UM	**Moisture Control Of Timber Material On Traditional Malay House In Batu Pahat Area** Nur Alwani binti Pa'at & Zahiruddin Fitri bin Abu Hassan
9	P109	UiTM Shah Alam	**Factor And Effect Of Unemployment Among Universiti Teknologi Mara (Uitm) Quantity Surveying Graduate** Calver Sokuil and Sr. Nor Azlinda Mohamed Sabli
10	P110	UiTM Shah Alam	**Iskandar Malaysia In Johor: A Catalyst For Rapid Development In Southern Peninsular Malaysia** Nabilah Afrina binti Maskob and Muhammad Nazim bin Alias
11	P111	UiTM Sarawak	**Impact Of Occupational Stress To Quantity Surveyors' Productivity In Consultant Firms In Sarawak** Nur Hazierah Suhaimi and Mohammad Nabil Fikri Saaid
12	P112	UTM	**Digital Readiness of Malaysian Construction Claims Management** Eileen Khiu Xin Ying and Mohd Saidin Misnan

13	P113	USM	**Appraisal of The Level of Awareness On the Existence and Roles of the Building Surveying Vocation by Non-Allied Building Surveying Construction Professionals in Malaysia** Nor Sharon Azirah Azlan Samudin and Siti Hamidah Husain
14	P114	USM	**Remodeling The Workspace for Education Building for Futuristic Teaching and Learning at School of Housing, Building and Planning (HBP), Universiti Sains Malaysia (USM)** Zul Amalli bin Harun

INVESTIGATION OF BUILDING DEFECT IN KOLEJ KEMAHIRAN TINGGI MARA, SRI GADING, BATU PAHAT

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ABSTRACT
Malaysia is one of the developing countries with fast growth in all industries, including the construction industry. Even so, some of the building structure, design, appearance, and function are unsatisfactory. According to various sources, these developments have low construction quality. The faults and defects in the buildings are one of the components that need care to avoid any unexpected incident happen to the occupants in the building. The aims of this research is to investigate the building defect in Kolej Kemahiran Tinggi MARA Sri Gading, Johor and the objective of this research is to identify the types of defects in Kolej Kemahiran Tinggi MARA Sri Gading, Johor. To determine causes of defects found in Kolej Kemahiran Tinggi MARA Sri Gading, Johor. To suggest the solutions for defect in Kolej Kemahiran Tinggi MARA Sri Gading, Johor. The data collection used is an inspection and quantitative method where give questionnaires to lecturer and students. The finding reveals that there seven (7) types of defects namely leaking pipes, cracking, dampness, peeling paint, detach, erosion of mortar and defective plaster rendering. While there are six (6) solutions namely strict supervision, training and educations, proper construction management, proper manpower, proper design, and maintenance. The findings from this paper will be able to shed some light on this issue and the relevant parties can fully utilise it to improve the maintenance process. Indirectly it will be able to set the country on a path towards building its economic and social resilience that will enable the whole country to move forward.

Keywords: construction, defects, failure, institution building, Malaysia,

DEFECT INSPECTION REPORT IN NEW RESIDENTIAL TERRACE HOUSE

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ABSTRACT

Numbers of residential terrace house are rapidly growing in Malaysia recently. Nevertheless, some of the new houses are poorly constructed. It is becoming a concern on the quality of the newly constructed residential house to the owner. Therefore, building inspection reporting is essential during the handover process by the homeowner. This research is aimed to determine the efficiency of building defect inspection report during the handover process to improve the building condition, specifically the new residential terrace house. In order to achieve this aim, three (3) research objectives have been derived. Firstly, to determine the implementation of the homeowner to make a defect inspection report of their new house before handover process by the developer, to analyse how well the new homeowner manages the inspection process for their house, and to propose an improvement on handling the new residential building inspection for the homeowner. The quantitative research approach was conducted by distributing an online questionnaire platform to the homeowners at Sibu, Sarawak that experienced in handling house inspection for a new residential terrace house. The result of this study highlights that 57.7% of the respondents already have a general idea on what is defect inspection and reporting process although about 5.4% of them did not implement this during their house possession. 71.83% of the respondents agreed that the best way in handling inspection is to create a building inspection checklist. In a nutshell, close observation on the local community is suggested in a way to create more awareness on the benefits of defect inspection report to the new residential building quality not only in Sibu, Sarawak, but the entire Malaysia and this should be embraced as part of a wider best practices.

Keywords: defects, defect inspection, defect inspection report, residential building

MOULD PREVENTION STRATEGIES FOR STUDENT ACCOMMODATION IN UNIVERSITI TEKNOLOGI MARA (UiTM) SHAH ALAM

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ABSTRACT

Student accommodation is described as one of the adequate facilities offered by higher educational institutions. Unfortunately, indoor mould growth is found to be one of the most common problems that cause adverse health effects and fabric deterioration in buildings. Despite that, identifying mould conditions of growth, including defining the factors and risks for student accommodation relating to the building, construction materials, and human health, is necessary to ensure comfortable living conditions in accommodation environments. This study emphasized three case studies that have been chosen from the student accommodation in Universiti Teknologi MARA (UiTM) Shah Alam, based on the type of building, age, and design, particularly on the roofing type. Qualitative methods by performing on-site observation and semi-structured interviews have been used as a means of data collection. Visual observation has been conducted to analyse the current building condition and causes which contribute to mould formation with photo taking as the record. A summary of each case study's findings is presented in Building Assessment Rating System (BARIS) table from the on-site observation. Meanwhile, three respondents have been selected from the Facility Department staff of UiTM Shah Alam for the semi-structured interview. The collected data were analysed, and the findings were concluded with three categories of maintenance strategies which enhance the existing policy and guidelines, implementation of operation and maintenance practices, and highlights the roles of management and occupant, as possible for mould prevention in the student accommodation building. Accordingly, the success of mould prevention relies strongly on practical implementation and enforcement by the management. Therefore, this study's output will be the management, occupant, and future research recommendations to establish mould prevention strategies for student accommodation in UiTM Shah Alam.

Keywords: condition assessment, maintenance management, moisture, mould growth, student accommodation

NAVIGATING THE 'NEW NORMAL': COVID-19 ADAPTIVE STRATEGY FOR QUANTITY SURVEYING PRACTICES

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ABSTRACT

The unprecedented crisis of COVID-19 has had significant impacts on the construction industry. With the arrival of new COVID-19 variants, the World Health Organization and scientists have predicted that it is implausible to return to normal soon, even with a vaccine. The implementation of various lockdown measures has affected the ability of construction players to carry out their responsibilities, including the quantity surveyors (QS). The nature of QS's job that requires them to carry out site visits, constantly communicate with other stakeholders and have a proper work environment can potentially affect their ability to carry out their duties during the pandemic. Therefore, it is of utmost importance to assess the impacts of the pandemic on quantity surveying practices and explore possible strategies to mitigate them. This research aims to propose adaptive strategies as a guide for QS to carry out their usual duties and remain relevant in the new normal. An exploratory sequential mixed-method approach was adopted, which involves conducting a preliminary exploratory interview to identify quantity surveying practices affected by the new normal, followed by a questionnaire survey to determine the significance of these impacts. Finally, an adaptive strategy covering all three aspects of the golden triangle — people, process, and technology — was proposed and reviewed by QS professionals. The findings are expected to provide an understanding of how COVID-19 has affected the duties of QS and identify which impact is the most significant. A set of adaptive strategies to reduce the impacts of COVID-19 new normal to quantity surveying practices was produced to enable QS to better adapt to the changing work environment. These findings can also be applied to other positions within the industry or even to other industries in terms of adapting to the new working environment during the pandemic.

Keywords: Adaptive strategy, COVID-19, impacts, new normal, quantity surveyor

CONSULTANT'S LEVEL OF AWARENESS ON THE IMPLEMENTATION OF DISPUTE AVOIDANCE PROCEDURE (DAP) IN THE MALAYSIAN CONSTRUCTION INDUSTRY

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ABSTRACT

The concept of prevention is better than cure is finally being grasped by the construction industry as it is increasing in awareness that proactive measures are better than reactive ones. Hence, the whole construction industry is starting to embrace Dispute Avoidance Procedure (DAP). The main dilemma in the construction industry is the inescapably arising disputes along the construction period and the functionality of DAP in handling the disputes. This encourages the researcher to investigate the level of awareness of consultants regarding the implementation of DAP in the Malaysian construction industry. The objectives of the research would be to assess the current scenario of DAP, to identify the characteristics of DAP and to investigate the Malaysian consultants' level of knowledge about this procedure. For obtaining the information needed to achieve the objectives of the study, a quantitative approach adopted via through questionnaire survey. The findings deduce that Malaysian consultants are aware of the DAP procedure, despite the fact that it has yet to be implemented in the Malaysian construction industry. However, majority of the consultants acknowledge that DAP procedure has its own benefits, and they are ready for DAP to be implemented in Malaysia.

Keywords: Construction, consultants disputes, dispute avoidance procedure

CONTRACTORS' PERSPECTIVES ON CHANGE ORDER IN COMMERCIAL BUILDING PROJECTS

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ABSTRACT

Malaysia's construction industry plays an important role in the country's development and strong growth, which contributes to the nation's economy. However, nearly every construction project will receive a Change Order, which is widely regarded as an unavoidable occurrence in any construction project. The purpose of this research is to determine the contractors' perspectives on change order in commercial building projects. The objectives are to identify the current situation of change order in commercial building projects, to examine the effects of variation order towards project performance in commercial building projects and to establish the recommendations on ways to minimize the arising of change order in commercial building projects. To accomplish this, a quantitative method of data collection was used, which included the distribution of questionnaires to the respective respondents. Based on the findings, the objectives of this research were able to be met in terms of the contractors' perspective on the change order in commercial building projects. As a result, recommendations on how to reduce the amount of variation order in commercial building projects are established in order to improve the performance of the Malaysian construction industry in the future.

Keywords: Change Order, Commercial Building Projects, Contractors

OPPORTUNITIES OF QUANTITY SURVEYOR IN ALTERNATIVE DISPUTE RESOLUTION IN THE MALAYSIAN CONSTRUCTION INDUSTRY

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ABSTRACT

The quantity surveying profession has evolved from its traditional roles to more varieties and challenging roles, including their involvement in the Alternative Dispute Resolution (ADR). The Quantity Surveyor (QS) roles in ADR include they perform as an Adjudicator, Arbitrator, Mediator and Negotiator. This study will focus on the skills required for QS in ADR and analyse the challenges of ADR for QS. This study uses both primary and secondary sources. The survey data will be analysed using descriptive analysis and statistical tests using the IBM SPSS Statistics 23. The findings show that critical-thinking skills to provide concise reasons for every decision making is the essential skill required by QS since it will be helpful to reach a final decision by considering all alternatives in making a rational decision. The challenges of ADR to QS are mainly on the lack of knowledge in ADR services. This study will help QS's to improve their skills to be involved in ADR and prepare themselves for the challenges of ADR that they may encounter to become more accomplished and competent professionals.

Keywords: ADR, challenges, construction industry, skills.

MOISTURE CONTROL OF TIMBER MATERIAL ON TRADITIONAL MALAY HOUSE IN BATU PAHAT AREA

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ABSTRACT

Moisture control issues surprisingly occur in buildings regardless of the region. However, the building material that suffers the most from moisture problems in timber is due to its high sensitivity towards moisture. In Malaysia, timber material as the main building material is still relevant, especially on traditional Malay houses. Since traditional Malay houses have existed for as long as anyone can remember, there are a lot of defects with regards to moisture problems occur in this building. This is because there is no awareness among the workers on how to monitor the best practice of moisture control. Thus, the best practice of moisture control is neglected and it destroyed the building material for a long time. Not just that, it also affected the health of the occupants due to the presence of defects occur on timber material. Thus, this research paper is focusing on the causes of moisture problems occur to identify the factor of these issues happens. This research paper will also focus on the moisture problem's effect if moisture control is neglected or not taken properly in traditional Malay houses. By doing so, the proposal of moisture control can be obtained. A detailed literature review of moisture control, timber material, factor and causes of the moisture problems and the ways to monitor moisture control are gathered in this topic. It will be analyzed to identify the factor and effects on the building material and the health of the occupants due to this defect and to propose the best practice of moisture control. The methodology will be explained to produce the required data. A mixed method approach will be conducted throughout this research. The case study for this research paper will be located at Kampung Parit Yusof with 12 selected respondents.

Keywords: health, issues, moisture control, traditional Malay house

FACTOR AND EFFECT OF UNEMPLOYMENT AMONG UNIVERSITI TEKNOLOGI MARA (UITM) QUANTITY SURVEYING GRADUATE

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ABSTRACT

Unemployment refers to individuals who are employable and still searching for a career but unable to get a position. This issue triggers the world's concerns lately, especially to the Malaysian graduate where approximately 1 out of 5 graduates remain unemployed. One of the reasons for unemployment might be due to the quality of the graduates. Unemployment has a bad impact on health, society and the economy. Due to this issue, the research aims on proposing strategies for enhancing the employment rate among Universiti Teknologi MARA (UiTM) Quantity Surveying graduates. To achieve the aims, this study was performed with three objectives, which are to identify the factor that influencing unemployment, to investigate the impact of unemployment and lastly to recommend the solution of unemployment among Quantity Surveying graduates. The survey approach by means of a questionnaire was employed, where 100 questionnaires were distributed to industry players which is the employer, quantity surveyor, assistant quantity surveyor or any job that represents quantity surveying job scope and another 100 questionnaires to UiTM Quantity Surveying graduates. Based on the questionnaire distributed, the data was presented in the mean of average index and frequency by using SPSS software. The results from the questionnaire shows that one of the factors that led to unemployment was the current situation of COVID19 pandemic which makes it hard for the fresh graduate to be employed. In order to be more marketable in the industry Quantity Surveying graduates need to possess communication skill, critical thinking and problem solving, and many more. It shows that unemployment has a huge impact on economic where it creates less spending due to no job available and no income. To solve these issues, it concludes that all parties from the private sector, higher educational institutions, the government and UiTM Quantity Surveying graduate must cooperate.

Keywords: Effect, Factor, Quantity Surveying Graduates, Solution, Unemployment

ISKANDAR MALAYSIA IN JOHOR: A CATALYST FOR RAPID DEVELOPMENT IN SOUTHERN PENINSULAR MALAYSIA

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ABSTRACT

The presence of Iskandar Malaysia has contributed to the increasing existing investment that will provide lots of opportunities for local players and foreign direct investment. This study aims to provide exposure to the community about the Iskandar Malaysia region which is resilient and has a strong economy. The first objective is to identify the key success factor of Iskandar Malaysia in the south of the peninsular Malaysia and the second objective is to explore the impact of Iskandar Malaysia on the development at the southern peninsular Malaysia. This study uses a mixed method that consist of quantitative and qualitative. The sampling technique used is random simple sampling for quantitative while homogeneous sampling is used for qualitative. Questionnaires are distributed via google form on the online platform to knowledgeable parties from the Iskandar Regional Development Authority and residents around the region. There are 235 respondents answered it. Data and information were collected for analysis using SPSS based on frequencies and descriptive analysis. The data are presented in the form of tables and pie charts. The study found that the key success factor of Iskandar Malaysia are on the strong support from the federal government, complete infrastructure facilities, have a strong local economic and others. Furthermore, the results of the study found that Iskandar Malaysia has given an impact on its development based on the high level of mean value obtained according to mean score interpretation. The positive impact are on development of road construction, succeeded in attracting investors to invest in the region and others. Meanwhile, the negative impact are sharp rise in houses prices, reduction of home ownership by people in Iskandar Malaysia region and others. In conclusion, this study gives implications to the population to be more aware of the development with various sector in the region.

Keywords: Catalyst, Development, Iskandar Malaysia, Southern Peninsular Malaysia

IMPACT OF OCCUPATIONAL STRESS TO QUANTITY SURVEYORS' PRODUCTIVITY IN CONSULTANT FIRMS IN SARAWAK

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ABSTRACT

Quantity surveyor's profession has become one of the important professionals in the construction industry. In fact, researchers have concluded that quantity surveyors are one of the stakeholders in the construction industry. With the ever-growing and everincreasing of the industry, the demands for quantity surveying service escalates. With the necessity to meet with the datelines, quantity surveyors are faced with occupational stress which in turn will deter their productivity. Hence, the objective of this research is to identify the occupational stress of quantity surveyors and the factors contributing to occupational stress and the influence on their productivity. This research has proven that quantity surveyors experience occupational stress which is caused by factors unique to the job, role in the organization, career development, interpersonal relationship, organizational structure and external social factors which influences their workplace productivity. This research is produced based on review of literature as a basis to identify the type of occupational stress, the contributing factors to occupational stress and the influence of occupational stress towards productivity. The data was collected by quantitative method through questionnaires and the results were analysed by using the SPSS software. Based on the findings, it is concluded that occupational stress is affected by various factors and influences productivity of quantity surveyors in consultant firms. It was therefore recommended that stress prevention measure should be integrated from the managerial level to prevent severe occupational stress.

Keywords: Occupational stress, productivity, quantity surveyors

DIGITAL READINESS OF MALAYSIAN CONSTRUCTION CLAIMS MANAGEMENT

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ABSTRACT

Digitalization has its roots set well in the Fourth Industrial Revolution, sweeping transformation across all industries. In the construction industry, digital transformation offers a diversity of systems and tools to digitalize construction processes such as construction planning, execution, management, and monitoring, including claims management. As the administrative tool to correct construction failures, it is surprising that incomplete and unsubstantiated claims are still the frequent contributors to construction disputes. This leaves a question if the industry players are aware of the presence of digital elements in diminishing potential issues in claims management. The exposure and readiness of practitioners in digitalizing construction claims management are worth pondering too. This research intends to distinguish the new norm of construction claims through the objectives of this study: the exploration of essential digital elements in construction claims management and the assessment of the readiness of Malaysian construction practitioners in digitalizing claims management. This research adopts qualitative analysis, where a theoretical framework on the evaluation of digital readiness from the aspects of culture, commitment and capacity, in terms of automation, robotics, Artificial Intelligence (AI), digital and big data, connectivity, and digital access have been developed to formulate the interview questions for field study. The targeted Respondents are the Malaysian construction industry practitioners, specifically Grade 7 contractors. From the findings, automation and robotics elements are found to be less pertinent in construction claims management while digital data and connectivity are more relevant in this context. Human element is also vital in digitalization. The practitioners were mostly ready culturally and from the aspect of commitment, but did not possess sufficient capacity readiness.

Keywords: Construction claims management, Digital readiness, Digitalization, essential digital elements.

APPRAISAL OF THE LEVEL OF AWARENESS ON THE EXISTENCE AND ROLES OF THE BUILDING SURVEYING VOCATION BY NON-ALLIED BUILDING SURVEYING CONSTRUCTION PROFESSIONALS IN MALAYSIA.

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ABSTRACT

The growth of the Malaysian construction industry is facing a time of transition due to changes in the marketability, type of project and construction operation. There are also major shifts in the positions of the occupations involving Building Surveying as it is among an established vocations in Malaysia. However, many experts in the construction field have often argued for the expertise and technical standard of Building Surveying graduates in the past. Hence, this research attempts to study the current level of awareness on the roles and existence of the Building Surveying vocation by other non-allied Building Surveying construction professionals in Malaysia. A mixed method research approach has been adopted to achieve this study's objectives. In-depth interviews have been developed and administered to 3 consultants which from the Architect and Quantity Surveying background to sought for participation's consent and perspectives. Second, a series of questionnaires have been developed and disseminated to 128 respondents ranging of architect, engineers and quantity surveyors. The results of the study from the interview series revealed that two respondents from private sector background are realize and aware on the existence of this profession while respondents who are working from government sector are unaware of it. The study had also found that the current status of this profession is not commercial as compared with others and its roles and job scopes is still being misunderstood. Contradictory, the findings of survey revealed that the building surveying profession is well accepted and recognized among the architect, engineers and quantity surveyors. A key implication of these findings makes a case for the professional bodies governing building surveying profession to constantly adopt several approaches to comply with the issues to ensure a smooth development of this professional growth, and to deal with the slow endorsement of the Building Surveying Act in Malaysia.

Keywords: building surveying enrolment, marketability, vocation, construction professional.

REMODELING THE WORKSPACE FOR EDUCATION BUILDING FOR FUTURISTIC TEACHING AND LEARNING AT SCHOOL OF HOUSING, BUILDING AND PLANNING (HBP), UNIVERSITI SAINS MALAYSIA (USM).

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ABSTRACT

The teaching and learning environment are very important for physical development, mental and cultural well-being as well as its adaptation to the latest technology used. The quality of workspace in education building is very important to create the conducive environment in teaching and learning process. The lack of facilities and space management caused the teaching and learning process space to become unconducive and outdated. The space is no longer can support by student growth, flexibility and the use of the latest technology that occurs in the twenty-first century education system. The aim of this research is to remodel and improve the capabilities of teaching and learning space to more modern and current teaching and learning approach. The space audit is conducted at HBP education building to evaluate the current condition stage. The result showed the space capacity was not complied with the ideal space capacity and the critical usage of all teaching and learning space. The result suggested to remodel the existing teaching and learning space for the current and futuristic teaching and learning. A proper space planning should be prepared by the university management for the changes of nature on existing teaching and learning workspace. It is important for university management to provide the best quality of teaching and learning environment to produce the competitive professional graduate.

Keywords: Futuristic, remodeling, space audit, space management, teaching and learning space

Sub-Theme 2 : Architecture and Planning Studies

Design, planning, architectural studies, legal, housing, geospatial, BIM

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THE PROSPECTS OF MICRO HOUSING AS YOUTH ACCOMODATIONS IN KUALA LUMPUR CITY CENTRE

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ABSTRACT

The lack of affordable housing options and opportunities within the Kuala Lumpur City Centre for youths are extremely concerning. High rental prices, strict housing policy, incomprehensive housing policy and uncompromising financial procedures contribute to the housing affordability issue. The initiative strategy is to design carefully to intervene in the housing market. Micro housing movement has reached various countries with the intention of addressing the housing affordability problem as a temporary housing option. Nonetheless, micro housing is a fairly new concept to be introduced in Malaysia. Consequently, this research descriptively analyses the prospects of micro housing as youth accommodations in Kuala Lumpur City Centre. The aim of this research is to investigate the prospects of micro housing as youth accommodations in Kuala Lumpur City Centre. In this research, semi structured interviews were used for analysis purposes. Purposive sampling method was chosen to select the respondents of this study. A total of 5 respondents from various professional fields were interviewed through an online meeting platform. The results were analysed through content analysis. The findings show with collaborative effort from the government and private sector, micro housing has high potential to be one of the top choices of housing in Kuala Lumpur City Centre as it possesses diverse characteristics with inexpensive rental value to accommodate youths. Hence, this research suggests possible strategies in response to the current housing situation and micro housing to be the future preferred accommodation for the youths in Kuala Lumpur City Centre.

Keywords: Affordable Housing, Kuala Lumpur City Centre, Micro Housing, Youths

THE FRAMEWORK OF AGING-IN-PLACE DECISION MAKING PREFERENCES BY GENERATIONS IN JOHOR BAHRU, JOHOR

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ABSTRACT

Decision-making would be carried away when the consumer had to choose, whereas a home user mostly the choice is made by maximizing satisfaction for their house by focusing on various factors whether external or internal. The characteristics of housing decisions and choices vary between generations (i.e. Baby Boomers, Generation X, and Generation Y) or age groups. As age increases, an individual needs and preferences also begin to change due to ageing factors. Thus, this study aimed to identify the Aging-in-Place decision among Malaysian generations in Johor Bahru, Johor. The generations' housing decisions were determined by housing options between "to move or not to move" (Age-In-Place). The objective proposed for this study; (i) To define the generations (housing consumers); (ii) To identify the factors that influenced housing decisions (Age-in-Place); and (iii) To determine the generational Aging-in-Place decision making in Johor Bahru, Johor. This study will adopt a mixed-method research strategy via qualitative data (i.e. interviews with the main industry players) and quantitative data collection (i.e. survey questionnaires with housing consumers by generations/age groups). Approximately 200 samples were collected through questionnaires surveys from various approaches. The factors that influenced Aging-In-Place Decision Making derived from literatures reviews, qualitative findings, and pilot study. The Aging-In-Place factors such as; (i) Demographic factors; (ii) Health and medical factors; (iii) Economic; (iv) Decision-Making influencer; (v) Help and support factors; (vi) Dwelling factors; and (vii) Neighborhood factors will be included in the final survey questionnaires. The findings are very significant to both public (i.e. government) and private sectors (i.e. housing developers) as the findings will provide indications of the Aging-In-Place features preferred by the generation of Malaysian housing consumers. Besides, this study crucial to housing consumers in getting the suitable housing provided by the actors of housing development.

Keywords: Aging-In-Place, Baby Boomers, Housing Decisions, Generation X (Gen-X), Generation Y (Gen-Y), Quality of Life,

THE GENERATIONAL PREFERENCES OF ELDERLY-FRIENDLY HOUSING DESIGN FEATURES CASE STUDY: SHAH ALAM, SELANGOR

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ABSTRACT

The function of a house is to keep the occupants safe, besides its primary function as a shelter. Malaysia will become an ageing nation with its ageing population forecasts in 2040, to increase up to 14.5% out of the total population. Due to the ageing process, the elderly can easily get injured due to falls, although they stay indoors or at home. Suitable housing design for the elderly or elderly-friendly housing design features in each housing schemes would be beneficial to assist people, especially the elderly, age-in-place comfortably and safely. In relevance, each age group or known as the generations, namely The Baby Boomers, Generation X (Gen-X), Generation Y (Gen-Y) and Generation Z (Gen-Z) are equipped with different taste and preferences. These differences (generational differences) will also be seen in the elderly-friendly housing features preferences as it resembles the generations different perceptions of ageing-in-place needs. This study provides an in-depth overview of the generational preferred elderly-friendly housing design preferred features with Shah Alam, Selangor as the case study. The objectives of this study proposed are as follows; (i) to categorize generations; (ii) to determine the design features for elderly-friendly housing; and (iii) to ascertain the generational preferences of elderly-friendly housing design features in Shah Alam, Selangor. This study adopted a mixed-method research methodology via qualitative and quantitative research strategies approach. The qualitative data collection was conducted through interview sessions with architects as the experts in housing design. The quantitative data collection was accomplished via survey questionnaires to the housing consumers (by generations) living in Shah Alam. Despite the government's Covid-19 restriction of movement enforcement, some 150 samples able to be collected via survey questionnaires distributions using Google Form and phone calls. The findings revealed six (6) main preferred features of elderly-friendly housing design; (1) kitchen; (2) bathroom; (3) staircase; (4) living room; (5) bedroom; and (6) entrance space. The derived findings will be very beneficial to both the government and the housing developers better understand the housing consumers' needs and preferences, especially by age groups/generations (i.e. Baby Boomers, Gen-X, Gen-Y and Gen-Z). The housing consumers will benefit by getting a house equipped with elderly-friendly features to assist them in age-in-place gracefully.

Keywords: Ageing, Age-in-Place, Elderly, Generations, Elderly-Friendly Housing Design Features

TACTICAL URBANISM AS AN INNOVATIVE APPROACH TO REJUVENATE THE UNUSED SPACE IN KUALA LUMPUR

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ABSTRACT

Tactical urbanism is a cheaper, quick, and short-term action for long-term changes program to build a better urban environment in urban areas. It presents an innovative approach to solve the issues of lack of space for community social activities, a space with the priority of vehicles, and poor safety elements installation in public spaces. With all these issues, it merits this research to measure the potentials of tactical urbanism as an innovative approach to revitalize the unused space that most occurred in urban areas due to poor spatial design and planning. Four (4) stipulated objectives have been highlighted to achieve the research aims; (i) to review the literature on unused space, (ii) to analyze the factors that contribute to unused space, (iii) to evaluate the potentials of unused space and the effectiveness of tactical urbanism, and (iv) to propose a holistic approach of the tactical placemaking that fit well in the local context. In advocating the research, a qualitative approach was applied - participant observation and expert interviews. To compare the results from observation, Space Syntax was introduced in a quantitative manner to test the relationship between spatial configuration and people movement and activities in unused space. The significant findings show that space such as transit rings and stations in LRT and MRT areas contribute to unused space whereby people tend to avoid using the space due to the safety issue and disconnect from the station to other destinations such as the office mall. In conclusion, tactical placemaking is an immediate change initiative to enhance the urban space and city gathering places to support strong social activity and economic realms within sustainable design and planning.

Keywords: Space syntax urbanism, tactical, unused space,

AN ASSESSMENT ON HOUSING EXPENDITURE TO INCOME RATIO AND TRANSPORTATION FOR B40 GROUP

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ABSTRACT

Real Estate and Housing Developers' Association Malaysia (REHDA) cited an affordable housing target of 500,000 in 5 years, leading to homes being built in less desirable locations, overpricing, and the wrong target market. In most countries, including Malaysia, affordability commonly used the housing expenditure-to income ratio to measure housing affordability, which considers household income and household expenditure and disregards transportation expenditure, which is a substantial amount of household expenditure. With all these issues, it merits this research to examine the efficiency of affordability in the Malaysian context by using the Housing Expenditure to Income Ratio (HRI) and Location Housing Affordability Index (LHA). This research has attempted to analyze the precise measurement of housing affordability on Bottom 40% or B40 household groups. In advocating the research, a mixed-method approach is being applied. The online questionnaire is being conducted, which considers as a non-probability sampling method, as the respondents cannot be confidently generalized to the total population. As a result, this research presents that the B40 household groups in the study area are critically unaffordable in buying a house using the measurement method based on several important indicators such as expenditure and location. In conclusion, Location Housing Affordability Index (LHA) is more accurate. It considers the housing location by considering widening perspectives other than income only, which led to more specific affordable housing location project in the future.

Keywords: Affordable, B40, Location Housing Affordability Index.

THE IMPACTS OF HIGH-DENSITY HOUSING ON MENTAL HEALTH

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ABSTRACT

Mental health has a relevant burden on the health of populations. Common mental health is well associated with the built environment, but little is known about the influence of housing density. Therefore, this research was conducted by applying the Depression, Anxiety and Stress Scale 21 Malaysia (DASS-21 Malaysia), which aim to determine people state of mental health who lived in high-density housing in an urban area. The findings found that many people are dissatisfied with providing safety elements in their neighbourhood, neighbourhood characteristics, affecting their social life and interaction among neighbours. However, only a small number of people are affected by a mental health problem and motivation due to several factors such as individual socio-demographics. The result indicates a significant positive relationship between high-density housing and mental health and motivation, and a person's emotion and feeling towards developing mental health symptoms. This research suggests exposing a close look at the gap between living in high-density housing and mental well-being, particularly mental health.

Keywords: Density, housing, mental health, well-being

THE RELEVANCE OF ADAPTATION OF SOCIO-CULTURAL VALUES IN TRADITIONAL MALAY HOUSE SPACE PLANNING

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ABSTRACT

Rapid urbanization and the evolution of modernism in housing projects in Malaysia trigger the loss of the identity of Malay Architecture. Instead of focusing on conserving the identity of Malay in the building, modern housing projects focuses on producing mass houses with necessities that overlooked the need to cater to Malay culture. The inhabitants are obligated to adapt their lifestyle to the houses that are built despite their culture because of the lack of options provided to comply with their cultural needs. The study aims to identify the relevance of adapting socio-cultural values in determining the space planning in the Traditional Malay Houses. The objectives of this study are to identify the Malays' socio-cultural values that influenced the space planning of traditional Malay houses and to assess the perception of the community towards traditional Malay house space planning thus contributes to the verifications on the relevance of Malay socio-cultural values adaptation. The study identifies socio-cultural values of Malays; folk festivals, formal events, gender-based daily activities, inter-relationship between family, religious beliefs and metaphysical beliefs influence on space planning in traditional Malay houses. The methodology includes questionnaire distribution to respondents who experienced living in traditional Malay houses and respondents who are inexperienced for similarity and contrast in perception towards space planning of a traditional Malay house. The study found that experienced respondents are more aware of the functions of spaces in traditional Malay houses compared to inexperienced respondents. Nevertheless, this study found that both categories of respondents claimed spaces in a house need to be planned accordingly to fulfil inhabitants' cultural values. The study validates the relevance of Malay socio-cultural values adaptation in traditional Malay houses thus recommends the adaptation of socio-cultural values should become the foundation of space redefinition in the modern housing projects.

Keywords: architecture, socio-cultural values, space adaptation, space planning, traditional Malay house

THE ACCEPTANCE OF USER'S IN USING CO-WORKING SPACE CONCEPT IN MALAYSIA

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ABSTRACT

The new development revolution, common areas now offer both flexibility and social benefits. These new developments have resulted in 13,800 co-working spaces within easy reach throughout the world including Asian major cities such as Singapore, Thailand and Malaysia and emerging rapidly since 2010. However, the longevity of this sort of business is difficult to predict due to not just tremendous competition but also a lack of clear information from the user side. Co-working space owners must be aware of the features and perspectives of their users, which may differ between countries and cultures. This study aim to identify the characteristics of co-working spaces in Malaysia. The expected result from this study shown what the real situation about co-working spaces. This research will focus on the younger generation especially in line of digitalisation of the economy which utilises the minimised spaces. Even with the minimal spaces provided as a working space, users can still be involved through the digitalise economy approach. For this investigation the methodology using qualitative approach which use the desktop study. From the finding, the recommendation will be issue about the characteristics and can related with the behaviour of user's information between countries and cultures.

Keywords: Co-Working Space, Digitalisation, Flexibility, User's Acceptance

THE EFFECT OF GLOBAL PANDEMIC IN PROPERTY PURCHASING DECISION IN MALAYSIA

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ABSTRACT

The COVID-19 pandemic has affected almost all local and global economic sectors, including the real estate industry. The literature review suggested that the market value for the primary properties could decrease within 10% to 15% and secondary properties within 15% to 20% during the global pandemic which shows the declining pattern in real estate while at the same point, create an opportunity for speculators to keep acquiring an undervalued asset. Therefore, this research is conducted to investigate the effect of global pandemic in property purchasing decisions. The objectives of this research are to study the effect of the global pandemic on the real estate market and to investigate the people's perspective in purchasing property during the global pandemic. The researcher used literature review and content analysis to study the effect of global pandemic on the real estate market. Meanwhile, questionnaire survey has been distributed to 200 potential property buyers in Malaysia to investigate the perception of people in property purchasing decisions during the pandemic. The online questionnaire survey consists of four (4) sections namely demographic profile, people's perspective on purchasing property before and during the global pandemic as well as open-ended section. Data were analyzed using descriptive statistics and thematic analysis. As a result, majority of respondents stated that they are still interested in purchasing a property despite the global pandemic. Most of the respondents acknowledged that real estate is a good long term investment but the pandemic has affected their source of income and financial management which could hold back them from purchasing property. The findings also suggested that, if the government and developers gave more appealing incentives to go along with the present incentives, individuals may be more inclined to purchase property during the pandemic. It will also ensure that, despite the pandemic, the real estate industry continues to improve and recover.

Keywords: Pandemic, People's Perspective, Property Purchasing Decision, Real Estate Market

THE FIRST PRECISION AGRICULTURE CAMPUS: PROMOTING LEARNING ENVIRONMENT TOWARDS SUSTAINABLE FUTURE AGRI-TECH UITM JASIN CAMPUS DESIGN

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ABSTRACT

The global is already prominent with other influential and newest technologies in agricultural practices and education as well as sustainable factors that impeccably can fuse along the way with integrated agriculture strategies. Unfortunately, Malaysia's agriculture education trends and practices remain outdated and one step behind. Does advanced agricultural education have a future in Malaysia to secure their food sources, and if so, what strategies are being used for it to survive? First the precision agricultural learning environment is briefly describe to give contextual information about agricultural education platforms. Then, this paper aims to develop an engaging learning environment in the campus design through sustainable precision agriculture implementation. The research emphasized the study purpose; 1) To provide an effective world-class education and learning environment in a sustainable agriculture campus. 2) To create regenerative agricultural approaches and spaces for learning environment setting. 3) To upgrade and improve the campus outdoor spaces by applying an Agri-Tech system into the sustainable campus design. Finally, to support the trend towards sustainable agriculture that followed by a description and discussion in Malaysia National Policy on Industrial Revolution 4.0 (IR4.0) and Sustainable Development Goals (SDG) on the future for the educational and agricultural sector. In conclusion, repositioning an innovative precision agriculture campus as a symbiotic campus lifestyle and agricultural relationships will regenerate the principles in achieving not just on greater crop yields, but also produce future agro-experts, increased biodiversity, setting enhancement, healthier well-being and sustainable lifestyle. A further conclusion, is to develop more understanding of sustainable integrated agriculture and campus design prospects that can become an excellent deviation for good agriculture practices in Malaysia.

Keywords: Agri-tech, campus design, learning environment, precision agriculture, sustainable

REIMAGINING THE LIBRARY: DISCOVERING THE TREASURE OF KNOWLEDGE AT KAMPUNG BUKU LANGKAWI THROUGH ECO-TOURISM.

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ABSTRACT

Once seen as the hub of education and knowledge for the public, nowadays, public libraries are threatened by the rise of the internet and digital technology. The role of a public library has ceased to meet the demand of the digital age with instant information. A library is a space or building containing a collection of data and records of a book, journal, archive, newspaper, and even recorded audio or visual content. This project introduces a new typology of public space anchored in a multi-functional public library. The main goal of this research is to reimagine the public library at Kampung Buku Langkawi and its surrounding as a productive public space that serves multiple functions and civic engagement for the community towards sustainable ecotourism. Instead of serving as a mono-functional component of the public library, the purpose of the public library design should be reimagined as a primary anchor that knits together an active, engaging, and productive public space. Three objectives are laid out to aid this research as follows. The first objective is to re-define the role of the public library through sustainable design. Second, to re-activate Kampung Buku as a multifunctional and civic engagement space for the community. Third, to re-generate the sense of place of Mt. Raya while preserving the richness of its biodiversity. The importance of this study highlighted the reimagination of existing public libraries and re-examined the idea and design of public libraries as cultural, recreational, and learning spaces. Through doing so, it reimagines a public library, not as a definitive collection of information, sources, and resources but rather as a facilitator, a space that embraces multiple roles and acts as a cultural and knowledge hub, the library is envisioned as a public space that is lively, productive, and accessible to all.

Keywords: knowledge hub, public library, reimagination

INTEGRATING WILDERNESS AND LEISURE EXPERIENTIAL OF ENDANGERED MAMMALS AT ZOO NEGARA

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ABSTRACT

A zoo is a confined space that houses a collection of exotic and wild animals for conservation or display to the public. It offers various wilderness elements and principles that reflect their life to be in a natural habitat. However, the current trend of rapid globalization and climate change has resulted in the loss of value of the wilderness and the extinction of the animals. Also, several other issues arise from it, for instance; outdated facilities and amenities, less conducive habitat for the endangered mammals, the zoo appears to be less enjoyable and does not serve the purpose of education and wilderness experiences for the visitor. This study aims to enhance the conducive well-being of endangered mammals and to provide wilderness experiential for the visitors as a zoological park. It proposes a contribution to identify wilderness characteristics and leisure of the exciting zoo environment. Moreover, to provide a master plan that portrays a sustainable zoological park for endangered species for urban recreational and convenient habitat. By doing so, we get to establish and provide a new concept and a suitable shelter for the endangered animals which later allows the visitor to experience in-depth of the wilderness concept while visiting the Zoo. There are a few key findings gathered through conducting a site survey in the making of the wilderness framework which are the research understandings, strategies and monitoring programs, a guideline criterion for an enclosure, and activities that represent leisure and experiential. Along these lines, it conveys in creating a beautiful flora and fauna by using the taxonomy structure of nature-based solutions. Besides restoring and preserving the environment, it indirectly helps in boosting our economic growth. Therefore, this study portrays a realistic landscape architectural design solution that highlights the conservation, restoration, and preservation of wildlife. A theoretical analysis, done by observations, will deliver a significant systematic model to enrich, enhance, and recommend zoos to be more comprehensive conservation needs in our community.

Keywords: wilderness,character,experiential,endangered mammals,nature based solutions

PORTAL OF SANCTUARY: REINVIGORATE EXPERIENTIAL DESIGN THROUGH GREEN INFRASTRUCTURE AT NATIONAL ELEPHANT CONSERVATION CENTER, KUALA GANDAH

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ABSTRACT

The goal of elephant conservation is to protect and provide a safe place for elephants. As we know, human-elephant conflict is becoming a global issue. Many of the treats which trigger concern about conservation result from human land use in one way or another. When suitable habitat is lost or spatially dispersed, population sizes can become precariously low, raising the risk of extinction. Nowadays, landscape architects already play an important part in the zoological park planning and designing process. However, as for conservation efforts, especially in wildlife-protected areas, we usually see it as a conservationist role to fill in the job. The significance of this study is to come up with strategies that can help increase public awareness about the importance of conserving wild elephants and prioritize habitat conservation in design guidelines. Thus, this study will focus on criteria that can become a guideline in developing a better standard for elephant care and management while educating the public through experiential design. There aspect in making framework strategies for experiential design by integrating multi-sensory programs and green infrastructure design. From green linkages to natural water recycling systems, these approaches intend to upgrade elephant lifestyles using sustainable design while providing memorable experiences to the public. The solution focuses on a well-designed conservation area that integrates educational programs and animals' conservation in one space. Therefore, this study shows how knowledgeable habitat design can add to conservation efforts and provide opportunities for interaction between animals and visitors in an elephant conservation area. Systematic and efficient site analysis and detail synthesis help deepen understanding of making the framework strategies in design challenges.

Keywords: experiential design, green infrastructure, public participation

INTENSIFY THE CENTRAL PARK BATU KAWAN ECO-CITY NEIGHBOURHOOD BY CONVERGING THE W.I.N CITY PRINCIPLE

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ABSTRACT

Nowadays, most of the townships in the world want a balance between the lifestyle and wealthy environment. The systems that have been applied in successful cities in the world such as Eco-city, Green Livelihood show that people need an environment to feel a sense of appreciation. Creating a city with the balancing element of building and nature will make the city more sustainable, and people will tend to enjoy the city. The research focused on: 1) To create a space interaction between neighbourhoods such as commercial, housing, industry, and institutional with the green linkages with the central park as a space sprawl for walkability.2) To create a low carbon city and reduce the pollution that leads to eco-city and promote a healthy environment.3) To have a balance between wealth and nature with some injection of the innovative approach that leads to the success of the W.I.N city principle. A good township should consider all the aspects such as Connection, Economic, Environment, and Social to make sure the place will create its melodrama and scenario that will impact the place's identity. The balance of Wealth, Innovative, and Nature elements will emboss the locality and enhance the quality of living towards succeeding Sustainable Development goals in Malaysia.

Keywords: balance township, Ecodevelopment, Innovative City, Nature City, sustainable planning, Wealth City

APPLICATION OF SOFTWARE TECHNOLOGY USAGE OVER TRADITIONAL TOOLS AMONGST ARCHITECTURE STUDENTS IN UITM

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ABSTRACT

The whole industries including the Architecture, Engineering, and Construction (AEC) industries are undergoing the transformation of becoming more modern. Architectural education also not left behind. Abundance of software was created in order to help the students. However, there is clashing opinion between the students that used traditional ways of tools and students that used digital software in the design process. The issue of the effectiveness of using the software was raised in architectural education. Thus, the aim of this research study is to understand the exposure of using software technology compare to traditional ways of tools among the architectural students while preparing the design process. Also, to understand the architectural students' preferences about the use of using the software. Other than that, to analyze their opinion about the importance of learning the software technology other than the traditional ways of tools as part of the design process. Conducting a questionnaire survey that focuses the opinion among the architectural student that currently in Semester 05 about using the software technology is one of the methods used for this study. The second method is to analyze the finding and result from the previous researcher as a medium of the research strategy. As the result shows varieties of opinions were collected and majorities of the students agreed that using digital software is more effective and has a lot of advantages.

Keywords: Architecture, Design Process, Digital, Education, Effectiveness, Opinion, Preferences, Software, Students, Technology, Traditional Tools

CHALLENGES OF IMPLEMENTING SUSTAINABLE CONSTRUCTION IN MALAYSIAN HOUSING INDUSTRY

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ABSTRACT

There is no doubt that sustainable construction and design is the future of the construction industry. Designing and constructing sustainable housing by changing its design, construction and operation could help in reducing resource consumption and mitigate climate change. However, it is found that there are barriers preventing the implementation of sustainable housing. This research aims to determine such barriers, thus enhancing knowledge and increase the implementation of sustainable housing development concept in Malaysia. The questionnaire-based survey approach is employed to construction practitioner (developers, contractors, suppliers, facility managers, and consultants) that are actively participate in Malaysia's housing development. the questionnaire asked the respondents to rate the importance of 20 barriers which were categorized into four key categories (financial challenges, design and technical challenges, institutional challenges, and socio-cultural challenges). the result showed that the implementation level of sustainable housing development in Malaysia is relatively low, even though efforts and willingness in incorporating sustainability are exceptional. This research also identified the most critical barriers and recommendation based on the perceptions and experiences of the respondents, while spreading awareness regarding sustainability concepts among construction practitioners and increase the implementation of sustainable housing in Malaysia.

Keywords: barriers, housing industry, Malaysia, sustainable construction

ACCESS AND FACILITIES FOR PEOPLE WITH MOBILITY DIFFICULTIES AT MALAYSIAN THEME PARK

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ABSTRACT

Theme parks are among the most enjoyable places to visit with friends and family. The popularity of theme parks has risen over time. It is one of the most popular places to visit on weekends and school holidays. Despite its popularity, it is known for being inaccessible to individuals with mobility difficulties. The aim of this study was at enhancing access and facilities in Malaysian theme parks. The requirements and guidelines for providing access and facilities at the theme park and issues linked to theme park accessibility were identified. This study employed both qualitative and quantitative in nature, encompassing collecting data on access and facilities satisfaction and recommendations from the respondents. The findings of this study are beneficial in formulating expansion of the existing services and facilities in the theme parks; to make visits to theme parks in Malaysia more convenient for people with mobility difficulties.

Keywords: accessibility, facilities, mobility difficulties, person with disabilities (PwDs), theme park

ADAPTATION OF WATER SENSITIVE URBAN DESIGN IN THE PRESERVATION OF HERITAGE SITE: A CASE STUDY OF KUALA LUMPUR HISTORIC CITY CENTRE

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ABSTRACT

The phenomenon of flash floods poses a major threat to the sustainability of heritage buildings in the historic core of Kuala Lumpur. Without proper mitigation measures, further damage to the buildings will result in the loss of value as a heritage site. This research aims to identify the applicability of adapting Water Sensitive Urban Design (WSUD) in Kuala Lumpur historic city centre considering the heritage conservation policy and guidelines. Specifically, this research investigates the factors and impacts of flood disaster to the heritage site as well as the effectiveness of the established urban drainage system to further justify the need of adapting WSUD in the study area. In this context, Water Sensitive Urban Design (WSUD) is a sustainable approach to the urban drainage system which integrates the functionality of water cycle management with the built environment through urban planning and urban design. This research involves fieldwork observation, expert interviews (Judgmental sampling), and data collection from secondary resources. Consequently, the data of quantitative and qualitative are analysed and correlated as well as interpreted through triangulation design. Finally, the result identifies the potential water infiltration areas and blue corridor paths and it shows that some of the components of WSUD are applicable to be adapted in the study area. On this basis, the concept of WSUD should be considered in the heritage preservation and conservation works and integrated into the drainage system development in the historic city centre of Kuala Lumpur.

Keywords: Heritage Preservation, Water Sensitive Urban Design

CHILD'S PLAY: PROMOTING COGNITIVE DEVELOPMENT THROUGH KINDERGARTEN ARCHITECTURE IN MALAYSIA

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ABSTRACT

The participation of children in the context of early childhood education in recent years has attracted considerable attention. This means involving and allowing children in their everyday lives to take part in decision-making processes. The purpose of this research is to examine the kindergarten design that promotes the cognitive development of children before further embarking on Malaysia's education system. It also intent in utilizing this as an elemental ground rule to stimulate a superior kindergarten in the future. This research is imperative in aside from responding to the individuals involved in the kindergarten premise, but as well countering to the national education agenda of Malaysia from 1957 to the present. Kindergarten playing role in providing the most basic and fundamental education system before children begin the way formal education programme; elementary school and secondary school. This research will be conducted out using case study approach outlined by Yin (2003) and data collection in a single complex building kindergarten in Malaysia. Direct observation will be adopted as part of the analysis with regard to four environmental stimuli: movement, comfort, competence and control. This research will not only favour policymakers, designers and educators, but will also be important for Malaysia's national agenda in advocating a better education system in the probe for a brighter future for our nation.

Keywords: childhood, child development, education, environmental stimuli, kindergarten

AMPHIBIOUS DESIGN: ADAPTIVE ARCHITECTURE IN FLOOD PRONE AREAS

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ABSTRACT

Over the past years, the rise of sea level had increased the awareness that the current flood mitigation system is not effective to control floods in the long run. The failure of flood barriers only leads to a more catastrophic consequence has opened many eyes to research for a new system that could work effectively in controlling the situation. Amphibious architecture is a passive flood mitigation system which the goal is to live within the environment rather than fighting the uncontrollable flood water. The design can adapt to various depths of water thus making it resilient to flood. This paper will discuss the criteria of amphibious design in flood-prone areas and investigate the resilient of current house design in flood-prone areas during flood through retrofitting flood resilient construction. Criteria of the amphibious design will be reviewed to consider the suitability of the design in Malaysia, as well as the limitation of the amphibious construction, obstacle, and possible path forward. The research is conducted through secondary sources that are available on the internet which is online journal and website. Total of 4 case studies were chosen from different categories of amphibious housing; newly constructed and retrofitted, which later being compared to investigate the resilience of each house toward the flood. Certain characteristics have been found to fulfil this duty as a functional and desirable amphibious home; the capability to float, the float line, the buoyant foundation, height calculation, the structure type, and utility access are all factors to consider.

Keywords: Amphibious architecture, buoyant, flood mitigation system, resilient

PUBLIC PARK AS SOCIAL INTEGRATOR

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ABSTRACT

The public parks in Malaysia are getting less attention from researchers however it is a one of the significant place to act as a social integrator for a community. Public parks playing a important role as a social integrator for a community's social interactions where multicultural people communicate and socialize. Therefore, this research study aimed to identify and understand the criteria of public park and its contribution to enrich social interactions between the community. The study's objective was to identify and determine public park design criteria to successful park as a social integrator and to examine quality of existing public park as a social integrator in Malaysia. Quantitative research carried out in a park by doing survey and observations. The measured variables were good access and linkage, degree of comfort and image, user and activities, sociability and voice of the community that contribute activities, utilization, and facilities in the park. The observation carried out on weekday and weekend to get information in the park.The survey carried out with around 30 park users each in Seremban 2 City Park and Seremban 2 Hill Park, Negeri Sembilan, to examine park design criteria and its relation to social interaction in a public public as social integrator. From the results, its showed public parks connected to their surroundings and have adequate connectivity will increase the park's quality an community growth, and social bonding. This study discovered that good accessibility and linkages are essential to attract and create familiarity for visitors to public park. There is also the demand for sociability, comfort and image, and the increasing in user and activities. From the survey, strongly agreed that the voice of the community is important to design a park layout in a city. The public parks in the city can develop a social environment.

Keywords: Community, Park design criteria, Public park, Social interaction

THE ROBUSTNESS QUALITY IN CONTRIBUTING TO IMAGE AND IDENTITY OF LITTLE INDIA DISTRICT: CASE STUDY IN BRICKFIELDS

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ABSTRACT

Considering the significance of the quality of robustness in contributing to image and identity of Little India district, the study will synthesize the quality of robustness in building edges in public urban spaces of a district, and it will reveal a relationship between building functions on the ground level and the surrounding urban space in contributing to the image and identity of a façade physical formations in contributing to the vitality of public urban spaces. The objectives of this research are to identify robustness criteria in Little India district that contributing to image and identity of urban Indian community; To investigate quality of robustness in Little India district in brickfields. Moreover, the research includes a literature survey, a user survey, on-site observations, analyses of functional relationships and physical aspects. The range of applications along a building's façade determines the vibrancy of its public boundaries, according to the findings. The expansion of public interactions from a building edge to the surrounding urban space is illustrated by functional relationships of mixed use on the ground floor. However, a building in an urban setting, as well as physical formations on the ground level façade, must be shown and constructed in a way that reflects a user-friendly environment. The intricate functional relationships between uses, façade shapes, physical amenities, and users, in particular, contribute to the vibrancy of a public urban place.

As result of this research paper Little India Brickfields is highly influenced by Indian community. It serves as community space where sociocultural activities take place. Quality of robustness contributes a lot to the urban Indian community in Little India Brickfields. It gives a strong identity to the Indian community. Apart from that, most of the well-designed urban spaces raise the occasion of having better and higher public activities that needs enhanced public facilities and urban amenities.

Keywords: Image and identity of district, Public urban space relationship, Robustness

STREET ART: TOWARDS A CREATIVE CITY OF GEORGE TOWN

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ABSTRACT

George Town is a city in the state of Penang which is rich in historical and cultural heritage leading to its inscription as UNESCO's World Heritage Site in 2008. In 2012, several wall murals and art installations brightened the city, as the city incorporated creative city principles to complement its famous historical and cultural built environment. However, there have been several indications of problems in the implementation of creative city elements as seen in the state of the street art. Causes of the problems range from the attitude of the George Town community itself to challenges in the preservation of street art. If not addressed, these problems will lead to failure in the creative city aspiration of the city planners. With the main aim to examine the role of street art as driver of creative city for George Town, this study has three objectives: 1) to examine the role of street art in transforming George Town into a creative city, 2) to examine local community awareness of the importance of street art for the development of George Town and 3) investigate the challenges faced by street art implementation in the city of George Town. The mixed methods approach was used, where qualitative data was obtained from online interviews and direct observation and quantitative data was obtained using online questionnaire survey. Whilst it was agreed by interviewees and survey respondents that street art has economic, environmental and social benefits, the survey results indicated that the local community lacked awareness of the role of street art in developing a creative city and the natural elements could threaten the street art preservation. Therefore, the authorities can consider various ways to increase local community awareness of the importance of street art and in the future ensure weather-resistant materials for the street art.

Keywords: city development, creative city, George Town, street art

BANGSAR CITY CENTER PROPOSAL: BUNCHBERRY CONCEPT

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ABSTRACT

This project is aim to propose a new development at the site that located in Bangsar Baru, Bangsar 59100, Wilayah Persekutuan Kuala Lumpur bordered by Jalan Maarof and Jalan Ara by referring to the guidelines and legislations. The methodology will consist of project briefing, creating concept and layout plan, and analysis of the proposal. Taking the inspiration from Bunchberry flowers as 4 petaled flower is a symbol of all life, wholeness, beauty, fragrance bounty, harvest and union, with the energy of each petal imparting uniqueness, with each uniqueness coming together in the centre. This will strengthen the idea of creating an area for all that consist of open space, commercial & facility building that located in the middle of business district. This is also align with the intention of Kuala Lumpur in becoming City for All. The structure of the open spaces was created by separating four petals into four equal groups of open spaces with its own speciality.

The goals of the proposal are, to propose a suitable development in the city centre with the aim of providing and avenue for community interaction, to analyse of the physical aspects of the site, potential and barriers as well as policies related to development and to explain the suitability of the proposed development facilities. The concept will be projected in concept plan, layout plan and also master plan. The components of the concept plan are: public library, co-working Space, playground, parks and open space, pedestrian walkways, boulevard, shop lots, parking Space, café, bus stop and road. Layout play will show that the proposed site has different land uses which divided into public facilities, commercial area, open space, roads, parking and pedestrian walkways. Masterplan will visualize the idea of buncberry concept applied to Bangsar Baru.

Keywords: Bunchberry, Concept, Layout, Masterplan, Metaphor

IMPLEMENTING SUSTAINABLE NEIGHBORHOOD CONCEPT AND DESIGN IN MALAYSIA

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ABSTRACT

A sustainable neighbourhood is a mixed-use area with a sense of community and where people desire to live and work in the future. Implementing a sustainable neighbourhood or sustainable communities can accommodate the different demands of current and future residents, preserving our environmental condition and contribute to a good quality of life. However, Malaysia is still not fully emphasizing the sustainable neighbourhood concept and still needs awareness and attention from the government and stakeholders particularly in a very compact area such as Kuala Lumpur. The future cities in Malaysia should develop a new sort of urban structure that can thrive and solve the issues of existing urbanization. This research aims to promote the implementation of sustainable neighbourhood concepts and initiatives of a new greenfield area in Taman Rimba Bukit Kerinchi, Kuala Lumpur. This research also aims to encourage more high-density urban development, reduce urban sprawl and optimizing the land use in the study area. Data collection has been carried out to understand the study area and its surrounding neighbourhood such as policies, land use, topography, social studies, accessibility, environment, urban design, public facilities and infrastructure. A systematic literature review on the concept and design of sustainable neighbourhoods was also done in an attempt to promote a sustainable development plan. The results from the research underlined the potential of the study area to be a successful development plan with a high-quality design of mixed-use developments. The examples of proposed design principles in the study are such as optimize land use that benefits both residents and businesses, encourage pedestrian-friendly neighbourhoods and create a safely connected network of streets for walking, cycling and driving. Sustainable neighbourhood concepts are not only focused on physical development but this concept also can support the Sustainable Development Goals (SDG) that are adopted by all United Nations Member States.

Keywords: mixed-use development, sustainable communities, sustainable development, sustainable development goals, sustainable neighbourhood

BIOPHILIC FOREST CITY AS A COMMON URBAN PLANNING CONCEPT IN MALAYSIA

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ABSTRACT

Biophilia refers to humans' natural biological connection with nature. Biophilic design is an increasingly popular concept in architecture and building. However, its application in Malaysia's urban planning is limited and often overshadowed by the relatively more popular concept – Forest city. The two concepts should come hand in hand to ensure maximum benefits can be gained by human, biodiversity, and city. For example, improved well-being, productivity, environmental protection, and climate resilience. This research aims to investigate the application of biophilic urbanism from an early planning stage of a new greenfield development in Taman Desa Kerinchi, Kuala Lumpur. The research also aims to demonstrate that biophilic urbanism can be applied on a neighbourhood scale to city wide development. Content analysis was conducted to understand the chosen site and its surrounding, including land use, topography, geology, accessibility, population, environment quality, vegetation, building activities, infrastructure, utilities, and public facilities. Systemic literature review on biophilic design, biophilic urbanism, and forest city was also conducted to propose a well-thought development. Results from the research highlighted the importance of enhancing humans' connection with existing nature particularly when there is an abundance of nature in proximity as noted in the chosen site. The key components proposed in the development include connected streets and pedestrian pathways for high walkability, various housing options for young population, commercial activities for local economic improvement, nature trails targeting locals and visitors to boost urban eco-tourism, significant green areas throughout the development such as community farms, gardens, forest walks, camping areas, and picnic lawns. Buildings, infrastructure and utilities should demonstrate visual and physical biophilic designs from as simple as green tree façade to biomimicry architecture. Malaysia's urban planning community ought to explore biophilic urbanism and tap into its vast potential in promoting sustainable development.

Keywords: biophilic city, biophilic urbanism, forest city, Malaysia, urban planning

20th CENTURY HERITAGE TO BE: ABANDONED STAFF RESIDENCES OF UNIVERSITI MALAYA

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ABSTRACT

The 20th century witnessed steady advance architecture innovation. 20th century buildings were built between the years 1901 until 1999 and there are usually built without historical precedent and develop something entirely new and different for their own time. There is no age limit for buildings to be nominated and gazette under National Heritage Act 2005 (Act 645). In fact, any building can be nominated as long as they have at least one of the nine criteria listed under Section 67(2) of Act 645. However, buildings built after Merdeka lack protection and at risk to new development because their significant values are under-appreciated and not recognized by many. Universiti Malaya has several staff housing units that are abandoned and left to decay. One of which is the former Vice Chancellor residence located within the campus. The VC residence hold possesses historical value as it was once resided by the late Royal Professor Ungku Aziz and family while also having architectural values as it was built during the beginning of the modern architecture wave in Malaya. The aim of this research is to identify 20th century staff residence of UM, to know and analyze the level of awareness the staff, students and alumni of UM and the general public towards the buildings identified and to recommend the ideal online platform to disseminate heritage modern staff and student residence info. A mixed method approach was used in this study where the primary data were sourced from UM staff residence building inventory and questionnaire survey while secondary data collection is collected from literature review. The findings of this research provide the characteristics of modern heritage buildings, the level of awareness of the public towards heritage modern buildings and the recommended online platform to disseminate its information to the public.

Keywords: Building conservation, heritage, online platform, public awareness, staff residence

DISCOVERING ANIMAL'S KINGDOM: AN APPROACH TO THE EFFECTIVENESS OF INDOOR INTERPRETATION AT THE FARM IN THE CITY

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ABSTRACT

Recreational learning is the type of learning gained through volunteering visitation to parks, forests, historic sites, or zoos. It is also inspiring visitors to self-select those opportunities to be in line with excitement and fun. However, it does not happen if interpretation is not included in the planning and managing processes, involving many techniques such as the language used, the art of influencing and reaching the visitor's hearts. Further, interpretation should enlighten the position of these people in their surroundings by increasing awareness of the vital interaction that contributed to the desirable conservation. This study aims to construct an effective interpretive plan specifically for indoor settings at Farm in The City that satisfies three interpretive objectives, which are: 1) to generate the visitor's knowledge about various animals worldwide and their nature, 2) to instil the visitor's sense of responsibility towards the various animal from across the world, and 3) to influence the visitors to treat the animals with a sense of respect. Thus, the primary data were collected using interpretive resource inventory and distributed questionnaires for visitors. At the same time, desktop study to comply in collecting secondary data. As a result, the proposed theme for this study is "Entering Nature Lane, expressing secret life of nature in a single journey", which comprises nine checkpoints with six sub-themes which are: 1) Stepping into the Kampung, 2) To the Sky and Beyond, 3) Landed on the Grassland, 4) Mingle in the Jungle, 5) Splashing into the Water and 6) Agile when the Nightfall. The significance of this study is that the flow from one checkpoint to another firmly delivered a marvellous recreational learning experience about the animal's kingdom, and it is connected through the concept of a treasure hunt. Do not forget to redeem your merchandise.

Keywords: communication, effectiveness, Farm in The City, Indoor Interpretation, Recreational Learning

INDOOR INTERPRETATION OF KL FOREST ECO PARK: REVEALING THE MEANING OF CONSERVING NATURE THROUGH VISITOR'S FIRST-HAND EXPERIENCE

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ABSTRACT

Interpretation is not simply information, but it is a significant way to communicate meaningfully about places, people, or events by creating interpretive centres or trails. The facilitation of knowledge with direct contact about nature and the relationship between the community and the site helps to improve the quality of the visitor's recreational experience and delightfully encourage a greater appreciation of the resource. Good development of interpretation guarantees awakened interest, change of attitude, and visitor's understanding and enjoyment when suitable interpretive facilities and media were selected. However, difficulty in delivering the first-hand experience, lacking attractiveness in providing interpretive media leads to dissatisfaction and misunderstanding among visitors regarding the whole idea of interpretation. Therefore, this study aims to reveal the benefits of forest resources and their ecology in developing the indoor interpretive plan for KL Forest Eco Park. The objectives of this study are: 1) to ensure visitors can identify the benefits of conserving forest resources, ii) to create a sense of love within valuable resources and iii) to encourage visitors to treat the ecology with respect and care. A conducted field study collected primary data through interpretive resource inventory form and an online survey on visitors' use and satisfaction at KL Forest Eco Park. Information from previous studies, journals, and other related sources is also collected for secondary data. As a result, there are 11 checkpoints, and six sub-themes has been produced in this proposed indoor interpretive centre which are i) Memory Lane, ii) Monkey Climd, iii) Scent of Science, iv) Geographical Intelligence, v) The Cure from Nature and vi) Living colours. The uniqueness is that each of them represented the benefits of forest resources and firmly manage to deliver a memorable interpretive experience for the visitors while realizing the importance of forest resources sustainability for future generations.

Keywords: Communication, First-hand experience, Forest Eco Park, Indoor Interpretation, Living Classroom

THE IMPORTANCE OF KILIM GEOFOREST PARK CONSERVATION

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ABSTRACT

Malaysia is very fortunate to have a valued environment and resources of geoforest park. Kilim Geoforest Park, Langkawi is one of Malaysia's geological and natural treasures that needs to be well protected and conserve with proper development planning. The destinations provide an opportunity to explore the geological history and magnificent scenery rich with both flora and fauna. However, due to tourism activities, it has resulted in various kinds of impact toward the natural ecosystem due to poor monitoring. Human activities might also bring deterioration to the forest and other habitats if the conservation value is not there. This research aims to identify on the threat factors that resulted from an eco – tourism activities and analyse in strategically the concept of conservation for protecting the valuable features of the Kilim Geoforest Park, Langkawi. The needs of the conservation efforts are crucial as UNESCO – certifies sites in Southeast Asia. Therefore, people who involved in tourism activities should be possessed with adequate knowledge and information on natural resources conservation for the preservation of the environment and forming a better future generation.

Keywords: Conservation, Kilim Geoforest Park, Local community, Mangrove

PUBLIC AWARENESS TOWARDS 20th CENTURY HERITAGE BUILDINGS IN MALAYSIA: THE CASE OF UNIVERSITY MALAYA ADMINISTRATION AND AMENITY BUILDINGS

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ABSTRACT

Universiti Malaya in Kuala Lumpur began in 1957 on a 650-acre piece of land at Pantai Valley. During that period, the colonial British government had just left Malaysia, which had led to a mix of international and local architectural firms were hired to design the buildings around the campus. Over time, the significance of these structures has increased. However, without a careful discussion and evaluation of the principles found in them, they are increasingly vulnerable to significant alteration or loss. This project aims to record and gain an understanding of the significance heritage modern buildings in UM and to create awareness by recommending the platform to disseminate the information. While it is true that the buildings in Universiti Malaya mostly are constructed after the Merdeka period, the buildings are full of characteristics and attributes that would list them as heritage based on the National Heritage Act (2005) Section 67(2) as nowadays, what is identified as heritage has evolved and grown to include a wide range of elements. The necessity for heritage identification and understanding is acknowledged, and specialists are attempting to attain this aim through a variety of methods. Through process of a gathering data and information of modern heritage buildings, an inventory for all the administration and amenity buildings in UM is created. With that, the relevant UM buildings that has potential to be a heritage in the future can be identified. Through assessing that issue, public opinion and awareness on the modern heritage buildings are also taken and surveyed for this project.

Keywords: heritage, modern buildings, public awareness

PLACEMAKING FOR AGING POPULATION: ASSESSMENT AND DESIGN CONCEPT OF SENIOR FRIENDLY OPEN SPACE PARK

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ABSTRACT

The concept of open space park is a facility that plays an important role in controlling the balance between the country's economic development and the health status of the population, especially the older adults. Life expectancy of older population in Malaysia is currently showing a rapid increase while child population showing a decrease. However, the current design of open space park does not reflect the changing for population structure. The aim of this research is to evaluate the current condition of open space park in Malaysia and proposed a relevant design concept of open space park that meet a requirement for senior friendly open space park. The objective of this research is i) to identify the specific needs of older adults in open space park, ii) to evaluate the activities of older adults in open space park and iii) to develop a framework for a senior friendly open space park. This study applied the mixed method; quantitative and qualitative approaches throughout several techniques such as questionnaire distribution, interview, observation, and article review. This study is only limited in Sungai Petani, Kedah that the most familiar green environment in Malaysia and this district had the highest population (239,067) in Kedah. According to interview with experts, it shown approximately 70 percent of current exercise's equipment is not relevant used for older adults to stay physically active.Thus, the senior-friendly open space parks should provide facilities with low impact exercise equipment that can fulfill older adults' needs. Findings, shown that there are six (6) main elements that contribute to the framework of a senior friendly open space park which are adequate facilities, shelter, safe and clean, peaceful environment, accessibility and nature element. This study was significant to the senior or elderly to ensure their well-being to engage in physical activity.

Keywords: Design Concept, Older Adults, Open Space Park, Senior Friendly

PLANNING FOR RECYCLING COMMERCIAL FOOD WASTE FACILITIES IN A NEIGHBORHOOD

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ABSTRACT

Urbanization has led to an increase in food waste, and it has been classified as a global issue since its production has a transparent impact on the environment and public health. In developing countries, Malaysia is not left behind with this global issue as it reported that 44.5% of food waste generated from the household sector and 31.4% from the industrial, commercial, and institution sector. Shah Alam is currently implementing the Zero Waste program that prioritizes sources reduction and follows by treatment and disposal with community involvement. The research aims to conduct a thorough evaluation of the key elements of planning for commercial food waste facilities at food court Section 2, Shah Alam. The analysis focuses on the planning element of food waste recycling facilities, knowledge of facilities and technology on recycling food waste and human behaviour on recycling food waste. The methodology used in this research involves four (4) methods: participant observation, questionnaire survey with the visitors, guided interview with the traders, and expert interviews with key stakeholders. The findings reveal that the key elements of planning for commercial food waste facilities are internal and external factors. Understanding recycling and bioconversion food waste, and the level of awareness of the importance of implementing this practice is an internal factor that influences the behaviour of recycling food waste through intention. While external factors such as the planning elements of food waste recycling facilities, the adequacy of information and skills of recycling food waste open up opportunities for participants. The proposal of commercial food waste recycling facilities in a neighbourhood centre emphasizes the planning, inclusiveness, educational and awareness program, design, and monitoring to increase the involvement of communities in food recycling practices.

Keywords: Community participation, food waste, health, recycle

AN ASSESSMENT OF HOUSING AFFORDABILITY INDEX SURROUNDING MRT STATION CASE STUDY: PETALING JAYA UTAMA (PJU)

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ABSTRACT

The affordability of homeownership has always been a severe problem for low- and middle-income families in Malaysia. This study aims to determine the housing affordability index in Transit-Oriented Development (TOD) among resident's apartments within 1 kilometer from MRT stations in Petaling Jaya Utama (PJU). This study's specific and reconfigured objective should be to study whether the apartments surrounding MRT stations are currently unaffordable for the average household income in the Petaling Jaya. The price-to-income ratio approach, known as the median multiple, is used in this study to determine the affordability index. The study found that the affordability index for apartments surrounding MRT station between the time before the MRT station project is carried out (2015) to upon completion (2019) has increased from 7.18 to 9.06, which clearly showed the level worsen over the years. Affordable housing cannot survive in TOD in the long run because developers manipulate prices to make more profit than solving the urban poor. The total number of 95 residents represents over 379 for the stratified sampling size. The findings show that the main factors causing this problem are; low income, high cost of living, and stagnant income over the years that is not commensurate with rising real estate prices. Besides, this paper intends to study the factors affecting housing affordability. The research results show that housing ownership's level of affordability varies with household income and its affordability. Simultaneously, the four main factors that affect housing affordability are housing prices, affordable mortgages, distance from the workplace, and government policies on affordable housing. Most respondents are still struggling with the ability to own residential units.

Keywords: affordable housing, housing affordability index, MRT station, price to income ratio, TOD

Sub-Theme 3 : Management

Building maintenance, asset, FM, POE, legal, risk, project management, property management, BIM

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
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PROJECT MANAGEMENT TOOLS ADOPTED BY CONTRACTORS IN SUCCESSFUL PROJECTS

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ABSTRACT

Tools for project management provide efficiency and effectiveness in the management and handling of projects. Many applications have been discovered and commonly used by project managers over a long period, with generous contributions to project performance. Applying the right tools in managing project can assist to eliminate potential issues and obstacles before a project is initiated. It can also help project managers accomplish realistic targets within the stipulated time, budget, and specification. Additionally, projects performed within the framework and funding improve the contactors' reputation and credibility, which usually includes repeated invitations for potential bids and projects in the future. Without a good understanding and awareness of potential gains, it can be a significant loss for the project. This study aims to identify the tools of project management adopted by contractors that lead to project success. Data for this study will be collected through questionnaires distributed to Grade 7 contractors in Klang area. The data will be analysed using inferential statistical analysis. The list of the contractor's project management tools is expected to be identified at the end of the study. Thus, the study of project management tools commonly used in this industry serves as an eye-opener for contractors and other decision-makers to adequately guide their attempts to implement project management practice effectively.

Keywords: Contractors, Project management, Successful Projects, Tools

APPLICATION OF RECREATION OPPORTUNITY SPECTRUM AND LIMIT OF ACCEPTABLE CHANGE IN CONSTRUCTING MANAGEMENT PLAN

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ABSTRACT

Ecotourism is a form of tourism that has been widely practiced throughout the world. Ecotourism encompasses nature-based experiences that increase visitor appreciation and understanding of natural and cultural values. These are experiences that are managed to ensure they are ecologically, economically and socially sustainable, contributing to the wellbeing of the natural areas and local communities where they operate. It involves natural setting and wilderness as sources in providing visitors' experience. A good management plan could enhance any ecotourism sites like Eco Parks. It is crucial to ensure the visitors' need are to be satisfied sufficiently but at the same time do not jeopardize the importance to conserve and preserve the natural resources. The same scenario occurs for Templer Forest Eco-Park and Templer Forest Reserve in the Selayang District of Selangor, chosen as the site of study. Therefore, this study aims to develop a proper management plan that satisfies both the natural environment and human being in a wilderness setting. In this study, the project is divided to three main sets namely physical, social, and managerial settings. However, each of the settings brings a different perspective of information and indicators. Thus, the management tools such as Limit of Acceptable Change and Resource Opportunity Spectrum are applied in the study. Primary data collection such as virtual interview session, survey questionnaires and on-site inventory and observation are applied in Templer Forest Eco-Park. While for secondary data collections involved literature search such as desktop study. By using the management tools, it focuses on the issues, concern, and opportunities available on this project. It is recommended that there are three alternatives of site zoning that consisting of various opportunity spectrum classes that

seem to have their own desired criteria according to standards. As a result, it is suggested to have a suitable practical management actions and evaluation.

Keywords: Concern, Issues, Limit Acceptable Change, Resource Opportunity Spectrum, Resources

ENHANCING THE EFFECTIVENESS OF TEMPLER FOREST ECO PARK AND TEMPLER FOREST RESERVE MANAGEMENT PLAN THROUGH LIMIT OF ACCEPTABLE CHANGE AND RECREATION OPPORTUNITY SPECTRUM

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ABSTRACT

Recreation management planning is not comprehensive land use planning. The process will take into account all land uses but is focused on recreation management and not on creating outcomes for other land uses. By defining and understanding the types and diversity of recreational opportunities today and in the future, land and program managers will be able to design strategies to manage recreational use consistent with the desired recreation settings and experiences. These strategies will also better harmonize recreational uses in the area with the other land uses and values of the particular study area. The purpose of this management plan is to recommend a viable and relevant indicator for the development of both Templer Forest Eco Park and Templer Forest Reserve. In collecting data collection two methods have been utilized where primary data consists of inventory data for natural and physical resources in the park, interviewing with local community and stakeholder as well as distribution of questionnaire survey. As for the secondary data collection it involved desktop study from previous researchers related with the study. The process of the management plan consists of three parts: 1) identifying issues, concerns, and opportunity, 2) identifying and describing Recreation Opportunity Spectrum and Limit Acceptable Change and 3) identifying management actions.

Three significance settings must be considered in the management plan which are resources, social and managerial. In Issues, Concerns, and Opportunity, resources are divided into physical, natural, and biophysical. The social is divided into social community, social economy and social cultural while for the managerial is divided into stakeholders, government, and private agencies. Three zones in the zoning management plan have been proposed from the indicators of Recreation Opportunity Spectrum. Later, the management actions, evaluation, selection of the preferred classes and implementation of the action plan are identified for a betterment of a management plan.

Keywords: Issues, Concerns, Opportunity, Limit of Acceptable Change, Management Plan

A STUDY ON THE WASTE MANAGEMENT SYSTEM AT CONSTRUCTION SITE

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ABSTRACT

Construction wastes come from construction activities which produce excessive concretes, plastics, timbers, tiles, and metals. Therefore waste management system at the construction site can be a crucial part of the construction process. The objectives of this research are to identify the waste management systems that are currently being implemented in the construction site and to identify the challenges that being faced by the construction wastes management team to implement an appropriate construction waste management. Next, the objective is to determine the level of contractor's awareness of regulations and legislations on the construction waste management system. To get the data, a set of questionnaire which comprised of 30 questions was distributed to 50 respondents which come from construction company grade 5, grade 6 and grade 7. All of the data collected were analyzed by using SPSS software. The results show that the amount of construction wastes at the construction site depends on the method of construction. From the study, it can be seen that most of the construction sites implement mixed construction method where they combined conventional construction method with Industrialized Building System (IBS). According to the construction method used, the highest amount of construction waste produced at the construction site is timber from formwork followed by plastic and concrete respectively. The timbers will either be recycled or sent to an open landfill for disposal. Most of the respondents acknowledge that one of the obstacles they must overcome to implement an appropriate construction waste management system is a lack of knowledge about effective waste management methods. As a final point, greater part of the respondents are aware of the regulations and legislation, as well as the authorities involved in the waste management system at the construction site. In conclusion, despite a variety of obstacles, most firms from grade 5 to grade 7 have an effective waste management system in place.

Keywords: construction waste management, challenges, regulations and legislations

COMMUNICATION AMONG STAKEHOLDERS IN INDUSTRIALIZED BUILDING SYSTEM (IBS) CONSTRUCTION PROJECT

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ABSTRACT

Communication in Industrialised Building System (IBS) is challenging due to involvement of stakeholders with different professions such as client, contractor, consultants, manufacturers and installers. Stakeholders are personnel and organizations who will influence the success of a construction project due to various demands, experiences and backgrounds. One of the success criteria of a construction project is effective communication among the stakeholders. However, previous study has proved that communication issues among stakeholder is one of the major obstacles and had contributed to the imperfection in construction project. This research aim to propose suitable improvement in managing communication process for IBS construction project. The research objectives are to identify the issues in communication for IBS construction project, to determine the effects of poor communication and to recommend the improvement for communication practices among stakeholders in IBS construction project. The data was collected using questionnaire and google form distributed to the stakeholders of IBS construction project. This research identified 10 issues and effects of poor communication and recommendation in improving the communication among stakeholders in IBS construction project.

Keywords: communication, construction project, Industrialised Building System.

ABANDONED HERITAGE SITES AT BUKIT JUGRA, KUALA LANGAT, SELANGOR

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ABSTRACT

Bukit Jugra is a historical town in Kuala Langat, Selangor known with its stately buildings, bridges and roads. Back in 1800, Jugra was the royal capital of Selangor. Its well-preserved buildings are good example of the artistry and grandeur of its glory pasts. Nevertheless, there are numbers of abandoned heritage buildings and monuments that can be found today in Bukit Jugra. This study aims to clarify the role of Local Authority in managing the heritage sites including the abandoned heritage buildings and monuments, by identifying current conservation management of heritage sites, analysing issues and factors of abandoned heritage sites, and finding solutions to the issues of abandoned heritage sites in Bukit Jugra. Site observation on selected abandoned heritage buildings and monuments, and interviews were carried out with representatives from Kuala Langat District and Land Office, Kuala Langat Municipal Council, Perbadanan Adat Melayu dan Warisan Negeri Selangor (PADAT) and National Heritage Department (JWN). Kuala Langat Old District and Land Office, Ammunition Dump, Long Puteri Palace and Sultan Abdul Samad Palace were taken as samplings. Findings showed that issues of abandoned heritage sites in Bukit Jugra are mostly caused by insufficient funding, accessibility, land ownership and the changing status of royal capital from Jugra to Klang in Selangor. The study suggested that government may cooperate with other private and NGO agencies for funding, awareness heritage sites' owners should be enhanced, and more effective measures should be taken to prevent these issues.

Keywords: abandoned heritage buildings, abandoned heritage monuments, Bukit Jugra, local authority, management of heritage sites

THE IMPLEMENTATION OF RISK MANAGEMENT WITHIN FACILITIES MANAGEMENT IN SELECTED ORGANISATIONS

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ABSTRACT

Risk management is an organisational method that focuses on improving management procedures by studying situations that have never occurred in the company before. For several years, risk management has been limited to a reductionist approach, which has resulted in poor outcomes and, it makes a reduction in efficiency of the project management. Therefore, this research is aimed enhance risk management implementation within facilities management. In order to achieve this aim, three research objectives have been derived. Firstly, to identify risk within facilities management. Secondly, to assess risk management implementation within facilities management in selected organisations and finally, to recommend the risk management implementation within facilities management in the selected organisations. Literature review and semi-structured interview are applied to achieve the aim and objectives of this study. The study might be significant to encourage the building manager, assistant building manager and facilities manager to implement and manage the risks within facilities management. The results of this study revealed that risk management is implemented within facilities management in all the selected organisations but at different extent. The most common risk found within facilities management is safety risk among the workers. Thus, insurance policy is suggested to enabled them to hire and retain high-quality employees.

Keywords: facilities management, organisation, risk management.

MANAGING CONGESTED CONSTRUCTION SITE AT THE URBAN AREA

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ABSTRACT

Construction always contributes to a large number of trade activities on a simple construction site. These activities also had connection interdependently in order to get suitable construction space for the working space area. Based the following reasons, the contractor needs to make an evaluation when entering a site that is situated at an urban area because usually urban areas are pulse of the economy which involved many parties. This will make construction projects become complex and tricky. Hence, the aim of this study is to identify contractors' practices when managing their projects in congested construction area. This study has three objectives which include to identify the requirements before beginning a project at congested site; investigating the problems that contractors have to go through in managing congested sites; to justify the contractors' practices in managing congested construction sites that are located at urban areas. In order to gather data related to this research, qualitative analysis by conducting interview sessions were done which involved six (6) professional experts in construction projects as respondents. The data collected from the respondents were analyzed through transcribing the online audio interviews and then discussing the key points. The research findings suggested some practices that could be useful to contractors to review before conducting their projects at congested construction site areas.

Keywords: Congested, construction space, contractor, managing, urban

THE REHABILIHATED ABANDONED HOUSING PROJECT

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ABSTRACT

The quality of the rehabilitated abandoned housing project became an issue. The impact from the quality and security arise should not be underestimated. The issue had arisen because the developers failed to comply with the quality of development standard requirement that set by the government. The aim of the study is to find out about ways to impro the quality of the rehabilitated abandoned housing project. The objectives of this research are to identify causes and impacts of abandoned housing project, also to identify the strategies ways to minimize the problem occur during rehabilitation of abandoned housing project process. A total of 100 questionnaires were distributes to the developers in shah alam, selangor through various platform. From the distribution, the total responses received are 53 responses.

The data is displayed in chart and table for data interpretation and discussion. Majority of the respondents are people who worked less than 5 years and 11 years to 15 years in construction industry. The most popular causes of the abandoned housing project are financial crisis, administration corruption and improper financial planning. For impacts, effecting the buyer's economy complex process and give bad image to the country are the highest. Lastly, strategies ways to minimize the problem occur during rehabilitation process are the role of financial institutions in supporting build-then-sell implementation, create baseline management plans and role of local authorities and government to identify suitable parties for the rehabilitation.

Keywords: Abandoned Housing, Rehabilitation, Quality

THE IMPACT OF COST OVERRUN IN RESIDENTIAL BUILDING PROJECTS IN MALAYSIA

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ABSTRACT

Malaysia's residential construction sector has been affected by project failures due to cost overruns. Even though a lot of previous research has focused on this subject matter, there is still more work to be done to identify the cost overrun elements that can lead to project abandonment. As a result, the purpose of this research is to establish the impact of cost overruns in residential buildings in Klang Valley. The objectives of this research are to study the current situation of cost overrun, identifying the factors, and scrutinizing the possible ways to overcome cost overrun in residential buildings in Klang Valley. The data were analysed by using Likert scale to obtain Relative Importance Index (RII). The shortage of material is the most essential need to be highlighted among the eight overriding criteria found in studies and Eight strategies are available to overcome each factor of cost overrun in the residential construction projects such as effective strategic planning, effective site management, put a proper emphasis on contractors, allowing for material price escalation and timely supply of materials. As a result, the findings of this study contribute to the body of knowledge and provide appropriate insights for managing residential projects in a way that reduces cost overruns.

Keywords: construction, cost overrun, residential buildings

PERCEPTION PERFORMANCE ON DEEP CLEAN JANITORIAL SERVICE FOR OFFICE FACILITIES IN KLANG VALLEY

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ABSTRACT

An office deep cleaning is more thorough and time-consuming than the normal janitorial services which are usually rarely included in daily cleaning because it is more detailed and demanding. Performance of the deep cleaning in office will be affected by the importance of features of deep cleaning services. This study aims to establish characteristics of deep clean performance in office buildings. Office buildings in Klang Valley have been selected as the case studies. This study adopted a quantitative method approach. The method used was a literature review on the features of deep cleaning services in the office. Hundred (100) online questionnaire forms were distributed randomly to the facility managers or relevant professionals of the selected case studies in Klang Valley. Fifty-one (51) responses were collected and found to be useful and qualified. All the quantitative data were then analyzed by using SPSS to evaluate the perceived performance of features of deep cleaning services in the office. The results and findings also highlighted the significant positive relationship between the importance of features of deep cleaning services and its performance in the office buildings. A depth analysis on the performance of the deep cleaning service with larger sample size and number of complaints, number of work-related incidents and indoor air quality level also recommended for further study.

Keywords: Deep Clean, Facility Manager, Office, Perceived Performance, Servqual Dimension

ENHANCING THE MAINTENANCE PRACTICE TO IMPROVE GUESTS' SATISFACTION OF HOTELS

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ABSTRACT

Hotels are important contributor to the tourism sector which has significant impact in developing the country's economy. Maintenance aspect should be taken into consideration to ensure the guests' satisfaction at optimum level. Lack of maintenance could result in complaints from guests which could affect overall satisfaction and reputation of the hotel. In fact, there are many factors which influence the maintenance practice that will be discussed in this paper. The aim of this research is to focus on proposing effective maintenance practices for hotels to improve the satisfaction level of guests. The main objectives of this research are as follows: (1) to identify the factors that affects the maintenance practice of hotels in Malaysia; (2) to examine the relationship between the hotel maintenance factors and satisfaction level of guests; (3) to propose measures that improves maintenance practice in hotel buildings.

The research follows a mixed method approach to data collection and analysis. Findings from literature review have resulted in identifying 8 factors. Semi-structured interview is conducted for 3 case studies to understand hotel maintenance in depth. For quantitative data, a total of 33 responses were collected from hotels ranging from three-star to five-star in Klang Valley and Ipoh. The data is analysed using SPSS to obtain results regarding correlation between maintenance factors and satisfaction level of guests. Priority ranking of the maintenance factors and overall satisfaction of guests are also analysed. The findings revealed that correlation exists for factors namely, "health and safety", "guest expectation" and "Covid-19 pandemic". Analysis of data from interview and literature review helped to draw effective conclusion and suggestions to improve maintenance strategy of hotels.

Keywords: Hospitality operations, hotel maintenance, maintenance management, maintenance practice

THE IMPACT OF FACILITIES MANAGEMENT TOWARDS CUSTOMER SATISFACTION OF SHOPPING CENTRE

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ABSTRACT

A shopping centre (SC) is a single property composed of multiple retail stores. In Malaysia, the number of shopping centres is increasing rapidly and the competition among shopping centres are getting fiercer to attract and maintain customers. In order to stand out in various shopping centres, management should realise the importance of facilities management to attract customers and improve satisfactions. However, the facilities management of the shopping centre gained comparatively less coverage than could have been due to the fact that the facility management services were originally not well understood within the shopping centre sector. Issues such as insufficient parking spaces and maintenance problem could severely influence the customer and provide negative shopping experience to the customers. Therefore, this study is intended to provide a comprehensive interpretation on the impact of facilities management towards the customer satisfaction of shopping centre. In order to achieve the research objectives, questionnaire surveys were distributed to the visitors of the shopping centres in Selangor area. The questionnaire was distributed via Internet to the respondents and they were asked to answer the questionnaire based on their last visit to a shopping centre in Selangor. 100 questionnaires were distributed randomly and 55 responses were received eventually. The questions were designed to enhance better understanding on the operation of facilities management and the customer satisfaction level towards the provision of facilities management in the shopping centres. Literature review has provided clear understanding on background of facilities management and shopping centre in Malaysia. Based on the literature review, facilities management services were identified and respondents were asked to rate their satisfaction with the services provided by the shopping centre. The majority of respondents were satisfied with most of the facilities management

services in shopping centres. Besides that, respondents to the questionnaire made other suggestions for improvement.

Keywords: Customer Satisfaction, Facilities Management, FM services, Shopping centres

CONSTRUCTION PROJECT PERFORMANCE DURING COVID-19 IN KLANG VALLEY

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ABSTRACT

In 2020, the biggest challenge faced by the world is the pandemic of COVID-19. COVID-19 is a type of infectious disease that will transmit easily through saliva droplet. In Malaysia, the government had announced different stage of Movement Control Order to prevent the increase of cases and they also implement series of Standard Operation procedure (SOP). The COVID-19 have affected all the industry including construction industry. In this research, it will investigate the impact of COVID-19 on construction project performance and also the factors that affecting the construction project performance during COVID-19. Apart from this, measure that can help to improve construction project performance also will be discussed. The data will be collected through questionnaire survey. The targeted respondents are project management team for on-going residential construction project within Klang Valley. Last, in the finding it has found out that time performance for residential construction project during COVID-19 was affected the most among the construction project performance and factors that affecting the construction project performance were determined. Besides that, most of the respondents agreed that clear gool and objective can help to improve project performance. In conclusion, the research has collected data to achieve all the objectives and recommendation has been discussed to improve related research and project performance.

Keywords: Construction Project Performance, Covid-19, Movement Control Order (MCO), Residential Project

A STUDY ON THE OUTSOURCED FACILITIES MANAGEMENT (FM) CLEANING SERVICES IN RESPONSE TO COVID-19 PANDEMIC

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ABSTRACT

Outsourcing in Facilities Management (FM) is assigning total management and decision-making responsibility over an operation to someone outside of the organization. The outsourced FM cleaning services includes residential cleaning, commercial cleaning, and industrial cleaning. Due to the outbreak of Covid-19 pandemic, the government implements Movement Control Order (MCO) that may affect many organizations including shopping malls due to the new Standard Operating Procedure (SOP) and their service delivery. Due to this, the outsourced FM cleaning services in the shopping mall are facing issues in their delivery and at the same time handling new operation during the Covid-19 pandemic. Therefore, a study on the outsourced FM cleaning services in response to Covid-19 pandemic at shopping malls was carried out. This research aims to improve the FM practice by identifying the special practices of outsourcing cleaning services in the shopping mall to solve the issues and challenges during the Covid-19 pandemic. The data was collected through literature review, case studies and semi-structed interviews. From the finding, the normal job scopes of outsourced FM cleaning services are carpet cleaning, daily cleaning, dry cleaning, washroom facilities, window cleaning, escalator and moving walkways, etc. Moreover, the crisis adaptation of outsourced FM cleaning services are addition of new equipment and tools, additional disinfecting job scope, deep sanitization and other. Findings also show that the issues and challenges are interrupted work schedule and acquiring new contract terms SOP, equipment and tools in their practice. The recommended strategies involved creation of new contractual term, discussion and collaboration, adjustment negotiation, recorded in detail, documentation of work, and others. This study is anticipated to provide fresh insight into the outsourcing of FM

during the pandemic period. It is also hoped to help the interested and/or relevant parties to issue initial assumptions and adapt the preliminary challenge to be revealed.

Keywords: facilities management, outsourced FM cleaning services, recommended strategies, shopping mall

LEVEL OF SATISFACTION OF BUILDING OCCUPANTS TOWARDS MAINTENANCE MANAGEMENT CASE STUDY: MYTOWN SHOPPING CENTER, KUALA LUMPUR

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ABSTRACT

This study represents the analysis and findings on level of satisfaction of building occupants towards maintenance management. Chosen case study is MyTown Shopping Center, Cheras, Kuala Lumpur as this is one of the power centers in Malaysia, hence, thorough research regarding the maintenance management is needed. Maintenance management in shopping center is one of the most crucial things to do as it receives many visitors and serve huge number of building occupants such as tenant, and worker. This research highlights the types of shopping center available in Malaysia and it also highlights the satisfaction of building occupants towards maintenance management in there. Maintenance management said to be very crucial in shopping center, hence, this research are proposed to investigate whether it is proven in practice or not. Data from this research were obtained from a sample questionnaire of 80 respondents. Results showed a total number of six (6) key determines of maintenance component which are fire prevention equipment, escalators and elevators, air-conditioning systems, lighting condition, general cleaning and plumbing and sewerage. However, in this research, it was proven that plumbing and sewerage facilities in this shopping center is adequate and satisfying the building occupants, further research regarding the maintenance on these

facilities can be void. This paper provides insights to developer, maintenance and management team, property management firm, and building occupants.

Keywords: building, maintenance management, satisfaction, shopping center

THE CHALLENGES OF SOLID WASTE MANAGEMENT IN RESIDENTIAL AREA AT SELANGOR

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ABSTRACT

Due to population expansion, industrialization, and a rise in the quantity and variety of waste created, municipal waste management (MWM) in Malaysia has become a challenging task in recent years. Malaysia's municipal solid waste (MSW) generation surpassing 33.8 thousand tonnes in 2019, a long-term waste management system is desperately needed. Suitable disposal sites are becoming limited, and the majority of those that do exist are nearing the end of their useful lives. Recycling programs have been implemented by various stakeholders including the government sector and private sector to limit waste generation and prevent it from being disposed of in landfills however little has been achieved. Recycling awareness among households is critical even household consumption is most of the solid waste came from. Despite the government's efforts to sufficiently educate households with knowledge and know-how to handle solid household waste through various environmental preservation initiatives, household recycling expertise remains inadequate. This research aims to identify the challenges of solid waste management from residential areas and to determine the ways to minimize the increment of solid waste in landfills. The study employs a quantitative research approach in which 52 questionnaires are collected of data among the local authority and organization involved in managing waste at Selangor. The finding shows that the challenges face by the local authority in managing solid waste was the limited landfill area due to available land and also due to the land cost. Other than that, the low enforcements towards community and poor community knowledge about recycling programs are the increment of waste from the residential area. Moreover, The collected data were then contributed to concluding the ways to minimize the solid waste from the residential area make recycling program

compulsory and be fined for those not complying with it. Next, add as many recycling bins as possible to public places, encourage the kids starting from the kinder garden, form a recycling club at every residential area and spread the news and information about recycling through the internet.

Keywords: solid waste, municipal waste management, residential

THE IMPLEMENTATION OF SMART HOME AUTOMATION SYSTEM TO ENHANCE THE QUALITY OF LIFE IN MALAYSIA

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ABSTRACT

In the last few years, the concept of a smart home has been highly evolved to transform the living conditions by adding additional facilities and improving functionality. Life becomes easier, relaxed, and simpler with the use of advanced technologies to transform ordinary homes into smart homes. This research aims to explore the implementation of smart home automation system to enhance the quality of life in Malaysia. The objectives were to study the level of implementation of smart home applications and features used in home automation systems in Malaysia, to evaluate the effectiveness of home automation systems in enhancing the quality of life and to identify the challenges faced among residents and homeowners in implementing the smart home automation system in Malaysia. A quantitative research method was used. A questionnaire of 35 questions was distributed among smart home resident, homeowner, developer, designer, and maintenance technician. The total of 53 respondents were achieved. The findings were analyzed using the (Statistical Package for Social Science) SPSS. The result concludes that the level of implementation smart home applications and features used in home automation systems in Malaysia is at high level. Moreover, Home automation systems is very effective in enhancing the quality of life. Besides that, the three main challenges faced among residents and homeowners in implementing are financial, acceptability and usability, and technological challenges.

Keywords: home automation system, quality of life, smart home.

BUILDING CONDITION ASSESSMENT AND PREVENTIVE MAINTENANCE OF THE OLD SHOPHOUSES IN RAUB, PAHANG

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ABSTRACT

The survival of any building is underpinned by regular maintenance. On the other hand, regular maintenance is
critical to any building, whether it's heritage or non-heritage. There is crucial need to manage and ensuring the best maintenance of old shophouses. Therefore, maintenance has been identified as a key intervention in protecting old shophouses structure by prolonging a building lifespan. If there is no systematic and correct maintenance method, the old shophouses will deteriorate and will not be able to function as well. This study aims to identify the building maintenance and problems faced by old shophouses and to analyse the current preventive action on maintaining the old shophouses located in Raub, Pahang. Qualitative approach has been used in this research together with the survey methodology for data gathering. In addition, data collection was obtained by observation and through interviews with tenants of old shophouses. The study has found that the way to reduce defects of old shophouses and the impact of preventive maintenance are crucial. The results were examined by Building Condition Assessment (BCA) and it has provided a basis for the best maintenance plan for the old shophouses. Consequently, this study proposes an approach to ensure high-quality of maintenance with regards to old shophouses conservation in Raub, Pahang.

Keywords: Building Condition Assessment (BCA), Building Conservation, Old Shophouses, Preventive Maintenance, Raub

MAINTENANCE MANAGEMENT PRACTICES OF LOW-COST STRATA HOUSING IN KLANG VALLEY TOWARD RESIDENT'S QUALITY LIFE

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ABSTRACT

The purpose of this research is to develop framework in enhancing the maintenance management practice of low-cost strata housing in Klang Valley, as well as to enhance a quality of life for resident. This research consists of 3 objectives which is (i).to identify the current practices of maintenance management structure of local authority in Klang Valley for Low-Cost Strata Housing, (ii). to analyse the satisfaction level of current maintenance management practices in Low-Cost Strata Housing based on resident's perception, and (iii). to develop framework for maintenance management practices based on Critical Success Factor (CSF) to achieve sustainable Low-Cost Strata Housing. To obtain the overall conclusion by the objective, the data was analysed using the content analysis approach, SPPS version 28, and comparative analysis. Based on the findings, a conceptual framework for maintenance management based on Critical Success Factors has been developed in order to achieve sustainable Low-Cost Strata Housing while considering the findings obtained from the local authority regarding current maintenance management practises, specifically, the appointment of three CIDB-registered certified contractors in the civil, mechanical, and electrical domains. The Most residents in Klang Valley's low-cost strata housing showed a moderate level of satisfaction with current maintenance management practices. The current state of this case study building is mentioned, which corresponds to the feedback received from residents via questionnaire. In this scenario, improved building maintenance management practises may enhance building performance overall.

Keywords: Critical Success Factor, Low-Cost Housing, Maintenance, Management, Quality of Life

Sub-Theme 4 : Building and Construction

Design, structure, material, construction, engineering technology, risk, BIM

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2	P402	UiTM Shah Alam	**An Exploratory Study for Procurement Strategy in Bio-Safety Laboratory at National Institute of Health, Setia Alam, Selangor** Muhammad Ihsan bin Sahrom, Dr Faridah Muhamad Halil
3	P403	UiTM Shah Alam	**Issues And Best Management Practice In Defects Liability Period (Dlp) From Contractors' Perspective In Selangor** Siti Aminah Ayob and Zainab Mohmad Zainordin

4	P404	UiTM Shah Alam	**The Application Of Building Information Modelling (Bim) In Sarawak Industrialized Building System (Ibs)** Robeccacia William ,Wan Zuriea Wan Ismail
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19	P419	UiTM Sarawak	**Construction Stakeholders' Awareness Towards The Application Of Virtual Reality For Safety Training** Muhammad Hanif Azhan Bin Zainal Abiddin and Sr. Dr. Hjh. Noraziah Bt Hj. Wahi

THE CHALLENGES IN THE DEVELOPMENT OF MODULAR HOUSES IN MALAYSIA

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ABSTRACT

As Malaysia moves forward in terms of population preference and changes in quality of life, the housing demand is also changing over time. In order to improve efficiency and productivity in construction, innovative construction approaches such as Industrialised Building System (IBS) and modular construction were introduced. In modular housing, modules are constructed off-site in a controlled environment and delivered to site for installation or assembly. Modular construction could be better than the conventional method in terms of cost, quality, time, productivity and reduction in wastage; but problems include lack of manufacturers and modular system knowledge or expertise in Malaysia. This research aims to study the challenges faced by construction players in the development of modular houses in Malaysia. The objectives of this research are to evaluate the current status of modular houses, to determine the challenges faced by construction players and to assess the recommendations suggested by the construction players in addressing the challenges. As the population of respondents likely to develop modular houses is fairly small, the methodology chosen for this research is the qualitative method; where data is collected through structured interviews and analysed using the thematic analysis approach. The result shows that the development of modular houses in Malaysia is still in its early stages and growing while the acceptance among the public and the developers are still low due to lack of exposure and awareness about modular houses. There are several common challenges such as transportation, public perception, material, location of the site, cost, lack of installation knowledge and skilled labour and lastly, government regulations. The construction players suggested several solutions that could help address the problems such as government intervention, training programmes, publicity and exposure to the public, improved transportation and material organisation, as well as proper planning.

Keywords: Challenges, Modular Houses, Malaysia

AN EXPLORATORY STUDY FOR PROCUREMENT STRATEGY IN BIO-SAFETY LABORATORY AT NATIONAL INSTITUTE OF HEALTH, SETIA ALAM, SELANGOR

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ABSTRACT

Malaysia is known for its rapid developments; as we already know, the corona outbreak affects the whole world and Malaysia in particular. Thus, the absence of a reliable laboratory for Malaysian researcher to conduct researches and produce vaccine are limited. This has caused our country to depend on other countries for vaccination from the pandemic solely. Therefore the construction of Bio-Safety Level-3 Laboratory is imminent to help Malaysia cope with the outbreak. Choosing the appropriate procurement system practice in the Bio-safety Laboratory is crucial due the project involves specialist work. In Malaysia Bio-Safety projects, the contractors are still encountered difficulties in handling the fundamental process and function of procurements causes that affect project performance. The problems that occur in the procurement system are lack of understanding of the procurement method in which inadvertently inhibit the decision-making process such as frequent order changes, escalation of material prices, insufficient or discrepancies of contract documents, lack of skill, expertise and experienced workers, and cash flows and financial problems. Therefore, from the issue stipulated, the research aims to cultivate awareness towards the proper type of procurement suitable for constructing a BSL-3 laboratory. The qualitative method was employed to examine this problem through online interviews due to the restrictions resulting from the lockdown towards the contractor who has experience constructing a Bio-Safety Laboratory project in the National Institute of Health (NIH), Setia Alam. The research results were analysed by using a computer aided qualitative data analysis (CAQDAS), which is Nvivo. The result shows that the most suitable

procurement system for Bio Safety Laboratory building is a Design and Build procurement system. The respondents also agree that even though some drawbacks to the design and build procurement method, they decided that design and build are the most suitable due to the nature of the procurement and construction requiring specialist work.

Keywords: Design and Build, Procurement, Qualitative Method

ISSUES AND BEST MANAGEMENT PRACTICE IN DEFECTS LIABILITY PERIOD (DLP) FROM CONTRACTORS' PERSPECTIVE IN SELANGOR

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ABSTRACT

Malaysia is among one of the development countries that growing rapidly in all sectors which include the sector in construction. Nevertheless, some of the new buildings or infrastructures are poorly constructed. One of the components that need attention is the defects in such buildings or infrastructures. The aim of this study is to study on the practice of defects liability period and the objectives of this study are to identify the main issues encountered during the defect liability period and to identify the best management practice of defects liability period. A quantitative research was conducted by distributing questionnaire survey to those who are working in any areas in the construction industries. The results are analyzed by Average Relative Index (ARI) value and their rank. According to the study, the main issues encountered in defects are poor workmanship, work executed are not in proper manner, poor material usage and not according to specification, lack of supervision, surrounding temperature and environment, limited time, manpower allocation and not follow the method statement given. The best management practice of defects liability period is improving soft skills, improving the management of maintenance defects, proper communication among parties involved, proper construction contract management and proper design. It can be inferred that the respondents are equally pleased with the overall DLP practice in Selangor construction industry. Apart of that, these factors also as a guideline to ensure that the building, M&E or the infrastructure have an impressive consistency in results depending on the construction itself.

Keywords: best management practice, construction industry, defects liability period.

THE APPLICATION OF BUILDING INFORMATION MODELLING (BIM) IN SARAWAK INDUSTRIALIZED BUILDING SYSTEM (IBS)

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ABSTRACT

Industrialized Building System (IBS) is a construction system that is progressively well acknowledged by the construction industry players. Many benefits of the IBS system that have been discovered through studies that have been conducted. Consistent with the latest technological advancements, the Building Information Modeling (BIM) application is expected to offer more benefits to IBS system. However, the extent of its application is remain unexplored, especially in Sarawak. Therefore, this study is undertaken to investigate the application of BIM in IBS industry specifically in Sarawak. To achieve the objective of the study, qualitative approach was adopted by interviewing those involved in IBS industry in Sarawak. Through semi structured interview and content analysis, researchers discover that the use of BIM in IBS is still lacking. The industry players themselves are unaware the existence of BIM and the lack of knowledge on BIM bring more barrier in its application. Hence, the authorities need to conduct programs to promote the BIM potential application and disseminate the knowledge among the industry players.

Keywords: BIM, BIM application, IBS, Sarawak IBS

THE CAUSES AND TYPES OF CONSTRUCTION ACCIDENTS AMONG WORKERS IN MALAYSIA

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ABSTRACT

The purpose of this research is to identify and understand the causes and types of construction accidents among workers in Malaysia and the purpose of this study is to provide a general safety perspective at construction sites. The specific objective of this study is to determine the causes of accidents at construction sites and identify current and possible safety hazards in the construction industry. Second, to analyse the safety measures used at construction sites in relation to existing safety regulations, design standards and codes of practice, and their impact on worker safety. Third, to recommend safety measures in construction projects. The use of the methodology is data collection and data analysis and report writing. Finally, an important result of the research was to identify the types of accidents that often occur to workers at construction sites and an important recommendation is construction site safety among workers with safety recommendations during the Covid-19 pandemic.

Keywords: construction, project management, risk

DEVELOPMENT OF WALL PANELS USING RECYCLED PAPER AND COTTON POLYESTER FIBRES FOR ACOUSTIC AND THERMAL PERFORMANCE

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ABSTRACT

Noise pollution is one of the environmental problems that cannot be eliminated due to long-term exposure to an excessive amount of noise that can cause physical and psychological effects. In building application, acoustic panel made of fiberglass or mineral wool materials are non-recyclable and pose health risks to occupants in the building. Acoustic and thermal insulation made from recycled materials becomes a good alternative due to its outstanding acoustic properties and low production costs, which reduce environmental impact and the usage of raw materials. Therefore, an alternative of the combination from two recycled materials; paper and cotton polyester fibers are selected for this research. The purpose of the study is to identify the optimum proportion of recycled paper and cotton polyester fibers used in acoustic panels, to measure the acoustic and thermal properties, and to compare the properties with the standard and existing acoustic panels in the market. The wall panels made of 70% - 90% recycled paper with 10% - 30% cotton polyester fibers and mixing with natural tapioca binder composed of 100 g tapioca flour and 1000 mL water. Three proportions samples are produced, and properties tested. Sound absorption coefficient (SAC) based on ISO 10534-2 and ASTM E 1050-10 standards, were determined using an Impedance Tube with two fixed microphones. Meanwhile, the thermal conductivity value using Thermal Conductivity Apparatus in accordance with ISO 8302:1991 and ASTM C177 standards. The expected outcome of this study is to ensure an improvement in acoustic and thermal performance of acoustic panels produced from recycled materials. An effective alternative from conventional acoustic panels, not only for reducing noise but also for low manufacturing costs and low environmental impact to obtain a competitive solution in the market.

Keywords:cotton polyester fibers, recycled paper, Sound absorption coefficient, tapioca binder, thermal conductivity

RISK MANAGEMENT TO AVOID TIME AND COST OVERRUN IN CONSTRUCTION INDUSTRY AMONG GRADE 5 TO GRADE 7 CONTRACTORS.

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ABSTRACT

The construction sector is one of the first industries that made a major contribution to the development of Malaysian economy. However, time and cost overruns in construction is common problems facing the construction industry in Malaysia today. Risk management is one of the ways on how a contractor reacts to any problem that arises. However, the implementation is still low due to lack of awareness and reluctant due to perceived cost constraints. Taking those issues into consideration, the objective of this research is to find out the factors that make the contractor lacking in risk management, determining the risks that related to time and cost overruns toward the contractor, and investigate how the contractor practices risk management to ensure them avoiding time and cost overruns. This research utilizes the quantitative method in which a set of the questionnaire had been distributed via google form to potential respondents in Selangor and Kuala Lumpur. A total of 60 responses were gathered. Findings showed that the explanation behind the importance of risk management lies onto the respondents view and experience based on their working environment. Poor corporate management and misunderstanding in risk management are some of the factors that stands out. The project manager of company must take an initiative for ensuring the procedure of works are acceptable before executing the construction project. By implementing risk management methods in a construction company, it may increase the likelihood of success by reducing and minimizing negative risks, allowing projects to be completed on schedule. A good management plan also helps to reduce the risk that arises at workplace. .

Keywords: cost overrun, risk, risk management, time.

A STUDY ON THE CHALLENGES IN IMPLEMENTING INDUSTRIALIZED BUILDING SYSTEM (IBS) FOR CONSTRUCTION PROJECT IN MALAYSIA

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ABSTRACT

Industrialised Building System is a modern system that adopts the new mechanization and the use of prefabricated components. Malaysia is currently using this new system in its project. However, the construction industry has an unsolved problem in terms of the number of applications of IBS in their projects. The company still relies on the traditional method of construction. This traditional method has already been proven by many researchers for many problems such as delays, costs and wastage. Based on previous research, IBS provide an advantage in terms of quality, productivity, cost and time. Although there are many efforts to improve the implementation of IBS in projects, several problems occur that affect all parties involved in construction, especially in terms of payment, cash flow, and skilled labor. The aim of this research is to identify the challenges of IBS and to propose solutions to the problems encountered. A portal survey with questionnaires was conducted among 100 respondents in Selangor. Only 50 respondents answered the question. The questionnaire consists of three sections. Background of the respondents, obstacles of IBS and proposed solutions of the respondents. The respondents' data were analyzed using Likert scale and mean scores. The respondents are from contractors, engineers, manufacturers and developers. Majority of the respondents in this study are from the construction company. The biggest problem in this study is the cost and the fear of the construction companies to risk this problem in implementing IBS in their project. There are many solutions in this study that can be taken by authorities and companies.

Keywords: Industrialised Building system (IBS), IBS challenges, solution problems

CHALLENGES OF SUSTAINABLE CONSTRUCTION PRACTICES IN MALAYSIA

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ABSTRACT

The topic of sustainability already received attention among construction industries in Malaysia, however the implementation of it still below the expected level put by government for all constructions building. In fact, in Malaysia, the number of green buildings is considerably lower than the government`s efforts to provide all necessary training and programmes. After all, the reasons of why construction industry ignore this topic is because of the financial problems and labor shortage in construction. The goal of this study is to identify many challenges that the construction industry faces when it comes to implementing sustainable construction and to devise solutions to encourage them to implement in a more efficient manner. A questionnaire survey was sent out to construction industry participants in Malaysia, particularly in Selangor. About 65 construction participants respond to the questionnaire survey indicate that 83.75% responses rate for this survey. The respondents` data were examined using statistical analysis which indicates the frequencies and percentage and with the support of table, chart figure and graphs figure. From the individual background info, all respondents come from various status company grade and positions in the company. Everyone has participated in CIDB training and a sustainable building project at least once during their working period. The most popular responses on why sustainable construction still not receive much attention in construction industry were because it bears cost which too high and our construction industry lack of specialist in this area. Hence, the barriers of attending special training were cost of the course, no superior support and lack of awareness.

Keywords: Financial Issues, Green Building, Labor Shortage, Sustainable Construction

THE PERSPECTIVE OF TIMBER APPLICATION ON LOW RISE RESIDENTIAL BUILDINGS

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ABSTRACT

The construction industry in Malaysia is facing a reduction in timber usage despite the demand for sustainable construction, especially in housing development. Since timber is known as the oldest building material used from historical times, timber is said not to be relevant anymore for future construction. New materials in the industry have made timber become unfavorable choice of material especially for the young generation. The benefits of timber have been buried long ago despite many measures taken by construction players to enhance timber as viable construction material. The root causes of these scenarios are explored. The research objectives for this study are to investigate the factors influencing timber material implementation and to identify the strategies to improve timber implementation. An online questionnaire survey has been mapped and distributed to 200 contractors in Selangor. A total of 110 contractors responds to the survey. The questionnaire has inquired on respondents' demographic, opinions and perception on initiatives and strategies listed out. The data of analysis were analyzed using the Relative Importance Index (RII Formula). The respondents are both male representing (36.4%) and female representing (63.6%), age ranging from 25 to 54 years old above, have engaged with timber in the past and present, and have worked for 1 year to more than 7 years. The first factor ranking influencing the timber material implementation for low rise residential buildings is the expensive maintenance cost, following by the high knowledge required on technical skill and specific skill which required when handling timber. The strategy and initiative which is most chosen by the respondent are by the government on increasing more research and Development (R&D) to be explored and exposure from designers on the advantages of timber to clients.

Keywords: contractor, perspective, residential, timber.

EFFECT OF PIGMENT AND ADDITIVES IN LIMEWASH

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ABSTRACT

Many governments have made enormous effort to preserve historical buildings because historical buildings are extremely valuable nowadays due to so few of the historical building have survived to this day. A true idea of preservation according to (Siti Norlizaiha Harun, 2011), is "keeping the authenticity of the structure by keeping the basic basis and historical existence of the heritage structure". The building preservation for the historical building can be done in many ways and method. But in this research, will be focusing more on the paint or coloured use on the historical building. Historical building is known to use limewash as a material for paint. So, using limewash as the main material for paint in building conservation is advise as it have been proven that limewash is compatible with the historic building structure and using other modern material might not be compatible with the wall of the historical building.

The objective of the research is to create and mix new colour for limewash with the exact measurement as limewash colour selection is quite limited. As has been stated by (Bennet, B., 1997) limewash have only white colour due to the nature of the limewash, and it is difficult to make limewash in a certain colour since once applied, limewash produces a lighter colour. Furthermore, if a second supply is necessary for the same project, it is very difficult to recreate the same colour. The three (3) main objective of the research is to Identify the colour, produce by adding different percentage of pigment during the mixing process, to identify the different additives that can change the colour of limewash, and to identify the result of using other colours. So, this experiment aims to recreate a certain colour and documented it. So, the limewash coloured can be reproduce if desire. This will help create more variety in the limewash colour and increase the appeal of the limewash colour to use in the conservation work of historical building.

Keywords: colour, gambier, historical building, limewash,olive oil

DRIVING BUILDING INFORMATION MODELLING (BIM) IMPLEMENTATION IN SUSTAINABLE DESIGN AND CONSTRUCTION STAKEHOLDERS IN KLANG VALLEY

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ABSTRACT

Due to the growing concern of sustainable built environment, several green building certification and rating systems are available around the world such as Green Building Index (GBI) and GreenRE that were introduced in Malaysia in 2009 and 2013 respectively. However, the current techniques of assessing, analysing and documenting the green building design have no fixed processes to meet the specific criteria for different buildings. The recent technology trend has pushed the industry toward the use of Building Information modelling (BIM) as a tool to plan, design, build, control and manage projects efficiently because it is perceived as a comprehensive tool for integrating various project attributes. The development of BIM technology has made it easier to digitally construct complex building models, export all necessary information to support green building design and assessment throughout all construction stages. Therefore, the scope of this research is to further study the benefits, challenges and driving factor of BIM and aims to encourage the adoption of BIM in construction industry especially in sustainable design. In this research, quantitative method is used by conducting questionnaire survey with 4 main parts of structured questions. Part A of the questionnaire is about the profile of the respondents. Part B is to identify the importance level of several BIM application in a construction project. Part C is to determine what are the potential benefits and challenges face when BIM is being implemented into sustainable design. The last part is to know which driving factors are important for construction company to adopt BIM. The data collected are analysed through descriptive statistic (ranking analysis) and inferential statistic (correlation analysis) using the SPSS version 24 by interpreting the primary data base on the mean, mode, median, variance and standard deviation.

Keywords: Building Information Modelling (BIM), BIM Adoption, Sustainable Built Environment

A STUDY ON THE FEASIBILITY OF RAINWATER HARVESTING SYSTEM ON HERITAGE AND/OR HISTORICAL BUILDING

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ABSTRACT

Water is one of the most important elements in daily human life. This makes water one of the elements that must always be given attention so that the water does not experience any problems that can prevent the use of water by humans. For a country with large, highly populated cities, water consumption becomes a frequent issue. This also affects countries that receive limited water supply. High water consumption often occurs in buildings used by humans. This is because the building is known as a place for human to carry out daily activities. Water consumption in washing, cooking, watering and drinking are among the causes of water consumption in buildings is the highest. To ensure that the use of water can be controlled, every building must have technological features that can reduce water consumption. Such as the example, the uses of rainwater harvesting systems. But heritage and historic buildings are seen to be unable to use rainwater harvesting systems. This is because things that involve history or have historical value that is the heritage of a community or country is one of the important things that must always be taken care of to ensure that the historical value remains preserved for future generations. For that, this study will focus on the feasibility of rainwater harvesting systems on heritage buildings and/or historic buildings. From this study, all the system related to rainwater harvesting system will be identified also the advantages and disadvantages of the system will be identified and the list of recommendation of the suitable rainwater harvesting system will also be proposed. This study is also conducted based on the observation of several buildings that can be seen as the buildings that can use rainwater harvesting system. Each analysis and view based on the findings, will be explained in more thoroughly in this study.

Keywords: Heritage building , historical building, Rainwater harvesting system, Water consumption

CHARACTERISTIC OF HISTORICAL LIME MORTAR: A CASE STUDY OF SELECTED SHOPHOUSES IN GEORGETOWN, PULAU PINANG

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ABSTRACT

According to Sedat et. al, (2006), mortar and plaster contain a mixture of lime and brick powder due to their hydraulic properties. In this research, the mortar composition, basic physical, sand grading and hydraulic properties of mortar were determined through sand grading test, acid dissolution test and visual observation. The study conducted in five (5) selected shophouse aimed to identify the characteristics of historic lime mortar. The results of the study conducted, it is shown that the mortar used is hydraulic lime. This is because the colour of the solution changes from colourless to grey when the mortar is mixed with acid. The grey colour most likely indicates the presence of a hydraulic lime component. Lime is used in construction work as a binder to increase the strength and durability of mortar. Lime mortar is a traditional material for building construction and is used for the restoration and repair of old or historic buildings nowadays.

Keywords: conservation, lime, mortar.

DESIGN THE STAINLESS STEEL WATER HOSE PIPE BY USING FLEXIBLE SPRING

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ABSTRACT

A clean toilet symbolizes a person's high personality. The importance of a clean toilet is to ensure that the toilet is comfortable to use and prevents the spread of germs and bacteria. Healthcare is one of the mandatory things for all communities in Malaysia. But still there are some people who take for granted in matters of hygiene in the bathroom. In addition, the use of dirty toilets can also lead to infections of the urinary tract or bladder which can be regarded as chronic. In addition, the use of unsystematic pipe hoses by leaving the hose on the bathroom floor and in the toilet hole is a matter that will cause dangerous diseases due to various germs and bacteria that will attack a person's body. It is because the pipe hose is not re-suspended in its proper place. Therefore, the study was applied stainless steel pipe hose using this flexible spring, the pipe hose will not fall to the floor again because the spring will return the pipe hose to its original place without the user placing the hose pipe back to the hose hanger. This study focused on only one bathroom in a private home. The test method that will be implemented is a pipe leak test and test the effectiveness of the pipe hose using the Quality Function Distribution (QFD) by being tested by 20 respondents by providing a survey form in the form of google forms. By using this system, , the purpose of this project is to ensure the cleanliness of the toilet is always kept away from bacteria by ensuring that toilet equipment such as plumbing is always in its original place without the user re-hanging the hose after using it and it is protected from all impurities.

Keywords: Bacteria, Flexible Spring, Quality function distribution, Water hose pipe

THE IMPACT OF LEAN CONSTRUCTION (LC) AND BUILDING INFORMATION MODELLING (BIM) APPLICATION ON DESIGN MANAGEMENT AMONGST MALAYSIAN CONTRACTORS

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ABSTRACT

The Malaysian construction industry plays an important role in the nation's economic growth. It acts as an engine of growth for the economy. However, the industry productivity is still considered unsatisfying. It is still facing problematic construction projects all across the nation, consequently, it is lacking in term of efficiency. Therefore, this study aims to investigate the impact of Lean Construction (LC) and Building Information Modelling (BIM) application on design management amongst Malaysian contractors. The objectives of the study are to identify the potential benefits, challenges and improvements of LC and BIM application on design management in the Malaysian construction industry from the perspectives of the contractors. A quantitative approach was considered in this study where a survey by questionnaire was conducted for data collection. The survey results were then descriptively analyzed using frequency analysis and mean value index from the SPSS software. The findings showed that LC and BIM application benefit most in boosting information sharing between parties involved in the construction projects. Lack of skills and knowledge amongst employees was identified as the most crucial in term of challenges of adopting both applications. Whereas, providing subsidies and incentives to overcome high implementation cost was among the best recommendations to improve LC and BIM usage within the construction industry. Significantly, the study provides a better exposure embedding the potential benefits, challenges and improvements on the application of LC and BIM amongst Malaysian contractors. More future studies specifically focusing on SMEs would be necessary to improve the application of LC and BIM in Malaysia.

Keywords: Building Information Modelling, Design Management, Impact, Lean Construction, Malaysian Contractors

THE IMPLEMENTATION OF HAZARD IDENTIFICATIONS, RISK ASSESSMENTS AND RISK CONTROLS (HIRARC) FOR SCAFFOLDS IN HIGH-RISE BUILDING WITHIN KUALA LUMPUR

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ABSTRACT

There was a negative stereotype about safety and protection in the construction industry during working. A significant number of fatality rates in construction industry were mostly involving scaffolding work. It is well known to have the highest number of fatality rate in high rise construction building. This study aims to provide in depth investigation accident as result of scaffolding associated risk assessment and risk control, identify the hazard on scaffolding in construction site by identifying and analysing the hazard and taking a proper control measure. It is crucial to identify the fundamental cause of numerous accident associated with scaffold work that rapidly happen on site. Providing a safe and healthy work activity is crucial to ensure the importance of safety regulation had been taken. Therefore, this particularly study will investigate the reason why many accident happen on scaffold work even safety measured had already been taken. It is found that the major reason contributing to the accident on scaffold is due to human factor. The result of this study indicates the control measures that needs to be taken by supervisors and their knowledge on scaffold.

Keyword: accident, high fatality rate, Scaffold

FACTORS PREVENT IMPLEMENTATION OF QUALITY ASSESSMENT SYSTEM (QLASSIC) IN CONSTRUCTION PROJECT

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ABSTRACT

QLASSIC assessment has been introduced by CIDB since 2006 to measure the quality of workmanship based on Construction Industry Standard (CIS 7). However, the number of projects in Malaysia that applying QLASSIC system is still poor. Only a small number of contractors implement QLASSIC in their construction projects. The lower rate of QLASSIC implementation in construction industry shows the contractor faced barrier and difficulties implementing this assessment. The objective of this research is to identify the challenge and barriers in complying QLASSIC assessment in construction project. It is also to identified method to improve implementation of QLASSIC assessment in construction project. A survey using questionnaires were conducted on 181 G7 contractor in Melaka Tengah, Melaka. Only 50 companies responded (response rate 28%). The questionnaire inquired on company background related to QLASSIC and barriers and methods to improve implementation of QLASSIC assessment. The data of respondents were analyzed using statistical which is the mean and standard deviation. The majority of the respondents are aware and recognize QLASSIC as a quality assessment. Some challenges and barriers for contractors to implement QLASSIC assessment are the behavior of contractors, issues on construction labor and workers, time constrains, poor communication and design of building. The method to improve the implementation of QLASSIC assessment are enforcement, role, and responsibility of authorities, increase awareness in QLASSIC system, support from top management and appreciation.

Keywords: Construction, Quality, Quality assessment system (QLASSIC)

CONSTRUCTION STAKEHOLDERS' AWARENESS TOWARDS THE APPLICATION OF VIRTUAL REALITY FOR SAFETY TRAINING

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ABSTRACT

The construction industry is known for its dangerous works and high risks, especially on-site. There are lots of fatal injuries in the construction industry all over the world. Malaysia is no exception from it, and lots of evidence can be seen throughout the news and articles regarding this issue. The problems that being outlined in this research are the lack of awareness regarding virtual reality's technology existence, perceptions towards virtual reality technology and cost to implement virtual reality. This research aims to know the level of awareness in applying virtual reality to train labours.There are three objectives in this study. Firstly, to determine the importance of safety in construction sites. Secondly, to identify the barriers of implementing virtual reality technology to train labours in the construction industry. Thirdly, to investigate the level of awareness in applying virtual reality for safety training. Questionnaire survey method is used for this study and the data collected is analysed using spss software. Research is done in sarawak because it is easier and faster to reach the respondents as well as to improve and solve this safety issue in sarawak. The respondents of this research are construction stakeholders such as contractors, consultants and developers.

Keywords: Awareness, Construction, Safety training, Stakeholders, Virtual Reality

Sub-Theme 5 : Building and Environmental Science

Energy, simulation, IAQ, IEQ, BIM, materials, legal, building performance

NO.	REF. NO	INSTITUTION	TITLE AND AUTHORS
1	P501	UiTM Shah Alam	**Indoor Air Quality (Iaq) In Green Building In Klang Valley** Nur Aminah Abdullah and Julaida Kaliwon
2	P502	UiTM Shah Alam	**Students' Perception Of Thermal Comfort In Selected University Classrooms** Nurdiana Ellysha Bt Azman, Kwong Qi Jie and Abdul Rauf Abdul Rasam
3	P503	UTHM , Pagoh	**Analysis Of Carbon Footprint Of Transportation, Food, And Manufactured Product In Industrial Manufacture** Su Lai Ching, Kamarul Aini Mohd Sari

4	P504	UiTM Sarawak	**Awareness On Electricity Cost-saving By Using Solar Energy Among Domestic Residents In Kuching, Sarawak** Imanina Sofiya binti Hasnol and Sr. Dr Hjh. Noraziah bt Hj. Wahi
5	P505	UM	**A Study On the Energy Consumption in The Kindergarten** Muhammad Badrul Amin Bin Mahosin and Norhayati Mahyuddin
6	P506	UM	**A Study On Challenges For Vertical Greenery System Design And Installation Method In Tropical Climate** Vanghau Wong Ing Huo, Suzaini Mohamed Zaid
7	P507	UiTM Selangor Puncak Alam	**Comparative Study Of Green Building Rating Tools In Malaysia, Australia And United Kingdom** Hannah Aileen Binti Nor Hasnan
8	P508	UM	**An Investigation On Green Building Implementation In Universiti Malaya** Teow Wei Yi and Dr Raha Binti Sulaiman

9	P509	UiTM Selangor Puncak Alam	**Impacts Of Hedgerows On Outdoor Thermal Performance In A Johor Bahru Housing Area** Mohamad Afif Najmi Abdul Salam, Sabarinah Sheikh Ahmad and Rabiatul Adawiyah Nasir
10	P510	UiTM Shah Alam	**The Effect Of Trees In An Urban Residential Park On People's Thermal Comfort** Muhammad Iqbal Hashnan, Sabarinah Sheikh Ahmad and Rabiatul Adawiyah Nasir

INDOOR AIR QUALITY (IAQ) IN GREEN BUILDING IN KLANG VALLEY

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ABSTRACT

Currently, the development of green building is expanding all over Malaysia. It is receiving more demand among office owner and homebuyers. According to United State Green Building Council (USGBC) green building is define as building that will minimum or eliminate the bad impact to environment and building occupants. One of the benefits of green building development is for enhancing the indoor air quality in the building. Indoor Air Quality (IAQ) is defined as air quality within and all over buildings and structures which is known to influence the health, comfort, and well-being of building occupants. In order to maintain and enhance the health of people, choosing a green building with good indoor air quality is the best way. This study discussed on a relationship between indoor air quality and green building, issues related to green building and indoor air quality and also solution for the issues. From the study, there is relationship between indoor air quality and green building. Issues related to green building and indoor air quality is satisfaction of building occupants towards green building occupants, green practice might harming the green building occupants and indoor air quality is affected by air pollution that relate to traffic as there is some building is develop too near with roadways. Case study will be conducted in area that is rapidly developing in green building development which is Klang Valley.

Keywords: green building,indoor air quality,office building

STUDENTS' PERCEPTION OF THERMAL COMFORT IN SELECTED UNIVERSITY CLASSROOMS

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ABSTRACT

Thermal comfort in buildings is important as it is closely related to occupants' health and productivity. Several previous studies have suggested the relationship between thermal environment of classrooms and the students' performance. The aim of the study is to identify the students' perception of thermal comfort in selected classrooms within an educational building. The method used to obtain data from the students is through an online questionnaire. Results show that the overall thermal sensation in the classrooms is Neutral. This suggests that they do not have a specific preference regarding on the environment around them. Other than that, through this study it has proven that thermal environment has an impact towards the overall performances and health of students. A total of 102 students (46%) stated that the thermal environment of the classrooms could "sometimes" affect their mood and study performance. Meanwhile, a number of students claimed that they have experienced symptoms such as sleepiness (67.6%), poor concentration (47.7%) and headache (30.2%) while being in the classrooms. Moreover, a total of 48 students (22%) suggested that the temperature in the classrooms needs to be adjusted based on the current weather condition while 31 students (14%) stated that no change is required. The findings of this study may be used as a reference by the maintenance department to enhance thermal comfort level in the classrooms.

Keywords: classroom, educational building, performance, students, thermal comfort,

ANALYSIS OF CARBON FOOTPRINT OF TRANSPORTATION, FOOD, AND MANUFACTURED PRODUCT IN INDUSTRIAL MANUFACTURE

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ABSTRACT

Manufacturing industries are one of the largest contributors to the greenhouse effect and thus carbon footprint is used to estimate the amount of greenhouse gas emissions. The definition of carbon footprint is an amount of greenhouse gas emissions and reduction in a product system as carbon dioxide equipment that is often used in the environmental indicator. The elements of carbon footprint are including food, transportation, service, goods, clothes, and shelter. Thus, the purpose of the study is to identify the procedures of carbon footprint focusing on three elements; transportation, food, and manufactured product production of the wooden staircase. Following by calculate the total carbon footprint and suggest the carbon emission value of the 1 unit of a wooden staircase. The method that is used to collect data is investigating the carbon footprint produced in manufacturing industries which are Asiawood Lumbers Sdn. Bhd and Milestones Trading Sdn. Bhd. Then, the data will be analyzed by using formulas taken from previous research to determine the carbon footprint values. The carbon footprint values of transportation, the production process of manufactured products, and food will be sum up and form the total carbon footprint. The total carbon footprint will be compared with previous research. Finally, the discussion will be done on the factors that influence the total carbon footprint of element transportation, food, and manufactured product. This study provides a basic calculation for estimating carbon footprint in manufacturing industries and increased knowledge on carbon cycling in the manufacturing industries.

Keywords: Carbon footprint, food, manufacture product, transportation

AWARENESS ON ELECTRICITY COST-SAVING BY USING SOLAR ENERGY AMONG DOMESTIC RESIDENTS IN KUCHING, SARAWAK

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ABSTRACT

As Malaysia moves towards sustainability to preserve the environment, the government takes initiatives to construct green and sustainable buildings. Part of having green buildings is using renewable energy such as solar energy to reduce electricity utilisation. Without electricity, the world cannot run; however, there are better alternatives to generate power in clean, sustainable, and cost-saving ways. This study focuses on the awareness of the cost-saving of electricity by using solar energy among the domestic residents in Kuching, Sarawak. The research objectives are to identify the benefits of solar energy application to domestic residential, study the initiatives and incentives offered by the government towards the application of solar energy, and investigate the level of awareness on electricity cost-saving by using solar energy among domestic residents in Kuching, Sarawak. This research focusing on Kuching residents, and a survey will be conducted using Google Forms with 116 respondents. The results of this research are most of the respondents are aware of the cost-saving and other benefits of using solar energy and are interested in installing solar panels. In addition, initiatives and incentives offered by the government towards the application of solar energy to encourage the respondents to use solar energy were also included in this research.

Keywords: Awareness, Cost-saving, Solar energy

A STUDY ON THE ENERGY CONSUMPTION IN THE KINDERGARTEN

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ABSTRACT

Energy consumption is one of the important issues to the management of a building because it will affect most of the operating costs. The design of a building is important to make sure that energy for the cooling and heating system can be reduced as well. Thus, selection or decision at the early design stage on the appropriate architectural design is important that the design can provide a significant advantage to manage the heat flow in a building also prevent excessive energy consumption. The purpose of this studies to studies what systems that contribute most to the energy consumption in a private kindergarten. Also, to study the user behaviour on energy usage in kindergarten. A simulation using eQuest software was carried to determine the percentage of energy consumption in the kindergarten. Results from the simulation shows the energy consumption at the kindergarten which will be divided to three main systems which are lighting, cooling and plug loads. Using the simulation results also helps to determine what system can be reduced the energy consumption by retrofit or refurbish some parts or elements of the building at the same time, the refurbishment also help to increase the thermal comfort for the occupants. Data of all result and findings will be analyzed and compared. This study revealed the percentage of energy usage by systems and the refurbishments that can reduce the energy consumption in kindergarten.

Keywords: Energy audit, Energy Performance, Energy Consumption

A STUDY ON CHALLENGES FOR VERTICAL GREENERY SYSTEM DESIGN AND INSTALLATION METHOD IN TROPICAL CLIMATE

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ABSTRACT

Green infrastructure is a key element for safeguarding sustainable environments in urban areas that are perpetually getting denser. Vertical Greenery System (VGS) has gained increasing attention from contractors and designers to expand green areas in the urban concrete jungle due to its capability to provide environmental, social and economic benefits. However, little consideration has been given to specific design and installation criteria of VGS according to tropical climate, which impede the performance of VGS. The design and installation critical criteria include irrigation system and maintenance must be tailored to specific types of VGS. The drainage, water recirculation system, climatic conditions and location of VGS installed (outdoor or indoor) will influence suitable plant species choice. This research aims to recommend suitable VGS design in tropical climate conditions in mitigating the design and installation challenges. The objective of this research is to investigate challenges faced on the design and installation of VGS in tropical conditions of Malaysia for both indoor and outdoor settings. Qualitative research method is applied with primary data from structured interviews with different VGS case study companies to determine the challenges faced due to design factors and installation of VGS. Secondary data is collected via in-depth literature analysis from various sources such as journals, articles and books. The findings provide fundamental knowledge to the building industry regarding suitable design and installation methods of VGS in tropical climatic conditions. The findings highlighted that every VGS is unique as different types of VGS are innovated by individual VGS case study companies in order to match the clients' needs.

Recommendations to tackle the challenges such as regular maintenance with practical cost-in, well-planned drainage, irrigation system prior to installation and suitable plant selections based on VGS settings are needed to improve the efficiency and effectiveness of the VGS for long-term operation.

Keywords:Design,Installations,Maintenance,Tropical Climate,Vertical Greenery System (VGS)

COMPARATIVE STUDY OF GREEN BUILDING RATING TOOLS IN MALAYSIA, AUSTRALIA AND UNITED KINGDOM

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ABSTRACT

'Green Building' is the evolution of sustainable development that has been created to meet the challenge of current global climate change and global warming through the design and construction of a building. The concept of Green Building arises to overcome the issue of overly used energy consumption where the construction industry has been identified to contribute most usage. Corresponding to the concept of Green Building, several Green Building Rating Tools (GBRT) has been established over the years to ensure the goals of Green Building are achieved. However, there are several GBRT that different countries have established to suit their context of sustainable building. Therefore, this study aims to study the different types of GBRT that have been established. However, due to the limitation of time of the study, this paper focuses only on the GBRT adapted in three countries with different climatic states: Malaysia, Australia, and the United Kingdom. Malaysia has introduced Green Building Index (GBI) in 2009, considering its tropical climate. Meanwhile, Australia has introduced and adopted Green Star in consideration of its temperate climate. The third GBRT is the Building Research Establishment Environmental Assessment Method (BREEAM). This research adopted two methods to carry out the study: Systematic Literature Review (SLR) and Selective Critical Literature Review Analysis (SCLRA). Systematic Literature Review are a method where a study on several journals that has been done will be studied to obtain information and data on related topics to this study. Then, the Selective Critical Literature Review Analysis (SCLRA) is done to have an in-depth study of this study's issues. BREEAM is identified with the most assessment criteria compared to Green Star and GBI, as it is the earliest GBRT, established not only among Green Star and GBI but also among all the GBRT across the world.

Keywords: Green Building, Green Building Rating Tools, Sustainability

AN INVESTIGATION ON GREEN BUILDING IMPLEMENTATION IN UNIVERSITI MALAYA

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ABSTRACT

Improper building design had led to negative environmental impact and minimize the economic value of the building. Concerning this, the application of the green building concept is necessary to reduce the consequences and even brings benefits to the society, environment and the economy. For instance, improving the building performance of the existing building. Therefore, a strategy such as implementing green building elements can be conducted in the building. Currently, a higher education institution （HEI） building, namely the Faculty of Built Environment, University of Malaya (FBE, UM) is preparing to apply for green building certification under the Non-Residential Existing Building (NREB) Green Building Index (GBI). Thus, this research aims to evaluate the overall green building practices in UM from the whole campus perspective to a single building implementation. To achieve the objectives of this study, a mixed-method is used whereby data is collected through literature reviews, electricity bills, questionnaire surveys (that was distributed online) done by the representatives of UM management in administration and maintenance of the UM campus buildings. The significance performance of simulation energy measurements and actual operational energy consumption of case study building are included in this study as well. The common green building elements in HEIs as green building are water features and fountain, sufficient greenery and green roof, water-efficient fitting and rainwater harvesting system, illuminance features with natural light, renewable devices with solar panel, thermal comfort features and reducing and recycling features. Besides that, the UM campus is ready for the implementation of green building. The GBI rating tools are applied as a benchmark and found out that suitable green building elements such as light sensor, electrical sub-metering, solar panel, low-VOC product, and vertical greenery system, recycle bins, waterless urinals can be implemented in FBE after analyzing the building plan of the case study.

Keyword: Green Building Element, Green Building, GBI Ratings, Higher Education Institution,

IMPACTS OF HEDGEROWS ON OUTDOOR THERMAL PERFORMANCE IN A JOHOR BAHRU HOUSING AREA

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ABSTRACT

Cities around the world are affected by the urban heat island effect, especially during warm weather. This phenomenon occurs as the ambient air temperatures are higher in urban areas due to hard surfaces, such as buildings, roads, and pavements that retain heat and take longer to cool down at night than those surrounding rural countryside. Due to the high air temperatures in tropical cities, the outdoor environment is already hot, especially during dry seasons. However, carefully planned landscape design and a better understanding of outdoor thermal performance could help to reduce the adverse effects of these high temperatures in housing areas. The study's objectives are to investigate the importance of good landscape design that affect the outdoor thermal performance of a selected sustainable housing area in Johor Bahru and compare the level of outdoor thermal comfort by evaluating the best greeneries configuration. First, the study specified the weather conditions, building physical attributes and greeneries strategies in ENVI-Met's microclimate programme. Then, the simulation software replicated model parameters in five lots of houses at the Taman Setia Eco Cascadia housing area in Johor Bahru. This study focuses on several factors that impact outdoor thermal performance: the potential air temperature, relative humidity, and mean radiant temperature in three different cases. The case studies are Case A (base case -some grass & a few trees), Case B (grass only,) and Case C (hedgerow - a combination of grass, hedges & trees). The study evaluated the results produced by the simulations and compared the efficiency of the hedgerow configuration. This study found that Case C provides the best outdoor conditions in terms of air temperatures, relative humidity and mean radiant temperature.

Keywords: ENVI-Met,hedgerow,housing,landscape design,Outdoor thermal comfort

THE EFFECT OF TREES IN AN URBAN RESIDENTIAL PARK ON PEOPLE'S THERMAL COMFORT

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ABSTRACT

This study focuses on the effect of a park in an urban residential area on people's thermal comfort in Putrajaya. To achieve thermal comfort within the residential area, trees around the houses and along the streets are crucial for the thermal comfort of the residents. Furthermore, the site planning of the residential area is also crucial as it may affect the wind ventilation. Hence, the objectives of the study are (1) to compare the outdoor thermal comfort performance of the park in three scenarios and (2) to determine if the current and predicted thermal comfort level within the residential area is within the thermal comfort range. The method of this study was through simulation software, ENVI-Met, which provides a series of results of microclimate conditions. The simulations were replicated based on three scenarios at a selected neighbourhood park: Case A - existing condition, Case B - no trees, and Case C - four years after existing trees and vegetation growth. The results show that Case C offers the best solution where the mature trees provide positive benefits regarding people's perceived conditions through shading and reducing the surrounding air temperature. In Case C, after four years of tree growth, the shaded area is more expansive, and the surrounding temperature is slightly lower by 0.5°C than the existing and no trees conditions. However, the large number of trees has slightly increased the wind speed by 10% compared to the existing condition. The significance of this study shows the importance of a green park in an urban residential area to maintain people's thermal comfort.

Keywords: ENVI-Met,Outdoor thermal comfort, Putrajaya,residential area, urban park

Sub-Theme 6 : Computer Science and Engineering

Machine learning, data mining, artificial intelligence (AI), building engineering technology, big data, internet of things (IoT), geomatic, engineering studies

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2	P602	UiTM Shah Alam	**Identifying Potential Hazardous Trees In Uitm Shah Alam Using Remote Sensing Dataset** Liyana Shahirah Suhaizad and Nafisah Khalid
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6	P606	UiTM Shah Alam	**Finding Potential Routes For Green Lanes In Bandar Baru Bangi By Using Ahp And Gis** Lutfi A. Rahaman and Nabilah Naharudin
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11	P611	UM	**Assessing The Rural Tourism Destinations In Segamat Using Gis With Big Data** Daniel Harris Abd Razak

POTENTIAL SITES FOR MICRO-HYDROPOWER STATION USING AHP AND GIS

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ABSTRACT

Some parts of rural area in Kanowit Song, Sarawak still did not receive electricity supply today. The fact that they are located far from the urban area might cause this. The area is surrounded by small villages and vegetation area. Therefore, an alternative is needed to supply electricity to make it easier for the villagers to perform their daily activities. One of the most suitable power supply that can be used here is the micro-hydropower which is the smaller scale of hydropower. This is because the area is surrounded by river, so it is possible to generate electricity there. It is also one of the renewable resources. So, it is clean and green. The question now is, to find the potential site for the micro-hydropower station. The river is there, but, what are the other criteria needed in finding the sites? This study highlighted three (3) criteria in finding the potential sites based on the literature and interview with experts. The three (3) criteria are slope, water velocity and accessibility. Once the criteria had been identified, the potential sites can be determined by using Spatial-MCDA which this study aims to do. It is a method combining Spatial Analysis and Multicriteria Decision Analysis (MCDA). MCDA was used to weigh the criteria as each criterion have different degree of importance in selecting sites for micro-hydro power station. Spatial Analysis then used the weightage in finding the sites by using weighted overlay technique. The results of this study found several potential areas that may be suitable for the developing the micro-hydropower station which includes areas close to the village area, away from local agriculture sites, and also close to the nearest roads. The potential

sites were visualized as a map to provide a better representation of the sites so that people can understand and interpret the results better.

Keywords: hydropower, mcda, micro-hydropower, spatial analysis, spatial-mcda

IDENTIFYING POTENTIAL HAZARDOUS TREES IN UiTM SHAH ALAM USING REMOTE SENSING DATASET

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ABSTRACT

Trees beautify the landscape and provide many benefits to people including shade and oxygen production. However, trees with certain structural defects can pose a risk to human lives or activities. It is important to be able to identify the tree hazards so that appropriate mitigation steps can be taken to reduce their risk, particularly in urban settings. The common practices in identifying the hazardous trees are via visual tree assessment, expert interview, questionnaire and more. However, the individual process is time consuming especially for a large study area. Thus, this study is aimed to identify the potential of the hazardous trees in UiTM Shah Alam through the fusion of LiDAR and Pleiades dataset. The potential tree hazards were assessed using tree health and tree height parameters. Trees were classified into three rating classes which are low, moderate and high-risk. The results showed that the fusion of LiDAR and Pleiades dataset successfully identified the hazardous trees in the selected area in UiTM Shah Alam. A total 108 individual trees were detected with 7 trees were classified as high risk, 67 trees were classified as moderate risk and 34 trees were considered as low risk hazard. This study derived significant findings in identifying the potential of hazardous trees that can be used to support the facilities department in maintaining trees in the campus area.

Keywords: Green Landscape, Hazardous Tree, LiDAR, Remote Sensing, Urban Area

IDENTIFYING THE POTENTIAL FACTORS OF RURAL DEVELOPMENT GROWTH USING GEOSPATIAL TECHNIQUES: A CASE STUDY OF REMBAU DISTRICT, NEGERI SEMBILAN

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ABSTRACT

The nature of the interaction between urban and rural had been discussed in the land development and town planning theories decades ago. The process of urbanization gives a good opportunity to expand the economic and physical growth whether for current or future administrative, manufacturing, residential, commercial or for the development of new policies. The right integration between people, resources, and activities will benefit the whole system of planning and development of an area. Therefore, this research was conducted to explore the factors that potentially influence the growth of development in Rembau District, Negeri Sembilan using Geographical Information System (GIS) and Remote Sensing (RS) technology. The analyses were based on four-parameter (population, distance and connectivity, amenities, and tourist attractions) and later were used to map the new potential growth development areas. The methodology process was started with the primary and secondary data acquisition by the interview and online questionnaire via google form distribution. Next is the processing and analyzing stage that involves the Landsat data from USGS to produce the land-use maps for four consecutive years. From the analysis, the land use distribution for the Rembau district is dominant with agricultural areas. This activity became the main economic base besides industry. The accessibility analysis shows that the Rembau district is well connected by trains. Rembau can become a dormitory city through good communication infrastructure and thus able to realize a strategic development growth after Seremban. The findings of the study reveal that the built area in Rembau is only 7.15% of the total area of 40430.165 hectares. A total of 75.5% indicates that the land in Rembau is at a low-risk level which is suitable for any future development.

Keywords: Land use, potential growth, rural development, urbanisation

E-OKU@ UNIVERSITY: A COMMUNITY SERVICE MAPPING SYSTEM FOR PERSON WITH DISABILITIES (PWDS) IN MALAYSIA UNIVERSITIES

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ABSTRACT

The main aim of this innovation is to develop a service mapping system for communities of Persons with Disabilities (PWDs) in Malaysia Universities. In UiTM, the Unit Perkhidmatan OKU UiTM (UPO) organises and coordinates the programmes of the PWDs community of PWD. The problem is that the Unit (UPO) still does not have any specific media technology system for information management, delivery and sharing. The efficient system is important for managing the information and facilities of PWDs in a complete platform and an integrated way. Therefore, the establishment of the proposed mapping system or E-OKU@University is essential in the UPO UiTM. The standard guideline of SDLC is applied to develop the proposed system. Data collection was firstly conducted by gathering OKU secondary information, user requirement analysis and feedback from the Director and Fellows of UPO. Then, ArcGIS Online, ArcGIS desktop and WIX were used to create maps and the system. The other technique applied were data KML conversion into shapefile, digitizing the base map of Malaysia and transform attribute table from excel into layer feature. The result has shown the respondents agreed with the development of the proposed system. This proposed public system has offered the standard and special functions of a helpful community services system. The techniques of web mapping functions are also included which allows the user to control and use the map well with integrated OKU information. Three digital maps and system has been provided for PWDs and person related to PWDs to providing the

easiest way for these special communities. This prototype demonstrates the capabilities of mapping services for facilitating the PWD communities in the University.

Keywords: ArcGIS online, cartography and mapping system, Geographical information system, Person with Disabilities

APPLICATION OF PYTHON FOR CRIME CASES ANALYSIS

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ABSTRACT

Python scripting has become a vital tool in the growth of ArcGIS functionality and automating workflow for Geographical Information Systems (GIS) professionals. As script tools that function much like familiar geoprocessing tools, Python scripts can be integrated into ArcGIS. In mapping and crime detection, GIS plays an important role. Crime cases in Malaysia are becoming more common, from robbery to murders. Therefore, this research aim is to create a custom tool by using Python scripting in ArcGIS software where this tool will show a map of crime and can perform crime analysis. Three main objectives have been explored. The first refers to develop python scripting in ArcGIS. The second is to produce a custom tool from a python script that has been developed. The third is to analyse and visualise crime cases that occurred in Shah Alam. The methodology process was started with the secondary data acquisition through obtaining information on criminal incidents from the Shah Alam District Police Headquarters. Next is the processing to edit a stand-alone Script from ArcGIS Desktop Help. ModelBuilder has become an option for editing and running scripts. After that, new custom toolboxes have been created in ArcCatalog or the Catalog window within the ArcGIS for Desktop application. From the analysis, the data has been confirmed that it is clustering pattern happened in Shah Alam based on criminal cases. The findings of the study shows that a pattern for criminal cases in Shah Alam is clustered with more than 2.58 of z-score from spatial autocorrelation report. Moreover, from hot spot analysis (Getis Ord Gi*), the most majority of cases are in the Section 7 area with 99% confidence level, which means it is a statistically significant positive z-score of high values.

Keywords: Crime cases, Custom tool, python

FINDING POTENTIAL ROUTES FOR GREEN LANES IN BANDAR BARU BANGI BY USING AHP AND GIS

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ABSTRACT

City with a high-car reliance like Bandar Baru Bangi might have poor air quality due to carbon emission. Thus, something needs to be done to enhance the sustainability of the city. Active transportation may be the answer as people could walk or cycle instead of driving, thus no carbon will be emitted. However, encouraging people to walk or cycle is not easy as it is not the culture for a tropical country like Malaysia. But, it may be possible if routes based on the public's preferences that encourage them to use active transportation can be found. Thus, this study aims to find potential Green Lanes to support active transportation by using Spatial-MCDA, which is a technique that includes multiple criteria in the analysis. In this study, MCDA was used to determine the weightage of the criteria that were later used by GIS to find the Green Lanes which could provide paths for pedestrians and cyclists with criteria including access to several land uses to support various travel purposes, road characteristics, and classes. All these criteria are represented on the ground as geographic features, so, they can be used in GIS analysis. Each of the criteria has a different weightage which was translated from the publics' preferences by using the Analytical Hierarchy Process (AHP) which is one of the MCDA weighing methods. The weightages were then used in Least Cost Path Analysis to find Green Lanes. As a result, 15 Green Lanes were found connecting Bangi Central (Bandar Baru Bangi Central Transportation Hub) and 15 selected destinations which are mostly the popular destinations in Bandar Baru Bangi. 13 from them had provided improvement in the accessibility when compared to existing routes indicating traveling using Green Lanes may shorten the time travel apart from leading to a healthier lifestyle and greener city.

Keywords: GIS, Green Lane, Modelbuilder, Spatial-MCDA, Spatial Analysis

ASSESSMENT OF GROUND PENETRATING RADAR (GPR) AND ELECTROMAGNETIC LOCATOR (EML) FOR UNDERGROUND UTILITY

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ABSTRACT

Electromagnetic Locator **(**EML) and Ground Penetrating Radar **(**GPR) are two main types of underground utility survey technologies. Most of underground utility survey require a combination of two different equipment in order to ensure the production of utility map is as precise and extensive as possible. This research study describes the assessment of GPR and EML for underground utility in terms of depth accuracy for various underground pipe materials. The instrument that has been used in this research study are levelling instrument, Opera Duo GPR and EML RD8000. The levelling instrument used for transferring reduced level from TBM and determine the true depth for each pipe. The GPR and EML instrument used for depth scanning in order to obtain the depth of the underground utility in the research area. In this research study, the data collection divided into three categories which are conventional method to collect levelling data, GPR method to obtain radargram images and EML method to obtain depth reading for newly buried various underground pipe material. Besides that, data processing in this research study perform on levelling and GPR dataset. For levelling dataset, the data process using Reduced Level Adjustment and GPR dataset process is with post-processing by using UNext software. The results for this research study consist true depth for each pipe, enhance and filter radargram images and EML depth. All these results are analysed in order to produce an assessment of GPR and EML for underground utility. The comparison results between true depth, radargram images and EML depth have determined that GPR instrument is more reliable and accurate for detecting underground utility compared with EML instrument.

Keywords: Electromagnetic Locator (EML), Ground Penetrating Radar (GPR), Temporary Benchmark (TBM)

BICYCLE ROUTE PLANNING IN SHAH ALAM USING GIS TECHNIQUE

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ABSTRACT

For the past few years, cycling has started getting popular among Malaysian citizens. A group of bikers can be seen everywhere on the road or even on the highway cycling from one place to another. This activity had become their hobby as well as part of their active lifestyle's routine. As cycling at certain areas and routes can be dangerous for both cyclists and drivers, thus this study was conducted with the aim to produce potential bicycle route planning specifically around UiTM Shah Alam campus. The main focus of this study is for students who are travelling by bicycle from student's accommodation to UiTM Shah Alam campus. Most suitable criteria were determined by conducting questionnaires and answered by the experts, then analyzed through Analytical Hierarchy Process (AHP) and weighted overlay. This study also explores the Least Cost Path analysis on determining the best bicycle routes based on criteria given. The output of this study is a map showing bicycle route planning from Student's Accommodations to UiTM Shah Alam campus based on GIS techniques.

Keywords:AHP, Bicycle route planning, Least Cost Path.

APPLICATION OF AUGMENTED REALITY TECHNOLOGY FOR SMART BUILDING 3D MODELS AND VISUALIZATION IN MALAYSIA

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ABSTRACT

The Department of Survey and Mapping Malaysia (JUPEM) has gone further afield in the way it conducts its cadastral business towards the development of 3D-smart cities in a sustainable manner. The 3D model can shows the detail from every side of the building, but by applying Augmented Reality (AR), the 3D model presentation will be more even realistic and making users to feels like living in a virtual world. AR is an environment that inserts 3D virtual objects into a real environment in real time. The ain of this study is to develop a AR application for 3D modelling and visualization process for the apartment building at Salak Maju, Selangor towards an informative media so that users can get instructive details about the virtual apartment. The main dataset required creating the AR-3D building and visualization was the building plans and floor plans. These 2D plans were processed using AutoCAD and Revit software to generate the 3D model. Unity3D software utilised to add the application of in the 3D building models. The results of the AR-3D model and visualization are interesting, in which the 2D building plan has been developed using the provided floor plan with a minimal cost-software and moderate accuracy. The integration of the 3D models and AR application has shown this alternative approach could examine the floor plan so that a user can better understand and engage with the building design. The study has also revealed that it help land surveyor and developers through the application of AR to them detect the condition, quality, and error in the plan. The benefits of this application has been introduced include the basic computations for 3D objects of building that can be calculated, AutoCAD data booking from the fieldwork can be directly imported into the 3D software and creating a fast, flexible, and interesting modelling of the building. This scenario can enable to quickly mockup designsof objects, homes, or something else dream up.

SOLAR PHOTOVOLTAIC CELL OPTIMIZATION IN LEMBAH PANTAI

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ABSTRACT

Solar energy is one of the clean renewable energy sources used in Malaysia to provide environmentally friendly electricity. Malaysia has a significant potential for solar power plant development because it is located near the equatorial zone and receives high average daily sun radiation. With the high solar radiation received, solar photovoltaic provides a better and alternative solution together with traditional power supplies from the electrical grid to address increasing energy demand in the urban environment. However, to build a solar panel, it is necessary to select a suitable place within a high development area since it can lower the rate of carbon release into the air. The primary aim for this research is to visualize a map of the potential position of solar photovoltaic cell on buildings at Lembah Pantai. Lembah Pantai is one of Malaysia's developing cities. There are many high-rise buildings and residential areas in the neighborhood. The use of solar photovoltaic has numerous advantages in the future. It has the potential to save energy while also reducing pollution. Analytical Hierarchy Process (AHP) is the technique for Multi Criteria Decision Making which was adopted in this research. AHP was applied to weigh the criteria needed in evaluating potential areas. Many main criteria were identified in this study which include solar radiation, position of buildings, building elevation, slope, and more. Weightage were utilized to determine the most appropriate solar photovoltaic rooftop so that the outcomes are more trustworthy. Calculations by spatial Analyses were made and this research have successfully identified suitable areas for the potential installation of the photovoltaic cells. This new knowledge of roof distribution and possible photovoltaic outputs will help inform energy policy development in the Lembah

Pantai area and further research into solar photovoltaic deployment and its geographical possibilities.

Keywords: AHP, Analytical Hierarchy Process, GIS, Solar Photovoltaic Cell

ASSESSING THE RURAL TOURISM DESTINATIONS IN SEGAMAT USING GIS WITH BIG DATA

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ABSTRACT

Nowadays, the poverty problem in rural areas is a worldwide issue even in Segamat, Johor. One of the ways to cater to the poverty problem in rural areas is by developing rural tourism destinations found in these areas. Thus, this academic project aims to assess the rural tourism destinations in Segamat using GIS with big data. The objectives of this academic project are to identify the spatial distribution of rural tourism destinations, determine the relationship between the distance of rural tourism destinations from city/town and big data of each tourism destinations, and lastly, to assess the spatial relationship between existing & potential rural tourism destinations and Google Reviews. The method of this academic project is supported by using GIS tools like ArcGIS and GeoDa. Data used in this academic project are the number of reviewers and star rating of each rural tourism destination in Google Reviews. The findings show the spatial distribution of all existing and potential rural tourisms in Segamat are clustered but tends towards the random pattern. The relationship between the distance of rural tourism destinations from city/town and Google reviews data show a positive correlation where the longer the distance from city/town, the higher the number of reviewers and star ratings in Google Reviews. In regards to the spatial relationship of rural tourism destinations and Google Reviews, the results show that there are some clustering and outlier of rural tourism destinations. Also, there are some hot spots and cold spots of the rural tourism destinations identified. In conclusion, this academic project successfully achieved its aim and objectives. Lastly, this study also provides some recommendations where it can help Segamat's local authority in improving the rural tourism in Segamat which will eventually help in improving the rural community's economy.

Keywords: Big Data, GIS, Google Reviews, Rural Tourism, Spatial Statistics

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