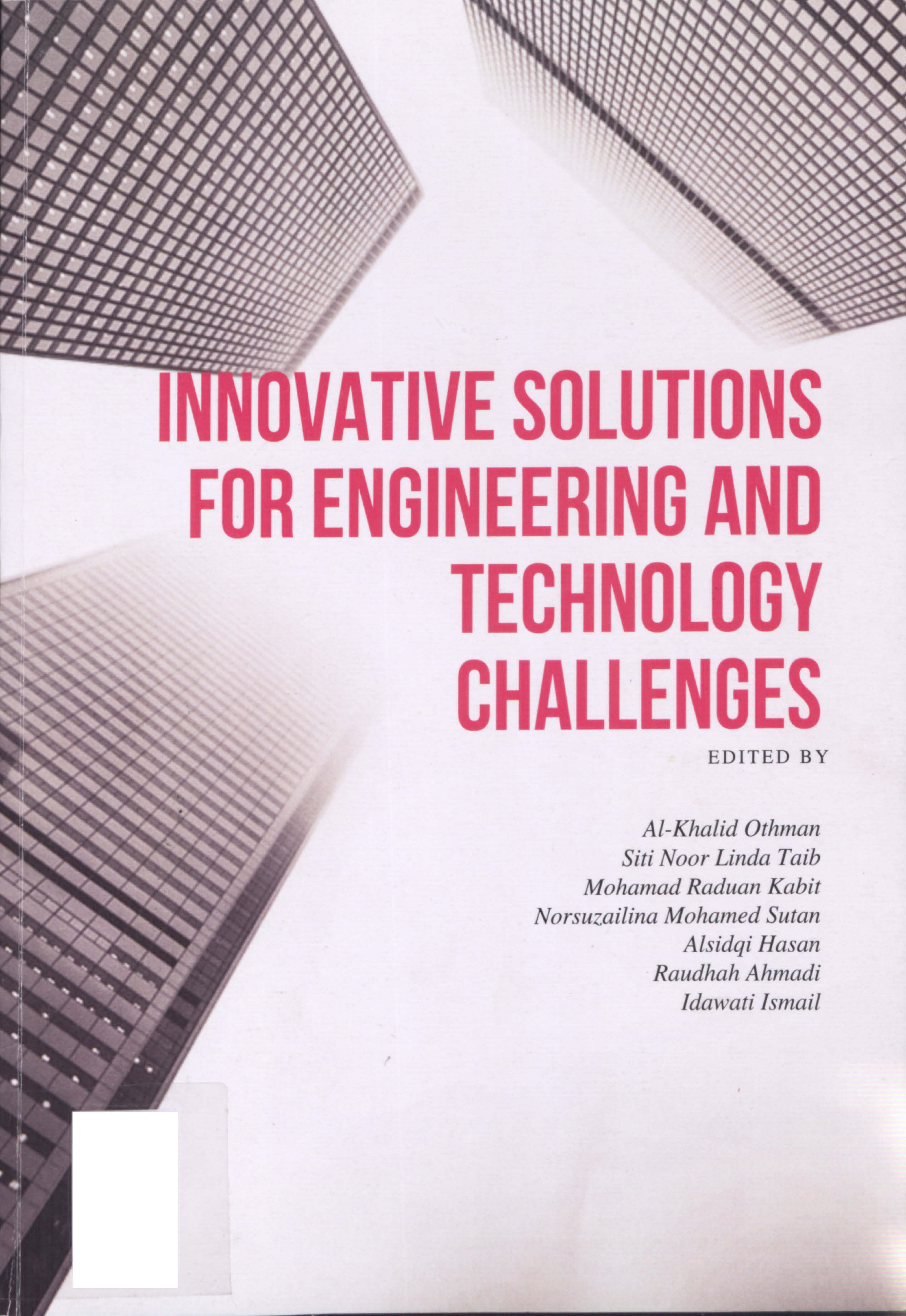




INNOVATIVE SOLUTIONS FOR ENGINEERING AND TECHNOLOGY CHALLENGES

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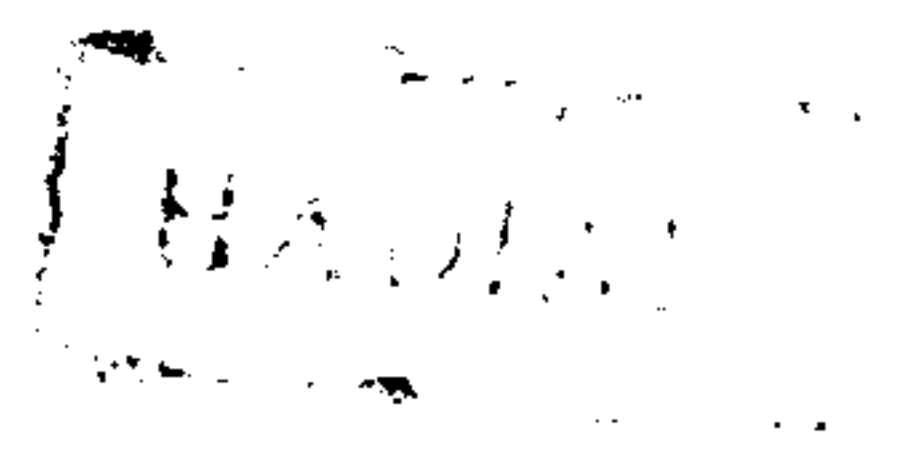
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Paper No: EC001

SWMM MODELLING OF ON-SITE STORMWATER DETENTION SYSTEM UNDERNEATH URBAN ROAD

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Abstract

This paper outlines the methodology in modelling the hydrological processes involving a novel product innovated by UNIMAS researchers, named StormPav. This product is meant as permeable pavement with a function of on-site stormwater detention. The features of StormPav are unique of other products available in the market. Using a well-known freeware - USEPA's SWMM software, this author explores the possibility to represent the product in SWMM, and subsequently presents an initial hydrological modelling to aid the design of the prototype.

Paper No: EC005

REVIEW IN FORMULATING THE STANDARD FORM OF CONTRACT FOR INDUSTRIALIZED BUILDING SYSTEM (IBS) CONSTRUCTION APPROACH IN MALAYSIA.

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Abstract

Industrialised Building System (IBS) is the common term used to represent the prefabrication concept in Malaysia. Based on previous research being done locally and internationally, it is certain that using IBS offers huge benefits in terms of cost, time, productivity and quality. The Malaysian construction industry has been urged to use innovative construction techniques. It is being highlighted under the present Construction Industry Transformation Programme 2016 - 2020 (CITP). These initiatives illustrate the Malaysia government's commitment in addressing the IBS agenda. Although some efforts have been taken to enhance the IBS adoption in Malaysia, various contract issues have emerged to become major concern amongst the IBS players that have led to delays, disputes, payment and cash flow issues in their projects. Formulating a dedicated standard form of contract for IBS construction approach is necessary to address the concerns. Therefore, the aim of the main research is to formulate the standard form of contract for IBS projects that will assist authorities and IBS industry players in mitigating the issues and challenges from the contractual perspectives. However, this paper will only present the literature reviews and findings from a preliminary survey conducted to establish pertinent contractual issues and challenges on the subject matter.

ENGINEERING BEHAVIOR OF CONCRETE WITH RECYCLED AGGREGATE

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Abstract

Concrete is extensively used as construction materials in Malaysia. Concrete contributes suitable feature for construction industry for instance durability, adequate compressive strength, fire resistance, availability and is economic as compared to other construction materials. Depletion of natural resources and disposal of construction and demolition waste remarkably claim environmental threat. In this paper, the engineering behavior, durability, and concrete microstructure of recycled concrete aggregates (RCA) on short-term concrete properties were investigated. The studied concrete at design mix proportion of 1:0.55:2.14:2.61 (weight of cement: coarse aggregates :sand :water) used to obtain medium-high compressive strength with 20%, 50%, and 100% of RCA. Results show that for the same water/cement ratio, RCA replacement up to 50% still achieved the targeted compressive strength of 25 MPa at 28 curing days. Addition, at similar RCA replacement, the highest carbonation depth value was found at 1.03 mm which could be attributed to the pozzolanic reaction, thus led to lower carbonation resistance. Scanning electron microscopy microstructure shows that the RCA surface was porous and covered with loose particles. Moreover, the interfacial transition zone was composed of numerous small pores, micro cracks, and fissures that surround the mortar matrix. On the basis of the obtained results, recommendable mineral admixtures of RCA are necessary to enhance the quality of concrete construction.

STUDY ON CONCRETE CONTAINING RECYCLED AGGREGATES IMMERSED IN EPOXY RESIN

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Abstract

In recent decades, engineers have sought a more sustainable method to dispose of concrete construction and demolition waste. One solution is to crush this waste concrete into a usable gradation for new concrete mixes. This not only reduces the amount of waste entering landfills but also alleviates the burden on existing sources of quality natural concrete aggregates. There are too many kinds of waste but here constructions waste will be the priority target that should be solved. It could be managed by several ways such as recycling and reusing the concrete components, and the best choice of these components is the aggregate, because of the ease process of recycle it. In addition, recycled aggregates and normal aggregates were immersed in epoxy resin and put in

concrete mixtures with 0%, 5%, 10% and 20% which affected the concrete mixtures properties. The strength of the concrete for both normal and recycled aggregates has increased after immersed the aggregates in epoxy resin. The percentage of water absorption and the coefficient of water permeability decreased with the increasing of the normal and the recycled aggregates immersed in epoxy resin. Generally the tests which have been conducted to the concrete mixtures have a significant results after using the epoxy resin with both normal and recycled aggregates.

Keywords: *Recycled aggregate, normal aggregate, epoxy resin*

Paper No: EC070

THE EFFECT OF BINDER AND WASTE GRANULAR MATERIALS ON THE SHEAR STRENGTH AND SHEAR RESISTANCE OF DREDGED MARINE SOILS

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Abstract

Dredged marine soil (DMS) is considered as weak and soft problematic soil. It is possible to give this type of soil a second life if only its geotechnical properties are improved. Infusing soil with solidification agent is the common practice of soil improvement. This study uses binder and waste granular material (WGM) such as cement, bottom ash (BA) and palm oil clinker (POC). The aforementioned materials are capable to fortify the poor features of the soil. Series numbers of soil bed samples were tested for its shear strength and shear resistance. Test results show that the mentioned soil parameters were corresponded with each other. In short, geo-waste and biomass materials are possible to be reused instead of being discarded.

Keywords: *Dredge marine soil, bottom ash, palm oil clinker, shear strength, shear resistance*

Paper No: EC071

CONSOLIDATION OF DREDGED MARINE SOILS WITH SINGLE AND DOUBLED DRAINAGE

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Abstract

Large volume of dredged marine soils (DMS) were produced in Malaysian waters during construction or maintenance the port structures. DMS have poor engineering properties and consider as geo-waste materials. The samples were essentially high water content, limited strength and excessive compressibility. The main purpose of this study was to examine the suitability and effectiveness of DMS compressibility characteristics of DMS with different type of drainage (singly and doubly). It shows that the doubly drained can hasten the consolidation than single drainage. Dredged marine soil was remoulded at high water content and allowed to settle. Thus, the settlement of soil particles along the column can be expected.

AN EVALUATION OF SIGNAL METERING APPLICATION TO MITIGATE ROUNDABOUT'S UNBALANCED FLOW CONDITIONS: A CASE STUDY IN KUCHING

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Abstract

Signal metering is usually used to reduce the impacts of dominant flow at roundabouts. While some roundabouts in Kuching are experiencing this phenomenon, signal metering strategy has not been deployed to mitigate this problem. This study aims to evaluate the impacts of signal metering in improving the problematic roundabout's performance due to unbalanced flow condition. A case study was conducted at a selected roundabout in Kuching to examine the impacts of signal metering strategy on the roundabout capacity. The data was analysed by using SIDRA Intersection 4.0 by which the results before (base condition) and after the implementation of signal metering strategy were compared. The results indicated that use of signal metering has a significant impacts in improving the capacities and the queue lengths of the controlling approach ($t(6) = 3.610$, $p = 0.011 < 0.05$). However, due to excessive traffic flow demands occurred at roundabout for the time intervals studied, the application of signal metering system yielded negative benefits for the metered approach and worsen the overall performance of the studied roundabout. The results provide good insights on the application of signal metering to improve roundabout performance due to unbalanced flow conditions provided that the traffic demands do not exceed the recommended range for an effective application.

Keywords: *roundabout capacity, unbalanced flow pattern, signal metering, queue length, average delay*

1D COMPRESSIBILITY OF DMS TREATED WITH CEMENT-GGBS BLEND

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Abstract

Great quantities of dredged marine soils (DMS) have been produced from the maintenance of channels, anchorages and for harbour development. DMS have the potential to pose ecological and human health risks and it is also considered as a geowaste. Malaysia is moving towards the sustainability approach and one of the key factors to achieve it is to reduce waste. Thus, this geowaste should be generated as a new resource to substitute soil for civil works such as for land reclamation and backfilling. This shows the improved settlement of consolidation in treated DMS. DMS is referred to as a cohesive soil which includes clayey silt, sandy clay, silty clay and organic clay. This type of soil has low strength and high compressibility. The objectives were achieved through literature review analysis and also laboratory test which was one dimensional oedometer test. On the other hand, treated DMS with more ground granulated blast furnace slag (GGBS) gives a lower settlement compared to specimen with higher percentage of cement in a treated soil. Thus, this shows that cement content can be reduced in soil solidification when GGBS is added. The optimum binder ratio found was 3:7 where 3 is cement and 7 is GGBS.

SUITABILITY OF COCONUT SHELL CONCRETE FOR PRECAST COOL WALL PANEL – A REVIEW

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Abstract

The cost for producing concrete has been increasing steadily. Therefore, the demand for using agricultural waste as a replacement or admixture inside concrete is also increasing gradually. Many researchers are doing research on agricultural waste such as palm oil, corn cobs, rice husks and coconut shells. Agricultural waste is increasingly being utilized in cement, concrete and other construction materials and provides numerous indirect benefits such as reduction in land fill cost, saving energy and protecting the environment from possible pollution. The aim is to produce concrete with improved properties at a lower cost and to maintain environmental sustainability. In this review paper, the suitability of coconut shell for concrete cool wall panels will be the main focus. Coconut shells can be used as aggregates in concrete. The characteristic properties of coconut shell concrete such as workability, bulk density, compressive strength, flexural tensile, water absorption and thermal performance were reviewed in this paper. This paper attempts to answer whether coconut shell is suitable to be used in concrete to produce a concrete cool wall panel in order to reduce heat transfer inside a building.

TRMM SATELLITE ALGORITHM ESTIMATES TO REPRESENT THE SPATIAL DISTRIBUTION OF RAINSTORMS

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Abstract

On-site measurements from rain gauge provide important information for the design, construction, and operation of water resources engineering projects, groundwater potentials, and the water supply and irrigation systems. A dense gauging network is needed to accurately characterize the variation of rainfall over a region, unfitting for conditions with limited networks, such as in Sarawak, Malaysia. Hence, satellite-based algorithm estimates are introduced as an innovative solution to these challenges. With accessibility to dataset retrievals from public domain websites, it has become a useful source to measure rainfall for a wider coverage area at finer temporal resolution. This paper aims to investigate the rainfall estimates prepared by Tropical Rainfall Measuring Mission (TRMM) to explain whether it is suitable to represent the distribution of extreme rainfall in Sungai Sarawak Basin. Based on the findings, more uniform correlations for the investigated storms can be observed for low to medium altitude (>40 MASL). It is found for the investigated events of Jan 05-11, 2009: the normalized root mean square error (NRMSE = 36.7 %); and good correlation (CC = 0.9). These findings suggest that satellite algorithm estimations from TRMM are suitable to represent the spatial distribution of extreme rainfall.

A COMPREHENSIVE REVIEW ON THE EFFECTIVENESS OF EXISTING NOISE BARRIERS COMMONLY USED IN THE RAILWAY INDUSTRY

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Abstract

Nowadays, advanced development and sophisticated new technology have led to various types of environmental pollution such as water, air, land, thermal pollution and so on. Recently, however, noise pollution is becoming one of the major threats to the world especially in urban areas where it adversely affects the quality of life of the public. In Malaysia, the Department of Environment has identified that the average transportation noise levels in major cities in peninsular Malaysia are 71.6 dB (A) and 70.4 dB (A) during the day and night respectively. The noise is usually emitted by airplanes, trains, vehicles, motorcycles, trucks and etc. Even though rail transport requires less energy and emits less hazardous substances, it has contributed to noise pollution issues and several health hazards among urban inhabitants such as deafness, nervous breakdowns, mental disorder, heart troubles, high blood pressure, headaches, dizziness, inefficiency and insomnia. Therefore, many studies attempt to reduce noise pollution by applying noise barriers at noise polluted areas via various approaches. This paper aims to explore the effectiveness of noise barriers using noise absorption performance due to several factors such as type of absorbent materials, material thickness, density, porosity and design. This research has found that the thicker the specimen and the denser the absorbent material, the better the sound absorption performance. Besides that, barrier design also plays a major role in determining its effectiveness, where the effectiveness of noise barriers should be high and long enough to break the line-of-sight between the sound source and the receiver. There are several methods that can be used to measure the effectiveness of noise barriers such as the Adrienne Method (in-situ measurement method) and impedance tube method (laboratory measurement method) to measure the acoustic absorption. Nevertheless, the impedance tube measurement method provides the most precise results with the least measurement uncertainty as it only required small samples of the material.

ESTIMATION OF SHEAR WAVE VELOCITY USING 1-D MULTICHANNEL ANALYSIS OF SURFACE WAVES (MASW) AND SHEAR MODULUS OF PEAT

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Abstract

In geotechnical earthquake engineering problems, dynamic soil properties determination is a critical task. Shear wave velocity (V_s), and shear modulus (G) are fragments of dynamic soil properties. This study focused

on the peat shear wave velocity determination using 1-D multichannel analysis of surface waves, the in-situ density using the peat sampler and the shear modulus estimation using empirical formula. The study was conducted at Parit Nipah, Johore and Penor, Pahang as it contains a large composition of peat. The result of the study indicates that, the peat shear wave velocity ranged from 30.4 m/s to 43.8 m/s for Parit Nipah and 43.4 m/s to 105.8 m/s for Penor. While the peat density ranged from 1.00 g/cm³. to 1.24 g/cm³. for Parit Nipah and 0.72 to 1.36 g/cm³. for Penor. The peat shear modulus, Gmax for Parit Nipah ranged from 736.0 kPa to 2589.6 kPa and 1474.7 kPa to 11265.0 kPa for Penor. The results indicate that the peat shear wave velocity was affected by the changes in peat soil density, while the peat density was governed by the depth. The peat shear modulus value was directly proportional to the peat shear wave velocity. Finally, the slight variation in results obtained might be due to the heterogeneity of peat.

Paper No: EC095

CONCEPTUAL MODEL FOR SYSTEMATIC CONSTRUCTION WASTE MANAGEMENT

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Abstract

Development of the construction industry generated construction waste which can contribute towards environmental issues. Weaknesses of compliance in construction waste management especially in construction site have also contributed to the big issues of waste generated in landfills and illegal dumping area. This gives sign that construction projects are needed a systematic construction waste management. To date, a comprehensive criteria of construction waste management, particularly for construction project in developing countries such as Malaysia is still not systematically defined. Therefore, construction waste management needs further investigation. This paper aims to explain a concept model for systematic construction waste management in the Malaysian construction industry. The methodology of this paper is through literature and previous research focusing on current practices of construction waste management, the barriers of construction waste management implementation and the additional factor for implementing systematic construction waste management in order to develop a conceptual model. Findings from this study will help to find out the elements required to implement systematic construction waste management in Malaysian construction industry. This action seems significant to the participants in prioritizing construction waste management more systematically. The implementation also will increase the awareness and better understanding of the construction players of the importance of construction waste management in construction projects.

BIOCLIMATIC HOME COOLING DESIGN FOR ACCEPTABLE THERMAL COMFORT IN MALAYSIAN CLIMATE

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Abstract

This study investigates the applicability of hydronic radiant cooling system charged with night cooled water in combination with Earth Tube Heat Exchanger (ETHE) to cool down a residential building in Malaysia. Through the use of building simulation program it is possible to design an environmentally friendly or bioclimatic building where sustainability has become crucial element in building development. The hybrid system takes advantage of the readily available heat sink source such as the night sky and cooler ground to passively cool down a residential building. The annual simulation using Energy Plus program shows that 95% of the time the building occupant could expect an indoor operative temperature of not more than 28.5°C. The hybrid system was able to meet the thermal comfort standard set by ASHRAE Standard 55 and ISO 7730. The hybrid system was also able to improve the base case operative temperature of 33.5°C to 28.5°C. Simulation on energy spent shows that as much as 95% energy could be saved by using the hybrid system. This level of saving is not impossible as renewable night cooled chill water was used to charge the indoor radiant cooling system in place of an energy guzzling air conditioning compressors.

THE EFFECTIVENESS EM MUDBALL AND BANANA PEELS FOR TEXTILE WASTEWATER TREATMENT

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Abstract

Textile industrial activities known as a higher consumer of water that involved several processed daily to maintain the quality of fabric that contribute to the water pollution. Wastewater produced from the textiles could lead to the presence of heavy metal contaminant. Meanwhile, heavy metal is one of the contaminants in wastewater and must be overcome with the appropriate treatment process. To overcome the heavy metal issue, the absorption method by organic waste could be used. Effective microorganism (EM) mudballs and banana peels is a method for threatening wastewater quality from textiles effluent. EM is a medium that is able to improve water quality without altering the design area while the banana peels act as a nutrient to microorganism growth and have a potential to removed heavy metal contaminant that produced from textiles wastewater. Method that used to carry out this study are through the laboratory experimental for all consider parameters. The result was obtained shows that EM mudball itself are capable to reduce the concentration of BOD and COD as much as 84% for BOD with the value reduced to 37 mg/L and 90% for COD with the value reduced to 89 mg/L. The effectiveness of banana peels added to the EM mudball could be seen by the 70% of banana peels are well mixed with the EM mudball have the potential to reduce the concentration of BOD, COD and heavy metal contaminant in textiles wastewater as much as 81% for BOD (43 mg/L), 90% for COD (87 mg/L), and 86% of Zink (Zn²⁺) with the value is 0.065 mg/L. From the comparison of result with the standard.

OIL AND GREASE (O&G) REMOVAL FROM COMMERCIAL KITCHEN WASTE WATER USING CARBONISED GRASS AS A KEY MEDIA

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Abstract

Oil and grease (O&G) are usually found in kitchen waste water. O&G are poorly soluble in water and can cause serious problems during the wastewater treatment. Adsorption is a fundamental process in the treatment of kitchen waste water and very economical. Activated carbon is the most effective adsorbent for this application. Therefore, the aim of the current study is to determine the potential of four materials (i.e. sand, gravel, carbonised grass (CG) and clay powder) as filter media for O&G removal. The CGs were originated from “Elephant Grass” and it is a fast growing plant with significant potential as carbon. The clay acts as a magnet, drawing the oil molecules out of the water and causing them to attach to the surfaces of the clay. In the current study, two filters were developed with different media materials to get the best percentage removal. Filters 1 and 2 were filled with sand, gravel and CG, and sand, gravel, CG and powder clay, respectively. Three samples were taken during peak hour between April and May 2016. The initial O&G concentration varied from 101.37 mg/l to 248.30 mg/l and the final concentration varied from none to 22.57 mg/l for both filters. The percentage removal (%) of O&G were between 90.9 and 97.3 (Filter 1) and between 94.3 and 100 (Filter 2). Overall, both filters could efficiently remove O&G in the waste water and the quality of the carbonised grass proved to be as good as carbon produced from other traditional sources.

CRITICAL FACTORS IN SECURING FINANCE FOR PFI PROJECTS IN MALAYSIA

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Abstract

The Private Finance Initiative (PFI) is seen as an alternative procurement method for developing public infrastructure projects. The PFI scheme requires the private sector investment in public infrastructure projects. The private sector faces challenges in securing capital, and fulfilling financial requirements with attractive terms and conditions, which are cost-effective. This paper aims to explore the sources of financing available for PFI projects and to understand critical factors affecting financing requirements for PFI projects in Malaysia. Structured questionnaires were distributed to licensed financial institutions in Malaysia. The results show that the two financing options available in Malaysia are conventional and Islamic financing, and most financing facilities offered are term loan and Istina respectively. The analysis indicates that project risks, project viability, and the company's financial strength are among the most critical factors that the financiers consider before granting any financing for the PFI projects. The findings may be valuable to the PFI key players, particularly in enhancing ways to securing finances.

PRODUCTION AND CHARACTERISATION OF ULTRAFINE SIZE PALM OIL FUEL ASH (POFA) ORIGINATED FROM BAU, LUNDU PALM OIL MILL

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Abstract

This paper presents the production and characterisation of ultrafine size palm oil fuel ash (POFA) from Bau, Lundu. A laboratory scale production by using electric powder grinder has been carried out. The raw POFA obtained from the palm oil mill was first grinded by using Los Angeles abrasion machine, then POFA is sieved using 150 μm sieve before burning in furnace at 500°C. The burned POFA was then grinded by using electric powder grinder to obtain the ultrafine sized. The characterisation of ultrafine sized POFA in the form of cement paste were analysed through several experiments such as Particle Size Analyzer (PSA), nitrogen sorption by using BET method, Fourier Transform Infrared Spectroscopy (FT-IR) and Scanning Electron Microscopy (SEM) with Energy Dispersive Spectroscopy (EDS).

Keywords: *production, characterisation, ultrafine size palm oil fuel ash (POFA)*

A REVIEW ON IMPLICATION OF MATERIAL MANAGEMENT TO PROJECT PERFORMANCE

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Abstract

Material management is an important element in project management as materials contribute a major portion to total project cost. It also plays a key role because of the successes of every construction project rely on having proper resources. Thus, it gives implication on project performance. Despite the importance of material management to project performance, there are limited numbers of research available related to this topic. Therefore, the aim of this paper is to identify the effects factors of material management on project performance. Literature from books, journal articles and conferences papers related to this topic are reviewed. In conclusion, exploring the implication of material management towards project performance will benefit construction players in improving the efficiency of material management in order to minimize the impacts on construction projects performance.

SCREENING OF GEOMECHANICAL RISKS FOR MALAYSIAN DEVELOPMENT FIELD

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Abstract

Deeper drilling and exploitation of difficult reservoir is the new trend in oil and gas industry. Geomechanics study has, therefore, become a new requirement particularly for oil and gas field development. However, a complete geomechanics study is limited with the number of experts, time consuming and not a straightforward task. Therefore, there is an urgent need of a quick geomechanics screening criterion to be used as a standard guideline to evaluate the high level geomechanical risks and suitable analysis can be recommended for the identified development fields. The aim of this paper is to propose a screening criterion for geomechanical risks study based on four key parameters, drilling, depletion, injection and storage and sand production. The screening approach is designed based on Risk Assessment Matrix (RAM) risk screening where the likelihood is based on a set of scores developed to specific questions. The consequence for each failure scenarios is assessed based on educated estimation of the impact towards people, asset, environment and reputation. Recommendations for geomechanical study are made based on the severity of each failure category on the RAM risk matrix. Fourteen development fields in offshore Peninsular Malaysia, offshore Sarawak and offshore Sabah are selected for the assessment. Based on results, fields in offshore Sarawak and Sabah have higher potential for geomechanical issues mainly because of their geological settings and formation characteristics. A set of geomechanical study is proposed for each individual field for prudent management of potential geomechanics risk associated with the depletion and EOR injection scheme planned for the fields.

EFFECTIVENESS OF MANGROVE FOREST AS COASTAL PROTECTION ALONG THE WEST COAST OF NORTHERN PENINSULAR MALAYSIA

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Abstract

The effectiveness of mangrove forest as coastal protection was evidenced during Indian Ocean Tsunami (IOT) on 24th December 2004. This paper presents the assessment on the characteristics and distribution of the mangrove forest along three northern states (Perlis, Kedah and Perak) affected by IOT 2004. At each site, the characteristics of individual tree were recorded including their species, height and diameter at breast height (DBH). A total of 52 matured trees were sampled that encompassing four species; *A. marina* (n=21), *A. alba* (n=7), *R. mucronata* (n=20) and *R. apiculata* (n=4) were found with *A. marina* as the dominant species. The zonation of mangrove forest along the northern states revealed that *Avicenniacea* inhabits the frontal area. The field survey also discovered that mangrove forest along the states was generally insufficient to protect the coastal area from future tsunami. There were several rehabilitation programs that had been implemented, but not all replanting efforts were successful. Outcomes from this research provided invaluable findings for the optimum replanting scheme to ensure acceptable level of protection along Malaysia's coastline.

APPLICATION ON BUILDING INFORMATION MODELLING (BIM) IN DESIGN AND BUILD (D&B) PROJECTS IN MALAYSIA

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Abstract

Design and Build (D&B) is one of the most suitable type of project delivery method that being used in implementing BIM. However, there is a lack of documented evidence to show on how BIM is being implemented in D&B project. This paper is aimed to explore on the current practices of BIM in D&B projects in the Malaysian construction industry. A literature review was done to explore on application on BIM in construction projects and D&B project concept. Furthermore, semi-structured interviews with construction players were conducted as a primary data for this paper. The interviews were conducted with construction players that currently involved and have experienced in D&B BIM projects. Findings for this paper revealed that the process of BIM in D&B projects is much similar with activities in D&B conventional project. The differences were by the used of BIM software, the process of developing project design into a 3D model and the involvement of BIM related designation in the project. In addition to that, the process of BIM in D&B has been highlighted in this paper.

Keywords: *Building Information Modelling (BIM), Design and Build (D&B), Current Practices, BIM Uses, Construction Players, Malaysia*

GLOBAL WARMING POTENTIAL OF A RESIDENTIAL BUILDING CONSTRUCTION IN MALAYSIA USING THE LIFE CYCLE ASSESSMENT (LCA) APPROACH

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Abstract

Building industry consumes substantial natural resources and produces considerable greenhouse gas emission. This paper presents a life cycle assessment approach to assess global warming potential (GWP) of a residential building in Malaysia. The results show that building element that uses a cement-based material such as concrete contributed the highest GWP in comparison to other materials. In the construction phase, temporary timber formwork has the highest GWP. The results also show that the semi-detached house has higher GWP per m² compared to flats. The findings from this research can serve as the benchmark for LCA for buildings in Malaysia.

DIMENSIONALITY ANALYSIS OF TECHNICAL COMPETENCY FOR MALAYSIAN CONSTRUCTION MANAGERS

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Abstract

Gap has been found regarding the provision slated for construction managers in Malaysia's construction industry. Non-existence of term of reference for construction manager's competency profile are dictated as a major hindrance. Therefore, a comprehensive research was dedicated to unfold the rudimentary by focusing on their technical competency as a central phenomenon. In this instalment, further deliberation will emphasise on the subsequent works which leads to establishment of technical competency of construction manager (TCCM). Here the question of 'How?' lingered to the authors, especially when 'dimension' is being considered. Therefore, the authors only reported on the issue of dimensionality in this paper through analysis by using Rasch model since it is the utmost concerned for prior central phenomenon in hand. In short, interestingly, Rasch analysis outlaid quite different perspective especially on items PR9 (Knowledge of Lean Construction), PR8 (Knowledge of Constructability), and PR7 (Knowledge of Value Engineering). Those items represent the current knowledge on construction concepts which considered important to be equipped by the construction manager. Finally, the authors posited that all items were to be retained until further analysis of significance are conducted through classical test theory, in order to confirm the removal of construction managers' technical competency item(s).

Keywords: *dimensionality analysis, Rasch model, technical competency, construction manager*

WORKABILITY AND COMPRESSIVE STRENGTH FOR CONCRETE WITH COCONUT SHELL AGGREGATE

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Abstract

This study was conducted to investigate the compressive strength and workability of concrete added with coconut shells. Comparisons were made between conventional concrete with concrete mix coconut shell. In this study, the concretes were mixes with coconut shell by percentage of weight concrete which is 0%, 5%, and 10%. The coconut shell has been crushed first, then it was sieved, to get the optimum size which, that retained on the 5mm sieve and passing 10mm sieve. Experimental tests conducted in this study are slump test and compressive test. The results from this study are workability of concrete added with 0% and 5% of coconut shell has medium degree of workability compared to concrete added with 10% that has low workability. For the compressive strength, the concrete added with 5% and 10% of coconut shell has lower strength compared with normal concrete.

PROPERTIES OF CONCRETE MIXES WITH CARWASH WASTEWATER

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Abstract

The rapid growth of the car wash industry today results in the need for wastewater reclamation. Thus, this paper aims to investigate the effect of using car wash wastewater on concrete properties in terms of mechanical properties. The basic characteristics of wastewater were investigated according to USEPA (Method 150.1 & 300.0) while the mechanical properties of concrete with car wash wastewater were compared according to ASTM C1602 and BS EN 1008 standards. In this research, the compressive strength, modulus of elasticity and tensile strength were studied. The percentages of wastewater replaced in the concrete mix ranged from 0% up to 40%. In addition, the results also suggest that the concrete with 20% car wash wastewater achieved the highest compressive strength and modulus of elasticity compared to other compositions of wastewater. Moreover, the results also recommended that concrete mixed with car wash wastewater has better compressive strength compared to conventional concrete.

THE EFFECT OF AGGREGATE CONDITION DURING MIXING ON THE MECHANICAL PROPERTIES OF OIL PALM SHELL (OPS) CONCRETE

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Abstract

One of the key characteristics affecting the properties of OPS concrete is the saturation condition of the coarse aggregates used during mixing. In this current study, the effect of different aggregate saturation conditions during mixing on the slump, compressive, flexural and splitting tensile strength of OPS concrete was investigated. Three aggregate saturation conditions were employed, namely saturated-surface-dry (SSD), air-dry (AD) and sun-dry (SD). The results revealed that the SD mix had a higher slump value than AD mix and SSD mix. On the other hand, SSD mix registered better compressive, flexural and splitting tensile strength compared to the AD and SD mix. This suggests that the use of SSD aggregates is more effective in producing higher strength concretes which could be credited to the internal curing provided by the SSD aggregates.