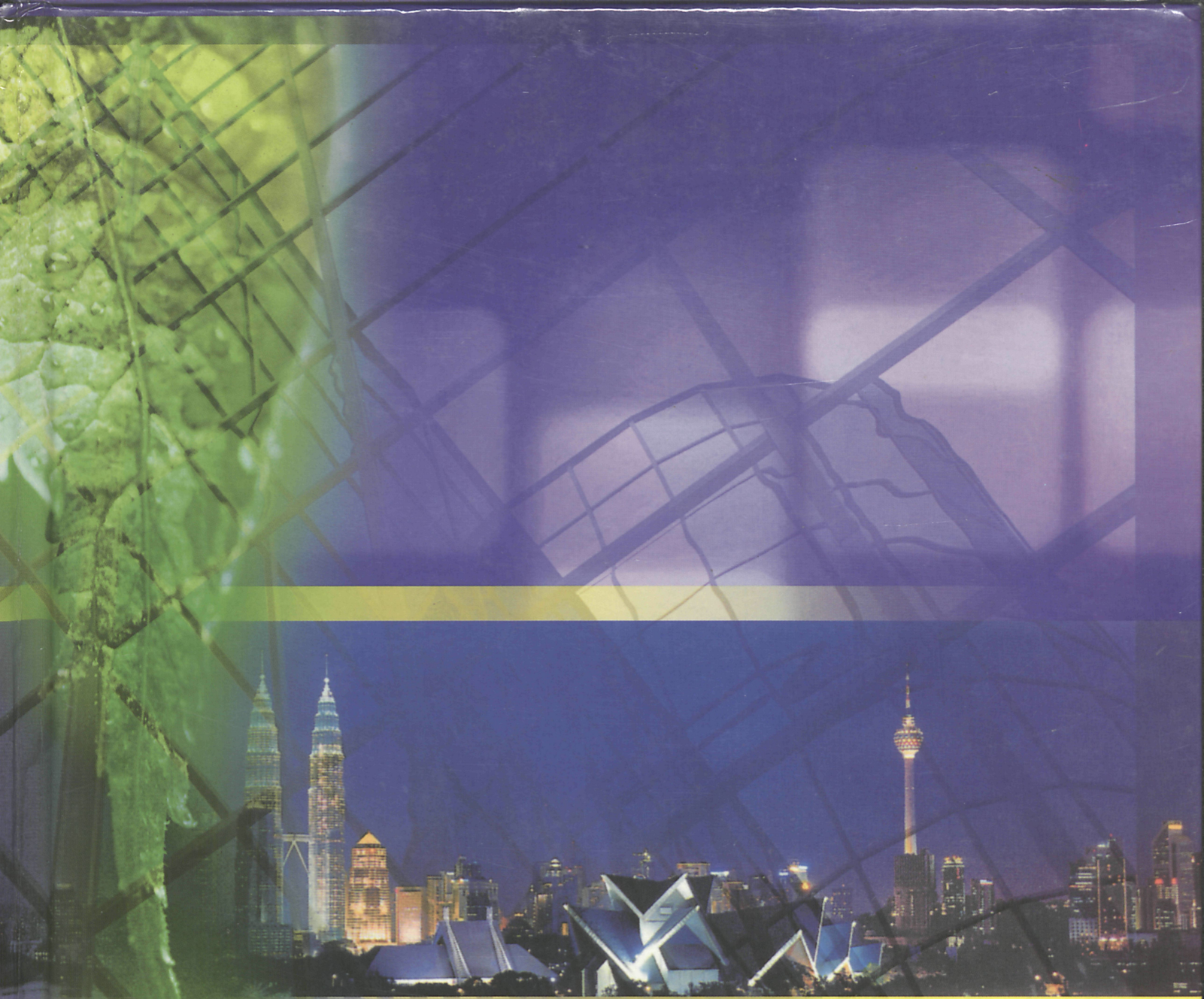

A Collection *of* Abstracts

Universiti Teknologi MARA

Faculty of Civil Engineering

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Universiti Teknologi MARA

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PANEL OF EDITORS

FOREWORD

The true strength of a Faculty is not reflected in the number of teaching staff or just on the physical facilities but more on the academic activities of the staff. Though teaching has been the main function of the academic staff at the Faculty of Civil Engineering, Universiti Teknologi MARA (UiTM), research activities were not neglected. Academic writings produced by the Faculty have been consistently presented at conferences and published in various journals during the years even when UiTM was known as Institut Teknologi MARA (ITM).

Since acquiring University status, research activities at the Faculty have increased markedly. More papers are being presented and published. The Faculty felt that a proper record of papers produced should be kept, thus this collection of abstracts is intended to serve that purpose. Apart from that, it will also serve as a valuable reference for junior members of the Faculty not only for finding a starting point in doing research but also to get an insight of what the Faculty had achieved prior to their joining the Faculty.

The subject of writings covered the main areas of civil engineering. The papers were categorized to reflect the four main divisions within the Faculty. These divisions are Geotechnical, Highway and Survey Engineering; Structural and Computer; Water Resources and Environmental Systems; Construction Engineering and Project Management. An additional category was added to include writings on the subject of engineering education. This reflects that though civil engineering is the main area of our expertise, issues related to teaching and learning is close to the hearts of our Faculty members.

I wish to express my appreciation to all members of the Faculty for all their hard work that had resulted in numerous publications which is manifested in this collection of abstracts. Most of all, I wish to congratulate the Editors for their commitment in undertaking the task of compiling these abstracts.

It is my sincere hope that the documentation of academic works at the Faculty does not stop here, future compilation of this nature should be published periodically as the Faculty anticipates more papers will be presented and published in the near future.

Assoc. Prof. Ir. Dr. Mohd Yusof Abdul Rahman
Dean,
Faculty of Civil Engineering
Universiti Teknologi MARA

PREFACE

This collection of abstracts represents the academic activities undertaken by the staff members at the Faculty of Civil Engineering, Universiti Teknologi MARA. The editors feel that the works contributed by Faculty members are a true reflection of the achievement of the Faculty, thus it should be properly recorded in a permanent form.

The idea of compiling the abstracts arises from the concern that many of the earlier works by senior members of the Faculty would go missing if they were not properly documented.

Judging from the finished product, i.e., A Collection of Abstracts, one might get the impression that the task of compiling the abstracts is relatively simple. This relatively simple task took the editors one and half years to "complete". However, with humility, the editors must admit that the abstracts collected here do not represent the entire collection of academic writings by our Faculty members. The editors have tried their level best to retrieve the abstracts from Faculty members. The busy schedule of Faculty members, especially our senior professors made it difficult for them to locate some of their earlier papers. In addition to that, many abstracts written by staff no longer with the Faculty could not be located.

The collection that we have here represents papers that were published up to the end of year 2002. The editors realize that the collection and compilation of abstracts is an on-going task, therefore we, the present editors or other faculty members will continue collecting these abstracts and publish them periodically.

We hope that our humble efforts to collect and compile these abstracts would benefit the present and future Faculty members and the civil engineering community in general.

Finally we would like to express our sincere appreciation to all faculty members for their cooperation especially Pn. Hasnah Abdullah for her patience in typing and re-typing the draft.

The Editors
Faculty of Civil Engineering
Universiti Teknologi MARA

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Bahardin Baharom[1]
S.E. Stallebrass[2]

ABSTRACT

The paper describes how dissipation functions and yield surfaces derived by considering the microscopic mechanisms of particle deformation and particle rearrangement of sands (Chandler, 1985) can be combined with the volumetric constraints of the framework of Critical State Soil Mechanics (Schofield and Wroth, 1968) to give a model that provides a consistent link between the features of the shear deformation of sands at large strain and the volumetric state of the sand. The difficulties of relating microscopic parameters used to formulate yield surfaces and flow rules to conventional macroscopic critical state parameters are discussed. The potential of the approach is demonstrated by comparison with laboratory test results.

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[1] Faculty of Civil Engineering, Universiti Teknologi MARA, Shah Alam, Malaysia.
[2] City University, London, UK.

4th European Conference on Numerical Methods in Geotechnical Engineering, Udine, Italy, October 1998

ANALYSIS AND DESIGN OF MACHINE FOUNDATION

Bahardin Baharom

ABSTRACT

For the design of foundations supporting machinery which may act as a source of vibrations, or foundations which may be subjected to vibrations from elsewhere, the resonant frequency of the machine-foundation-soil system and the amplitude of vibration must be determined. An elementary concept of vibration of foundation-soil system is represented by a mass m, a spring constant k and a viscous damping c excited by a sinusoidal force.

Two approaches in the determination of dynamic response of foundations on soil will be covered and a solution for the evaluation of the dynamic response of a block type foundation on the surface of a soil mass will be given.

Kursus Kejuruteraan Tanah dan Asas bagi Jurutera FELCRA, Shah Alam, 4-7 Julai 1994

ASSESSMENT ON THE EFFECTIVENESS OF SPEED HUMP DESIGN

Mohd Yusof Abdul Rahman
Bahardin Baharom

ABSTRACT

Reckless driving is one of the major human factors, which contribute to the high rate of road accidents in this country. Accident statistics recorded that about 45% was due to speeding. This information verifies that, "Speed Kill". Thus, traffic calming devices, like transverse bar, speed hump, textured road surfaces are treatment used to slow down vehicular speeds.

This paper focuses on the various type of speed hump design currently being implemented for speed reduction. Spot speed data before and at-hump were collected and analysed. The distance before the speed hump is being determined based on the type of road, design speed and the stopping sight distance. The 85 percentile and 15 percentile values of spot speeds were deduced and used as bench marking. Speed reduction between 35% – 48% were observed and recorded depending on its vertical displacement.

The study showed that vertical displacement could be an effective approach for speed reduction. However, the investigation also revealed the needs to comply with a minimum and maximum vertical displacements in order to setback the negative effects of the hump to the motorists and their vehicle.

Seminar Keselamatan Jalanraya (MKJR), Wilayah Persekutuan
Kuala Lumpur, 29 Oktober 2001

DEVELOPMENT OF A NEW MODEL FOR COARSE GRAINED SOILS

Bahardin Baharom

ABSTRACT

The Cam-clay model based in the framework of Critical State Soil Mechanics was originally developed to model the behaviour of fine-grained soils. Over the last 20 years, a large number of modifications have been proposed to a Cam-clay model to achieve better agreement between the predicted and observed soil behaviour. These models work well for fine-grained soils. However, they are less satisfactory for modeling the behaviour of coarse-grained materials. The objective of this work is to develop a new critical state soil model suitable for coarse grained soils that takes into consideration the two mechanisms of plastic deformation, particle rearrangement and particle breakage.

Fifth BGS Young Geotechnical Engineers Conference, Newcastle, 30 March – 1 April 1998

DEVELOPMENT OF A NEW MODEL FOR COARSE GRAINED SOILS

Bahardin Baharom

ABSTRACT

The presentation outlines behaviour of coarse grained soils at high stress levels. A comparison between test data and model prediction for an undrained and drained tests on Dog's Bay sand is shown. In undrained test, the model predicts a purely elastic behaviour before the soil reaches its previous maximum stress state. At that stage the soil started to yield inside the state boundary surface before reaches critical state. However in drained test, the truly over consolidated sample shows a very stiff behaviour initially because a lot of particle breakage already happened during isotropic compression to higher stress and in compacted sample breakage happened during shearing. Model prediction for both samples were shown herein.

3x3 Workshop on Prediction and Performance in Geotechnical Engineering, Napoli, Italy, 13 – 19 April 1998

DEVELOPMENT OF A CONSTITUTIVE MODEL FOR COARSE GRAINED SOILS

Bahardin Baharom

ABSTRACT

The Cam-clay model based on critical state theory was originally developed to model the behaviour of fine-grained soils. Over the last 20 years, a large number of modifications have been proposed to the Cam-clay model to achieve better agreement between the predicted and observed soil behaviour. These models, including the recently developed three surface kinematic hardening model (Stallebrass, 1990) or the bricks and strings model (Simpson, 1992) work well for fine-grained soils. However, they are less satisfactory for modeling the behaviour of coarse-grained materials. The problem with using the existing Cam-clay models is that they cannot predict the softening and dilatancy behaviour of dense sand and the undrained behaviour of loose sand. The lack of success in applying the critical state concepts to coarse-grained soils is also due to the experimental difficulty in obtaining the normal compression line and the critical state line for these materials.

British Geological Society Young Geotechnical Engineers Symposium, Oxford, UK, 1-3 April 1996

EARTH RETAINING STRUCTURES

Bahardin Baharom
Mohd Jamaludin Md Noor

ABSTRACT

The major problems in the design of earth retaining structure is the determination of the magnitude and distribution of the forces that the soils exert or transfer to them. These forces are either induced by the action of the gravity (the body forces) or are resultants of the combined action of the body forces, applied loading and others such as dynamic loading. The knowledge of this forces, or their estimates, enables the engineer to design individual components of these structures and to check their overall stability and hence their safety against all possible modes of failure.

This paper will discussed the different types of retaining structures used in solving earth retaining problems and the methods of evaluating loads on the structures and the design considerations. The concept of earth pressures will be briefly reviewed.

Kursus Kejuruteraan Tanah dan Asas bagi Jurutera FELCRA, Shah Alam, 4-7 Julai 1994

EFFECTS PF SLOPE LENGTH AND STEEPNESS WITH REGARDS TO SOIL EROSION

Roslan Zainal Abidin[1]
Tew Kia Hui[2]

ABSTRACT

Cameron Highlands, an idyllic highland resort in Malaysia possesses many steep slopes to which are nowadays developed either into vegetable farms or tea plantations. However, with the rapid pace of development in this highland resort recently, many hillslopes has been gazetted to pave way for development projects which include construction of residential houses and hotels, apartments and golf courses. As a price that we have to pay for developing the hillslopes too rapidly without taking proper mitigating measures, a space of landslips and flash floods in this famous highland resort had since occurred lately to which incurred loss of lives as a call from mother nature to remind and create awareness of the public about the ill-effects of overdevelopment in the highland resort areas.

Though development in highland areas that brings benefit to the country should be carried out especially to enhance tourism in this country, it should, however be environmentally sound and sustainable. In this regard, a case study on the determination of Slope Length and Steepness factor (LS) of the Universal Soil Loss Equation (USLE) is certainly timely as this parameter emphasizes on the effects of slope length and steepness in the study area and the impacts it has on the amount of soil erosion loss. Determination of the LS factor has been carried out using the topographic maps with information on the contours in the study area. With respect to this study, the Tringkap location in Cameron Highlands has been found out as having the highest erosion risk/loss based on the LS factor of the USLE. This can be well supported and justified by the fact that this location recorded the highest ranking for areas having steep slopes (LS>20). Conversely, the Boh Tea Plantation location shows the lowest erosion risk with only 11.21% of this area have steep slopes (LS>20). Furthermore, this location is rather flat with undulating slopes. Results of this study potentially highlights some of the steep slopes areas at various location in Cameron Highlands as it would give some indication about the possibility of future erosion risk/loss in time to come. Coupled with this knowledge of the LS factor, a better information for the State and Federal Government and developers on carrying out proposed project developments so that these developments could be carried out at the areas with the least erosion risks or proper safety measures should be implemented and undertaken if there is no choice of developing any new projects at high potential erosion risk areas.

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The 7th (1997) Annual International Offshore and Polar Engineering Conference, Honolulu, Hawaii, 25-30 May 1997.

ENVIRONMENTAL IMPACT ASSESSMENTS AND URBAN TRANSPORT PLANNING PROCESS

Haron Ismail
Suhaimi Abdul Talib
Junaidah Ariffin

ABSTRACT

Transportation is influence by, and influences the urban environment. The Environment Impact Assessment (EIA) is an important component in the implementation of urban transport project.

Ismail (1990a), have identified that a shared set of: 'mobility', 'energy', and 'the environment' can be applied to examine environmental impacts associated with urban transport projects. These elements do differ for developed and developing countries. Impact categorisation using these elements must be incorporated in the Urban Transport Planning (UTP) process when applied to developing countries.

Further, a general methodology of impact analysis, assessment and evaluation are presented herein.

Keywords: Environmental Impact, Assessment, Urban Transport Project.

ESTABLISHMENT OF SOIL EROSION SCALE WITH REGARDS TO SOIL GRADING CHARACTERISTIC

Roslan Zainal Abidin
Mazidah Mukri

ABSTRACT

Several research had been done by various government and private agencies for instant Department of Irrigation and Drainage, Department of Agriculture and Institution of Public Works related to soil erosion issues, nevertheless until to date, there is no research of this kind in establishing the soil erosion scale based on soil grading characteristics. Earlier researchers had successfully and clearly create the relationship between soil erosion features and its erodibility index. In this research, it is found that soil erosion scale can be established in linking the various soil erosion tragedy occurrence based on soil grading characteristics as used in Bouyancos equation. A sample from each soil erosion occurrence was taken and its grading characteristic identified. Using Bouyancos, the value of Erodibility Index (EI) can be obtained. From the EI value, a new equation, which is modified from Bouyancos equation, was developed successfully. This new equation is named as ROM (After the name of researchers, ROSLAN & MAZIDAH) equation. This equation is then used to get the new value of of EI_{ROM}, thus leading to the establishment of ROM Scale which indicates the degree of soil erosion tragedy. The ROM Scale will give a big contribution not only to the nation but also to the international scientific communities since it can be used internationally.

FARSIDE TERMINATING EXPRESS BUS TERMINAL FOR KLANG VALLEY

Zakaria Ahmad[1]
Mohd Yusof Abdul Rahman[2]

ABSTRACT

Bus terminal is an 'asset' to an area as it may acts as catalyst to economic and social development of the surrounding areas. However, a poorly planned and sited terminal for buses may generate traffic problems as well as deteriorating the quality of life of the affected surroundings. Kuala Lumpur is a good case study, where the influx of outstation buses into the heart of the city have cause unnecessary traffic problems. Experiences and outcomes from the stage bus study in Klang Valley [1] and the Express Bus Study [2], indicates that terminals for buses are preferably located at the fringe of the city boundary.

This paper looks into the aspect involving bus terminal as its location is related to land use (physical aspect). As with engineering and operational aspects of terminal facilities the focus would be on the design to fulfill traffic capacity requirement and operational efficiency to operators and passengers. The proposed far side terminating bus terminal model which located outside city center may have added advantages such as reducing unnecessary congestion and improving the environment. However the implementation of this model needs to be done in a coordinated manner. Thus, the focus of this paper are on the requirement aspects of site planning, engineering, operational and management of terminal.

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GEOTECHNICAL CONSIDERATIONS IN LANDFILL DESIGN

Haron Ismail
Bahardin Baharom

ABSTRACT

Landfills will remain a vital component of waste management strategy. Geotechnical consideration in landfill design is related to the effectiveness of waste containment while minimizing potential migration of waste materials. Generally, geotechnical aspects are related to factors such as permeability, settlement and slope stability and structural strength of landfill component such as impermeable base and side, leacheate collection system, engineered soil barrier, proper underlying geology and proper impermeable cover. However, the effectiveness of landfill is controlled by the geotechnical properties of these components particularly its permeability.

This paper, therefore, examines geotechnical considerations that control the effectiveness of the design landfills. Special emphasis is made on gas/air permeability, used for engineered soil barrier, impermeable base and sides, drainage medium for leacheate collection and impermeable cover.

Finally, several recommended practices and specifications in landfill design were outlined.

Keywords : Geotechnical Considerations, Landfill Design, Permeability

INTEGRATED MODELLING ON EFFECTS OF ONE DIMENSIONAL INFILTRATION ON THE STABILITY OF CUT SLOPES

Suhaimi Abdul Talib
Abdul Rahman Mahamood

ABSTRACT

Water infiltration into residual slope has been recognized as the main cause of slope failures in tropical countries.

A study was carried out on a homogeneous cut slope in ITM Shah Alam, Selangor Darul Ehsan. The study looks at the changes in moisture profiles in the slope during rainfall events. The moisture profiles in the slope were monitored by means of tensiometers.

An integrated model was developed based on the Green and Ampt equation to simulate the change in the moisture profiles for various rainfall events. This groundwater modeling assumes one-dimensional flow in an initially dry homogeneous profile.

The model then proceeds to show how the changes in moisture affect the stability of the slope.

Keywords : Green and Ampt, Moisture Profiles, One-dimensional Infiltration, Slope Stability

PILOT STUDY ON THE DEVELOPMENT OF AUTOMATED STRESS PATH TRIAXIAL TEST APPARATUS

Zainab Mohamed
Bahardin Baharom
V. Azad Chacko

ABSTRACT

The concept of a stress path has been around for many years as a practical engineering tool for the solution of stability and deformation problems of soils. Very often in the geotechnical engineering practice, if we understand the complete stress path of the problem, we are well along the way towards the solution of the problem.

In conventional triaxial apparatus, the axial stress is applied by strain-controlled loading and it is difficult to vary the axial stress in a controlled way. This pilot project will study the possibility of modifying the existing conventional triaxial test system in the Civil Engineering Laboratory to perform stress path test. By proper interfacing with a computer, the system can be made more flexible in performing other variations of triaxial tests. Emphasis has been made in this pilot study to design an interface module that will link the ADOS MM70 data acquisition system used with the conventional triaxial apparatus to a personal computer. The AutoLAB development system is used as software development tool on the MM700 data logger using a personal computer.

Seminar BRC 1998, Shah Alam, 1998, pp. 8-11

PROBLEMATIC SOILS AT TRAGEDIC AREAS IN MALAYSIA

Roslan Zainal Abidin[1]
Tew Kia Hui[2]

ABSTRACT

Soil erosion has become a very serious problem in Malaysia recently, and with the accelerated rate of land development both in the public and commercial sectors, this problem will certainly enhance and worsen unless proper planning and management of the utilization of land is adopted at the early stage of any proposal of land usage. Using the Field Erosion Plot established at Department of Irrigation & Drainage (DID) Ampang with soil samples taken at tragedic areas in Sepang, Batu Dam, Puchong, Highland Towers and Ulu Langat, an assessment on the soil erodibility factor (K), of the respective soil samples were conducted. By applying the Universal Soil Loss Equation (USLE), it is found out that the Sepang Soil have the highest K value. Obviously, this is an important step towards realizing the dream of standardizing erosion research results and it is hoped that the output of this research work would make some tangible new contribution to the scientific community in moving a step closer to better understnding and towards solving the severe problems of soil erosion.

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Problematic Soils, Yanagisawa, Moroto & Mitachi (eds) 1998 Balkema, Rotterdam, ISBN 90 5410 9971

RAINFALL ANALYSIS IN RELATIONS TO EROSION RISK FREQUENCY - CASE STUDY (CAMERON HIGHLANDS)

Roslan Zainal Abidin[1]
Tew Kia Hui[2]

ABSTRACT

Cameron Highlands, Malaysia's most famous and idyllic highland resort is nestled about 1829 meters above sea level among the Main Range of Peninsular Malaysia, which is also the smallest district in the state of Pahang and covers an area of 71,233 hectares (443 square kilometers). The cool temperature averaging between 10°C to 23°C makes it an ideal retreat for holiday makers. Seeing the advantages that Cameron Highlands had, the Pahang State Government has intentions of making Cameron Highlands a grand highland tourist attraction through development processes that are well balanced.

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RAINFALL ENERGY PRODUCTION IN RELATION TO SOIL EROSION OCCURRENCE

Roslan Zainal Abidin[1]
Tew Kia Hui[2]

ABSTRACT

Rainfall energy produced by a certain storm event could be expressed in index of EI_{30} which indicates the erosivity of the rain or well known as the Rainfall Erosivity Factor, R of the USLE. The factor E is the total energy for a rainfall and I_{30} is the rainfall's maximum 30 minutes intensity. Rain of less than 13 mm and separated from other rain periods by more than 6 hours are not included in the computations unless as much as 6 mm of the rain fall in 15 minutes. The variable EI_{30} is the product of the total energy for a rain and the rainfall's maximum 30 minutes intensity.

As rainfall erosivity has been a governing factor in causing soil erosion, a study has been carried out to determine the erosiveness of rainfall at various locations in Cameron Highlands, a famous hill resort in Malaysia. The location with the highest value of R would be classified as having the highest erosion frequency potential occurring and other locations would be ranked accordingly. Relationship between the intensity and rainfall to the rainfall energy would be taken into consideration in determining the erosiveness of the rainfall.

However, with thus area having basically more than 2000 mm of rainfall in a year, the rainfall plays an important role in causing erosion which would very much affect the development carried out there. This is due to the ability of rain to cause erosion that is attributed to its intensity and amount, both of which affect energy load of any rainfall event. From the result of rainfall analysis done, it is found out that in the month of November, year of 1988 and the rainfall station at Ladang The Blue Valley showed the highest erosion frequency. Therefore, with the knowledge of erosion risk frequency in Cameron Highlands from the analysis carried out on the rainfall datas, more attention and awareness in the form of providing sufficient erosion protection for areas having high frequency of erosion risk, better information for tourists and warning for others especially during monsoon seasons could be provided. Besides that, this sort of information could be brought to the attention of the government who is the policy makers in governing any future project development, thus protecting and preserving the environment of the country in liaise with the RIO DE JANIERO SUMMIT 1992.

Cameron Highlands has basically more than 2000 mm of rainfall in a year and in this context, rainfall plays an important role in causing erosion. The ability of rain to cause erosion risk is attributed to its intensity and amount, both of which affect energy load of any rainfall event. With the knowledge of erosion risk frequency in an area, more attention and awareness to provide sufficient erosion risk should be considered thoroughly so as to minimize soil erosion loss.

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RELATIONSHIP BETWEEN SOIL GRADING CHARACTERISTIC AND SOIL EROSION RISK

Roslan Zainal Abidin
Mazidah Mukri

ABSTRACT

Many research had been carried out by various government and private agencies related to soil erosion issues, nevertheless, there is no research of this nature in getting the relationship between soil grading characteristics and the possible risk of soil erosion. It had been clearly pronounced the relationship between soil erosion features and its erodibility index. In this research, it is found that the risk of soil erosion occurrence can be closely linked based on the results of soil grading characteristics. A few samples from each soil erosion sites was taken and its grading characteristic identified, "ROM" equation (After the name of researchers, ROSLAN & MAZIDAH) is then used to get the new value of EI_{ROM}, thus leading to the establishment of ROM Scale which indicates the degree of soil erosion risk.

RELATIONSHIP BETWEEN SOIL ERODIBILITY INDEX AND EROSION FEATURES (UiTM SHAH ALAM CAMPUS)

Roslan Zainal Abidin
Intan Rohani Endut

ABSTRACT

In line with the high mean annual rainfall of more than 1000 mm, soil erosion has become a serious problem in Malaysia. As the country rapidly growing towards industrialization, land development both in public and commercial sectors become dominant within the country. As a result, extensive land development took place without proper planning and awareness regarding the impact of the development on the environment. As the awareness on the impact of soil erosion increased, a research has been carried out to determine the soil erodibility index with regards to soil erosion features at Universiti Teknologi MARA (UiTM). UiTM like many other institute of higher learning is located in the outskirts of hilly area, which is exposed to severe soil erosion especially during the monsoon season. The research was carried out by physical reconnaissance around UiTM Shah Alam campus so as to give an indication of soil erosion features presents. In addition, laboratory testing on the particle size distribution of the soil samples collected at the respective locations around the campus was analysed so as to establish the soil erodibility index with regards to the soil erosion features encountered.

From the perspective of soil erosion features, hill erosion is obviously untraceable. Besides sheet and gully erosion, the occurrence of landslides with gully features is quite frequent. Subsequently, sheet erosion are much incorporated with the topographical nature as the slope are gentle, and gully, besides having low content of clay, they might be also influenced by management practices and formation of water flow channel which enhanced overland flow. From the relationship between soil erodibility and erosion features, landslides with gully features by indication does really fit with the soil erodibility as the values are within the range of moderate to high. On the other hand, sheet erosions show a close relationship between the feature and the erodibility indices. This feature and the respective values also topographically sound. Based on the methods of analysis adopted. Bouyoucos equation is best fit followed by Wischmeter and Nomograph in response with the ranking of the soil erodibility values.

SLOPE INSTABILITY: SELECTING REMEDIAL MEASURES

Suhaimi Abdul Talib

ABSTRACT

Slope instability has now become a common problem in Malaysia. There are many options ranging from a simple cut back to the use of soil nailing available for the engineer to adopt for remedial action. The decision on which method to adopt can only be made after taking into consideration factors such as cost, factor of safety, constructability, ability to prevent future failure and even aesthetics.

Being sited on a hill in Shah Alam, ITM has experienced a fair share of slope failures within the campus. This paper focuses on the slope failures, which occur in the vicinity of Kolej Delima and the ITM Swimming Pool Complex.

Several remedial measures including the use of Geo-grid, Gabion wall, Crib wall, RC retaining wall, Sheet piles and Soil nailing are proposed. A full analysis was carried out to obtain the Factor of Safety and the construction cost for each of these measures. The results of the analysis are presented in this paper along with the qualitative discussion on the suitability of the measures taking into account the constraints of the site. The paper concludes by recommending the measure, which was subsequently implemented.

Keywords: Slope Failure, Slope Repairs

SLOPE STABILITY PROBLEMS

Mohd Jamaludin Md Noor
Bahardin Baharom

ABSTRACT

This article will classify the different types of slope failures and discussion on the some causative factors of slope instability. It is very important to an engineer to identify the slope instability through ground inspection thus the surface manifestation of instability and the corrective measures for slope stabilization are also discussed. In order to understand more on the cause of failure in our natural or cut slope of unsaturated residual soil the latest theory of shear strength and the related method of stability analysis incorporating the effect of soil matrix suction is presented. Finally the various types of slope stabilization techniques are reviewed.

Kursus Kejuruteraan Tanah dan Asas bagi Jurutera FELCRA, Shah Alam, 4-7 Julai 1994

THE IMPLICATION OF NORTH-SOUTH EXPRESSWAY TO THE TRANSPORTATION SCENARIO IN MALAYSIA

Siti Hawa Hamzah
Kartini Kamaruddin
Sahri Bahari

ABSTRACT

The completion of the North-South Expressway (NSE) has had a largely positive impact on various sectors of the economy. The 847.7 km NSE, a mega infrastructure project by any standards, undoubtedly provides development access to many regions hitherto. With more than 16 million vehicles plying the expressway every month, the catalytic effect towards reduced traveling time, enhanced mobility and thus economic development is indeed tremendous. However, the NSE also has its aftermath. The rail and air transportations have been suffering dwindling fortunes of late. Rails passengers dropped drastically whilst the number of air travelers have taken a downward plight, hence the reduction of flights to some domestic destinations. This paper discusses the effect of the NSE vis-à-vis the two types of transportation – namely railway and air in Malaysia. The implications are analyzed in perspective of the transportation scenario of the nation. Future prospects and recommendations are elucidated herein.

12th Conference of ASEAN Federation of Engineering Organizations (CAFEO 12), Bandar Seri Begawan, Brunei Darulsalam, 28–30 November 1994

TRAFFIC CALMING APPROACHES FOR BETTER MOBILITY, ACCESSIBILITY AND SAFETY

Shamsudin Sabri[1]
Bahardin Baharom[2]

ABSTRACT

When talk about road related safety problems, the focus point is mostly to the driving attitudes. Fast driving, inconsiderate towards other road users and selfishness are the root to the occurrence of most road traffic accidents in this country. The popular 3 E's (Engineering, Education and Enforcement) approaches are implemented by the authorities, but the results are much more to be desired.

As 'root' to the problems is driver attitudes, thus an effective approach is to change the driver negative attitude while on the wheels. Traffic calming is an approach or measure, which forced the driver to change their driving attitude due site constraints imposed. Experiences from Australia, Europe and the United States of America in implementing traffic calming measures on their road network show positive outcomes are deliberated in this paper. Similarly, our local authorities have had experiences on certain traffic calming devices, such as speed hump, speed breaker, traffic circle, road diverter and others, but no records or studies done on their effectiveness.

This paper deliberate on experiences of traffic calming gained or experienced by other countries, and how it may be chosen selectively to suit local traffic driving conditions and road environments. Pilot projects done in collaboration between Highway Planning Unit (HPU) and Malaysia Centre for Transport Studies (Mac TRANS) for better mobility, accessibility and safety were highlighted and discussed. Initial findings showed that there are potentials of applying this approach to alleviate road traffic accident problems is very positive and encouraging.

Keywords : Traffic Calming, Highway Engineering, Transportation Planning, Road Safety, Mobility and Accessibility, Vertical Control Measures, Horizontal Control Measures

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TRAFFIC CALMING APPROACHES TO ROAD SAFETY

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ABSTRACT

"Prevention is better than cure" is a common and popular phrase which is applicable in many situations. In relation to road related accidents, counter measures that are able to give advance warning and physically alert to the driver of potential hazard ahead, and forced appropriate action to be taken can prevent accident occurrence or its severity. Traffic calming employ devices which relatively low cost and its self enforcing in changing drivers driving characteristics.

This paper deliberates traffic calming devices, such as speed hump, speed breaker, raised crosswalk, chicane are among others, which have being deployed in isolation or area wide basis had improve safety record of the locality and their acceptance by the community. These traffic calming tools when being 'blend' with the surrounding geometry may improve the neighborhoods environment aesthetically, thus give an added value to the area. Studies have shown that with speed hump implementation may improve the road safety of the area.

In conclusion a schematic guideline on the procedure of selecting appropriate device(s) to meet specific objective(s) is highlighted to assist practitioner in deciding the best treatment for specific traffic safety problems.

Keywoods: Road Safety, Highway Engineering, Traffic Calming

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UNSATURATED PROPERTIES OF REMOULDED LATERITIC SOILS

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ABSTRACT

The establishment of soil parameters plays a very important role in geotechnical engineering. The parameters, normally established by means of standard methods are single valued. Unfortunately there are many factors in practice that change the value of these parameters, one of the most important being water.

This paper shows how direct shear box testing can yield the variation of shear strength parameters with moisture content of five lateritic soils. The paper also shows the hydraulic conductivity for these lateritic soils changes with soil suction.

A discussion on how the changing value of soil shear strength parameters and hydraulic properties affect the performance of geotechnical engineering problem and how they can be incorporated in a slope stability analysis.

Keywords : Residual Soil, Shear Strength Parameters, Slope Stability, Unsaturated Soil

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Proceedings of the Regional Conference in Geotechnical Engineering 1994 (Geotropika '94), Malacca, 22-24 August 1994

USE OF SATELLITE IMAGERY TO DETERMINE THE LAND USE MANAGEMENT FACTORS OF THE USLE

Roslan Zainal Abidin [1]
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ABSTRACT

The Cameron Highlands, an idyllic highland resort in Malaysia, are now being threatened by landslips and flash floods due to numerous development projects as well as intensive agricultural activities being associated with tourism. A study of the land use management factor (Cover and Management factor, C, and Support Practice factor, P) of the Universal Soil Loss Equation (USLE) has been undertaken, as this parameter reflects the land cover in the study area and its effect on soil erosion. Using remote sensing satellite imagery, the Ringlet area in the Cameron Highlands has been identified as having the highest erosion risk/loss based on the CP factor and this is confirmed by its highest ranking for residential and construction areas compared to other locations. The results of this study highlight the important land uses associated with erosion risk, and provide guidance to ensure that development is carried out to ensure a quality environment for the future.

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Proceedings of Rabat Symposium 56 - Human Impact on Erosion and Sedimentation, April 1997

Structural & Computer

A GENERALISED APPROACH FOR THE DESIGN OF INDUSTRIAL WHEELS USING FINITE ELEMENT METHOD

Solomon Darius Gnanaraj
Afidah Abu Bakar
S. Ramachandran

ABSTRACT

Solid disc type wheels are widely used in industries for various applications from railway stock to jockey wheel of a trailer vehicle. The wheels are generally selected from the available standard wheels. In the present work, various proposed designs of mass produced disc type wheels are analysed using Finite Element Method for stress distribution. Finite Element software ANSYS was used for the analysis considering the static loads experienced by the wheel. Finite Element discretisation was done using PLANE 82 element of ANSYS with steel as the material for construction. Results of the analysis were obtained as stress plots in the post processor. For the wheels used in the analysis indicate high stress spots which are to be taken care of by the designer while designing the industrial wheel. The induced high stresses are gradually lowered to remain within the limit of allowable tensile and compressive stresses by suitably modifying the geometry of the wheels.

Keywords : FEM, Industrial Wheel Design, ANSYS

Conference, NASTEC '97, Malaysian Scientific Association, Kuala Lumpur, 1997, pp. 112-131

A NUMERICAL SIMULATION OF CRACK CLOSURE AND FATIGUE CRACK GROWTH IN STRUCTURAL STEEL

Khafilah Din

ABSTRACT

The influence of stress ratio R and ratio of the maximum stress to the yield strength S_{max}/S_Y on crack closure and fatigue crack growth were investigated. A mixture of finite element and fracture mechanics methods were used on a central crack in structural steel plate under Mode I constant amplitude loading. Careful attention is given in modeling the mesh size.

The results at stable growth show that an opening stress S_{op} increases with increasing stress range for the same stress ratio and this dependency is stronger for lower stress ratios. In addition, the S_{op} decreases with increasing stress range for the same S_{max}/S_Y. But for each stress ratio that under studied there is almost a constant value of S_{op}/S_{max} and it is independent of S_{max}/S_Y. This work found the pronounced increase in the effective stress range ratio U with increasing stress ratio. It is particularly significant for high stress ratio at lower S_{max}. In general, the ratio of S_{max}/S_Y has a lesser but important effect on crack growth process at least between $0.3 \leq S_{max}/S_Y \leq 0.6$.

Keywords : Fatigue Crack Growth, Crack Closure, Finite Element, Constant Amplitude, Mode I, Plane Stress Element, Central Crack

Proceedings of the Fourth Pacific Structural Steel Conference, PSSC '95, Singapore, 1995

AN EXPLORATORY INVESTIGATION ON THE EVALUATION OF FATIGUE CRACK GROWTH PROPERTIES

Khafilah Din

ABSTRACT

Fatigue is an important crack growth mechanism that required attention. Generally, propagating crack is best analysed by the use of the well known Paris crack propagation law. In using the Paris law, the C and m are considered to be material constants for any stressing condition. Results obtained from this work on steel were utilized to get these constants. For the high stress ratio, where R is greater than 0.5 and under the same stress range, the result clearly indicated that C is not a constant. The C-parameter and the crack growth rate are affected by the stress ratio and the relative position of the maximum stress to the yield strength.

Keywords: Constant Amplitude Loading, Centre-cracked Tension Gauges, Experimental, Mild Steel, Fatigue Crack Propagation, Stress Ratio, Crack Propagation Properties

Proceedings of International Conference on Environment Sensitive Cracking, Guilin, China, September 1994

ACCURATE MEASUREMENT OF ELECTROMAGNETIC PROPERTIES OF CONCRETE FOR NON-DESTRUCTIVE EVALUATION AT MICROWAVE FREQUENCIES

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Wan Mahmood Wan Ab Majid[2]
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ABSTRACT

Complex permittivities (ε^*) of concrete are a function of moisture content, frequency, temperature and concrete mix constituents. By using effective medium theory, it is possible to determine the moisture content from dielectric measurements of dry and wet specimens. A free-space microwave measurement system is used for reflection coefficient measurements of metal-backed specimens in the frequency range of 8.0-12.5 GHz. Complex permittivities of concrete specimens are determined from reflection coefficient values by using an algorithm which finds zeroes of the error function. The key components of the measurement system are a pair of spot-focusing horn lens antennas, mode transitions, coaxial cables and network analyzer. The results include complex permittivies and moisture contents of specimens with specified compressive strength of 30, 40 and 50 N/mm^2. It is found that the real as well as imaginary part of ε^* is significantly higher for wet specimens as compared with dry specimens. Also, moisture content values obtained using the dielectric method are close to the actual values.

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Proceedings of International Concrete Conference, Dundee, Scotland, September 1999

ACCURATE MEASUREMENT OF DIELECTRIC CONSTANT AND LOSS TANGENTS FOR NON-DESTRUCTIVE EVALUATION OF MALAYSIAN TIMBER AT MICROWAVE FREQUENCIES

Deepak K. Ghodgaonkar[1]
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ABSTRACT

Dielectric properties of timber are determined by its moisture content, slope-of-grain and density. So, they can be used for non-destructive evaluation of timber. Dielectric properties can be deduced from complex reflection coefficient measurements of metal-backed Malaysian timber specimens. A free-space measurements system was used for reflection coefficient measurements in the frequency range of 7.5-14 GHz. The key components of the measurement system are a pair of spot-focusing horn lens antennas, vector network analyzer and a computer. In free-space measurements, inaccuracies are due to diffraction effects at the edges of the specimen and multiple reflections between horn lens antennas via the surface of the specimen. Diffraction effects are minimized by the use of spot-focusing antennas and multiple reflection errors are eliminated by using the free-space LRL (line, reflect and line) calibration technique. Experimental results are reported for dry and wet specimens of different types of Malaysian timber. Also, dielectric constant and loss tangent values were measured when the directions of electric field were parallel and perpendicular to the grain direction. From the results for dry and wet timber, it is observed that dielectric constants and loss tangents values are larger for electric field parallel to the grain direction as compared with perpendicular to grain direction. Also, accurate estimates of moisture content of timber specimens were obtained by applying effective medium theory to dry and wet dielectric constant values.

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Proceedings of Pacific Timber Engineering Conference, Roturua, New Zealand, 14-18 March 1999 (Forest Research Bulletin 212)

ANALYSIS OF PRESTRESSED CONCRETE SLEEPERS UNDER DYNAMIC LOAD

Siti Hawa Hamzah
Khafilah Din

ABSTRACT

Over a decade, Malaysia railway has undergone serious upgrading and modernization programmes. This include relaying new track using Prestressed Concrete Sleepers (PCS). The nature of dynamic loading from the train produces variations in the pressure distribution between the ballast and the sleeper. At high speed, the high frequency caused high tensile stresses developed on quasi static response due to this dynamic force.

A prestressed monoblock design with 16 wires was chose for this initial study. Harmonic load with mean of about 270 kN and a frequency of 9 Hertz applied to PCS for 3 million cycles. From this investigation behaviour of deflection against time and stress regions were studied and will be discussed in this paper. Through dynamic analysis, it is found that bending failure took place at the rail seat of the PCS.

Proceedings of the Fifth International Conference on Concrete Engineering and Technology, Kuala Lumpur, 5–7 May 1997, pp. 291-298

BASIC MODELLING ISSUES ON THE USE OF FINITE ELEMENT ANALYSIS IN THE STUDY OF STRESS BEHAVIOUR IN CRACKED BODY

Khafilah Din

ABSTRACT

This paper describes a model for the elastic-plastic finite element simulation of propagating crack under mode I constant amplitude loading. The method is used to investigate the stress behaviour of a fatigue crack in steel member. Crack growth advancement is accommodated by unlocking the tip node. Results suggest that the critical attentions must be given in the finite element modeling, such as mesh design and mesh refinement along the potential crack path and also a proper simulation of crack surface behaviour upon loading and unloading. It is suggested that the analysis should be carried out until a steady state growth condition is established.

Keywords: Finite Element, Constant Amplitude, Mode I, Central Cracked Steel Plate, Steady State

Proceedings of International Conference on Advances in Steel Structures, ICASS '96, Hong Kong , Vol. II, 11 – 14 December 1996

BEHAVIOUR OF PARTIALLY PRESTRESSED CONCRETE WAFFLE SLABS UNDER LOADINGS

Afidah Abu Bakar
Haron Ismail
Mohd Salleh Mohd Noh

ABSTRACT

Post-tensioned prestressed concrete construction has become standard practice in the last three decades. Despite of its advantages, fully prestressed members developed early cracking. To overcome this problem, researchers had introduced non-prestressed reinforcement in order to accommodate the tensile stresses and thus rendering only partially prestressed state.

In this research project, of particular interest is partially prestressed waffle slabs as these type of structures offer tremendous advantages due to their high stiffness properties with lesser self weight. The structural response of partially prestressed waffle slabs and waffle slab foundation units had been examined under working loads as well as under ultimate collapse loads. The results obtained indicated that the presence of an increased in the number of ribs improves the overall performance of the waffle slabs. Their potential use for large span structures and as precast (prestressed) isolated footings could also be enhanced.

Keywords : Waffle Slabs, Partially Prestressed, Behaviour, Different Loading

BRC Journal, Volume 5 No. 1, June 1998, pp 47-58

BEHAVIOUR OF REINFORCED CONCRETE BEAM WITH SILICA FUME UNDER DYNAMIC LOADING

Siti Hawa Hamzah
Rudy Tawie

ABSTRACT

Concrete mixes design to produce 42 N/mm^2 – 84 N/mm^2 in compressive strength are easily obtainable today with silica fume replacing a portion of the cement content. Such concretes with a design compressive strength exceeds 42 N/mm^2 may be defined as "High Strength Concrete". For several reasons, there has recently been a marked interest in the determination of the dynamic characteristics of structures and their response under dynamic loads and effect. Subjected to dynamic loading under sinusoidal wave pattern, a study has been carried out to make an experimental investigation on reinforced concrete beam of Grade 60 incorporating silica fume replacing cement by weight, of w/c ratio of 0.30, with respect to the serviceability and ultimate limits. A total of 8 beams were cast and tested under static and dynamic load. Parameters investigated include deflections, crack widths and crack lengths. The study concludes reinforced concrete beam incorporating silica fume shows improved crack resistance and reduces deflection.

JURUTERA, No 7 Bil. 2001, July 2001, pp 42 - 44

BEHAVIOUR OF WAFFLE SLAB FOUNDATION

Afidah Abu Bakar
Norman Mohd Said
Haron Ismail

ABSTRACT

The performance of two way partially prestressed (post tensioned) waffle slabs (WSF 02 and WSF 03) were compared to the conventional reinforced concrete waffle slab (WSF 01) when tested up to a maximum load of 400kN. Waffle slab WSF 01 have four "waffles" or celss whereas WSF 02 and WSF 03 has four and sixteen number of "waffles" respectively. These specimens were tested under rigid foundation conditions.

The results obtained were examined in terms of load-deflection, load-strain relationship and crack propagation characteristics.

Proceedings of 3rd International Conference on Concrete Engineering and Technology, Kuala Lumpur, 1993, pp TS5- /22-28

COMPRESSIVE STRENGTH BEHAVIOR OF LAMINATED VENEER LUMBER(LVL) MADE FROM SELECTED MALAYSIAN TROPICAL TIMBER

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P.S.Eric[1]
Zakiah Ahmad[2]
Azmi Ibrahim[2]

ABSTRACT

This paper presents the result of project on compression strength behavior of LVL manufactured from selected Malaysian tropical timber. The 50 mm thick LVL panels were manufactured using 13 and 17 layers veneers. The compression strength test was carried out using in-grade size specimens. In order to carry out this test, a special compression bearing blocks and support was fabricated. The LVL comprised Kedondong (*Canarium*, spp), Keruing (*Dipterocarpus*, spp) and Bintagor (*Calophyllum*, spp). Tests were conducted according to ASTM D198 (Static Test of Lumber in Structural Size). The compression strength properties evaluated include compression strength and modulus of elasticity. Effect of timber species and the number of veneer layers on the compression strength properties were also analysed statistically. The results show that the species types have a more dominating effect on the compressive strength of LVL.

Keywords: Compressive Strength, LVL, Modulus of Elasticity, Malaysian Tropical Timber

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CRACK PROPAGATION IN PRE-STRESSED CONCRETE RAILWAY SLEEPERS

Khafilah Din
Junaidah Ariffin
Zakiah Ahmad

ABSTRACT

This paper presents full-scale experimental investigation on positive bending test under rail seat of pre-stressed concrete railway sleepers experiencing static and fatigue loading. The pulsating tensile fatigue loading was chosen with frequency of not more than 10 hertz and mean load is kept at not less than 50% of the yield load of the sleeper. Results found that both deflection and crack opening increase with fatigue loading whereas crack length decreases. Linear elastic fracture mechanics method was employed to determine the material constants namely; $C = 4.48 \times 10^{-5}$ and $m = 1.11$, that is commonly used in the well-known Paris law in assessing the crack propagation rate.

Proceedings of 2nd World Engineering Congress, Engineering Innovation and Sustainability: Global Challenges and Issues, Structural Engineering and Construction Management, Kuching, Sarawak, Malaysia, 22-25 July 2002

DETERMINATION OF SHEAR MODULUS BASED ON BENDING SHEAR TEST

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Azmi Ibrahim[1]
H'ng Paik San[2]
Paridah Md Tahir[2]

ABSTRACT

The determination of modulus of rigidity is difficult for anisotropic materials. With special precautionary measures modulus of rigidity can be obtained from torsion tests using the method of evaluation given in ASTM D198. However, the apparatus for direct torsion test is not available and is difficult to perform especially for square cross section. This study evaluates an alternative method to determine the modulus of rigidity based on static bending shear test.

In this experiment, an investigation was made on the shear modulus of Laminated Veneer Lumber (LVL) of 13-ply and 17-ply panels by using three species of Malaysian Tropical timber, namely Bintangor *(Colophyllum spesies)*, Keruing *(Dipterocarpus species)*, and Kedondong *(Burseraceae species)*. The cross section of the specimen is 36mm x 50mm with the length varies according to span to depth ratio of 5.5, 6.5, 8.5, 2.0 so that to give approximately equal increments of $(h/l)^2$ between them, within the range of 0.035 to 0.0025 were prepared according to ASTM D198-97. In addition to shear modulus, shear strength and failure characteristics was also evaluated. The data was analyzed statistically.

Keywords: Shear Modulus, Modulus of Rigidity, Laminated Veneer Lumber, Bending Shear

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DETERMINATION OF STRUCTURAL RESERVE STRENGTH RATIO (RSR) OF AN EXISTING OFFSHORE STRUCTURE

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Mohamad Embong[2]

ABSTRACT

All offshore platforms are designed with a specific design life. In Southeast Asia region, the design life is between 20 to 30 years. For operators in the Malaysian waters, normally, the lease duration is between 20 to 25 years. The handover of these old platforms related to the superstructure (ageing equipment's, vessels and other facilities), the integrity of the substructure is the most important factor in the safe operation of the platform. The RSR is an indication of the platform's integrity and depending on each operator, the minimum RSR value may vary. Some operator might adopt a minimum RSR value of 2.0 while another might take a minimum value of 1.32. There is a growing need for reliable assessment method and in this paper a progressive collapse analysis is used to predict the existing platform's actual capacity. No doubt that powerful computers are a prerequisite to perform this analysis.

Keywords: Collapse, Design, Reserve Strength

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Proceedings of the Eighth (1998) International Offshore and Polar Engineering Conference, Canada, 24-29 May 1998

EDGEWISE BENDING PROPERTIES OF LAMINATED VENEER LUMBER: EFFECT OF VENEER THICKNESS AND SPECIES

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Paridah Md. Tahir[1]
Zakiah Ahmad[2]

ABSTRACT

Effects of veneer thickness and species on the edgewise-bending properties of Laminated Veneer Lumber (LVL) were investigated. Five types of tropical hardwood timbers, namely Keruing (Dipterocarpus spp.), White Meranti (Shorea spp.), Yellow Meranti (Shorea spp.), Bintagor (Calophyllum spp.), and Kedondong (Canarium spp.), were used to manufacture 50 mm thick, 13-ply and 17-ply LVL. The veneers were peeled to 4.0 mm and 3.1 mm thickness, respectively. Phenol formaldehyde resin (having 42% solids) was used as a binder. The LVL panels were cut and tested dry in accordance to ASTM D-198. A three point bending test was carried out on 50 mm (width) by 90 mm (thick) by 1620 mm (long) specimens. The results showed that there was significant interaction between wood species and veneer thickness on the modulus of rupture (MOR) of the LVL. Yellow Meranti was found to be significantly inferior in strength compared to the other species. The effect of species on the MOR values was more pronounced in LVL having thinner veneers (17-ply). The modulus of elasticity (MOE) values of the LVL were greatly influenced by the wood species; Keruing being the stiffest followed by White Meranti, Bintagor, Yellow Meranti and Kedondong. Using thinner veneers resulted in a mere 4% increment of MOE. Among the five species studied, Keruing showed much superior performance, whilst, Yellow Meranti was the poorest in terms of MOR and MOE.

Keywords: Laminated Veneer Lumber, Tropical Timbers, Edgewise Bending, Veneer Thickness

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EFFECT OF MEAN STRESS LEVELS ON FATIGUE STRENGTH OF BOLTS

Khafilah Din

ABSTRACT

Fatigue is an important crack growth mechanism. Fatigue failure can hardly be prevented in many structures including tall building and towers. Therefore, it must be properly managed through a proper understanding on fatigue behaviour of members and their components. Currently, there is not much published data on fatigue strength and behaviour of bolt. Realising this, an experimental investigation was carried out on a limited number of high strength friction grip bolt. Four stress ranges at three mean stress levels were chosen. The bolt is subjected to cyclic constant amplitude loading of Mode I with positive mean stress level.

Results obtained show that the fatigue fracture took place at the fillet head of the bolt and showing a smooth shiny black appearance. The S-N curve plotted showed a clear influence of the mean stress and stress range. Slope of the curve is not affected by mean stress level and posses the same trend as the S-N curve for welded members. The question of whether every material posses an endurance or fatigue limit is also noted.

Keywords: Fatigue Crack, Life Prediction, Bolt, Mode I, Constant Amplitude, S-N Curve

Proceedings of 2nd International Conference on Multi-Purpose High-rise Towers & Tall Buildings – Reach for the Sky-Dedicated to 2000', Singapore, 30-31 July 1996

FACTORS DISTURBING THE VALIDITY OF MINER CUMULATIVE DAMAGE RULE

Khafilah Din

ABSTRACT

Validity of Miner's rule is examined by conducting a series of fatigue test on center cracked steel gauges under tensile load at remote boundaries. Results for constant amplitude test showed constant growth rates, confirming the independence of stress intensity factor and crack length. Significant effect of stress ratio was found for the same stress range 30 N/mm^2 at high stress ratios from 0.67 to 0.83. Moreover, the growth rate increases linearly by twice than before. Surprisingly, the random amplitude test also showed constant growth rates with number of repeated blocks, but different growth rates were observed for load sequences which arranged in a different order. Whereas according to the Miner rule, the growth rates should give the same result. This observation demonstrates that the Miner rule does not considered effect of the type of load history via stress ratio effect and interaction effect between stress levels applied. Therefore, it is concluded that the Miner rule is inconsistent, controversial and on occasions unsafe results.

Keywords: Miner Rule, Fatigue Crack Growth, Constant Load, Random Load, Stress Interaction, Stress Ratio, Fracture Mechanics.

Proceedings of APEC Construction 2002, International Conference on Advancement in Design, Construction, Construction Management and Maintenance of Building Structures, Bali, Indonesia , 27-28 March 2002

FINITE ELEMENT ANALYSIS ON THE STRESS DISTRIBUTION IN A LINK SHAPED COVER USING ANSYS

Solomon Darius Gnanaraj
Mohd Nor Berhan
Afidah Abu Bakar

ABSTRACT

The finite element analysis software ANSYS has been used to analyse the stress distribution in a Link shaped cover made of High Density Poly Ethylene. Studies are made on different wall thickness. From the results, it is found that a thickness of 1.95mm is the minimum requirement for the cover to withstand the forces acting on it. This procedure helps the designer to design the part for the required strength with a minimum weight.

Keywords : Finite Element, ANSYS, Design

Conference "Application of Numerical Methods in Engineering", Universiti Putra Malaysia, 1997, pp 69-75

FINITE ELEMENT STUDIES ON THE EFFECTS OF CORNER RADIUS OF AN ENGINE FLYWHEEL

Solomon Darius Gnanaraj
Afidah Abu Bakar
S. Ramachandran

ABSTRACT

Flywheel is an important component of an engine which is used for storing the available excess energy. The manufacture of the flywheel includes casting and machining to the required size. The cross section of the flywheel has several corner radii which are high stress raisers. In this paper, an engine flywheel is analysed and stress levels due to corner radii are computed. Two dimensional plane element of ANSYS was used for the discretization of the model and centrifugal forces experienced by the flywheel are applied as load. Stresses at various corner radii are obtained as plots wherein the critical regions where the stress levels are high and are indicated by red color code. The designer should take care of the high stress levels while designing the flywheels. In critical regions, the stress levels were brought down by increasing the notch radius and also by introducing a few notches in the adjacent areas.

Keywords: Flywheel Design, FEM

Conference, NASTEC '97, Malaysian Scientific Association, Kuala Lumpur, 1997, pp. 85-96

FLEXURAL STRENGTH BEHAVIOR OF LAMINATED VENEER LUMBER

Zakiah Ahmad[1]
Paridah Md Tahir[2]
H'ng P. S.[2]

ABSTRACT

The use of timber as structural member have come under serious review and study recently as good quality logs are alarmingly becoming scarce besides the chronic problems of traditional sawn timber. Several technologies, like plywood, OSB, glulam and Laminated Veneer Lumber (LVL) have been developed to improve the properties of timber.

This paper present the results of a preliminary investigation on the flexural strength behavior of LVL made from Malaysian timber namely, bintagor, kendondong and keruing. Tests were carried out on sixty isolated simply supported beams according to procedure set forth in ASTM D198. The flexural strength behaviors are discussed and comparison with the flexural strength behaviors of other materials is also presented.

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Proceedings of "Malaysian Science and Technology Congress (MSTC) 2000: Research and Development in Science and Technology for the New Era", Genting Highlands, Pahang , 7-9 November 2000, pp8.

HORIZONTALLY CURVED REINFORCED CONCRETE FLOOR SLAB DESIGN

Siti Hawa Hamzah

ABSTRACT

A practical and simplified method for the analysis and design of continuous and horizontally curved two-way reinforced concrete floor slabs is presented. The slab panels are assumed to be uniformly loaded and supported on all sides by rigid boundary supports (beams and walls). The method is based on the use of design moment coefficients that are derived from classical elastic theory of curved plates. Continuous edges are treated as clamped, and discontinuous edges as simply supported. Twelve possible combinations of clamped and simply supported boundaries are considered. The positive and negative design bending moments in the radial and angular directions are obtained from the corresponding moment coefficients. The proposed method is similar to the one developed by Marcus for the design of two-way rectangular slabs which was later adopted by ACI 318-63 in Section A2003 as "Method 3".

Journal of the School of Engineering, ITM, Vol. 11 No 1 May 1995, pp 54-69

INTERMEDIATELY STIFFENED WEBBED WELDED PLATE GIRDER

Hanizah Abdul Hamid
Azmi Ibrahim
Md. Hadli Abu Hassan

ABSTRACT

Conventional plate girder involves the use of transverse intermediate stiffners especially in slender web to avoid catastrophic failure associated with shear buckling of the web. High cost of fabrication is attributed to welding of transverse stiffners to the web of the girder. Therefore, in this study the ribs of the profiled web was used to replace the transverse stiffners in the conventionally stiffned girder. Thus, making the cold forming of ribs into a flat sheet to form alternative stiffeners has been shown to be an attractive option.

Three specimens were tested to failure under a three-point-bending system with the web designed to resist only shear and the flanges designed to resist only bending . Failure of the profiled web girder is characterised by a shorter yield plateau and a steeper descending branch, a failure mode referred to as 'brittle'. It was observed that the diagonal tension field within the web sub-panels is anchored at the junctions between the ribs or stiffeners and the flanges.

INVESTIGATION OF CONCRETE SLEEPERS UNDER DYNAMIC LOAD

Siti Hawa Hamzah
Bahardin Baharom

ABSTRACT

The railway track is the most important infrastructure of the railway system. The use of concrete sleepers in making the track becomes more important due to the increase in train speed and development of long welded rails. It is necessary to increase the weight and the strength of the concrete sleepers to resist track buckling and to reduce vibration.

The Light Rail Transit (LRT) system and the Keretapi Tanah Melayu Berhad (KTMB) Double Tracking System have been introduced to improve transportation system and to ease traffic congestion in the city. Modern high speed trains are used in these systems which can cause considerable amount of impact energy to the track and high frequency vibration in the rails. These forces will lead to high tensile stresses which can cause cracking in the sleepers. Concrete sleepers, presently being widely used should be able to absorb these stresses and retard the development of cracks.

A study on the dynamic behaviour of these concrete sleepers with context to Malaysian system has been carried out. The structural behaviour of Prestressed Concrete Sleepers (PCS) under static and dynamic loads using positive bending moments tests has been investigated.

BRC Journal Vol. 5 No 1 June 1998, pp 1-11

PESONGAN RASUK BERTETULANG YANG DIKENAKAN BEBAN STATIK – PERBANDINGAN DI ANTARA KAEDAH UJIKAJI DAN KAEDAH PERMODELAN

Md Rasul Mohamad Nor
Siti Hawa Hamzah

ABSTRAK

Pembentangan kertas kerja ini adalah tertumpu kepada rasuk konkrit bertetulang berukuran 1400 mm panjang, 125 mm lebar dan 150 mm tinggi yang dikenakan beban statik pada dua titik yang telah ditetapkan sehingga gagal. Keputusan ujikaji dibandingkan dengan permodelan satah dan permodelan padu di mana keputusan yang dihasilkan menunjukkan pesongan mempunyai hubungan lelurus terhadap bebanan sehingga tahap beban alah iaitu 92% daripada beban muktamad. Ini menunjukkan faktor keselamatan sebelum kegagalan berlaku ialah 175% dari beban rekabentuk. Kajian ini memberi maklumat lanjut terhadap corak pesongan bagi konkrit kekuatan tinggi (HSC), dengan kekuatan mampatannya 60 N/mm^2 , di mana hasil ianya berguna untuk penilaian dan penaksiran struktur.

**Persidangan Kebangsaan Kejuruteraan Awam 99 (AWAM 99),
Lumut Perak, 24 – 26 Januari 2000**

PROFILED STEEL SHEET AS LOAD BEARING STRUCTURE

Siti Hawa Hamzah[1]
Wan Hamidon Wan Badaruzzaman[2]

ABSTRACT

This paper describes the development of Profiled Steel Sheet (PSS) as load bearing structure.The PSS is presented in the development of composite structures as innovative applications for slab, beam, wall, folded plate roof and column constructions and research. In contrast to traditional forms of construction such as reinforced concrete system, PSS has many advantages such as it is reduces time of construction, requires unskilled labour, requires no formwork, optimum use and less wastage of materials, and lighter supporting structural system and foundation. This paper highlights the potential of PSS as new composite construction material and as an alternative for new construction techniques.

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SENSING MOISTURE CONTENT IN CONCRETE USING MICROWAVE NON-DESTRUCTIVE TESTING TECHNIQUES

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Wan Mahmood Wan Ab Majid[1]

ABSTRACT

The existence of moisture in concrete is a major cause of damage to the concrete structure, so there is an increasing need for non-destructive detection and monitoring of moisture content in concrete. Microwave Non-Destructive Testing (MNDT) techniques have advantages over other NDT methods (such as radiography, ultrasonic and eddy current) regarding low cost, good penetration in non-metallic materials, good resolution and requirement of only one face of material for testing. In this paper, microwave open-ended rectangular waveguide was used to measure the electromagnetic properties of Portland Cement Concrete (PCC) over a frequency range of 7.0 to 13.0 GHz. PCC specimens of three different water cement ratio (w/c) were prepared. PCC dielectric properties were evaluated at different moisture content ranges from saturated to over dry. The results show, that all electromagnetic properties, reflection coefficients, transmission coefficients, dielectric constants and loss factors increase with increasing moisture content of PCC. Also the result shows that dielectric constant and reflection coefficients at dry condition or low moisture content (less than 5%) can be used to indicate w/c ratio and compressive strength. At the same values of moisture content, the reflection coefficients and dielectric constant of PCC increase with decreasing w/c ratio. Also, this study evaluate the penetration depth, velocity and wave length of microwaves inside PCC over the frequency range for saturated and dry conditions.

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Seventh International Conference on Concrete Engineering and Technology, 5-7 June 2001

STRESS INTERACTION EFFECTS AFTER SINGLE OVERLOAD CYCLE ON FATIGUE CRACK GROWTH IN STEEL

Khafilah Din

ABSTRACT

In this study, a cycle by cycle plane stress finite element analysis was employed to simulate fatigue crack behaviour of steel plate subjected to Mode I remote stress. The single overload stress was always fixed at 0.6 times the yield strength and maintained at zero stress ratio. Then it was followed by main cycles at three stress ranges for a different stress ratio. Bilinear stress-strain material behaviour was used to model plasticity effect. Pre-estimated crack growth increment was obtained based on fracture mechanics principles and crack advancement was allowed by unloacking the crack tip.

Based on the results analyzed there is a substantial retardation in crack growth process in which it is a beneficial event. It is also shown that crack closure could be the prominent factor that causes retardation. Percentage of overload ratio alone is not enough to quantify the retardation effect. The discussion on number of delay cycles is also put forward.

Proceedings of The Third International KERENSKY Conference on Global Trends in Structural Engineering, Singapore , 20-22 July 1994

STRUCTURAL BEHAVIOUR OF PROFILED STEEL SHEET DRY BOARD SYSTEM WALL PANEL WITH WINDOW OPENING

Yong Chua Bon[1]
Siti Hawa Hamzah[1]
Wan Hamidon Wan Badaruzzaman[2]

ABSTRACT

This paper presents an experimental investigation of the Profiled Steel Sheet Dry Board (PSSDB) system wall panel with window opening. Three samples of panel were prepared, two samples with overlap profiled steel sheet and the other without overlap, and tested under axial load. Each sample measured 1000 mm height x 820 mm width x 69 mm thick and the window opening at the center is 400 mm x 330 mm. The parameters determined include lateral deflection, ultimate load capacity, and crack pattern. The ultimate load capacity for the panel without overlap was found to be 174 kN and that for the other two were 123 kN and 140 kN.

Keywords : Profiled Steel Sheeting, Dry Board, Load Bearing Wall, Composite Panel

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20th Conference of ASEAN Federation of Engineering Organizations (CAFEO 20), Phnom Penh, Cambodia, 2–4 September 2002, pp76-80

STRUCTURAL MEMBERS FROM LAMINATED VENEER LUMBER (LVL)

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ABSTRACT

The decreasing supply of large diameter logs that can be profitably converted into sawn timber has steadily encouraged the utilization of laminated products, particularly the Laminated Veneer Lumber (LVL). Advance gluing technology has made it possible to produce much larger and longer timber components to meet various engineering needs. Like other composite products, LVL offers the advantages of higher reliability, as well as, lower variability through defect removal and dispersal. The veneering and gluing processes in LVL manufacture enable small diameter logs i.e, the fast growing plantation species, being utilized more efficiently. Some of the structural applications for LVL include engineered I-joists, floorings, roof truss and cross arms.

A series of studies on LVL manufacture and strength properties has been carried out using tropical hardwood species namely Sesendok (Endospermum spp), Pulai (Alstonis spp.), Kekabu Hutan (Bombax spp.), Keruing (Dipterocarpus spp.), Kedondong (Santiria spp.), Bintagor (Calophyllum spp.), Yellow Meranti (Shorea spp.), and White Meranti (Shorea spp.), with air-dry average specific gravity of 0.36, 0.35, 0.27, 0.7, 0.64, 0.5, 0.48 and 0.59, respectively. The engineering properties studied were bending (MOR and MOE) in flatwise and edgewise directions, compression parallel to grain, tension, and shear in both flatwise and edgewise directions. Both the manufacturing and strength evaluation of the LVL were carried out according to JAS (1993) Structural Laminated Veneer Lumber, AS/NZS 4357:1995 and ASTM D198, 1988. The study shows that LVL made from mono species wood always have higher flatwise strengths (MOR, MOE and shear) compared to those of edgewise. The strengths of low density wood LVLs were improved greatly when they were reinforced with higher density wood such as Keruing. For this type of combination, lay-up pattern significantly influenced the direction of loading i.e, flatwise and edgewise. To improve the strength in flatwise loading, all Keruing veneers should be arranged in the top and bottom layers of the LVL whilst in edgewise loading, these veneers should be alternately arranged with low density wood and Keruing veneers were found to be much more stable when exposed in moisture. The study suggests that incorporating low and high density wood in LVL manufacture

gives acceptably high strength and more dimensionally stable panel. Based on the work accomplished so far, all the LVLs studied have comparable, if not higher, than the strength values published in the Standards.

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TENSILE STRENGTH BEHAVIOUR OF LAMINATED VENEER LUMBER (LVL)

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ABSTRACT

Tensile strength behaviour of LVL manufactured from Malaysian tropical timber was evaluated. The 50 mm thick LVL panels were manufactured using 13 and 17 layers veneers. The tensile strength test was carried out using in-grade size specimens. In order to carry out this test, a special tensile grip was fabricated using the model suggested in ASTM D198. The LVL comprised Kedondong (*Canarium*,spp), Keruing (*Dipterocarpus* , spp) and Bintagor (*Calophyllum*, spp). Tests were conducted according to ASTM D198 (Static Test of Lumber in Structural Size). The tensile strength properties evaluated include tensile strength, modulus of elasticity and Poisson ratio. Effect of timber species and the number of veneer layers on the tensile strength properties were analysed statistically.

Keywords: Tensile Strength, LVL, Modulus of Elasticity, Poisson Ratio, Malaysian Tropical Timber

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THE USE OF DESTRUCTIVE AND NON-DESTRUCTIVE TESTINGS IN STRUCTURAL APPRAISAL OF BUILDINGS

Suhaimi Abdul Talib

ABSTRACT

Structural surveys on building are needed when there is a change in the building use or there is a need to re-assess the structural integrity of the building following events causing deterioration of the building, e.g., due to a fire or simply because there is a statutory requirement.

Structural surveys may comprise of destructive and non-destructive testings. This paper outlines the procedure for structural survey of buildings that include activities for initial survey, specialized survey, selected survey and comprehensive survey.

Keywords : Building Surveys, Structural Surveys, Destructive Tests, Non-Destructive Tests.

THE USAGE OF LOTUS 123 FOR ENGINEERING APPLICATIONS

Bahardin Baharom
Siti Hawa Hamzah

ABSTRACT

The early electronic spreadsheet for the microcomputer was programmed and developed to be used to solve financial and economic problems and to track time and dollars. In the last few years it has been widely used in other areas such as engineering. The new and more sophisticated version of the program with wider range of built in functions and macro commands was made available. With this electronic spreadsheet, the engineer has a powerful tool for solving routine engineering problems.

The program has unlimited applications for engineers. The ability of the electronic spreadsheet to use the calculus of finite difference by relaxation or other techniques opens an entirely new application for the microcomputer.

This paper will describe two engineering problems that were solved using Lotus 123 spreadsheet program. The problems are steady state seepage analysis by relaxation method and slope stability analysis by Bishop's Rigorous Method.

National Short Course on Construction Project Management for DID Engineers and TA, Kuala Lumpur, 4-8 December 1989

THEORETICAL STUDIES ON FRICTION AND WEAR OF BRAKE LINING MATERIALS USING ANSYS

Solomon Darius Gnanaraj
Posnasetti Nageswara Rao
Afidah Abu Bakar

ABSTRACT

In brake systems, friction is required to stop the car or to reduce the speed. The brake lining should have higher friction but lesser wear. In practice, the pressure is not evenly distributed on the surface of the brake lining. Because of this situation, frictional force on the brake lining surface is not uniformly distributed. It affects the braking efficiency and also the wear of the brake lining is not uniform. More wear would occur where the pressure is more. An attempt is made in this work to find the brake lining material for which the variation in pressure on the braking surface is a minimum. In this work, the Finite Element Analysis software ANSYS is used to analyse the pressure distribution at the brake pad/rotor interface. The frictional force and wear are calculated using these values of pressure. Three different brake lining materials viz., asbestos, sintered metal and polyimide on a cast iron rotor are analysed and the sintered brake lining material is found to be superior.

Keywords : Brake Lining, Materials, Finite Element Analysis

Proceedings of 14th Conference of ASEAN Federation of Engineering Organizations (CAPEO 14), Malacca, November 1996, pp 128-138

TUBULAR JOINTS RELIABILITY AND FRACTURE ANALYSIS FOR DEVELOPMENT OF UNDERWATER INSPECTION OF OFFSHORE STEEL STRUCTURES

Wan Mahmood Wan Ab Majid[1]
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ABSTRACT

Tubular joints of offshore structure are subject to cyclic loading of wave during the service life of the platform. This normally lead to fatigue failures, crack growth and fracture of the joints. All these failures will lead to reduction of platform reliability for safe operations. Operating oil company spent millions of dollar to carry out underwater inspection of tubular joints of offshore structures. Inspections are normally carried out in a fixed interval time period (i.e. 4, 5 years and etc.) determined by either company standard practice or international codes. The interval period may be increased or reduced if proper analysis of the joints reliability can be systematically established. This paper outlines the analytical basis and the calculation method used in the derivation of reliability indices, fracture assessment and the development of an outline inspection schedule for critical joints of offshore platform.

Keywords : Cyclic, Crack, Fracture, Reliability

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TWO-WAY PARTIALLY PRESTRESSED CONCRETE WAFFLE SLABS

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Haron Ismail
Mohd Salleh Mohd Noh
Ismail Zainal

ABSTRACT

The performance of waffle slab could be improved with the aid of prestressing. Three types of waffle slabs namely WS 01, WS 02 and WS 03 of equal overall size of different number of waffles and ribs within them were investigated. The behaviour of these slabs under cyclic knife-edge loading were examined in the laboratory.

The load-deflection characteristics obtained indicated that both ultimate and serviceability limits are highly dependent on the number of waffles and ribs.

Proceedings of 2nd International Conference on Concrete Engineering and Technology, Kuala Lumpur, 1991, pp 1 /67-76

TWO-WAY PARTIALLY PRESTRESSED (POST-TENSIONED) WAFFLE SLABS

Afidah Abu Bakar
Mohd Salleh Mohd Noh
Haron Ismail

ABSTRACT

Post-tensioned (unbonded) prestressed concrete construction have become standard practice in the last three decades. Methods of analysis and design procedures for one way partially prestressed concrete is well known. However, two-way partially prestressed concrete, a recent innovation, offers advantages in better control of deflection crack widths and an improved overall performance when compared to ordinary reinforced or one-way prestressed concrete.

This paper describe investigation works carried out in the MARA Institute of Technology laboratory on the behaviour of two-way partially prestressed waffle slabs. Several test results on waffle slab and waffle slab foundations indicate its potential use for large span structures and as precast (prestressed) isolated footings.

Keywords : Waffle Slab, Prestressed Concrete, Deflections, Strain Distribution.

Proceedings of 14th Conference of ASEAN Federation of Engineering Organizations (CAPEO 14), Malacca, November 1996, pp 311-319

WAFFLE SLAB FOUNDATION

Afidah Abu Bakar
Haron Ismail

ABSTRACT

Shallow foundations are commonly used for building less than four (4) storey high. This paper examines a new waffle slab foundation system consists of a flat slab with ribs spanning in two directions. This new shallow foundation system was examined in terms of its load-displacement response. Preliminary results indicate considerable potential in the use of fabricated waffle slab foundation system.

Keywords : Waffle, Foundation System, Shallow

The Malaysian Technologist, December 1997, pp 34-36

Water Resources & Environmental

A FIELD INVESTIGATION OF RUNOFF COEFFICIENT FOR URBAN CATCHMENT

Ramlah Mohd Tajuddin
Turahim Abd. Hamid
Ideris Zakaria

ABSTRACT

An investigation was carried out for the determination of runoff coefficient in a selected urban catchment. Taman Mayang in Petaling Jaya was selected in this study with catchment area of about 173.9 ha. It is consisted of about 22% open space and the remaining are built-up surfaces such as housing and town area. Storm events were monitored for about two years at three stations and the discharges into a nearby stream within the area were measured using current meter and stick gauges. The field runoff peak discharges, measured directly in the field were compared with the calculated discharges obtained from the rational formula with a view to deriving improved runoff coefficient for the study area. From the study, it is found that due to insufffient rain events, there was inconclusive evidence in the development of runoff coefficient to be used for local conditions.

Seminar Urban Hydrology of Taman Mayang, Century Mahkota Hotel, Melaka , 22 January 2000

A STUDY FOR THE DETERMINATION OF TIME OF CONCENTRATION FOR AN URBAN AREA

Turahim Abd. Hamid
Ramlah Mohd Tajuddin
Ideris Zakaria

ABSTRACT

A field study was conducted to determine the time of concentration in an urban area. The study was carried out in Taman Mayang, Petaling Jaya which is a typical urban settlement with about 75% of the area consisted of dwelling houses. Storm events were monitored for about two years at three selected stations and measurements were carried out to collect stream flow and rainfall data at these stations. The time of concentration was calculated from a hydrological procedure published by the Department of Irrigation and Drainage, Malaysia and then compared with the values obtained in the field. The results showed that for a particular station, the variation between the calculated and observed time of concentration was not consistent. However, due to the limited number of available stream flow and rainfall data, it was rather difficult at this stage to arrive at a conclusive evidence on the suitable time of concentration to be used in design.

**Seminar Urban Hydrology of Taman Mayang,
Century Mahkota Hotel, Melaka, 22 January 2000**

A PILOT STUDY ON FLOOD FORECASTING FOR SELANGOR RIVER BASIN

Junaidah Ariffin
Suhaimi Abdul Talib

ABSTRACT

Flood forecasting and warning is acknowledged as the most important non-structural device of reducing flood damage. This is because most emergency measures during floods require forecasts of incoming floods based on observed and/or forecast hydrological and meteorological data. Such forecasting when extended to cover river flows throughout the year will also help immensely in flood control works that includes operations and planning.

In this paper, the Sungai Selangor river basin has been studied and analyzed to demonstrate the hydrological forecasting model based on the tank model for flood control. It is a known fact that the basin under study is flood prone and the need to generate continuous hydrograph for the basin under study is highly required so that the magnitude and timing of a flood rise, its discharge and river stage can be precisely predicted.

The flood forecast model, including calibration of the model will be highlighted. Four flood samples were tested and verified against the initial parameters of the model. The accuracy of the results will depend on the information about the precipitation in the next time interval. If the quantitative precipitation forecast can be made available there is no doubt that this will show a marked improvement on the results. However, the results obtained are undoubtedly fairly accurate.

Keywords : Flood Forecasting, Tank Model, Selangor River Basin

ANALYSIS OF DAM BREAK FOR DISASTER PREPAREDNESS

Turahim Abd. Hamid
Mohd. Najib Abdullah

ABSTRACT

For centuries, dams have provided mankind with essential elements of life such as water supply, flood control, recreation, hydropower, irrigation etc. Indeed, they are an integral part of society's infrastructure. In the last decade, several major dam failures have increased public awareness of the potential hazards caused by dam failure. Even though, dam failure may be regarded as a low probability event, but it can bring about very high losses. As such, it is important to assess the risks involved in the event that failure occurs especially when the downstream areas are become more developed. In this paper, an analysis on the effect of dam break to the downstream area of the Klang Gates dam is discussed. Several scenarios of dam breaks are analyzed corresponding to different extent of the possible damages experienced by the affected area. The findings show that the area affected by the flooding is approximately 4.5 km long by 1.0 km wide. The maximum height of flooding is about 45 m at a point 50 m away from the dam. The time for the height of flooding to reach a danger level of 3 m is about 50 seconds from the start of dam break.

2nd World Engineering Congress Engineering Innovation And Sustainability: Global Challenges And Issues, Kuching, Malaysia, 22 – 25 July 2002

ANOXIC TRANSFORMATIONS OF WASTEWATER ORGANIC MATTER IN SEWERS- PROCESS KINETICS, MODEL CONCEPT AND WASTEWATER TREATMENT POTENTIAL

Suhaimi Abdul Talib[1]
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Jes Vollertsen[2]
Zaini Ujang[3]

ABSTRACT

The sewer is an integral part of the urban wastewater system: the sewer, the wastewater treatment plant and the local receiving waters. The sewer is a reactor for microbial changes of the wastewater during transport, affecting the quality of the wastewater and thereby the successive treatment processes or receiving water impacts during combined sewer overflows. This paper presents the results of studies on anoxic processes, namely denitrification, in the bulk water phase of wastewater as it occurs in sewers. Experiments conducted on 12 different wastewater samples have shown that the denitrification process in the bulk wastewater can be simplified by the reduction of nitrate to nitrogen with significant accumulation of nitrite. Utilization of nitrate was observed not to be limited by nitrate for concentrations above 5 g NO_3-N/m^3. The denitrification rates, under conditions of excess substrate and electron acceptor, were found to be in the range of 0.8 – 2.0 g NO_3-N/(m^3h). A discussion on the interaction of the sewer processes and the effects on a downstream-located wastewater treatment plant (WWTP) is provided.

Keywords : Anoxic Processes, Denitrification, In-sewer Processes, Nitrate Utilization Rate, Nitrite, Nitrous Oxide

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Proceedings of 2nd International Conference on Interactions between Sewers, Treatment Plants and Receiving Waters in Urban Areas – INTERURBA II, Lisbon, Portugal, 19-22 February 2001
Also published in Water Science and Technology Vol. 45 No.(3) pp. 53–60.

AN EXPERT SYSTEM PROTOTYPE FOR DESIGN FLOOD ESTIMATION TECHNIQUES

Wardah Tahir
Zaidah Ibrahim

ABSTRACT

Design flood estimation is crucial in the planning and design of water resources projects like the construction of culverts, bridges, reservoirs or dams. The safety and cost efficiency of a hydraulic structure is closely related to the accuracy of design flood estimation. The paper discusses the automation of three widely used design flood estimation techniques namely the Regional Frequency Analysis Method, Rational Method, and Triangular Hydrograph Method . An effort is made to develop an expert system on these three techniques. Besides, the Regional Frequency Analysis technique is updated as to produce a more accurate procedures using longer period of annual maximum stream flow data and more gauging stations throughout the Peninsular Malaysia .

JSPS – VCC Seminar on Water Environmental Planning
International Islamic University, Kuala Lumpur, 15-16 October 2002

CHARACTERIZATION OF MUNICIPAL WASTEWATER USING RESPIROMETERY

Suhaimi Abdul Talib
Ramlah Mohd Tajuddin
Mat Som Marwi

ABSTRACT

The use of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Organic Carbon (TOC) as pollution indicators are beginning to be questioned as to their relevance in representing the microbial processes in wastewater. Oxygen Utilization Rate (OUR) is now being promoted as an alternative tool to evaluate extent and impacts of pollution due to wastewater. This paper describes experimental procedure to measure OUR in order to characterize municipal wastewater into various COD fractions.

Results of OUR measurements and COD fraction analysis on municipal wastewater in Shah Alam, Malaysia when compared to wastewater from other studies, show that the range of COD fractions of municipal wastewater in Malaysia differs from values reported by the IAWPRC Task Group (Henze et al.,1987). The easily biodegradable, SS, fraction in this study was found to be lower while the hydrolysable components are much higher compared to the IAWPRC values.

Keywords: Oxygen Utilization Rate, COD Fractions, Wastewater Characterization, Batch Test

CHARACTERIZATION OF WASTEWATER IN HOT-CLIMATE COUNTRIES FOR MODELLING OF IN-SEWER MICROBIAL TRANSFORMATION PROCESSES

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ABSTRACT

Design of sewers in Malaysia, as outlined *by MS1228 (1991): Code of Practice for Design and Installation of Sewerage Systems,* only focus on two main aspects, i.e., the structural and hydraulics designs of sewers. No consideration was accorded to process design, as the *Code* implicitly assumed that all processes take place at wastewater treatment plants. With the possibility of existing 6000 small sewage treatment plants being replaced by fewer centralized plants, thus increasing travel time of wastewater to treatment plants, it is necessary to analyze and quantify the in-sewer transformation processes of the wastewater before it enters the treatment plant.

This paper presents a fundamental and conceptual description of the microbial system in sewers in terms of wastewater organic matter transformation. The model has been applied successfully both in gravity and pressure sewers and is capable of handling both aerobic and anaerobic processes as described by Bjerre *et al.* (1997), Hvitved-Jacobsen (1998), Hvitved Jacobsen *et al.* (1995). Wastewater in Johor Bahru, Malaysia is characterized and parameters used for modelling of in-sewer processes are established from Oxygen Uptake Rate (OUR) and *Standard Methods.*

The characterization of wastewater from warm climate countries is important and significant as it allows the conceptual model to be used over a temperature range of 20 – 30°C, which is well above the 20°C of its normal use. The characterization also yields the composition of wastewater in warm countries, which is significantly different compared to wastewater in temperate climate, due to high dilution resulting from infiltration and inflow into sewers.

Keywords : Warm Climate Wastewater, Wastewater Characterization, Organic Matter Transformation, Microbial Systems, Oxygen Uptake Rate.

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COMPARATIVE ANALYSIS OF EIA SYSTEM IN ASEAN COUNTRIES

Haron Ismail
Junaidah Ariffin

ABSTRACT

This paper examines the existing framework and procedure for EIA (Environmental Impact Assessment) of ASEAN countries. Concern on the diversity of legislative framework are highlighted. The types of projects subjected to EIA for different ASEAN countries are compared. Further, operational support for EIA are analysed.

In conclusion, the need for uniform EIA system within ASEAN countries are explored.

Keywords : Environmental Impact Assessment, Framework , Procedure, Comparative Study, ASEAN Countries

14th Conference of ASEAN Federation of Engineering Organisation at Melaka, Malaysia, November 1996

COMPARATIVE STUDY ON INFILTRATION MODELS ON RESIDUAL SOIL

Suhaimi Abdul Talib

ABSTRACT

The study of infiltration has normally been associated with recharge of groundwater. However, findings, recently established, from investigations of slope failures have shown that infiltration seemed to be the major factor triggering these disasters.

The study of infiltration in unsaturated residual soil has caught the attention of many researchers around the world. Among the many areas that require attention is the ability to predict the depth and amount of infiltration during rainfall events.

This paper compares several infiltration models with respect to actual infiltration behavior of residual soil slope. The models studied include Kostyakov, Horton and Green-Ampt. A discussion on the ability of each model to predict in infiltration rate and the Cumulative infiltration is provided based on field monitoring of a residual soil slope.

Keywords: Infiltration, Slope Stability

Proceedings of the Regional Conference on Geotechnical Engineering
Geotropika 97, Johor Bahru, 11-12 November 1997

COMPUTATIONAL MODELLING OF TURBULENT DISPERSION IN OPEN CHANNEL FLOW

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ABSTRACT

Rivers are often polluted by soluble contaminates which may be hazardous to life. In an effort to minimize the effect of pollution there is a need to understand the dispersion of such contaminants. Numerical models have become very useful in the prediction and study of longitudinal convection-dispersion of sluble matters. This paper proposes a one-dimensional two-zone dispersion model for open channel flow. Solutions of the numerical scheme have shown good agreement with the laboratory measurements.

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DATA ANALYSIS OF SUSPENDED SEDIMENT FOR RIVERS

Mohmad Radhwan Abdul Karim
Junaidah Ariffin

ABSTRACT

Data analysis of suspended sediment was made based from data taken from three rivers namely Sungai Lui, Sungai Semenyih and Sungai Langat in Selangor. The data were measured from four gauging stations namely Kajang and Dengkil along Sungai Langat, Kg. Lui along Sungai Lui and Kg Rinching along Sungai Semenyih. Observed river stages during the study were between 3.87 m and 77.36 m. Data covers flow discharges ranging from 2.053 m^3/s to 87.792 m^3/s. Observed velocities were between 0.411 m/s and 1.422 m/s with range of flow depths between 0.302 m to 3.227 m. Measured suspended load for the rivers were between 0.046 kg/s to as high as 118.305 kg/s. From this study it revealed that suspended load constitutes a large fraction of the total load. Thus it can be concluded that total load is dominated by suspended load in most rivers. The concentration of suspended sediment in relation to flow depth is established.

**Seminar Penyelidikan BRC , Century Mahkota Hotel, Melaka,
31 October – 2 November 2001**

DESIGN FLOOD ESTIMATION FOR PENINSULAR MALAYSIA : REGIONAL FLOOD FREQUENCY ANALYSIS AND SOFTWARE DEVELOPMENT

Wardah Tahir
Zaidah Ibrahim

ABSTRACT

The Regional Flood Frequency analysis for Peninsular Malaysia are revised using extended record of data (1960 up to 2000) and additional records of data from 45 more stations. This analysis produces revised regional frequency curves and derives a new average median curve for each frequency region. An equation of best–fit for each regional curve is introduced to enable a more objective reading of the dimensionless ratio of flood for a given return period over the mean annual flood (MAF). Flood for a given return period for an ungauged catchment is estimated by multiplying the ratio with the MAF. Revised MAF equations for ungauged catchments are derived by multiple regression techniques using SPSS software.

A first version of design flood estimation software named DeFlood is introduced Visual Basic programming language is used to develop the design flood estimation software for Peninsular Malaysia which incorporates three techniques, namely Simple Rational Method, Triangular Hydrograph Method and Regional Frequency Analysis .

National Conference on Hydraulic, Hydrology and Water Resources Management, Equatorial Hotel Bangi, Selangor, 26 September 2001

DESIGN OF KNOWLEDGE-BASED SYSTEM FOR FLOOD FORECASTING, OPERATIONS AND PLANNING(KBSFOP)

Junaidah Ariffin

ABSTRACT

KBSFOP, acronym for Knowledge-Based System for Flood Forecasting, Operations and Planning has been developed to assist relevant flood management practices. Artificial intelligence applications and the development of knowledge-based system was introduced in the design of KBSFOP. This would allow the user more flexibility to alter and add new information to the system.

This paper will discuss the modules that made up KBSFOP and the overall structure. A general application to show the validity of the model will be shown.

Keywords: Flood Management, Artificial Intelligence, Knowledge-based System.

DETERMINATION OF BED SEDIMENT LOAD FOR RIVERS

Junaidah Ariffin
Wardah Tahir

ABSTRACT

Bed sediment load is essential in calculating the transport rate of sediments in rivers and several empirical equations have been developed using experimental and field data by past investigators. However it should be noted that the equations developed were based on controlled conditions done in the laboratory and sediments were of uniform sizes. Even if the empirical equation derived is based on field data, this does not seemed to match with our local conditions. The predicted rate of transport of bed sediments using these equations do not agree with the observed values. In view of this, several field data have been collected from river gauging stations in Selangor namely Kg. Lui Station for Sg. Lui, Kajang and Dengkil Station along Sg. Langat and Kg. Rinching Station along Sg. Semenyih to establish a relationship for the transport of bed load. The number of bed load samples taken at each cross-section in every observation vary between two to nine. The methods employed in the river gauging operation and sediment measurements depend largely on the flow conditions. In this research work the effective grain size of sediments was found from the S-curves. From the sieve analysis tests it was found that the river beds under study composed of more than 60 % of sand which has size ranges from 0.063 micron to 2 mm. A rating curve of discharge versus bed load has been prepared. A relationship for bed load transport have been established for rivers in Selangor.

EFFECT OF URBANISATION OF THE MAINTENANCE OF DRAINAGE SYSTEM: A CASE STUDY AT ITM CAMPUS, SHAH ALAM, SELANGOR DARUL EHSAN

Suhaimi Abdul Talib

ABSTRACT

ITM, Shah Alam is one of the leading tertiary institutions in this country. It is located on a 380-acre site in Selangor and was first developed in 1968. Various physical developments were carried out in the last 25 years. These physical expansions and developments have caused the surface runoff to increase over the years. This paper looks at the following:

a. how the surface runoff increases with respect to physical developments in the last 25 years.
b. What are the impact of physical developments on the existing drainage system
c. Maintenance strategies developed to overcome the drainage problems arising from these developments.

Amongst the maintenance strategy proposed is the development of a database for drainage systems on campus. This database is used to monitor the condition, capacity and maintenance records of existing drain.

Buletin Jurutera, Bil. 1994 No.1 January 1994, pg. 7-13

EFFLUENT CONTROL IN RIVERS: UNIFORM EMISSION STANDARDS VERSUS RIVER QUALITY OBJECTIVES

Suhaimi Abdul Talib

ABSTRACT

The rapid pace of development in Malaysia has taken toll on one of the country's potentially renewable resources. i.e., rivers. Reports on river pollution compiled by the Department of Environment (DOE), Malaysia, indicated that water quality in Malaysian rivers have deteriorated. This paper looks at the two major approaches in controlling effluent discharge in rivers, namely, the River Quality Objectives (RQO) and the Uniform Emission Standards (UES). Both approaches are compared and contrasted in order to establish their merits. Practices in Malaysia, which is based on the UES system is compared to the RQO approach adopted in the United Kingdom. The paper proposes changes, which can be incorporated into effluent control system for Malaysian rivers in future.

Keywords: River Pollution, River Pollution Control, River Quality Objectives, Uniform Emission Standards.

Proceedings of International Conference on Hydrology and Water Resources of Humid Tropics, Perak, 24-26 November 1998

ENVIRONMENTAL CONSIDERATIONS OF DEVELOPMENT PROJECTS IN THE COASTAL ZONE

Turahim Abd. Hamid

ABSTRACT

Coastal zone is under constant attack not only from the wave action but also from the man action. Man action which materialize in many development projects can change the dynamic equilibrium of the coast and cause serious coastal erosion problems. The number of coastal sites experiencing critical erosion in this country are in the increase due to the increased man activities. Therefore, our use of coastal zone must be organized so as to allow a balance between the demand for development and the need of protection. A strategy has to be formulated to control and coordinate all development projects in the coastal zone. This paper tracers some of the steps taken by the government in formulating necessary development policies to guide and manage all development projects in the coastal zone.

National Seminar on Environmental Engineering And Management for National Development, Shah Alam, Selangor 12 - 13 May 1998

ERROR INTRODUCED IN MEASUREMENTS OF BED LOAD TRANSPORT

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ABSTRACT

High accuracy in calculating the transport rate of bed load in natural channels is required for design purposes. This can be achieved through good sampling and reliable data sets. However, measurements of bed load transport can be a difficult task for rivers with flow depths exceeding one meter owing to the methods of measurements that uses either a cableway or an A-Frame. Therefore this study is confined to rivers with flow depths less than one meter only. Method of measurements employed is wading technique using Helley-Smith bed load sampler that is the most superior to other methods.

Study has been conducted on two rivers namely Sungai Lui and Sungai Semenyih with cross-section spanning between 14 m to 15 m. Sampling was done at every meter through out the river cross-section. The main aim of this paper is to make comparisons on the amount of bed load transport taken at every meter with the bed load transport taken at every two meter points at each observation. Results are tabulated and presented in graphical forms showing the percentage errors introduced between the two procedures. A qualitative and quantitative discussion on the improved accuracy of the former sampling method are presented.

A formula in computing the actual bed load has been established to make possible the estimation of bed load if less number of samples were taken at each traverse.

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EVALUATION OF EQUATIONS ON TOTAL BED MATERIAL LOAD

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ABSTRACT

Predictions of total bed material load for Malaysian rivers using selected empirical equations were made based on 56 sets of field data. Data were obtained through observations made from three rivers namely Sungai Lui, Sungai Semenyih and Sungai Langat in Malaysia. The rivers are categorised under wide rivers with width to depth ratio greater than 10. Data covers flow discharges from 2.7 m^3/s to 54.078 m^3/s, flow velocities from 0.411 m/s to 1.422 m/s, flow depths from 0.3664 m to 2.4425 m and median sediment sizes between 0.582 mm to 2.415 mm. The equations used in the evaluation are Ackers and White, Engelund and Hansen, Yang and the equation proposed by Wu et al. The selection was based on the performance of these equations by past investigators who showed good agreement between observed and calculated transport rates. The range of data used by these investigators are tabulated. Graphical comparisons of the calculated and measured transport rates are shown. The accuracy and the reliability of these formulas are verified.

Keywords: Total Bed Material Load, Sediment

FLASH FLOOD MODEL

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Suhaimi Abdul Talib
Sahol Hamid Abu Bakar

ABSTRACT

Floods have been a major aspect of man's interaction with nature. It results from a number of basic causes of which the most frequent are climatological in nature. The spread of urbanization, forest clearance, agricultural, under drainage and ploughing-up of natural grassland have increased the potential of flooding. There is clear evidence that damage caused by flooding is ever increasing. There is therefore a need for an efficient means of forecasting flood to alleviate the damage caused both physically and financially.

This paper discusses the modification and application of the Tank Model for flash flood predictions in urban areas. The Tank Model was recalibrated with various modifications. This paper will elaborate the overall procedure involved in the modification of the model. Flowchart showing the sequence of events will be explained. The paper will verify the application of this model for flash floods even though traditionally it has been applied for seasonal events only. Comparison of the observed and forecasted values will be shown for verification. The model was applied using data from Klang River Valley Basin.

Keywords : Flash Flood, Tank Model, Forecasting

Proceedings of International Conference on Hydrology and Water Resources of Humid Tropics, Perak, 24-26 November 1998

FLOOD PROBLEMS IN MALAYSIA : ITS CAUSES, DAMAGES AND NECESSITY OF FORECASTING

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ABSTRACT

Flooding is a frequent occurrence in Malaysia as river flows respond very quickly to heavy rainfall. Flood in Malaysia usually occurred during the North East monsoon season i.e between November and January. During this season, heavy rain falls on the east coast of peninsular Malaysia and the coastal regions of Sabah and Sarawak. This paper discusses the causes of flood in Malaysia, damages caused by the flood and necessity of forecasting as a mean of minimizing damages as well as some mitigation measures and disaster plan.

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International Seminar On Disaster Preparedness, Disaster Management And Post-Disaster Rehabilitation in Asia-Pacific Region Manila, The Philippine, 29 - 31 January 1992

HALF SATURATION CONSTANTS FOR NITRATE AND NITRITE BY IN-SEWER ANOXIC TRANSFORMATIONS OF WASTEWATER ORGANIC MATTER

Suhaimi Abdul Talib[1]
Thorkild Hvitved-Jacobsen[2]
Jes Vollertsen[2]
Zaini Ujang[3]

ABSTRACT

Significant breakthrough and progress have been made in the study on kinetics of microbial transformation in sewers under aerobic and under changing aerobic / anaerobic conditions. Fundamental knowledge on anoxic kinetics of wastewater is still lacking, that it is now not possible to apply an integrated approach of municipal wastewater treatment incorporating sewer networks as bio-chemical reactor. This paper presents the results of studies on determining half saturation constants for nitrate, K_{NO3}, and nitrite, K_{NO2}, in raw wastewater. The average values of K_{NO3} and K_{NO2}, determined from experiments conducted on 7 different wastewater samples were found to be 0.76 and 0.33 gNO_3-N/m^3 respectively.

Keywords : Anoxic Processes, Denitrification, Half-saturation Constants, In-sewer Processes, Nitrate Utilization Rate, Nitrite Utilization Rate

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INFLUENCE OF RAINFALL IN UNSATURATED SOIL ON THE STABILITY OF SLOPES

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ABSTRACT

Great difficulty can be met in justifying many high and steep slopes in residual soils, even under heavy rainfall, and yet some slope fail during rainfall and some remain stable for many years. It is now clear that unsaturated zone plays a crucial role in the slope stability, as it is the link between surface and groundwater. The objective of this paper is to develop the solution where the unsaturated flow equation and the formulation of appropriate effective stress equation and parameters for such soils can be solved simultaneously.

Keywords : Residual Soil, Slope Stability, Unsaturated Soil

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Proceedings of the Second International Groundwater Conference IGW2-90, Kota Bahru, Kelantan, 25-29 June 1990

IN-SEWER PROCESSES : DENITRIFICATION IN THE BULK WATER PHASE OF MUNICIPAL WASTEWATER

Mokhtar Shaharuddin
Suhaimi Abdul Talib
Dzaraini Kamarun

ABSTRACT

Microbial transformations of organic compounds start in the sewer network. The dominating process will be decided by the availability of the type of electron acceptors. The electron acceptors are utilized in a fixed sequence: oxygen for aerobic respiration, nitrate for denitrification, organic compounds for fermentation, sulphate for sulphate reduction and carbon dioxide for methanogenesis. The lack of studies on microbial transformations under anoxic conditions is presently a barrier to establishing an integrated model for in-sewer processes. This study investigates the denitrification rates in bulk water phase of municipal wastewater. It was established that the denitrification rates are maximum when yeast extract is used as substrate followed by sodium acetate and glucose. Denitrification rates under conditions of excess electron donor and acceptor have been found to be in the range of 2.01- 4.41 g NO_3-N /(m^3h).

Keywords : Anoxic Processes, Denitrification, In-sewer Processes, Nitrate Utilization Rate, Nitrite Utilization Rate

INTEGRATED DESIGN OF SEWERS AND WASTEWATER TREATMENT PLANTS

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Thorkild Hvitved-Jacobsen[1]
Zaini Ujang[2]
Suhaimi Abdul Talib[3]

ABSTRACT

Sewer system design must be integrated with wastewater treatment plant design when moving towards a more sustainable urban wastewater management. This integration allows an optimization of the design of both systems to achieve a better and more cost-effective wastewater management. Hitherto integrated process design has not been an option because the tools to predict in-sewer wastewater transformations have been inadequate. In this study the WATS model – being a new and validated tool for in-sewer microbial process simulations – is presented and its application for integrated sewer and treatment plant design is exemplified. A case study on a Malaysian catchment illustrates this integration. The effects of centralization of wastewater treatment and the subsequently longer transport distances are addressed. The layout of the intercepting sewer is optimized to meet the requirements of different treatment scenarios.

Keywords : WATS, Sustainability, Sewers, Wastewater

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LABORATORY PROCEDURE FOR OXYGEN UTILIZATION RATE IN CHARACTERIZING MUNICIPAL WASTEWATER

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ABSTRACT

The use of Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Organic Carbon (TOC) as pollution indicators are beginning to be questioned as to their relevance in representing the microbial processes in wastewater. Oxygen Utilization Rate (OUR) is now being promoted as an alternative tool to evaluate extent and impacts of pollution due to wastewater. This paper describes a simple procedure for laboratory batch test to measure OUR in order to characterize municipal wastewater into various COD fractions.

Results of OUR measurements and COD fraction analysis on municipal wastewater in Johor, Malaysia when compared to wastewater from other studies, show that the range of COD fractions of municipal wastewater in Malaysia differs from values reported by the IAWPRC Task Group (Henze *et al.*, 1987). The easily biodegradable, S_S, fraction in this study was found to be lower while the hydrolyzable components are much higher compared to the IAWPRC values.

Keywords: Oxygen Utilization Rate, COD Fractions, Wastewater Characterization, Batch Test

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Proceedings of 6th International Conference on Pollution Control in Metropolitan Cities, Kuala Lumpur, 20-23 March 2000

MEASUREMENTS OF DYNAMIC PRESSURES ON A VERTICAL WALL SUBJECTED TO NON-BREAKING WAVES

Turahim Abd. Hamid

ABSTRACT

Vertical wall structures have many applications in coastal engineering. The main design parameter of these structures is the force exerted by non-breaking and breaking waves. If the water depth in front of the wall is more than twice the incident wave height, then the wall is subjected to non-breaking wave conditions. In this paper, an experimental study of dynamic wave pressures on a model vertical wall subjected to non-breaking waves is presented. Both regular and irregular waves have been used in the experiments. The dynamics pressures were measured at six depth of submergence along the centre line of the wall. The results obtained from measurements in the laboratory have been presented in terms of vertical pressure distribution and probabilistic distribution.

Seminar R & D in Coastal Studies: Spotlight on Applications
Flamingo Hotel, Kuala Lumpur, 4 - 5 August 1997

MEASUREMENTS OF WAVE IMPACT PRESSURES ON A VERTICAL WALL

Turahim Abd. Hamid

ABSTRACT

Vertical wall structures have many applications in coastal and offshore engineering. In shallow water, vertical seawalls are constructed to protect an area of land or facilities against storm waves. In deep water, vertical wall breakwaters are built to provide a calm area and to reflect incidents waves. The main design parameter of these structures is the force exerted by non-breaking and breaking waves. If the water depth in front of the wall is more than twice the incident wave height, the non-breaking wave conditions may occur. This paper presents an experimental programme on measurements of wave impact pressures against a vertical wall in deep water using regular and irregular waves. The impact pressures were measured at six depth of submergence along the centre line of the wall. The results reported in this paper have shown that the impact pressures produced from regular waves follow linear wave theory in deep and intermediate water for low wave steepness, whereas for steeper waves, the impact pressures follow third order solution quite well. It is also found that the impact pressures produced form irregular waves follow Weibull distribution quite well for depths below Still Water Level (SWL).

1st Asia Pacific Conference on Offshore Systems: Pipelines, Fixed, Mobile, and Floating Structures and Related Topics, APCOS – 2001, Subang Jaya, Malaysia, 23 – 26 April 2001

POTENTIAL USES OF SATELLITE REMOTE SENSING IN MONITORING RIVER SEDIMENTATION

Turahim Abd. Hamid
Bakhtiar Husain
Nordin Ahmad

ABSTRACT

Considerable knowledge on the extent of sedimentation is vital to the proper planning, design, installation, and maintenance of works of improvement for the development, use, and conservation of soil and water resources. One of the approaches is to use the satellite remote sensing method. This paper dwells on the technique of remote sensing in particular its applications, methods and limitations.

Workshop on Field Measurement Of Sediment in Rivers and Reservoirs
Bangkok, Thailand, 17 – 21 December 1990

QUALITY AND CUSTOMER SATISFACTION IN WASTE DISPOSAL SERVICES

Suhaimi Abdul Talib

ABSTRACT

Waste Disposal is an area, which no industry can do away with. It may not be the core business for most organisations in this country. However, the need to dispose waste and unwanted material from the organisations facilities creates lucrative opportunity for many waste disposal companies.

As concerns for environment and quality services grow in the country, waste disposal companies must take on new perspective in providing services to their customers. This paper looks at factors, which will promote quality service in the area of waste disposal. The following areas will be discussed:

a. Meeting the needs of the customers.
b. Setting service standards
c. The design and implementation of service programs
d. Profiting from effective feedback systems.

Discussions will be based on experiences of waste management in ITM, Shah Alam, Selangor Darul Ehsan.

Proceedings of the IEM/ICE Conference on Solid and Industrial Wastes Management Systems, Kuala Lumpur, 19-21 September 1994

RIVER MODELLING STORM EVENTS OF SUNGAI KAYU ARA CATCHMENT AREA USING MIKE 11

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ABSTRACT

Flash flood occurrences due to fast land cover development and frictionless socio-economic growth especially in Klang Valley has imposed a huge strain impact to urbanised areas. Studies with accurate models and methods in ascertaining flood expectancy are very important in counteracting the phenomena. Available data and effective hydrological models and precise hydrological and socio-economic studies would normally be able to propose beneficial solutions. However these studies would require time and cost for data preparation and monitoring. Complex models produce large quantities of result data that are difficult for people without specialist backgrounds to understand. Due to the limited data and complex hydrological approaches, a tool is needed to enhance flash flood profile. The integration of Remote Sensing (RS), Geographic Information System (GIS) and hydrology would assist to understand the physical processes and facilitate decision making by applying spatial simulation from limited data. The flood simulation can then be modelled with changes in land use features. This paper intends to discuss on utilising a tool to predict flash flood by using MIKE 11-GIS as a database and data processor. The hydrological data for Sg. Kayu Ara, based on 1996 and 1998 was used to produce the flow simulation. From this study, elevation view of the predicted flash flood levels is produced, highlighting the areas predicted to be covered with flash flood.

Keyword: GIS, Flood, Runoff Coefficient, MIKE 11GIS Model.

RIVER POLLUTION CONTROL IN MALAYSIA: A CHANGE IN THE REGULATORY INSTRUMENT

Suhaimi Abdul Talib
Haron Ismail

ABSTRACT

The rapid pace of development in Malaysia, especially during the last ten years has taken toll on one of the country's potentially renewable resources, i.e., rivers. Reports on river pollution compiled by the Department of Environment (DOE), Malaysia, indicated that water quality in Malaysian rivers has deteriorated.

The regulatory instrument used to control river pollution in Malaysia, is based on the Uniform Emission Standards (UESs) approach. This paper discusses the effectiveness of the present system and consider changes which can be implemented to transform the UESs approach into a River Quality Objectives (RQOs) approach.

Keywords : River Pollution, River Pollution Control, River Quality Objectives, Uniform Emission Standards

RIVER PROTECTION: ALTERNATIVE APPROACHES TO POLLUTION CONTROL

Suhaimi Abdul Talib
Junaidah Ariffin
Bahardin Baharom

ABSTRACT

Eventhough Malaysia is blessed with abundance supply of water resources, spatial and temporal variation of rainfall distribution and increasing incidences of river pollution have caused several crisis in water supply services.

The regulatory approach which is based on Uniform Emission Standards concept is discussed in relation to the opposite concept of River Quality Objectives. It has been acknowledged that due to a number of constraints, the measures adopted by the Government have to some extent failed to safeguard the well-being of our natural water resources. This paper also proposes that economic instruments should be used to compliment the existing regulatory instruments, so that more innovative and cost-effective pollution control measure will emerge that would be suited to specific industries.

Keywords : Economic

SEDIMENT DISCHARGE ON SUNGAI LANGAT AND ITS TRIBUTARIES

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ABSTRACT:

Study pertaining to suspended load and bed load profiles were conducted on Sungai Langat and its tributaries. The suspended load was found to be more dominating to bed load in certain range of flows, i.e., 9 – 90 m^3/s. The amount of load being transported at a certain period governs the situation. In low flows the bed load constitutes only a small fraction of the total load. However this depends on other factors such as the longitudinal slope and the composition of the sediments that made up the bed load and size of transported materials. A close examination on all sediment discharge revealed that total load showed the same trend as suspended load even though they did not agree quantitatively. Results from the study showed that increase in the flow did not signify an increase in the total load. The size of transported materials did not resemble the gradation of the bed materials.

Keywords : Sediment Discharge, Total Load, Bed Load, Suspended Load, Natural Channels

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SEWER DESIGN: A SHIFT FROM THE CONVENTIONAL VIEW

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ABSTRACT

This paper reviewed the management of sewerage services in Malaysia, highlighting problems prior to privatization and short/long term strategies taken to upgrade the service. In view of possible introduction of new, bigger and more efficient centralized wastewater treatment plants (WWTPs) to replace the existing 6000 smaller plants, resulting in increased transport time, it is recommended that sewer design and operation should incorporate the possibility of the sewer to act as a physical, chemical and biological reactor.

Microbial transformation processes in sewers have been neglected in design of sewers, including in Malaysia. Sewer systems in Malaysia have been designed solely to perform mass transport function, while WWTPs are considered stand alone treatment units. Developments in wastewater research particularly in Europe, have indicated that significant microbial processes and transformations occur during wastewater transport in sewers.

A shift from conventional understanding in sewer design begins with wastewater characterization, that is based on fractions of biodegradable organic matter in the wastewater. The microbial processes in sewers and WWTPs are similar, and the Activated Sludge Model No.1 outlined by Henze *et al.* (1987) could be used to model these processes, allowing both sewer system and WWTP to be modelled as an integrated wastewater treatment system. The output from sewer modelling serves as input to the WWTPs model.

Microbial processes and model concepts describing these transformations could be used to design sewers, either as systems where bio-degradable organic matter are removed prior to being delivered to mechanical WWTPs, or systems where biodegradable organic matter are preserved to ensure efficient operation of advanced WWTPs with denitrification and biological phosphorus removal. In the case of hot-climate countries like Malaysia, hydrogen sulfide formation in sewers can be controlled if understanding of these microbial processes and the associate model concepts are incorporated into the design of sewers.

With possible introduction of regulations on nutrient removal, wastewater characterization to identify various COD components will become essential.

Keywords : Sewer Design, In-sewer Treatment, Microbial Processes, Wastewater Transformations, Wastewater Characterization

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SEWER MICROBIAL PROCESSES, EMISSIONS AND IMPACTS

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ABSTRACT

Corrosion and human health problems related to hydrogen sulfide and odor nuisance exist as potential problems whenever and wherever anaerobic conditions in wastewater occur. Deterioration of sewer networks and malodors are by nature a wide spread risk in urban sewer networks. This paper has focus on aspects that are related to the emission of volatile substances in sewers and the corresponding approaches for their prediction. Such sewer air problems should find their solution in the design or renovation phase of the sewer network rather than by a control measure when problems appear. It is therefore crucial that such problems cannot just be monitored but be related to the anaerobic processes in the sewer network where the fundamental cause of the problem has its origin. Concerning odor, two major aspects must be dealt with to establish a procedure that can be applied in this respect. First, an indicator for an unknown large number of odorous substances must be found. Such a substance must be related to relevant in-sewer processes and a criterion in terms of odor for the indicator must be set. Secondly, a concept and a corresponding model that describes the pathways of the indicator must exist. Hydrogen sulfide is directly related to corrosion and health problems and can also be recommended as an appropriate indicator for odor problems. An existing in-sewer process model (WATS) that includes a conceptual description of and interaction between wastewater organic matter and sulfur transformatiðns can be extended to comply with sewer air problems.

Keywords : Anaerobic Condition, Emissions, Hydrogen Sulfide, Odor, Sewer Microbial Processes

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SHORT-TERM FLOOD FORECASTING USING ARMA MODEL

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ABSTRACT

River flooding has always been a major cause of death and destruction of property, and poorer people in developing countries are particularly vulnerable. While other disasters cause greater loss of life, the number affected by flood are far more serious. Major floods in Malaysia are caused by monsoonal disturbances occurring during the North-East season. In addition, flash floods which are caused by conventional rainfall have become increasingly common and severe as a result of rapid urbanization experienced in the country over the last fifteen years. In this paper, an attempt was made to carry out an analysis of annual stream flow data to simulate short-term flood discharges for Batu River at Sentul in the capital city, Kuala Lumpur. The investigation found that the forecasted flood peak discharges did not show consistent trends. These may be due to climatic conditions and different local features which are not considered in this study.

International Conference on Urban Hydrology For The 21st Century Urban Problems In The New Millennium, Kuala Lumpur, Malaysia, 14 – 16 October 2002

SIMULATION OF IRREGULAR WAVES FOR MODEL TESTING

Turahim Abd. Hamid

ABSTRACT

Many coastal model tests in the past were carried out using regular waves. However, the real sea waves are irregular in nature; being a combination of many wave components with different wave heights, frequencies, and directions. With the availability of modern testing equipments, the current practice is to use irregular waves to represent the real sea conditions. In this paper, the simulation of irregular waves for signal generation in the wave flume is discussed. For a specified number of samples and sampling intervals, many time series can be generated with the same spectral properties but with different random phases. In order to allow smooth movement of the wave generator, smoothing is introduced at the junction where two different time series are combined to form a longer record. Ramping is also included at the beginning and the end of the overall signal. Results obtained from measurements in laboratory have shown the measured spectrum reproduced the target spectrum quite well. The paper also discusses the use of SIWEH as a means of defining wave groupiness from a wave record.

1st Asia Pacific Conference on Offshore Systems: Pipelines, Fixed, Mobile, and Floating Structures and Related Topics, APCOS – 2001, Subang Jaya, Malaysia, 23 – 26 April 2001

SIMULATION OF NITROGEN LOSSES FROM FLOODED RICE FIELDS USING WIND TUNNEL EXPERIMENT

Reinier Bouwmeester[1]
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Siti Hawa Hamzah[2]
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ABSTRACT

A research has been done to study the effect of wind on fertilizer losses from rice paddies. The main aim of the study was to identify the major parameters influencing the process of ammonia (NH_3) volatilization from the water surface in a microplot. The study was conducted employing a construction of a 15.6 metre long test section of a wind tunnel with 1.0 metre square cross section. Ammonia concentration experiments were carried out to determine the amount of ammonia that evaporated into the atmosphere. The tests were performed in Civil Engineering laboratory of Institut Teknologi MARA, Shah Alam, using wind tunnel with 0.25 metre deep and 1 metre wide water channel as a prototype rice-paddy-field condition.

Water samples were taken and analysed using indophenol blue colour method. The results of the study showed that factors such as pH of water samples, wind speed and ammoniacal-N concentration of floodwater influence the NH_3 volatilization. The experiments indicated that ammoniacal nitrogen concentration directly influences the flood water NH_3 (aq), whereas the effects of pH and temperature result in fractional dissociation of ammoniacal-N.

Keywords : Hydrolysis, Ammonia Volatilization, Wind Tunnel, Ammoniacal-N Concentration, Floodwater, Wind Speeds and the pH Value.

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THE DEVELOPMENT OF DESIGN FLOOD ESTIMATION SOFTWARE FOR MALAYSIA

Wardah Tahir
Zaidah Ibrahim

ABSTRACT

Reliable estimates of the magnitude and frequency of floods are essential for the economical planning and safe design of any hydraulic structure. If a hydraulic structure is under designed, the results could be a disaster; the dam may break, the highway may flood or the bridge may collapse. On the other hand, if the structure is over designed and hence very safe, the cost involved could be unreasonably expensive. The Drainage and Irrigation Department of Malaysia has published the manuals on the estimation of design flood in the form of Hydrological Procedures. These procedures were developed around 10 to 20 years ago using the hydrological data from about 8 to 36 years of record (Pre-1960 to 1980). Since flood estimation involves the application of probability and statistical analysis for time series of data, the accuracy of the estimation would be improved if longer record of data were used. The first part of the paper discusses the revision of Regional Flood Frequency analysis using extended record of data and the following development of new Mean Annual Flood (MAF) equations for each frequency region in Peninsular Malaysia. In the revision, new values of flood peaks for different return period are derived for each stations by applying Gumbel probability analysis. Next, revised MAF equations for ungauged catchments are developed by multiple regression techniques using SPSS software. The other part of the paper looks into the development of design flood estimation software using Visual Basic programming language .The software will implement the three design flood estimation techniques used in Malaysia, namely the revised Regional Flood Frequency Analysis techniques, the Rational method and the Triangular Hydrograph method. It is expected that the Malaysian design flood would be better estimated in a more efficient way as a result of the project.

2nd International Conference on Disaster Management : Preparing and Planning for the Future, Surabaya , Indonesia, 3-5 May 2001

TRANSVERSE VELOCITY DISTRIBUTION IN RELATION TO BED LOAD MOVEMENT IN NATURAL CHANNELS

Junaidah Ariffin[1]
Aminuddin Ab. Ghani[1]
Nor Azazi Zakaria[1]
Ahmad Shukri Yahya[1]
Suhaimi Abdul Talib[2]

ABSTRACT

The transverse velocity distribution in a plane normal to the direction of flow with respect to bed load movement is analysed. There are limited studies on the transverse velocity profiles in natural channels with B/y_0 aspect ratio greater than 10. The findings are based on observations under field conditions in two rivers namely Sungai Lui and Sungai Semenyih. In this paper, results of field experiments on the effects of velocity to bed load profile were examined. The findings indicated that velocity was not the only determining factor to the change in bed load profile. Other contributing factors responsible for the change include bed slope and composition of the bed load.

Keywords : Bed Load, Natural Channels, Sediment Transport, Transverse Velocity

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Presented at River Basin Management 2001, Cardiff, Wales, U.K., 11 – 13 September 2001.
Also Published in Brebbia, C.A. and Blain, W.R (2002). "Hydraulic Information Management." WIT Press, United Kingdom, pp 183-190.

WATER AUDIT – INCREASING PROFIT AND REDUCING POLLUTION

Suhaimi Abdul Talib

ABSTRACT

This paper introduces water audit as a tool for industries to be more efficient in production by using less resource and reducing pollution. Measures such as recycling, reuse and recovery are introduced in order to reduce wastage and pollution to the receiving water environment.

Water audits incorporates prevention measures, with treatment of pollution at source while promoting recycling, reuse, recovery and reclaiming of materials. Water audits also balance out the polluter pay and user pay principles.

Project & Construction Management

CHALLENGES AND DIFFICULTIES IN CHINESE CONSTRUCTION PROJECT FOR MALAYSIAN CONTRACTORS

Che Maznah Mat Isa[1]
Intan Rohani Endut[1]
Ngah Embong[2]

ABSTRACT

Market penetration into China offers huge challenges and risks together with its great potential and opportunities brought by its economic growth. There are obviously problems such as in dealing with the bureaucratic procedures, establishment of inter-personal relationships, difficult and lengthy periods of negotiation process, adaptation to its complex cultures and in dealing with the unfamiliar political environment.

This paper presents some of the difficulties and challenges experienced by the Malaysian contractors who have won contracts in China. The results revealed that the most unrefuted and recognized difficulties in operation experienced by the successful contractors and anticipated by other contractors were the "lack of transparency" of the laws and regulations, the bureaucratic nature of the government system and the lengthy negotiation process.

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CONSTRUCTION METHODS FOR SUBSTRUCTURE AND BASEMENT WORKS

Suhaimi Abdul Talib

ABSTRACT

Sub-structures are structural components which are located beneath the soil surface or which are in direct contact with the earth. They play a very important role in ensuring the safety and performance of the entire structure/building. Incompetence in design and/or poor construction practices either in using substandard material or shoddy workmanship may lead to serious damage, which impair the performance of the structure or even lead to total failure of the structural system

This paper introduces the basic types of foundations, i.e., shallow and deep foundations, and outlines the construction methods focusing on site preparation, excavations, groundwater control and de-watering, and quality control during the construction phase.

CPD Construction Training Programme : CM 6, Kuala Lumpur, 28 February 1998

CONSTRUCTION METHODS FOR SUBSTRUCTURE: SLOPE STABILITY AND RETAINING STRUCTURES

Suhaimi Abdul Talib

ABSTRACT

Slope failures are not uncommon in Malaysia. Over the last ten years, numerous incidents of slope failures have been reported by the media. These failures have caused not only monetary damages also loss of lives.

This paper discusses the attributing factors for slope failures in Malaysia. A brief discussion on the mechanics of slope failure is also provided.

Alternatives for slope remedial measures are discussed focusing on good construction practice.

CPD Construction Training Programme : CM 6, Kuala Lumpur, 28 February 1998

COST ELEMENTS INVOLVED IN THE INSTALLATION OF UNDERGROUND SERVICES IN URBAN AREA

Kartini Kamaruddin

ABSTRACT

This paper highlights the different cost elements involved in the installation of underground services in urban area, for both the non-man entry trenchless techniques and open cut methods of construction. The economic considerations and comparison on the capital cost of the machine, setting-up and construction of the pits, excavation of trench, installation depth, pipe material, drive length, ground water problem, progress rate, renewal costs, reinstatement costs, labour involved, traffic distruption costs, speed of work, air and noise pollution, damage to road surface and underground facilities, safety and obstruction of plant and materials on site are forwarded herein. This subject is useful particularly to practising engineers and contractors embarking upon underground services installation projects.

International Conference Cum Exhibition on Trenchless Construction – Towards Trenchless Cities, Negeri Sembilan, Malaysia, 11–13 July 1994

CONSTRUCTION WORKSITES AND WORK PRACTICES – BASIC SAFETY GUIDELINES

Sahri Bahari
Siti Hawa Hamzah
Bahardin Baharom

ABSTRACT

The construction industry today employs more than 400,000 workers. Each worker is exposed to the potential hazards of the industry which might stem from lax safety attitudes, poor safe work practices, lack of safety planning by management or inadequate safety enforcement. Regardless of the site of the construction projects, potential accidents might range from just minor bruises due to protruding objects to fatal mishaps that took away lives. But these accidents could be prevented if proper safety measures are being taken. This paper highlights some of the common potential hazards in the construction worksites and the measures necessary to provide a safer working environment. Basic safety guidelines promoting safe working practices are also elucidated herein.

National Short Course on Construction Project Management for DID Engineers and TA, Kuala Lumpur, 1-6 July 1991

DEVELOPMENT AND MANAGEMENT OF HIGHLAND

Roslan Zainal Abidin
Intan Rohani Endut

ABSTRACT

Summary: The rate of development in Malaysia is going at a fast pace to the extent that it knows "NO BOUNDARY". Our highlands are important water catchment areas, thus uncontrolled and ill-planed developments would greatly affect these areas. A proper and integrated planning and management of highland areas need to be drawn up and this can only be achieved through the involvement and commitment of all parties concerned. A very clear policy on the development of highland areas is significantly needed and it should take into account not only the economic but also the ecological values provided by the highlands.

HOUSING FOR THE MASSES – THE DEVELOPMENT OF LOW COST HOUSING IN MALAYSIA

Kartini Kamaruddin
Siti Hawa Hamzah
Sahri Bahari

ABSTRACT

Adequate and reasonable standard of housing is a basic need of any populace. Malaysia is no exception. Of growing concern to the nation, amidst its robust economy, is providing housing to its masses – namely the low cost housing. Towards this end, the government has incorporated the low cost housing program in its development plan. However, burgeoning cost of land, construction materials and labor have raised pertinent issues vis-à-vis the low cost housing programs. Further, with the shift of emphasis, the private sector now being the engine of growth, the social responsibility of providing houses to the masses is now shared between the government and the private sector. This paper addresses the development of low cost housing in Malaysia – its problems and prospects. Pertinent issues and the critical success factors are highlighted herein.

12th Conference of ASEAN Federation of Engineering Organizations (CAFEO 12), Bandar Seri Begawan, Brunei Darulsalam, 28–30 November 1994

KAWALAN KUALITI DALAM PEMBINAAN KONKRIT

Muhd Fadhil Nuruddin[1]
Intan Rohani Endut[1]
Abu Bakar Mohamad Diah[2]

ABSTRAK

Lazimnya konkrit merupakan bahan binaan yang tahan lasak dan memerlukan selenggaraan yang minima. Walaubagaimana pun fenomena ini mungkin tidak kekal lama jika aspek-aspek yang berkaitan dengan pembinaan konkrit berkualiti dikesampingkan. Justeru, tidak boleh tidak, keprihatinan terhadap permasalahan kualiti mesti diutamakan bagi memastikan struktur binaan selamat dalam perkhidmatannya.

Di antara aspek besar yang secara langsung mempengaruhi keutuhan konkrit ialah bahan, tata kerja, pengawetan, dan rekabentuk. Kepincangan dalam salah satu aspek akan menyebabkan kemerosotan seluruh struktur konkrit. Kerosotan yang berlaku seringkali bertindak seperti kanser yang merebak tanpa tepian. Kadangkala pembaikpulihan adalah mustahil dan struktur perlu diroboh dan diganti dengan yang baru.

Kertas kerja ini membincangkan bagaimana aspek-aspek ini memberi kesan kepada kualiti konkrit dan juga memperkatakan tentang pengawasan harian kerja-kerja konkrit dalam industri pembinaan. Sebarang kecuaian membawa padah yang mengundang kos perbelanjaan pembaikan yang tinggi.

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Persidangan Kebangsaan Kejuruteraan Awam '99, Lumut, Perak, Malaysia, 24-26 Jun 2000

KE ARAH MENINGKATKAN KOMPETENSI DAN DAYA SAING KONTRAKTOR BUMIPUTRA

Suhaimi Abdul Talib

ABSTRAK

Kertas kerja ini membincangkan cabaran-cabaran yang dihadapi oleh kontraktor bumiputra dalam melaksanakan sesuatu projek. Cabaran diperincikan pada peringkat pra projek, peringkat perlaksanaan projek dan peringkat selepas projek.

Seminar Kebangsaan Prospek & Peluang Kontraktor Bumiputera Dalam Industri Pembinaan di Malaysia, Shah Alam, 28 Ogos 1995

LOW COST HOUSING IN MALAYSIA – A MYTH OR REALITY

Siti Hawa Hamzah
Kartini Kamaruddin

ABSTRACT

Malaysia amidst its robust economy aligned with its VISION 2020 to be an industrialized country, has no exception in providing adequate and reasonable standard of housing to the masses. This is a basic need to any populace. Squatter colonies have been like thorns in the flesh of any nation of this world. Giving the poor decent accommodation is the least the nation can salve her social conscience alongside other measures to wipe out poverty and improve the living standard of the people. Towards the end, the government of Malaysia has incorporated the low cost housing programme in its development plan, since the beginning of the Second Malaysian Plan commenced in the early seventies (1970's). However, burgeoning cost of land, construction materials and labour have raised pertinent issues vis-à-vis the low cost housing programmes. The social responsibility of providing houses to the masses is now shared between the government and the private sector. This paper addresses the development of low cost housing in Malaysia – its realities and myths. Pertinent issues such as strict regulations imposed by the government on the standard building layout and maximum selling price of RM 25,000 by any developer, process of identifying genuine buyers and the critical success factors and achievement are highlighted herein.

The Journal Institution of Engineers Malaysia, Malaysia, June 1997, Vol 58 No. 2, pp 55 – 61

OPPORTUNITIES IN CHINA CONSTRUCTION PROJECTS FOR MALAYSIAN CONTRACTORS

Che Maznah Mat Isa[1]
Intan Rohani Endut[1]
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ABSTRACT

China's "open door" policy established in 1979 has encouraged overseas investors into its market with the aim to accomplish the four modernization programmes in agriculture, industry, political and military, and science and technology. These programmes offer vast economic and business opportunities not only to the People of Republic of China but also to foreigners. This paper analyses the enormous opportunities in the China's market that are open to foreign companies. It looks into the current position of Malaysian contractors in China, the level of awareness of the contractors on the opportunities available and the sources of information consulted about the opportunities in China. The results revealed that Malaysian contractors who are interested or have undertaken works in China have on average, a wider contracting experience abroad compared to those who are not interested. Generally, the results show that the level of knowledge on China's opportunities is very low amongst the contractors. Finally, the sources of information consulted about the opportunities in China came mostly from the "soft" information, such as from previous consultants or clients.

Keywords: Opportunities in China, Interested and Disinterested Contractors

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Proceedings of APEC Construction 2002, International Conference on Advancement on Design, Construction, Construction Management and Maintenance of Building Structures, Bali, Indonesia, 27 – 28 March 2002

OVERCOMING THE NOMADIC NATURE OF CONSTRUCTION INDUSTRY IN MALAYSIA

Yahaya Haji Ahmad[1]
Suhaimi Abdul Talib[2]

ABSTRACT

This paper will discuss the nature of the construction industry in Malaysia and highlight some of the problems encountered in the maintenance of building and facilities. Choice of materials, durability and maintenance cost, design details and services are some of the criteria that will be discussed. The paper also gives suggestions to relevant parties on how to improve the profession.

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Persidangan Alam Bina IV, Universiti Sains Malaysia, Pulau Pinang, 14 Januari 1995

PEMBAZIRAN DALAM INDUSTRI KONKRIT DI MALAYSIA

Nor Azazi Zakaria[1]
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Muhd Fadhil Nuruddin[2]
Ahmad Ruslan Mohd Ridzuan[2]

ABSTRAK

Kekuatan mampatan konkrit amat penting dalam pengiraan semasa kerja mereka bentuk struktur konkrit bertetulang. Oleh itu setiap konkrit yang dibekalkan ditapak bina haruslah memenuhi kekuatan yang telah diambilkira semasa rekabentuk. Kekuatan ini dipantau melalui kekuatan kiub pada hari ke-28. Kiub yang diuji haruslah mengikut prosedur yang dikehendaki menurut spesifikasi dan kod amalan rekabentuk MS 1195. Kajian telah dijalankan keatas 10,274 kekuatan kiub bersaiz 150 x 150 x 150 mm untuk kekuatan 25 hingga 80 N/mm^2 yang telah diuji oleh makmal berdaftar yang diiktiraf sekitar Kuala Lumpur dari tahun 1997 hingga 1999. Ini berdasarkan konkrit yang telah dibekalkan oleh syarikat pembekal konkrit siap campur (ready mixed) untuk kegunaan pembangunan sekitar Kuala Lumpur.

Analisa menunjukkan konkrit yang dibekalkan telah melebihi kekuatan yang dikehandaki. Ini telah mengakibatkan harga konkrit yang dibekalkan 15-30% lebih tinggi dari sepatutnya. Ini mungkin disebabkan industri konkrit di Malaysia mengikut piawaian British yang tidak sesuai dengan bahan dan cuaca di negara kita. Mungkin juga bekalan melebihi kekuatan yang dikehendaki disengajakan untuk mengambilkira faktor kecacatan, kecuaian atau ketidakmahiran pekerja dalam proses perletakan konkrit. Jika ini benar berlaku, ini merupakan pembaziran yang besar dalam industri konkrit di Malaysia.

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PENGURUSAN KEMUDAHAN DALAM MENYEDIAKAN ITM KE ARAH MEMPELBAGAIKAN SUMBER KEWANGAN

Suhaimi Abdul Talib
Alias Taib

ABSTRAK

Arena pendidikan masa kini sedang mengharungi satu proses perubahan yang sudah pastinya memberi kesan yang besar terhadap operasi Institusi Pengajian Tinggi seperti ITM. Kecenderungan kerajaan untuk menswastakan sektor pendidikan telah mendapat pelbagai reaksi dari semua pihak yang terlibat.

Sebagai sebuah Institusi Pengajian Tinggi yang unggul di negara ini, ITM haruslah membuat persediaan untuk menangani sebarang kemungkinan dan bukan hanya bertindakbalas apabila konsep penswastaan pendidikan ini dilaksanakan sepenuhnya.

Kertas kerja ini akan meninjau Kemudahan Fizikal yang ada di ITM serta tahap penggunaannya. Kos operasi bagi Kemudahan sedia ada di kampus ITM juga akan dibincangkan. Seterusnya, potensi untuk memanfaatkan sebahagian dari Kemudahan ini sebagai "profit centres" akan diketengahkan. Di antara Kemudahan-Kemudahan yang berpotensi adalah:

1. Penyewaaan ruang di ITM untuk pelbagai tujuan termasuk pengiklanan
2. Penggunaan tanah yang belum dibangunkan secara produktif
3. Penggunaan Kemudahan ITM sebagai Pusat Konferensi
4. Penggunaan Kemudahan ITM sebagai Pusat Rekreasi dan Sukan.

Konsep Pengurusan Kemudahan (Facilities Management) juga dikemukakan bagi memastikan Kemudahan sediada serta pelaburan di masa hadapan di ITM dapat memberi pulangan yang semaksima mungkin.

Adalah diharapkan persediaan ke arah mempelbagaikan sumber kewangan ITM akan mengekalkan serta memperbaiki lagi tahap operasinya sekiranya ITM perlu menanggung sendiri sebahagian dari kos operasinya.

Perbincangan yang dikemukakan dalam kertas kerja ini adalah berdasarkan maklumat yang dikumpulkan oleh Pejabat Pembangunan dan Penyelenggaraan, ITM, Shah Alam.

Prosiding Persidangan Akademik ITM 1994, Santubong, Sarawak, 2-6 September 1994

PERANAN PENGURUS KEMUDAHAN DALAM MENYELENGGARA DAN MENGURUS ASET ORGANISASI

Alias Taib
Suhaimi Abdul Talib

ABSTRAK

Sejak kebelakangan ini kesedaran telah timbul tentang kepentingan pengurusan kemudahan bangunan. Malah di luar negara sudah muncul satu displin kerja yang dikenali sebagai Pengurusan Kemudahan (Facilities Management).

Kertaskerja ini membentangkan peranan, bidang kerja serta misi Pengurus Kemudahan (Facilities Manager). Peranan komputer dalam menangani arus perkembangnan teknologi maklumat turut dibincangkan. Kaedah pendekatan di mana komputer serta perisian-perisian seperti CAD dan CAFM digunakan bagi melicinkan tugas pengurus kemudahan turut diketengahkan. Penggunaan komputer di sektor korporat yang menghubungjalinkan aspek-aspek pengurusan kerja-kerja penyelenggaraan, perancangan serta pengurusan ruang, hartanah, tenaga, talian serta kabel dan sistem amaran kebakaran serta keselamatan juga dibincangkan.

Akhir sekali, kertaskerja ini menyarankan agar bidang pengurusan "facilities" diberi perhatian yang sewajarnya kerana ia melibatkan jumlah aset yang besar bagi sesuatu organisasi atau negara.

THE SURVEYOR First Quarterly 1993 Vol. 30 No 1.

PERCEPTION OF RISK AND CONSTRUCTION RISK MANAGEMENT IN KLANG VALLEY

Intan Rohani Endut[1]
Che Maznah Mat Isa[1]
Noraliza Basrah[2]
Jamaluddin Othman[1]

ABSTRACT

Risk, which is an inevitable character of human existence, is also imminent and inherent in construction projects. Consultants offer their services and advice to their clients to control the risks while the contractors and developers have to deal and cope with the risks. For decades, construction industry has a very poor reputation with many projects not being completed on time, commonly coupled with time overruns and low quality of products and services. Unfortunately, many project managers and construction managers are not aware of the vital need of risk management in their organizations where the three targets of cost, time and quality is likely to be subjected to risk and uncertainty.

This paper discusses the current views of risk management perceptions in terms of the trends, culture, level of awareness and implementation of risk management. The survey was being carried out against over seventy construction companies in Klang Valley, Malaysia comprising of consultants, contractors and developers. It is acknowledged that lack of perception of risk management would lead to unexpected occurance of events and if more information and knowledge is available, probability of occurance can be predicted and severity of impact can be minimised. The study will show that the level of awareness, culture, trends and implementation of risk management are low for consultants and contractors except developers who are more consistent in their approach as the owner, end-users and financier of the projects.

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Seminar On Enhancing Productivity In Construction Industry, MINES, 14 September 2000

PREPARATIONS FOR MALAYSIAN CONTRACTORS IN DOING BUSINESS IN CHINA

Che Maznah Mat Isa
Intan Rohani Endut

ABSTRACT

The scene in the international construction market today provides a very competitive and challenging environment for the Malaysian contractors. They must be able to understand the current and up-to-date scenario, analyze the situation and be willing to adopt the proven strategies and also adapt intelligently to the unfamiliar international construction environment. Market expansion is well known as one of the strategic reasons behind any company's move into the international market. Malaysian contractors must realize the opportunities available within the Asia-Pacific region, especially in China are huge and available. The contractors must not pass the opportunity to take part in the modernization and development of China in order to reap immense advantages offered. This paper looks into the preparation and homework that should be done by the Malaysian contractors in order to gain a foothold in China. It analyses some of the preliminary investigations and preparation done by the successful contractors who have penetrated China's market. The results revealed that in general, Malaysian contractors who were successful and interested in opportunities in China had been thorough in their homework and in preparing their entry strategies.

Keywords: China's Construction Market, Early Preparation, Successful Contractors, Interested Contractors

RISK MANAGEMENT AWARENESS IN THE MALAYSIAN CONSTRUCTION INDUSTRY

Intan Rohani Endut
Che Maznah Mat Isa

ABSTRACT

The construction industry is well-known as an industry having a very poor reputation in completing projects on time and within the required quality and budget. Unfortunately, most parties involved in the construction industry are not aware of the importance of risk management in ensuring the three important objectives in any construction project, namely time, quality and cost are met. This paper, in general, looks into the level of awareness of risk management in the Malaysian construction industry. Specifically, it examines the perception of risk in terms of its level of awareness and implementation of risk management in the construction companies and surveys the various parties' views on the level of risk involved in different types of construction projects and at different phases of construction. The survey was carried out with over seventy (70) Malaysian construction companies and consisted of three main parties namely, consultants, contractors and developers.

The study revealed that the level of awareness and implementation of risk management is low for consultants and contractors but not developers. It was also found that the three parties have the same view that the level of risk was high during the construction phase.

THE COLLAPSED SKYSCRAPER : AN OVERVIEW WITH A CASE STUDY

Wardah Tahir

ABSTRACT

The World Trade Centre (WTC) could have survived or at least there could have been enough time for evacuation if only the skyscraper was covered with concrete. Concrete cover would reduce the effect from the tremendous heat (800oC) of the aviation fuel from melting the steel structure like cooked spaghetti. While lack of concrete is said to be one of the main reasons of WTC failure, concrete building is mentioned to be one of the biggest problems in earthquake zone. The paper presents a general overview of collapsed concrete buildings; the reasons for failure and recommendations to reduce failure with examples from several case studies.

World Conference on Concrete Materials and Structures
Shah Alam, Malaysia, 14-16 May 2002

THE ROLE OF HUMAN RESOURCE MANAGEMENT IN ENHANCING PRODUCTIVITY OF THE MALAYSIAN CONSTRUCTION INDUSTRY

Che Maznah Mat Isa[1]
Aini Jaapar[2]

ABSTRACT

Human Resource Management (HRM) is currently a rapid growing field in Malaysia and is becoming more complex to most organisations, including construction companies. The scenario is due to the changing environmental forces, which includes the changing of government and legal requirements, increasing demands for a more skilled and better motivated workforce, increasing attention to diversity in the work force, and intensifying global competition, just to name a few. In the construction industry, HRM is unquestionably the fundamental element for improving productivity. As a labor-intensive sector, the impact of HRM is even more significant since construction products are created by clients, developers, project managers, architects, engineers, construction managers, contractors, skilled and unskilled labourers, and others.

This paper presents a holistic view of HRM in the construction industry and focuses on the problems and applications of the management in enhancing the construction productivity of the workforce. It further discusses the important and significant roles of HRM to overcome the problems in managing the workforce. It also attempts to provide some solutions and recommendations in managing effectively by developing and integrating the human resource activities which ultimately and most importantly contribute to the corporate strategic development to collectively achieve the highest productivity as one of the goals of the organization.

Keywords: Human Resource Management, Construction Industry, Management of Workforce, Labour, Productivity

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Seminar on Enhancing Productivity in Construction Industry at MINES, 14 September 2000

TOWARDS PLANNED AND PREVENTIVE MAINTENANCE OF INFRASTRUCTURES

Suhaimi Abdul Talib[1]
Alias Taib[2]
Kamaruzaman Wan Yusuf[1]

ABSTRACT

Infrastructures require large investments. Proper maintenance of these facilities is necessary to ensure their continuous and effective performance.

This paper discusses the various maintenance approaches, which include corrective, planned, preventive and predictive maintenance.

The essential components of a maintenance management system are illustrated and several elements forming an effective maintenance strategy will also be highlighted.

Keywords : Corrective Maintenance, Planned Maintenance, Preventive Maintenance.

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Proceedings of Seminar on Planned and Preventive Maintenance of Infrastructure System, Shah Alam, Selangor, 17-18 May 1995

Concrete Technology & Construction Materials

A STUDY ON THE WORKABILITY AND DURABILITY OF HARDENED CONCRETE USING LIGHTWEIGHT AGGREGATE

Kartini Kamaruddin

ABSTRACT

The production of concrete having the required workability, crushing strength and durability will depend on the design of concrete mixes, and thus the selection of the most economical mix proportions of cement, water and aggregates (fine and coarse). In this study the design mix was based on specied strength 30N/mm^2. Proportion of the lightweight aggregates as a replacement of coarse aggregates in the mixes was varied in terms of percentage. Comparative test was performed to evaluate the workability of the fresh concrete and the durability of the hardened concrete in term of surface absorption (ISAT) are tested on 7,14 and 28 days.

The Monthly Bulletin of The Institution of Engineers Malaysia, KDN PP1050/3/97, pp 61-68, ISSN No. 0126-9909, No. 8, Bil.1997, Malaysia, August 1997

CHARACTERISATION OF ZINC AS A REFERENCE ELECTRODE IN CORROSION MONITORING OF STEEL IN CONCRETE

Hamidah Mohd. Saman
Muhd. Fadhil Nuruddin
Hasnah Abd. Wahab
Azman Said

ABSTRACT

The objective of this study is to investigate the feasibility of developing a rugged, cheap and practical reference electrode for corrosion monitoring of steel in concrete by establishing zinc electrodes. The reliability of zinc electrodes was analysed by comparing the potential reading of steel vs. zinc and that vs. conventional reference electrode of silver-silver chloride (SSC) electrode. Fifteen pieces of zinc (10 mm x 10 mm x 5 mm) were embedded in concrete blocks and the concrete specimens were exposed to marine environment for 20 months. The results in the early stage revealed that the potential of steel vs. zinc (PSZ) behave similar to that vs. SSC (PSSC) but became erratic after 2 months of exposure which could be a result in the change of concrete properties. A correlational analysis based on SPSS showed that there is no correlation between potential of steel vs. zinc (PSZ) and potential of steel vs. SSC (PSSC). However, the PSZ showed that the same trend as PSSC when measured on the surface of specimens. For coated concrete specimens with embedded zinc, the potential of steel versus the two reference electrodes readings was stable. Metallographic, SEM and chemical analysis were also performed.

Seventh International Conference on Concrete Engineering and Technology, 5 –7 June 2001

CHLORIDE-ION INDUCED CORROSION OF GALVANISED AND ORDINARY STEEL REINFORCEMENT IN HIGH PERFORMANCE CONCRETE

N.Gowripalan
H.M.Mohamed

ABSTRACT

An experimental investigation has been carried out to assess the effectiveness of the use of High Performance Concrete (HPC) and galvanized steel in reducing reinforcement corrosion. Two Normal Strength Concrete (NSC) mixtures with 28-day compressive strengths of 30 and 40 MPa and two High Strength Concrete (HSC) mixtures with compressive strengths of 50 and 80 MPa were used for this study. The rapid chloride ion penetration test was used to study the ion penetration and the results are compared with the results of long-term immersion tests in 4% NaCl solution over a period of 1 year. No correlation between the results of these two tests could be established. Half-cell potential measurements were used to monitor the initiation of corrosion. The pH of HPC pastes and mortars were monitored for 90 days to study the effect of silica fume on pH of concrete and corrosion initiation. The results showed that HPC reduced chloride ion penetration significantly. Silica fume at 10% eplacement level reduced the pH of concrete from 14.00 to 12.80 over a period of 90 days.

Cement and Concrete Research, Vol. 28, No.8, 1998, pp 1119-1131

CHLORIDE ION PENETRATION AND REINFORCEMENT CORROSION IN HIGH PERFORMANCE CONCRETE (HPC) CONTAINING SILICA

N.Gowripalan
H.M.Mohamed

ABSTRACT

High Performance Concrete (HPC) with a blended cement has been found to be more beneficial in reducing corrosion of steel in reinforced concrete structures when compared with a plain OPC mix. In this paper, results of a laboratory investigation carried out on HPC containing silica fume at replacement levels of 5-20% by weight of cement are reported. The concrete mixes investigated are designed for applications in a marine environment and had a 28-day compressive strength ranging from 50 MPa to 100 MPa. The scope of this paper includes the long term chloride ion penetration tests over a period of 1 year by immersion, accelerated chloride ion penetration tests at various voltage differences and actual rate of corrosion measurements carried out on reinforced concrete specimens in a cyclic, wetting and drying environments (24 hours salt water spraying and 24 hours drying at about 35°C) using a half cell potential device.

Chloride ion penetration depths with a 5% salt solution, as measured by silver nitrate, for mixes with silica fume were considerably smaller than those for corresponding mixes with only OPC. The accelerated tests carried out for chloride ion penetration at different voltages gave a more in depth knowledge as to how chloride ions move through concrete capillary pores. The influence of total porosity, capillary pores and gel pores on chloride ion penetration and ion concentration at a given depth was quantified by measuring the porosity by two different methods. Although the pH of concrete containing silica fume was slightly lower than that of OPC concrete, HPC containing silica fume was found to be very effective in reducing the rate of corrosion of steel reinforcement.

International Conference on High Performance Concrete and Performance and Quality of Concrete Structures, Florianopolis, Brazil, 5-7 June 1996

COCONUT SHELL AND ITS ASH AS A REPLACEMENT OF AGGREGATE OR CEMENT IN PRODUCING CONCRETE AND PARTICLE BOARD

Hamidah Mohd. Saman
Azmi Ibrahim
Rohana Hassan

ABSTRACT

In this investigation, the performance of concrete and cement particle board made of ground coconut shell were assessed. It was found that the coconut shell replacement as a fine aggregate does not contribute to the strength of concrete. However, the concrete with ground coconut shell was found to be durable in terms of its resistance in water, acidic, alkaline and salty environment and comparatively invulnerable to fire as that of conventional concrete. Concrete and particle board with coconut shell has extra advantage as its density was lower than the concrete without ground coconut shell. While in assessing cement particle board, nine different formulation with three different ratio of cement and ground coconut shell and three different water content were cast. The board were prepared with dimension of 500 mm x 500 mm x 10 mm. The cement and ground coconut shell were mixed manually, poured and pressed for 300 psi into the mould. After demoulded and cured for 28 days, the particle board were tested for bending strength, water absorption, swelling and density test. It was found that the bending strength of particle board made of coconut shell achieved the specified properties marginally.

Seminar Insights 2002: K-World Challenges, Innovations and Solutions, PWTC, Malaysia, 24-25 August 2002

COVERCRETE ESTIMATON BASED ON CARBONATION EFFECT

Muhd. Fadhil Nuruddin
Abu Bakar Mohamad Diah
Hamidah Mohd. Saman

ABSTRACT

Existence of adequate covercrete makes concrete structures durable and provides protection for the reinforcement from corrosion. Durability is supposed to be a value proposition in concrete construction therefore adequate covercrete that contribute to the durability aspect is very important. It is evident that the onslaught from the marine environment results in deterioration of the concrete structures. Carbonation has been identified as one of the causes that contribute to durability problems. Carbonic acid produced when CO_2 diffuses into the concrete tends to reduce the alkalinity level within the concrete. Thus an optimum thickness of covercrete is of paramount importance in ensuring the integrity of the structures. This is because excessive covercrete may cause spalling problems whilst inadequacy promotes corrosion.

This appear elucidates the performances of various concrete grades exposed to marine environment. Concrete grades introduced were low, medium, and high representing strengths in N/mm^2 of [15,20], [25, 30, 35], and [40,50] respectively. Effect of carbonation via phenolphatalein spray method on concrete of up to 40 years of age was monitored. Carbonation depth data were obtained from laboratory and on site samples. Simulation of the real effect with the one in the laboratory was also done using an accelerated carbonation chamber. Based on 1 week in carbonation chamber as equivalent to 1 year in real life, a flow chart was introduced which can be used to estimate the thickness of covercrete needed. When parameters such as grade and service life span were given, a proposed covercrete thickness could be estimated.

Keywords : Deterioration, Covercrete, Accelerated Carbonation Chamber, Exposure, Simulation

DURABILITY OF CONCRETE REINFORCED WITH OIL PALM TRUNK FIBRE (OPTF)

Zakiah Ahmad
Hamidah Mohd. Saman

ABSTRACT

The objective of this study is to investigate the durability of concrete reinforced with Oil Palm Trunk Fibre (OPTF). The durability was assessed by weight change when immersed in water, NaOH, NaCl and HCL solutions. The microstructural was also examined using Scanning Electron Microscope (SEM) before and after immersion test. The weight change in percentage of the concrete reinforced with OPTF was found to be lower than that of plain concrete specimen. The microstructural examination showed that the OPTF was still in good condition after embedded in concrete and immersed in aggressive solution. The microstructural examination also showed that the pores in the OPTF was filled when embedded in the concrete that might attributed to its durability.

Keywords : Reinforced Concrete, Oil Palm Trunk Fibre, Durability, Weight Change, Scanning Electron Microsope (SEM), Microstructural Examination

World Conference Materials and Structures, Shah Alam, Malaysia, 14-16 May 2002

EARLY COMPRESSIVE STRENGH AND DRYING SHRINKAGE OF RECYCLED AGGREGATE CONCRETE

Ahmad Ruslan Mohd Ridzuan[1]
Muhd Fadhil Nuruddin[1]
Abu Bakar Mohamad Diah[2]
Kamarul Badlishah Kamaruzaman[2]

ABSTRACT

Recycled concrete aggregates were tested for grading, specific gravity, bulk density, impact and crushing value, water absorption and the results compared with those for natural aggregates. Concrete mix of designed strength 25 MPa at 28 days with w/c of 0.58 were prepared using this recycled aggregate as coarse aggregate either by fully or partially replacing it with the coarse natural aggregate and tested for workability, compressive strength and drying shrinkage. For the fresh concrete mixes the recycled aggregate concrete shows lower workability than the corresponding natural aggregate concrete. From the strength point of view the recycled aggregate concrete compared well with natural aggregate concrete. Therefore, it could consider for various potential applications. With respect to drying shrinkage the recycled aggregate concrete shows higher shrinkage than the natural aggregate concrete.

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Seventh International Conference On Concrete Engineering And Technology, 5-7 June 2001

EFFECT OF AIR CONTENT ON DRYING SHRINKAGE OF OPC CONCRETE

Kamarul Badlishah Kamarulzaman[1]
Taksiah Abdul Majid[1]
Abu Bakar Mohamad Diah[1]
Ahmad Ruslan Mohd Ridzuan[2]
Mohd Ali Jelani[2]

ABSTRACT

Drying shrinkage is defined as "the time-dependent volume reduction (concrete) due to loss of water at constant relative humidity and temperature". Drying shrinkage is affected by various factors such as aggregate (content, size and grading, elastic properties), water/cement, size and shape of specimens, curing and concrete properties. Where movement of the concrete is restrained, drying shrinkage will produce tensile stresses within the concrete which may caused cracking. The present study is concerned with investigating the drying shrinkage of grade 35, 50 and 70 N/mm^2 Ordinary Portland Cement (OPC) concrete with air content 3.5% and 5.5%. The result shows that the ultimate drying shrinkage of the OPC concrete increases as the strength of the concrete increased and no significant difference with air content.

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EFFECT OF AIR-CURED ON STRENGTH DEVELOPMENT OF OPC CONCRETE

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Nor Azazi Zakaria[1]
Taksiah A. Majid[1]
Kamarul Badlishah Kamarulzaman[1]
Ahmad Ruslan Mohd Ridzuan[2]

ABSTRACT

This paper is an attempt to investigate the effect of curing procedures of OPC on development of strength. The investigation is concentrated on the concrete curing in water at early ages. OPC concrete of design strength at 25, 35, 50,60, 70 and 80 N/mm^2 has been investigated. This covers a wide range of concrete strength used in industry. The strength development of samples cured in water at 20°C with 55% RH up to 1 year have been compared to concrete cured in air only at same age. The results shown that with air-cured concrete shown lower strength and non achieved design strength.

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The Second Asia/Pacific Conference on Durability of Building Systems Harmonised Standards and Evaluation, Institut Teknologi Bandung, Indonesia, 10-12 July 2000

EFFECT OF USING CRUSHED CONCRETE ROOF TILES AS COARSE AGGREGATES ON PROPERTIES OF CONCRETE

Abdul Manaff Mohd. Ismail
Hamidah Mohd. Saman
Azmi Ibrahim

ABSTRACT

The research work reported herein is to investigate the possibility of developing new materials that can be used in the production of Ordinary Portland Cement (OPC) concrete. The potential use of some recycled concrete roof tiles (CRT) as aggregates in OPC are documented in this paper. The use of CRT aggregates in the right proportions, may provide the much-needed improvement in concrete performance and in the development of mechanical properties without substantially increasing the unit weight of the resulting mix compared with that of an equivalent conventional aggregates concrete. Tests were performed on 28-day-old specimens to determine sorptivity and compressive strength of concrete containing CRT aggregates. In general, the specimens were found to possess lower soprtivity and higher compressive strength compared with those of the control mix.

Keywords : Concrete Roof Tiles (CRT), Sorptivity, Compressive Strength, Coarse Aggregates

ESTIMATION OF LIFESPAN AND COVERCRETE DUE TO CARBONATION OF CONCRETE STRUCTURES EXPOSED TO URBAN AND RURAL ENVIRONMENTS

Muhd. Fadhil Nuruddin
Abu Bakar Mohamad Diah
Hamidah Mohd. Saman

ABSTRACT

Carbonation has been identified as one of the causes that limits the life span of a concrete structure. Carbonic acid produced when CO_2 diffuses into the concrete tends to reduce the alkalinity level within the concrete. Thus an optimum thickness of covercrete is of paramount importance in ensuring the whole life span is served. This paper elucidates the performances of various concrete grades exposed to urban and rural environments. Concrete grades introduced were low, medium, and high representing strengths in N/mm^2 of [15, 20], [25, 30, 35], and [40, 50] respectively. Effect of carbonation via phenolphatalein spray method on concrete of up to 40 years of age was monitored. Carbonation depth data were obtained from laboratory and on site samples. Simulation of the real effect with the one in the laboratory was also done using an accelerated carbonation chamber. Based on 1 week in carbonation chamber as equivalent to 1 year in real life, a flow chart was introduced which can be used to estimate the thickness of covercrete needed and also the life span of the concrete structures.

Keywords : Life Span, Covercrete, Accelerated Carbonation Chamber, Exposure, Simulation

FACTORS AFFECTING CARBONATION : SOME RESULTS BASED ON ACCELERATED TESTS

Muhd Fadhil Nuruddin
Ahmad Ruslan Mohd Ridzuan

ABSTRACT

Malaysia is undergoing a rapid development programme in line with vision 2020. Over the past 9 years, construction of new buildings mushroomed almost at every nook and corner of big cities like Kuala Lumpur, Johore Bahru and Penang. These concrete structures exposed to the environment are vulnerable to deterioration especially via carbonation attack. Carbonation takes a long time (20 years or so, depending on the durability of the concrete) to affect the steel reinforcement. Therefore buildings constructed before 1978 need to be looked at to determine any future problems. Researchers have much deliberated the problem of carbonation but this platitude does not come in tandem with the phenomenal remedy set. Carbonation's effect on the reinforcing steel is no more a contentious or equivocal matter, therefore the authorities concern must critically adopt planned and preventive maintenance programme rather than concentrating on reactive endeavors. This paper elucidates the mechanism of carbonation and subsequently the methods of predicting the rate of carbonation. Experimental results on different grades of concrete exposed to accelerated carbonation process are also analyzed in this paper.

Journal – Institution of Engineers, Malaysia. Vol. 60 No. 2 1999

FERROCEMENT AND ITS APPLICATION IN CIVIL ENGINEERING

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ABSTRACT

Ferro cement is not a new construction material. It has been introduced in construction more than a hundred years ago when Joseph Louis Lambot starting rowing boats etc. from ferrocement in France in 1848. Since then, it has been used elsewhere around the world as a construction material because it offers many advantages compare to the other traditional materials. This paper provides some historical background of ferrocement, its constituent materials and its properties as well as some of its possible applications in Civil Engineering.

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National Seminar 'Towards the Integration of Technical Development and the Society', Kelana Jaya, Selangor , 15 – 16 July 1992

FIBRE REINFORCED PLASTICS (FRP) – A NEW GENERATION OF REINFORCEMENT AND PRESTRESSING TENDONS FOR CONCRETE STRUCTURES

N.Gowripalan
XW Zou
H.M.Mohamed
RI Gilbert

ABSTRACT

Corrosion of reinforcing steel in concrete is a major problem in terms of durability of concrete structures. Numerous studies have been carried out and various methods have been developed to prevent steel corrosion in concrete structures. More recently, Fibre Reinforced Plastics (FRPs) have been introduced as reinforcement and these appear to be one of the most promising developments. These FRPs are free from the classical form of corrosion, and therefore have the ability to solve the problems related to reinforcement corrosion.

FRP reinforcement consisting of aligned continuous fibres mainly carbon, aramid or glass embedded in a resin matrix has already been developed and is available in many developed countries. FRP reinforcement has excellent properties as reinforcement for concrete structures. It possesses high tensile strength, light weight, and is non-magnetic and non-corrosive. These properties may lead to maintenance free concrete structures. To support this view, significant efforts have been made both in laboratory studies and field practice to utilize FRP reinforcement.

This paper briefly describes the historical development of FRP, the production processes and the advantages of FRP when used as reinforcement in concrete. This paper also summarises the short-term and long term mechanical properties together with some experimental results obtained at The University of New South Wales. A detailed paper on the flexural behaviour of prestressed beams with FRP is published separately.

Australian Civil/Structural Engineering Transactions, Vol. CE39, No.2 and 3, 1997

INFLUENCE OF COARSE RECYCLED CONCRETE AGGREGATE ON THE DRYING SHRINKAGE OF OPC CONCRETE

Ahmad Ruslan Mohd Ridzuan[1]
Mohd Ali Jelani[1]
Abu Bakar Mohamad Diah[2]
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ABSTRACT

The effects of using crushed waste concrete as coarse aggregates upon deformation due to drying shrinkage of concrete were investigated. Waste concrete cubes which has been tested for compressive strength as a compliance with construction specification were crushed and utilized as coarse recycled concrete aggregates in new concrete. Concrete mix of designed strength 30, 35 and 40 N/mm^2 at 28 days were prepared by fully replacing the coarse natural aggregate with coarse recycled concrete aggregate and tested. The ultimate drying shrinkage of OPC concrete containing recycled aggregates shows lower or comparable shrinkage to corresponding OPC concrete.

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INFLUENCE OF MORTAR SPACES BLOCK ON COMPRESSIVE STRENGTH OF CONCRETE

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ABSTRACT

Spacer block is an element used to provide the depth of reinforcing steel in a reinforced concrete structure. This depth is known as the cover to the reinforcement in the structure. An experimental study was undertaken to investigate the effects of spacer blocks made of mortar on the compressive strength of concrete. Grade 25 (25MPa) concrete with water-cement ratio of 0.58 were casted in 150mm cubes and spacer blocks with thickness of 30 mm were placed in the surface of the specimens in different positions. Compressive strength of the concrete specimens were determined on the 3rd, 7th and 28th day and were compared with the compressive strength of the control concrete specimens. Results obtained indicated significant variations in the compressive strength of the concrete specimens. Specimens in which spacer blocks were placed in the center of top surface and in the center of bottom surface exhibited a lower compressive strength than the control specimen, whereas the specimens in which spacer blocks were placed in the center of left side surface and in the center of right side surface exhibited a much higher compressive strength than the control specimen.

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INFLUENCE OF RECYCLED AGGREGATES ON THE PERFORMANCE AND DURABILITY OF OPC CONCRETE

Ahmad Ruslan Mohd Ridzuan[1]
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ABSTRACT

The effects of using crushed waste concrete as coarse aggregates upon compressive strength, drying shrinkage and air permeability of concrete were investigated. Waste concrete cubes which had been tested for compressive strength in compliance with construction specification were crushed and utilized as coarse recycled aggregates in new concrete. Tests on the aggregates showed that the recycled concrete aggregates have lower specific gravity and bulk density but have higher water absorption capacity than the natural aggregates. The resistance to mechanical actions such as impact and crushing for recycled concrete aggregates is also lower. Concrete mixes with design strength of 30N/m^2, 35N/m^2 and 40N/m^2 were prepared using this recycled aggregates as coarse aggregates and tested. With respect to strength and air permeability the recycled aggregate concrete shows higher strength and permeability compared to corresponding natural aggregate concrete and comparable shrinkage.

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2nd World Engineering Congress Sarawak (WEC 2002), Malaysia, 22-25 July 2002

INVESTIGATION ON SAW DUST ASH AS PARTIAL CEMENT REPLACEMENT

Kartini Kamaruddin

ABSTRACT

Construction activities in developing countries have increased in the recent years and the world inflation had made conventional construction materials more costly. These have compelled the developing countries such as Malaysia to look into the development of alternative building material. Cement plays an important role as a building material because it contributed to a substantial portion of the construction cost. Besides the high cost of cement, the industrial analyst (Pelabur[1]) projected that in the year 2000, the demand for cement will increase by 21 percent to 11.4 million tonnes and 13 percent to 14.0 million tonnes for year 2001. Due to these reason, many research have been conducted over the past decades to find a suitable replacement for cement. From the economic, technological and ecological points of view, cement replacement materials have an undisputed role to play in the future of the construction industry. Small amount of inert filler have always been acceptable as cement replacement, what more if the fillers have the pozzolanic properties. Many of these filler materials were industrial by-products which can also be considered as waste material, so the resulting benefits in term of energy saving, economy, environmental protection and conservation of resources are substantial.

Timber industry is one of the major contributors to Malaysia's economic growth, thus a large quantity of timber being consumed in the timber related industry. When the timber is processed, large amounts of sawdust were produced and being thrown away without any commercial value. It is the intention of this research to find out the possibility of using sawdust ash (SDA) as partial cement replacement. In this investigation a grade 30 concrete was designed at various water binder ratio of 0.45, 0.50, 0.55 and 0.60 with 30 % cement replacement. The reason why 30% cement replacement was chosen in this research is because in the preliminary investigation carried out by varying the percentage of the cement content, it was found out that 30% replacement of SDA with 0.5 water cement ratio is acceptable and within the design mix. The SDA obtained is at uncontrolled burning temperature.

From the investigation it was found out that with an increased in water cement ratio, the concrete cubes decreased in its' density, and the compressive strength. In terms of durability, concrete with SDA result in low resistance to acid attack, but it improves the resistance to chloride ingress.

7th International Conference on Concrete Engineering and Technology-CONCET 2001, Shah Alam, Malaysia, 5-7 June 2001

INVESTIGATION ON THE PHYSICAL PROPERTIES OF BRICKS AS LOAD BEARING WALL - PHASE 1

Kartini Kamaruddin
Siti Hawa Hamzah

ABSTRACT

The usage of bricks in construction industries as infill material is common. However, the use of bricks as load bearing structural element is relatively few in Malaysia. It is the aim of this research to identify the suitability of locally produced bricks as load bearing structural element. Thus, this preliminary investigation covers determination of the physical properties such as compressive, flexural and fatique strengths, absorptibility and permeability of four common types of bricks found in Malaysia, namely, the Calcium Silicate bricks, Sand-Cement bricks, Clay bricks and Engineering bricks.

From this research it was found that all the four types of brick tested i.e Calcium Silicate bricks, Sand-Cement bricks, Clay bricks and Engineering bricks cannot be used as load bearing wall construction. The reason is because the compressive strength of each type of bricks tested are far below the required lower limit of compressive strength, that is 28.0 N/mm^2.

Seminar Hasil Penyelidikan, Bureau of Research and Consultancy, UiTM at Shah Alam, Malaysia, 8 June 1999 and published in BRC Journal, Vol. 7, No.1, pp 57-76, ISSN No. 0128-7141, February 2001

INVESTIGATION ON THE POTENTIAL USE OF ORGANIC WASTE MATERIAL AS CEMENT REPLACEMENT

Kartini Kamaruddin

ABSTRACT

Construction activities have increased in recent years and is going to grow further in the future. With the increased in demand it will make the conventional construction materials more costly and this has awakened the developing countries to look forward in seeking new materials as an alternative building materials. Among the building materials, cement plays a major role because it comprises a large portion of the construction cost. It is the intention of this research to find out the possibility of using organic waste material, i.e sawdust ash (SDA), rice husk ash (RHA) and the rattan dust ash (RDA) as cement replacement material. In this preliminary investigation, grade 30 concrete was designed at 0.5 water binder ratio with variuos percentage of 0% (as control mix), 10%, 20%, 30%, 40% and 50% cement replacement. For each series of mix, the workability test, durability test and the compressive strength test at 3, 7, 14 and 28 days were conducted. From the results obtained, it shows that the organic waste material which are SDA, RHA and RDA have the potential usage as partial cement replacement.

Keywords : Compressive Strength, Durability, Organic Waste Material, Cement Replacement

KESAN PENGAWETAN STIM TERHADAP KEKUATAN KONKRIT

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ABSTRAK

Peningkatan kualiti konkrit bukan sahaja pada masa segar tetapi juga sepanjang umur konkrit tersebut. Bagi mencapai matlamat tersebut konkrit mestilah menjalani proses pengawetan yang terbaik dan sempurna. Kajian keatas kaedah pengawetan yang terbaik perlu dilakukan sebelum konkrit yang dibentuk diawet. Seharusnya kita tidak boleh berpuas hati dengan kaedah pengawetan konvesional iaitu menggunakan air dalam mendapatkan kualiti konkrit yang terbaik. Analisa dan keputusan yang didapati menunjukkan bahawa kaedah pengawetan menggunakan stim memberikan kekuatan yang tinggi berbanding dengan kaedah pengawetan air dan udara.

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KEUTUHAN DAN PENERLAPAN KONKRIT AGREGAT KITAR SEMULA

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ABSTRAK

Kertas kerja ini melaporkan kajian yang telah dijalankan terhadap konkrit agregat kitar semula. Aspek yang dikaji termasuk kesan penggunaan agregat kasar kitar semula ini terhadap kekuatan mampat, kebolehtelapan udara dan serapan air konkrit yang terhasil. Sisa kiub konkrit yang dihantar untuk ujian mampat sebagai mematuhi spesifikasi pembinaan telah dihancurkan dan digunakan sebagai agregat kasar kitar semula dalam penghasilan konkrit baru. Ujian tehadap agregat kasar kitar semula, menunjukan bahawa agregat jenis ini mempunyai graviti tentu dan ketumpatan pukal yang rendah, tetapi mempunyai serapan air yang lebih tinggi daripada agregat semulajadi. Ketahanannya terhadap beban hentaman dan hancuran juga adalah lebih rendah daripada agregat biasa. Campuran konkrit yang berkekuatan 30 N/mm^2, 35 N/mm^2 dan 40 N/mm^2 telah dihasilkan dengan menggunakan agregat kasar kitar semula dan diuji. Dari aspek serapan air dan kebolehterlapan udara ianya adalah tinggi sedikit berbanding konkrit biasa tetapi perbezaannya berkurang pada kekuatan yang tinggi.

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Persidangan Kebangsaan Kedua Kejuruteraan Awam (AWAM 2001), Star Cruises Superstar Gemini, 5-8 February 2002

KONKRIT UNTUK MASA HADAPAN

Abu Bakar Mohamad Diah[1]
Nor Azazi Zakaria[1]
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Kamarul Badlishah Kamarulzaman[1]

ABSTRAK

Amalan pembinaan masa kini lebih banyak menumpukan pembinaan struktur konkrit menggunakan konkrit gred 20, gred 25 atau gred 30. Adalah dicadangkan untuk pembinaan akan datang konkrit gred yang lebih tinggi dapat digunakan. Ini dapat meninggikan ketahanan konkrit untuk jangka masa panjang. Kertas kerja ini melaporkan keupayaan konkrit gred 25 hingga gred 80. Kekuatan mampatan konkrit telah diuji pada hari ke 28 dan 365 hari, manakala ujian pengkarbonatan terpecut telah diuji untuk hari ke 28 dan ujian kandungan klorida telah diuji selepas pendedahan selama 9 bulan. Program ujikaji telah diakukan yang mana meliputi tiga jenis pengawetan (dalam air, 1 hari dalam air dan 7 hari dalam air). Keputusan yang menunjukan konkrit gred tinggi lebih tahan lasak dari konkrit gred rendah. Adalah dicadangkan konkrit gred 50 digunakan dalam pembinaan struktur konkrit di Malaysia pada masa hadapan. Ini bemakna penyelidikan akan datang harus menumpukan konkrit berkekuatan tinggi tanpa memikirkan penggunaan bahan import (seperti bahan gantian simen) yang mana menumpukan penggunaan simen keluaran negara sendiri.

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Simposains 2000, Fakulti Sains Universiti Teknologi MARA, Shah Alam, 4 Oktober 2000

MEASUREMENT OF DIELECTRIC PROPERTIES OF CONSTRUCTION MATERIALS USING A CAPACITOR PROBE FOR NON-DESTRUCTIVE EVALUATION

Hashem Mohammad Ali Al-Mattarneh[1]
Deepak K. Ghodgaonkar[2]
Wan Mahmood Wan Ab Majid[1]

ABSTRACT

Construction materials (wood and concrete) can be non-destructively evaluated by electrically characterizing for dielectric properties. Previously, a parallel plate capacitor was used for this purpose. This method is useful in research and laboratory setting. In this study, a capacitor probe (CP) was designed to determine in-situ dielectric properties of materials at a frequency of 100 KHz. This probe consists of two planar conducting plates with separation between them, connected by wires to HP4263B LCR Meter. Prior to material testing, measurements were conducted to determine the validity of such a system by testing specimens with known dielectric properties such as Nylon. The dielectric properties of wood and concrete specimens were measured at 100 KHz. The results showed an increase of dielectric properties of concrete with increasing chloride content and fibre content. The dielectric properties of wood specimens decrease with increasing the angle between the direction of electric field and the grain direction.

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Seventh International Conference on Concrete Engineering and Technology, 5-7 June 2001

MECHANICAL PROPERTIES OF OIL PALM TRUNK FIBRE REINFORCED CONCRETE

Zakiah Ahmad
Hamidah Mohd Saman
Paridah Md. Tahir

ABSTRACT

An experimental study was conducted to compare the effectiveness of oil palm trunk fibres used at relatively low volume fractions, in enhancing the mechanical properties of concrete material. Fibre content ranges from zero to 3 percent by volume, fibre length is 25 mm and the concrete matrix compressive strength is about 30 MPa. Flexural and compression tests were conducted according to BS 1881. The influence of fibre content on the compressive strength and modulus of rupture is presented.

Keywords : Compressive Srength, Fibre Reinforced Concrete, Modulus of Rupture

MICROWAVE NON-DESTRUCTIVE TESTING FOR CLASSIFICATION OF MALAYSIAN TIMBER USING FREE-SPACE TECHNIQUES

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Wan Mahmood Wan Ab Majid[1]

ABSTRACT

Microwave non-destructive testing methods are fast, contactless, accurate and continous techniques for evaluation of moisture content, slope-of-grain, density of knots and specific gravity of the timber. Dielectric properties of timber are determined by its moisture content, slope-of-grain and density. So they can be used for non-destructive evaluation of timber. In this paper dielectric properties were deduced from the reflection and transmission coefficient measurements of Malaysian timber specimens using a free-space measurement system in the frequency range of 8-12.5 GHz. Dielectric properties were evaluated over different angles between the electric field and the direction of grain, strength, grain angle (angle between the direction of grain and electric field) and dielectric properties of Malaysian timber were established.

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MICROWAVE NON-DESTRUCTIVE TESTING OF FIBRE CONCRETE USING FREE SPACE MICROWAVE MEASUREMENTS

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ABSTRACT

Microwave Non-Destructive Testing (MNDT) techniques such as reflection, transmission and dielectric measurements have advantages over other NDT methods regarding low cost, good penetration in nonmetallic materials, good resolution and contactless feature of microwave sensor (antenna). In this paper, reflection coefficients, transmission coefficients, dielectric properties (ε = dielectric constant and ε" = loss factor) were measured to detect fibre distribution and concentration in Fibre-Reinforced Concrete (FRC). For FRC specimens, reflection (S_{11}) and transmission (S_{21}) coefficients were measured in the frequency range 8 – 12.5 GHz by using free-space microwave measurement (FSMM) system. FSMM system consists of a pair of spot-focusing horn lens antenna, mode transitions, coaxial cables and vector network analyzer, ε" and ε values can be evaluated from the measured S_{11} and S_{21}. FRC specimens were manufactured with polypropylene (PP) fibre (Fibermesh @ fibres, length = 19 mm) and steel fibres (Convotex fibres, length = 30 mm), FRC specimens were cast with fibre concentration of 0, 0.6, 0.9 and 1.2 kg/m^3 for PP fibres and 0, 10, 20 and 30 kg/m^3 for steel fibres. The results show decreasing reflection coefficients, transmission coefficients, and dielectric properties with increasing curing age. These properties also show the potential to be used to determine the percentage of fibre content in concrete.

Keywords : Microwave, Fibre Concrete, Non-destructive, Free-Space, Dielectric Properties.

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MICROWAVE NON-DESTRUCTIVE TESTING OF MALAYSIAN TIMBER FOR GRADING APPLCIATIONS

Deepak K. Ghodgaonkar[1]
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ABSTRACT

Microwave non-destructive testing methods are fast, contactless, accurate and continous techniques for evaluation of moisture content, slope-of-grain, density of knots and specific gravity of the timber. MNDT techniques using free-space microwave measurement system involve measurement of reflection and transmission measurements in free-space. Materials such as timber which are lossy and anisotropic causes a linearly polarized electromagnetic wave to be depolarized (i.e. elliptically polarized) upon transmission through the material. The free-space microwave measurement (FSMM) system can be used to measure polarization angle and axial ratio of elliptically polarized wave transmitted by the timber specimen. The slope-of-grain which is defined as an angle between the grain direction and the direction of incident electric field, is closely related to the polarization angle. This polarization angle and axial fields are co-polarized and from measured complex transmission coefficients when transmitting and antenna feeds are co-polarized and when these feeds are at an angle α (which is 56.3°). An experimental procedure is developed for the measurement of SOG using co-polarized and α polarized transmission measurements using FSMM system. We are reporting SOG measurements for Malaysian timber (light red meranti and yellow meranti) specimens using this method.

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Procedings of the World Conference on Timber Engineering Whistler, Canada, 2000

MICROWAVE SENSING OF MOISTURE CONTENT IN CONCRETE USING OPEN-ENDED RECTANGULAR WAVEGUIDE

Hashem Mohammad Ali Al-Mattarneh
Deepak K. Ghodgaonkar
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ABSTRACE

The existence of moisture in concrete is a major cause of damage to the concrete structure, so there is an increasing need for non-destructive detection and monitoring of moisture content in concrete. Microwave Non-Destructive Testing (MNDT) techniques have advantages over other NDT methods (such as radiography, ultrasonic ad eddy current) regarding low cost, good penetration in non-metallic materials, good resolution and requirement of only one face of material for testing. In this paper, microwave open-ended rectangular waveguide was used to measure the electromagnetic properties of Portland Cement Concrete (PCC) over a frequency range of 7.0 to 13.0 GHz. PCC specimens of six different water cement ratio (w/c) were prepared. PCC dielectric properties were evaluated at different moisture content ranges from saturated to oven dry. The results show reflection coefficients, dielectric constants and loss factors increase with increasing moisture content of PCC. At the same values of moisture content, the reflection coefficients, dielectric constants and loss factors of PCC increase with decreasing w/c ratio. The measured values of reflection coefficients, dielectric constants and loss factors can be used to determine the moisture content of PCC.

Keyword: Concrete, Moisture Content, Waveguide, Microwave, Non-destructive Testing.

MONITORING THE PERFORMANCE OF CATHODIC PROTECTION AND COATING OF STEEL IN CONCRETE USING ZINC AS A REFERENCE ELECTRODE

Hamidah Mohd. Saman
Muhd. Fadhil Nuruddin
Hasnah Abdul Wahab
Azman Mohd. Said

ABSTRACT

The objective of this study is to investigate the suitability of using zinc as an reference electrode to monitor the effectiveness of applying sacrificial anode (SA) and coating as a mean to protect the steel reinforcement in concrete. The reliability of zinc electrodes was analysed by comparing the potential reading of steel vs. zinc (psz) for protected steel reinforcement in concrete specimens and that vs. silver-silver chloride (pssc) electrode. The psz was also compared to the pssc of control (unprotected) specimens. The results showed that psz reading in protected specimens using SA and unprotected concrete specimens are erratic. Nevertheless, the psz is always less negative (more positive) than pssc and the trend is similar for psz in concrete with SA. There is no correlation of the psz and pssc with the corrosion level. There is also no good agreement between the pssc and the equivalent of psz to the chloride content. For coating specimens, the psz was stable and ranged from –50mV to 50 mV. The pssc for coated specimen was in ranged of –100mV less negative than the –276 mV (threshold value to indicate the probability that corrosion occurs) showed that the steel in coated specimens was not corroded. The visual inspection agreed that the steel in coated specimens was in good condition. The chloride content analysis showed that the chloride ion has reached the reinforcement within a year of exposure for 20 mm cover thickness while almost no chloride ion detected in coated specimens.

Keywords : Corrosion Protection, Sacrificial Anode, Coating, Reference Electrode, Reinforced Concrete, Chloride Content

NON-DESTRUCTIVE EVALUATION OF OIL PALM TRUNK FIBRE REINFORCED CONCRETE

Zakiah Ahmad
Hamidah Mohd. Saman
Paridah Md. Tahir

ABSTRACT

This paper reports on a study of the application of ultrasound waves in concrete reinforced with Oil Palm Trunk Fibre (PPTF) with the purpose of evaluating the latter's mechanical properties. The evaluation is based on the correlation between the speeds of propagation and modulus of elasticity. The speed of transmission is sensitive to the materials quality-determining factors; hence, this technique is an important tool to determine the quality of concrete. The concrete used in this study is of Grade 30. Fibre content ranges from zero to 3 percent by volume and fibre length is 25 mm. The identical concrete specimens were also subjected to destructive conventional method for purposes of comparison with the non-destructive findings. The results and analyses lead us to conclude that the non-destructive ultrasound method can be employed to obtain reliable evaluations of the mechanical properties of the concrete.

OIL PALM TRUNK FIBRE REINFORCED CONCRETE

Zakiah Ahmad[1]
Hamidah Mohd Saman[1]
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ABSTRACT

Concrete is known to have high compressive strength, stiffness, low thermal and electrical conductivity and low toxic. Another important thing is that concrete can be shaped into geometrical properties. However, concrete is brittle and weak in tension. When subjected to tensile stress, unreinforced concrete will crack and fail. Reinforcement with randomly distributed short fibres presents an effective approach to curb the crack propagation and improving the ductility and tensile strength of concrete.

In this studies, four different concrete mixes with different fibre content namely 0% , 1%, 2%, 3%, and 4% were cast. The parameters to be tested are flexural strength, compressive, and tensile strength (by splitting), modulus of elasticity, PUNDIT, durability and post deflection crack behavior. The durability test was tested by immersion test and ability to resist water and chemical attack in terms of weight gain or loss. The parameters obtained were compared to that of plain concrete (without fibre) and to that of concrete using other types of fibre. The effect of fibre content to the workability was also investigated. Grade 30 concrete with constant w/c, cement: aggregate ratio was employed. Morphology using Scanning Electron Microscope (SEM) was also examined. The result was also analysed statistically.

The results show that 1% fibre content give the best performance in terms of flexural strength, compressive, and tensile strength. Increase in the fibre content more than 1% cause drop in slump and strength of concrete. Increase of the fibre content reduces workability. However, adding up to 0.5% (by cement weight) superplasticiser can maintain workability as that of plain concrete. The durability shows that concrete with OPTF can resist water and NaCl as goos as plain concrete.

However, its performance in NaOH and HCl is still in doubt as the SEM photographs shows indication of degradation but yet to be confirmed. However, in terms of weight change the fibre concrete shows weight loss as much as plain concrete.

Keywords: Fibre Reinforced Concrete, Oil Palm Trunk Fibre, Strength, Durability, Modulus of Elasticity, Scanning Electron Microscope.

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PERFORMANCE OF HIGH ALUMINA CEMENT CONCRETE IN SULFATE ENVIRONMENT

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Kamarul Badlishah Kamarulzaman[1]
Ahmad Ruslan Mohd Ridzuan[2]

ABSTRACT

This paper presents results of an investigation on the effect of sulfate environment on high alumina cement concrete. Specimens were prepared using Ordinary Portland Cement (OPC), High Alumina Cement (HAC) and Sulfate Resisting Portland Cement (SRPC). Cylinder specimens (100mm diameter * 25mm thick) with grade 25 were prepared using water cement ratio 0.6. Specimens were demoulded after 24 hours and air cured in room temperature (28°C) with high humidity environment for 7 days before immersion in sulfate solutions (0.3M Na^2 SO4). Mass changes and visual changes were recorded every ten days for 300 days. After 200 days result shows that HAC samples recorded a large increase in mass and shows severe deterioration compared to samples made from OPC and SRPC. Results show that high alumina concrete is very vulnerable in sulfate environment hence using such cement is not advisable despite having high resistant unless extra precautions are taken during preparation and strict control of curing temperature. Result implies using SRPC is still the best choice in sulfate environment.

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PHYSICAL AND MECHANICAL PROPERTIES OF CEMENT PARTICLE BOARD MADE OF COCONUT SHELLS

Hamidah Mohd. Saman
Hadariah Bahron
Azmi Ibrahim

ABSTRACT

Coconut shells being a hard and non-easily degradable material, if crushed to the size of sand can be a potential material to substitute sand. A feasibility study on particle boards using cement as a binder and crushed coconut shells as particles has been carried out. Nine different formulations with three different ratios of contents namely 35%, 40% and 45% for each series of ratios were investigated. The boards were prepared with the dimensions of 500 mm x 50 mm x 10 mm. The cement and particles were mixed manually and then poured into a mould. Then, the moulded boards were pressed by applying a pressure of 50 psi for 15 minutes, then the pressure was increased by 100 psi for 15 minutes and the total pressure was increased further to 300 psi for the rest of half an hour. After applying the pressure, the boards were demoulded and cured under water for 28 days before being cut into appropriate sizes as specified in BS 5669: part 1 for the determination of bending strength, density, moisture content, water absorption and swelling. It was found that the bending strength of the boards was lower than that specified in the standard. However, the water absorption and swelling were low and the values are well within the stipulated range. The bonding strength and density decreased as the coconut shells content increased. It was found that the bending strength of the boards was lower than that specified in the standard. However, the water absorption and swelling were low, and the values are well within the stipulated range. The bending strength and density decreased as the coconut shell content increased.

POTENTIAL APPLICATION OF LAMINATED VENEER LUMBER IN MALAYSIAN CONSTRUCTION

Zakiah Ahmad
Khafilah Din

ABSTRACT

Shortage of sawn timber as structural members is not new. As an alternative, several technologies, likes plywood, glulam and Laminated Veneer Lumber (LVL), have been developed. Investigation has been carried out in many developed countries on mechanical properties, physical performance and durability of LVL materials. Results showed a great promise in construction industry. In Malaysia, this would give encouraging prospects for the new distinct group of timber materials for potential applications in various types of construction.

This paper reports on development, present status and future prospects of structural Laminated Veneer Lumber (LVL) in various engineering constructions. Topics include LVL materials and their characteristics, production technology, factors affecting properties, their advantages over sawn timber, and physical performance. It also highlights on its practical and potential applications in Malaysia.

Proceedings of Enhancing Productivity in Construction Industry, Mines Centre, Malaysia, 14 September 2000

POTENSI PENGGUNAAN KONKRIT AGREGAT KITAR SEMULA

Ahmad Ruslan Mohd Ridzuan[1]
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ABSTRAK

Kertas kerja melaporkan hasil kajian ilmiah yang telah dilakukan ke atas penyelidikan penggunaan agregat kitar semula untuk penghasilan konkrit yang telah diterbitkan. Sifat agregat kitar semula yang didapati daripada runtuhan struktur konkrit, sisa kiub dan sisa lebihan konkrit campur siap telah dikaji oleh banyak penyelidik dari pelbagai aspek termasuk segi ketahanlasakan. Kajian ilmiah mendapati perkembangan yang positif dan potensi penggunaan konkrit agregat kitar semula ini amat cerah, walaubagaimanapun penggunaannya setakat ini adalah terhad dan kebanyakannya hanya digunakan untuk digunakan sebagai struktur binaan tetapi banyak perkara lagi perlu diambilkira sebelumnya ianya menjadi sebagai bahan binaan yang utama.

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Persidangan Kebangsaan Kejuruteraan Awam '99, Lumut, Perak, Malaysia, 24-26 Januari 2000

REFORMATION OF SHOTCRETE VIA GGBS

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Shaifful Anuar Mohd Yunus
Abu Bakar Mohd Diah

ABSTARCT

Sprayed concrete for repair works is an excellent placement method for vertical and overhead surfaces. Where formwork is impractical, sprayed concrete repair for large, shallow areas is cost effective.

This paper discusses the performance of shotcrete incorporating Ground Granulated Blast Furnace Slag (GGBS) as partial cement replacement material compared to normal OPC concrete. Initial Surface Absorption (ISA), chloride ingress, bonding, and compressive strength tests are employed on samples comprising 0, 30, 40, 50, 60, and 70% replacement of OPC by GGBS. 28-day samples are used in the ISA and bonding strength tests whilst 60-day samples for chloride ingress test. The strength development is monitored for ages 1, 3, 7, 14, 28, and 60 days.

Consequently, mix proportions containing GGBS show improvement in performance with 40% level demonstrating conspicuous positive influence in most of the tests undertaken.

Sixth International Conference On Concrete Engineering And Technology, Kuala Lumpur, June 1999

SORPTIVITY OF CONCRETE USING RECYCLED TILES AS COARSE AGGREGATE

Abdul Manaff Mohd. Ismail
Hamidah Mohd. Saman
Azmi Ibrahim

ABSTRACT

The paper presents the results of an investigation into the potential use of rejected Concrete Roof Tiles (CRT) as coarse aggregates in concrete. The CRT aggregates of 14 mm in size were treated as coarse aggregates while other materials remained as usual. A set of concrete cylinders was prepared using 0, 50, and 100 percent replacement of CRT for a mixture corresponding to a grade 30 concrete. The specimens were subjected to a sorptivity test of up to 49 hours of sorption.

Plots of weight gained per cross sectional area of specimen (divided by the density of water) as a result of water imbibing versus square root of time are presented from which sorptivity is quantified as the slope of the straight line. The sorptivitiy of the CRT concrete is compared to that of concrete with natural aggregates. The study shows that the sorptivity of Roof Tiles Concrete is lower than that of Natural Aggregate Concrete (NAC) and that sorptivity decreases as the percentage of replacement of CRT increases.

Keywords : Concrete Roof Tiles (CRT), Sorptivity, Coarse Aggregates, Natural Aggregate Concret, Roof Tiles Concrete (RTC)

STRENGTH CHARACTERISTICS OF FIBRE REINFORCED CONCRETE

Kartini Kamaruddin
Zakiah Ahmad
Hamidah Md Saman

ABSTRACT

Cementitious materials in the form of mortar or concrete are attractive for use as constructional materials since they are cheap, durable and have adequate compressive strength and stiffness for structural use. Another important thing that concrete can be shaped into geometrical properties. However, concrete is brittle and weak in tension. When subjected to tensile stress, unreinforced concrete will crack and fail. Reinforcement with randomly distributed short fibres presents an effective approach to curb the crack propagation and improving the ductility and tensile strength of concrete particularly in applications where conventional reinforcement by steel bars, is unsuitable.

This paper describes the results of an experimental investigation conducted to determine the influence of fibre on the concrete properties and to compare the strength properties of concrete reinforced with natural fibres and synthetic fibres. The fibre used is oil palm trunk fibre and polypropylene fibre. Grade 30 concrete with constant w/c, cement: aggregate ratio was employed. The parameters tested are flexural and compressive strength. It was found out that the addition of the fibres; the compressive strength and the flexural strength increase with normal concrete. In terms of the crack propagation the addition of fibres showed a reduction in the crack width.

World Conference on Concrete Materials and Structures -WCCMS 2002
Shah Alam, Malaysia, 14-16 May 2002

STRENGTH ENHANCEMENT USING SILICA FUME

Muhd. Fadhil Nuruddin
Norliyati Mohd. Amin
Hamidah Mohd. Saman

ABSTRACT

Silica Fume (SF) was employed for the foundation construction of Kuala Lumpur City Center Twin Towers. Proper introduction of SF improved the compressive strength of the concrete. This paper presents the results of research done using SF to improve the strength development of the concrete. The experimental program comprised of six levels of SF contents viz 0% (as control), 4%, 6%, 8%, 10%, 12% and 14%. Two methods of mixture proportions were employed i.e. addition method and replacement method. Concrete mixtures with SF demonstrated an increased strength compared to normal Portland cement concrete.

Keywords : Silica Fume, Mixture Proportion, Addition Method, Replacement Method, Optimum Level, Partial Replacement

STRUCTURAL GRADE CONCRETE FROM PALM OIL WASTE

Ahmad Thamby Kadir
Siti Hawa Hamzah

ABSTRACT

This study is concerned with the utilization of palm shell as a substitute for crushed granite in normal concrete.

The study was divided into two stages. The first stage deals with the determination of cube strength for 21 types design mix. Second stage deals with the casting and testing of reinforced concrete beams to determine the cracking load, failure load and cracking pattern of the beams.

The results of the study indicate that it is possible to produce structural grade concrete having cube strength ranging from 8 N/mm^2 to 30 N/mm^2 and the density of concrete reduced by 20 %. Furthermore, the experimental ultimate load obtained was greater than calculated value and the deflection as well as crack width under serviceability limit state were within the limit specified by Code of Practice, CP 110, for all beams tested.

Conference on Concrete Engineering and Technology (CONCET 89), Kuala Lumpur, 12-14 June 1989, pp. II-98-II-114

TAMBAHNILAI KONKRIT SEMBUR MELALUI PENGGUNAAN SANGA RELAU BAGAS BERBUTIR (SRBB) DALAM BAHAGIAN CAMPURAN

Muhd Fadhil Nuruddin[1]
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Abu Bakar Mohd Diah[2]

ABSTRAK

Konkrit sembur untuk kerja-kerja baikpulih adalah satu kaedah yang baik. Apabila acuan konkrit tidak sesuai digunakan, kaedah konkrit sembur menjadi kos efektif terutama untuk baikpulih kawasan yang luas dan nipis. Kertas kerja ini membincangkan prestasi konkrit sembur menggunakan sanga relau bagas berbutir (SRBB) sebagai bahan gantian simen berbanding dengan konkrit biasa yang menggunakan simen Portland biasa (SPB). Beberapa ujian yang dilaksanakan terhadap sampel yang mengandungi 0, 30, 40, 50, 60 dan 70% SRBB. Antara ujian yang digunakan ialah serapan permukaan mula (USPM), resapan klorida, kekuatan ikatan, ujian mampatan. Sampel 28 hari digunakan bagi USPM dan ujian kekuatan ikatan manakala sample 60 hari bagi ujian resapan klorida. Pemantauan kekuatan mampatan dilakukan pada umur 1, 3, 7, 14, 28 dan 60 hari. Kesimpulannya, bahagian campuran mengandungi SRBB pada takat 40% mempamirkan kesan positif terhadap kebanyakan ujian-ujian yang dilakukan.

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TENSILE STRENGTH BEHAVIOR OF OIL PALM TRUNK FIBRE REINFORCED CONCRETE

Zakiah Ahmad[1]
Hamidah Mohd Saman[1]
Paridah Md. Tahir[2]

ABSTRACT

This paper reports the result of an experimental investigation on the tensile behavior of concrete reinforced with Oil Palm Trunk Fibre (OPTF). Fibre length is 25mm and fibre varies at 0%, 1%, 2% and 3% of the total volume of concrete material content. Concrete with 1% fibre showed marked improvement in first crack load and ultimate tensile strength. The Modulus of Elasticity was determined by using non-destructive test and conventional stress-strain method according to BS standard. It was observed that the addition of 1% fibre provides higher MOE compared to plain concrete.

Keywords: Tensile Strength, Oil Palm, Non-destructive, Fibrous Concrete

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THE COMPRESSIVE STRENGTH OF HARDENED CONCRETE USING LIGHTWEIGHT AGGREGATE

Kartini Kamaruddin

ABSTRACT

The usage of concrete as a popular construction material is enhanced due to its strength, high durability, aesthetic appeal and design flexibility. However, the dense nature of concrete generated several constraints particularly in the aspects of handling, stacking, transporting and installation. Further, this dense characteristic contributed substantially to the self weight of the structural elements. In order to overcome or reduce the constraints, Light Weight Aggregate (LWA) is used. However the salients properties of concrete in term of strength and durability must not be compromised. This research undertakes a study and analysis on the compressive strength of concrete cube using lightweight aggregates. Based on the design mix of concrete grade 30 (30 N/mm^2 at 28 days), different proportion of percentage of lightweight aggregate are investigated and comparison with the normal aggregate concrete as a control mix are made. The proportion of lightweight aggregate in the mixed are based on volume batching. The results show that the percentage proportion of lightweight aggregates governed the workability and the compressive strength of the hardened concrete.

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THE CORROSION OF STEEL REINFORCEMENT IN CONCRETE STRUCTURES AND APPLICATION OF THE ADVANCED MATERIALS AS A PREVENTIVE METHOD

Hamidah Mohd. Saman

ABSTRACT

Corrosion of reinforcing steel has been recognized for more than 50 years as the major contributing factor affecting the deterioration of reinforced concrete structures and since then, significant effort has been devoted to solve this problem. In hot and humid countries such as Southeast Asian regions including Malaysia, the corrosion of steel reinforcement is becoming a main concern as high humidity and temperature promote rapid rates of corrosion. The cost of repair is extremely high, and some structures require subsequent repair measures. Within the last two decades, in many countries, the repair cost of concrete structures has become a major proportion of the construction cost. Hence, investigation of methods to prevent or reduce corrosion of reinforcing steel is of prime importance in modern concrete construction. The options of protecting reinforcement are numerous and they can be categorized into two. First by reducing the chloride ions from reaching the surface of the steel reinforcement bar which include reducing the porosity or permeability of the concrete by applying coatings, using admixtures such as silica fume, using a coated reinforcement such as fusion bonded epoxy coating and galvanizing, using stainless steel and chloride removal or extraction technique. The second category includes use of corrosion inhibitors, cathodic protection by sacrificial anode and impressed current system, and use of non-metallic reinforcement such as Fibre Reinforced Plastics (FRP). The development of the composite reinforcement material and advanced cement based material such as FRP reinforcement and Reactive Powder Concrete (RPC) respectively for high end application were aimed to curb the corrosion problem in concrete structures. FRP are one of the promising development to overcome the problem of steel corrosion. FRP at early development has been predominantly used in automotive and aerospace industries where light, corrosion resistant and high strength materials are required. However, the application of FRP for structural engineering purposes is increasing especially in prestressed concrete where corrosion problem is more critical. Glass FRP tendons were first used in a prestressed concrete bridge in Germany in 1980 while Japan was the first country to use carbon FRP tendons in prestressed concrete bridges in early

1990s. The high costs and lack of knowledge in design concepts are the reasons why FRP is still not so popular. In addition, although these FRP bars are not prone to the classical electrochemical corrosion, the mechanical properties of these bars may suffer when exposed to moisture, water and other aggressive environments for a long time. The long term structural integrity is also questionable and a lot of research on the structural performance of concrete reinforced with these materials have to be conducted.

THE EFFECT OF DIFFERENT LENGTH OF FIBRE IN CONCRETE

Mohd. Ali Jelani
Zakiah Ahmad
Hamidah Mohd. Saman
Paridah Md. Tahir

ABSTRACT

Concrete is known to have high compressive strength, stiffness, low thermal and electrical conductivity and low toxic. Another important thing that concrete can be shaped into geometrical properties. However, concrete is brittle and weak in tension. When subjected to tensile stress, unreinforced concrete will crack and fail. Reinforcement with randomly distributed short fibres presents an effective approach to curb the crack propagation and improving the ductility and tensile strength of concrete. Even though there a lot of research have been done on the use of oil palm waste or fibre in concrete and mortar but none of the researchers have used fibre from oil palm trunk as concrete reinforcement. Therefore in this study, an investigation was made on the use of fibre from oil palm trunk in concrete. Five different concrete mixes with different length of fibre content namely 0 mm, 25 mm, 35 mm, 45 mm and 55 mm were cast at a constant fibre volume of 1%. The parameters tested are flexural strength and compressive strength. It was found that there is an increase in compressive strength when compared with normal concrete but among the different length there is not much different. In terms of flexural strength there is an increased in strength as the length of fibre increases.

Keywords : Fibre Reinforced Concrete, Oil Palm Trunk Fibre, Strength

THE EFFECT OF FIBRE ADDITIVE IN CONCRETE

Kartini Kamaruddin

ABSTRACT

Plain concrete as structural material behaves like brittle or semi brittle material and exhibits low tensile strength. Traditionally to overcome these defects, concrete is used in combination with steel. In a reinforced concrete member, tension is taken first by the concrete and gradually transferred to steel when cracks are initiated in its tensile zone. With the addition of fibres, it will improve the impact strength of concrete, limit the crack growth and lead to greater strain capacity of the composite material because they provide strength after the cement paste matrix has cracked. Fibres in concrete will increase the tensile strength by delaying the growth of cracks, and also to increase the toughness by transmitting stress across a cracked section so that much larger deformation is possible beyond the peak stress.

A study on the behaviour of concrete with fibre additive was conducted, and it was found out that in term of compressive strength there is not much different with normal concrete of grade 30 N/mm^2 with 0.45 water cement ratio, whereas, it shows an increased in flexural strength. In term of water absorption, higher percentage of fibre additive gives a lower rate of water absorption.

The Malaysian Technologist Bulletin, Vol. 1/2000, PP1110/1/2001, pp 3-6, ISSN No. 0127-6441, Malaysia, October 2000

THE INFLUENCE OF RECYCLED AGGREGATE ON THE EARLY COMPRESSIVE STRENGTH OF OPC CONCRETE

Ahmad Ruslan Mohd Ridzuan[1]
Kamarul Badlishah Kamarulzaman[2]
Rosli Hamir[2]
Abu Bakar Mohamad Diah[2]

ABSTRACT

Recycling waste concrete as source for the production of new concrete can help control environmental pollution and the problem of depleted natural aggregates. The effects of using crushed waste concrete as coarse aggregates upon compressive strength of concrete were investigated. Waste compliance of construction specification were crushed and utilized as coarse recycled aggregates in new concrete. It is important to mention that in order to simulate the real life condition waste concrete with very minimal information about its originality is used in this natural moisture condition. The recycled aggregates were tested for grading, specific gravity, bulk density, impact crushing and water adsorption and the results compared with those for natural aggregate concrete. Concrete mixes of design strength of 20 N/mm^2, 25 N/mm^2 and 30 N/mm^2 were prepared using this recycled aggregates as aggregate concrete compared well with natural aggregate concrete. Therefore could be considered for various potential applications.

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THE INFLUENCE OF RECYCLED AGGREGATE ON THE EARLY COMPRESSIVE STRENGTH AND DRYING SHRINKAGE OF CONCRETE

Ahmad Ruslan Mohd Ridzuan[1]
Abu Bakar Mohd Diah[2]
Rosli Hamir[2]
Kamarul Badlishah Kamrulzaman[2]

ABSTRACT

Recycling waste concrete as source for the production of new concrete can help control environmental pollution and the problem of depleted natural aggregates. The effects of using crushed waste concrete as coarse aggregates upon strength and drying shrinkage of concrete were investigated. Waste concrete cubes which has been tested for compressive strength as a compliance of construction specification were crushed and utilize as coarse recycled aggregates in new concrete. It is important to mention that in order to simulate the real life condition waste concrete with very minimal information about its originality is used in its natural moisture condition. The recycled aggregates were tested or grading, specific gravity, bulk density, impact crushing and water absorption and the results compared with those for natural aggregate concrete. Concrete mixes of design strength of 20 N/mm^2, 25 N/mm^2 and 30 N/mm^2 were prepared using this recycled aggregates as coarse aggregates and tested. From the strength point of view the recycled aggregate concrete compared well with natural aggregate concrete. From the strength point of view the recycled aggregate concrete compared well with natural aggregate concrete. Therefore could consider for various potential applications. With respect to drying shrinkage the recycled aggregate concrete were found to have comparable shrinkage with the corresponding natural aggregate concrete.

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THE PERFORMANCE OF CONCRETE MADE OF GROUND COCONUT SHELLS AS FINE AGGREGATE

Hamidah Mohd. Saman
Azmi Ibrahim

ABSTRACT

The study of new materials obtained by substituting one or more elements in concrete is continuosly explored. Similar with many other countries, Malaysia is experiencing a shortage of natural sources for fine aggregates. One of the ways to overcome this problem is by utilising waste materials such as ground coconut shells to replace sand while at the same time reducing environmental problems arising during the processing of river sand. The ground coconut shells has a potential to be used as a new supplementary raw material for construction and can be obtained during the breaking operation of coconuts. Coconut shells are known to contain similar chemical compositions of wood.

In this study, coconut shells were ground to a similar size of natural sand and were used to replace the natural fine aggregate proportion by 10%, 20%, 30% and 50%. The performance of the concrete made by using the ground coconuts shells was assessed by comparing its compressive and tensile strength, chemical and fire resistance, density and microstructural with that of plain concrete. It was found that the replacement of ground coconut shells did not contribute to the enhancement of the strength. However, up to 30% replacement, the concrete with ground coconut shells were as durable as a plain concrete in terms of its chemical resistance (by weight gain) and resistance to fire. The concrete with coconut shell has an advantage of having a lower density than the plain concrete.

Keywords : Concrete, Ground Coconut Shell, Strength and Durability.

THE PERFORMANCES OF UNBURNT CLAY BRICKS ON COMPRESSIVE STRENGTH AND WATER ABSORPTION

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Taksiah Abdul Majid[1]
Salehuddin Radin Sumadi[2]
Ahmad Ruslan Mohd Ridzuan[3]
Mohd Ali Jelani[3]

ABSTRACT

Unburnt clay bricks are widely used in construction industry for a long time. However not much research have been carried out to evaluate its performance. In this study dimensional test, compressive test and water absorption test is carried out. It was found that the performance of unburnt clay brick satisfied the BS 3921 : 1985 [1] in all aspects.

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THE TENSILE STRENGTH AND DURABILITY OF LATEX CONCRETE

Mohd Ali Jelani
Siti Hawa Hamzah
Nor Hayati Abdul Hamid

ABSTRACT

Concrete, being an important construction material in Malaysia, has been increasingly used for its good quality in terms of strength and durability. Preliminary research on partial constitution of latex dosage for sand and water had been undertaken. Standard testings for durability and tensile strength were carried out. Permeability as the prime indicator to durability is stressed as this is the main improvement in latex concrete as compared to its poorer performance in strength. Analysis of the effects of latex admixture to tensile strength and durability of concrete is shown herein.

JURUTERA, No. 3 Bil. 1998 March 1999, pp. 36 - 41

THE USE OF FIBRE FROM OIL PALM TRUNK FIBRE (OPTF) AS A CONCRETE FIBROUS REINFORCEMENT

Zakiah Ahmad
Hamidah Mohd. Saman

ABSTRACT

The feasibility study of using Oil Palm Trunk Fibre (OPTF) as a fibrous reinforcement in concrete was investigated. Four concrete mixes with 0% (plain concrete), 1%, 2% and 3% of fibre content (by volume) were cast. The workability, flexural, compressive, and tensile strength and modulus of elasticity were determined. The micro structural examination using Scanning Electron Microscope (SEM) was also examined. Up to this investigation, it showed that the concrete with 1% fibre content performed the best. Increase fibre content further cause the drop in flexural, compressive, and tensile strength. The addition of fibre also causes loss in slump. The durability test, however, showed that the ability of fibre concrete to resist the water and aggressive solution is as good as plain concrete.

Proceedings of " Seminar Hasil Penyelidikan UiTM 2001", Melaka, 31 October -2 November 2001

TITANIUM MESH AS AN EMBEDDED REFERENCE ELECTRODES FOR CORROSION MONITORING CONCRETE

Hamidah Mohd Saman
Mohd Amin Hashim
Muhd Fadhil Nuruddin

ABSTRACT

The investigations were carried out in the laboratory and at actual site to observe the potential behaviour of titanium mesh as embedded reference electrode for corrosion monitoring of steel reinforcement in concrete. In the laboratory, the potential of steel reinforcement in saturated $Ca(OH)_2$ solution was measured in respect to the Copper/copper Sulphate Electrode (CSE) and titanium mesh by using conventional voltmeter. The potential of titanium vs. Silver-Silver Chloride (SSC) were monitored in saturated $Ca(OH)_2$ solution for three different pH namely pH9, pH11 and pH13. It was found that titanium mesh behaved similar to CSE and stable in high alkaline and salty environment. Titanium mesh was also embedded in cylinder shape (Ø 75 mm x 140 mm) reinforced concrete specimen as an embedded reference electrodes and exposed to wet and dry cycle in 4.5% NaCl environment. By statistic (SPSS) analysis, the relationship of the potential of steel versus titanium and versus CSE were obtained. In the saturated $Ca(OH)_2$ solution and in the concrete exposed in the laboratory, it was found that the potential of steel versus titanium is similar to that versus CSE. The potential of steel vs. titanium mesh (embeddable) in concrete and exposed to actual marine environment is differed by 120mV (less) than that vs. SSC. By surface measurement, the potential of steel vs. titanium is shifted upward by about 200mV to that vs. SSC. The performance of titanium as embedded reference electrode is comparatively reliable as SSC and yet the latter performance is still questionable.

Keywords : Reinforced Concrete, Corrosion, Reference Electrode, Titanium

USE OF LIGHT WEIGHT SUBSTRUCTURES FOR OIL AND GAS MARGINAL FIELD DEVELOPMENT

Wan Mahmood Wan Ab Majid
Mohamad Embong

ABSTRACT

As the world oil price is cyclic in nature, the economic viability of the oil and gas developments is often subjected to a certain risk and sometime unforeseeable.

The development plans, which were economical at certain time may no longer be true at other time, especially when the oil price hit the bottom level.

Typical example of this type of development is the marginal fields, which require minimal investment and fast recovery in order to remain viable. This is due to the short life span of reservoir, minimal crude reserve and also mostly scattered in various locations. In some cases the development, will be put on-hold for the next cycle or when the oil price at the peak or attractive level.

Whilst the marginal field development is commonly simple in term of process facilities, but the structures will remain complex if the design is to adopt a standard are mainly dependent approach. The factors such as topside loads, environmental conditions, operating philosophy, soil conditions and the water depth.

With the structure is relatively more complex than other facilities, the structure cost may out weighted other cost and thus put the total project cost as non-viable to proceed with the development.

This paper briefly discussed how the use of the Light Weight Structures may reduce the overall project cost this potentially save the project. The main point of interest will be: what are the technical challenges of the cost saving ideas, such as deviation to Codes and Standard and common practices, use of state of the arts computer analysis, fit for purpose principal and use of newly developed or non-proven technologies.

Keywords: Light Weight Structures, Deviation, Cost Saving Ideas, Viability

Proceedings of the Eleventh (2001) International Offshore and Polar Engineering Conference, Stavanger, Norway, 17-22 June 2001

UTILISATION OF RECYCLED CONCRETE AGGREGATE IN CONCRETE FOR SUSTAINABLE CONSTRUCTION

Ahmad Ruslan Mohd Ridzuan[1]
Abu Bakar Mohammed Diah[2]
Muhd Fadhil Nuruddin[1]
Kamarul Badlishah Kamarulzaman[2]

ABSTRACT

The recycling of waste construction materials, have become more and more important during the last years. There are two threads to the rationale underlying recycling: the need to conserve resources and to manage waste. Recycling waste concrete as source for the production of new concrete can help control environmental pollution and the problem of depleted natural aggregates. The current reported is part of a comprehensive study on the long term strength development and durability of recycled concrete as civil engineering materials. Waste concrete cubes which has been tested for compressive strength as a compliance of construction specification were crushed and use as coarse aggregates in new concrete. The recycled aggregates were tested for grading, specific gravity, bulk density, aggregates impact and crushing values, and water absorption and the result are compared with those for natural aggregates. Concrete mixes of design strength 20 N/mm^2, 25 N/mm^2 and 30 N/mm^2 were prepared using this recycled aggregate as coarse aggregates and tested. From the strength point of view, the recycled aggregates concrete compared well with the natural aggregate concrete and therefore, could considered for various potential applications.

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Malaysian Science and Technology Congress (MSTC 2000), Ipoh, Perak, Malaysia, 16-18 October 2000

UTILIZATION OF RECYCLED AGGREGATE IN NEW CONCRETE

Ahmad Ruslan Mohd Ridzuan[1]
Abu Bakar Mohammad Diah[2]

ABSTRACT

Recycling materials is not new in fact the utilization of recycled material has been in the scene for couple of decades. Waste material such as papers, plastic, wood, glass, etc. are some materials that are reuse and recycled commonly. These recycled material are usually much cheaper than if it were made from virgin materials, and are widely use in domestic and public purposes. Just as with other materials the recycling of building materials has become more and more important during the last years. Basically there are two main reasons to the rationale underlying recycling : the need to conserve natural resources and the need to manage waste. As societies progress, one of the problem arising from continuous technological and industrial development is the disposal of waste materials. Concrete, being the most widely used construction material, produced one of the largest proportions of construction and demolition waste. Everyday old building and structures is being knocked down and replaced with new ones. The debris is usually thrown away causing environmental pollution. In some areas in developed countries such as the United State, Europe and Japan natural aggregate is becoming scarce and bringing aggregate from far away places increases cost of concrete. Thus recycling these waste concrete materials seem an inevitable solution.

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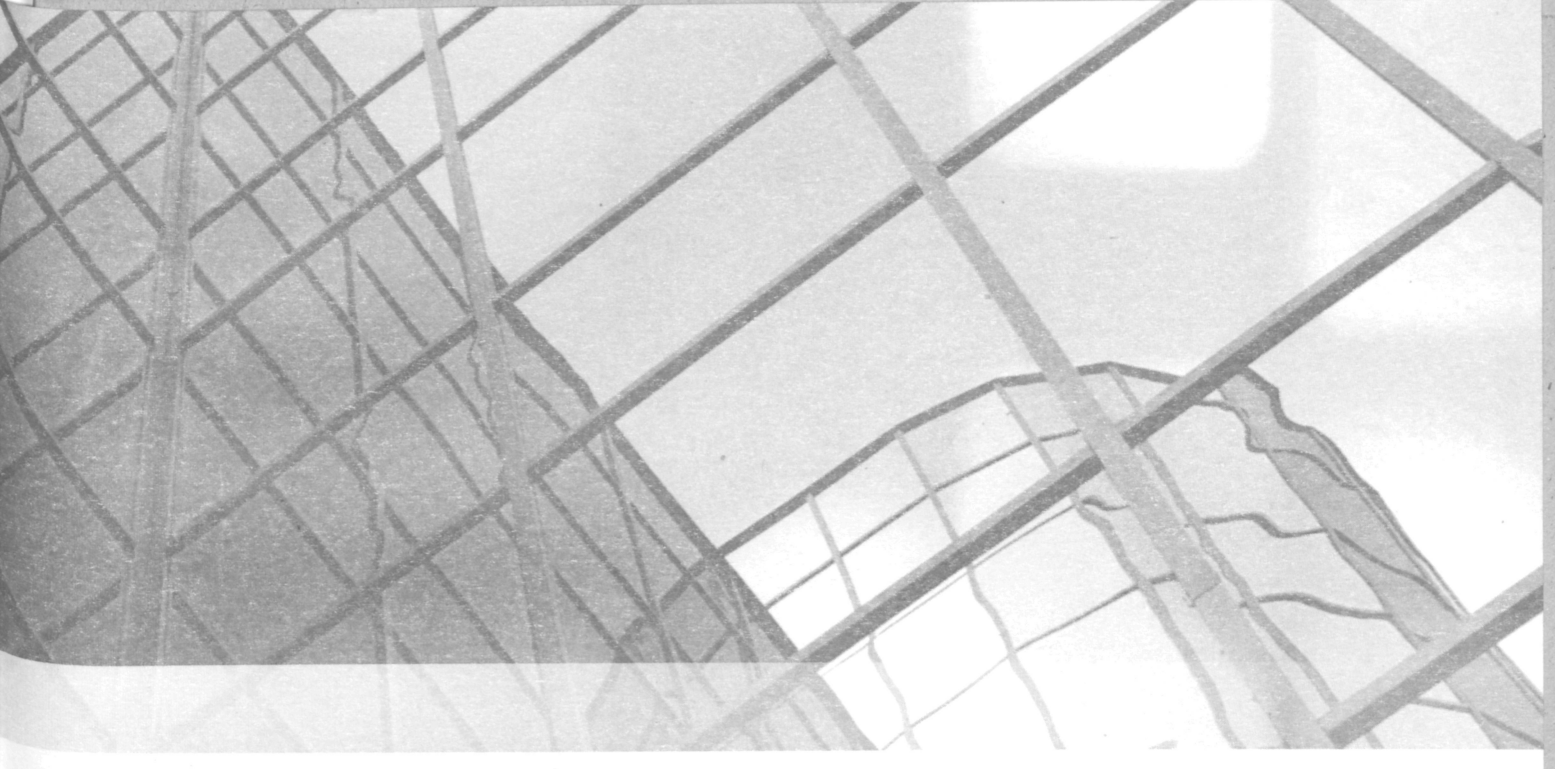
WORKABILITY OF OIL PALM TRUNK FIBRE (OPTF) REINFORCED CONCRETE WITH SUPERPLASTICISER

Zakiah Ahmad
Hamidah Mohd. Saman
Albart Kurau Anak Jawi

ABSTRACT

The addition of natural fibre into a concrete is reported to reduce the workability as its nature to absorb water. Sufficient workability of fibre reinforced concrete is essential as a dry mix can cause inhomogeneous mix and tendency of fibre balling and tangling. An experimental study has been conducted to investigate the effect of adding Oil Palm Trunk Fibre (OPTF) and superplasticiser to a workability of concrete mixtures. In this study, the optimum level of superplasticiser dosage to improve workability of the concrete with OPTF were also determined. Four series of concrete with 0%, 1%, 2% and 3% OPTF by volume fraction were cast. For each series, another three series of concrete with 0%, 0.3% and 0.5% superplasticiser of cement content were prepared. The workability was assessed by slump, vebe test and compacting factor test. The compressive strength test was also performed and the relationship between workability and compressive strength was analysed statistically. Up to this investigation, it was found that the 1% addition of fibre and 0.5% superplasticiser by cement content were the optimum level to gain the highest compressive strength. It was also found also that slump test is sensitive to the change of the mobility of fresh concrete with fibre.

Keywords : Workability, Oil Palm, Fibrous Concrete, Superplasticiser



Education

DIPLOMA IN CIVIL ENGINEERING UiTM CURRICULUM

Siti Hawa Hamzah

ABSTRACT

Engineering education has excited many, young citizens and Institutions of Higher Learning (IHL). Of late, the IHLs that run twinning engineering programmes with foreign and local universities increased tremendously. This gives good indication that the nation and every party in her are striving to prepare themselves in achieving the status of an industrialized nation by the year 2020 by themselves. However, it is important to note that engineers are governed by Engineer's Act, thus its education must be of a standard acceptable by Board of Engineers in major countries in the world.

This presentation highlights the development of Diploma in Civil Engineering programmes at Universiti Teknologi MARA, students entry requirements, development of curriculum abiding to University's and Board of Engineers Malaysia requirements, and routes to continue into the Bachelor of Engineering programmes. Experiences shared is hoped to benefit Lembaga Akreditasi Negara in laying down the accreditation process for private IHL in Malaysia.

Bengkel Pembentukan Kriteria Spesifik Bidang Pengajian Kejuruteraan Awam, Lembaga Akreditasi Negara, Petaling Jaya, 1 November 1999

ENVIRONMENTAL ISSUES IN ENGINEERING EDUCATION : VIEWS AND SUGGESTIONS

Turahim Abd. Hamid

ABSTRACT

This paper intends to discuss about the nature of engineering works in relation to national development and its impact on the environment. Of course, engineering sectors have contributed a lot to the development of the country by providing the necessary physical infrastructures and other amenities, but the impact it brings to the environment needs to be addressed wisely. Therefore, there is a need to formulate an engineering curriculum which emphasizes the understanding of environmental problems in the training of the future engineers. This paper examines some of the environmental issues and suggests an integrated approach to be incorporated in the engineering education.

Academic Workshop School of Engineering, Engineering Education: The Way Forward , Shah Alam , Selangor, 15 – 16 July 1990

HALUAN PENDIDIKAN DI INSTITUT TEKNOLOGI MARA – STRATEGI PENGUKUHAN MENJELANG ABAD 21

Sahri Bahari
Siti Hawa Hamzah
Bahardin Baharom

ABSTRAK

Institusi Pengajian Tinggi (IPT) mempunyai peranan yang besar dan unggul ke arah melahirkan masyarakat yang progresif dan bertamadun. Oleh itu, statusnya sebagai gedung ilmu yang melahirkan manusia yang berfikir dan beradab, peka terhadap permasalahan sosio-budaya dan berperanan secara aktif dalam mencorakkan pemikiran masyarakat haruslah diperkukuh dan diperkayakan. Institut Teknologi MARA sejak penubuhannya tidak ketinggalan berusaha gigih bagi memenuhi pengisian aspirasi tersebut.

Dalam menangani era kepesatan pembangunan ekonomi dan perindustrian, ITM mempunyai dua peranan yang begitu genting ke arah menjayakan proses pembangunan negara, menjelang abad 21 :

1. melahirkan tenaga manusia yang terdidik dan berwibawa; dilengkapkan dengan keupayaan, kemahiran dan kompetensi, bagi memenuhi keperluan pembangunan kini dan masa depan, dan

2. memainkan peranan yang aktif bagi menampung usaha pembentukan gagasan dan paradigma pembangunan; supaya negara mempunyai identiti dan visi pembangunan yang tersendiri, sejajar dengan iklim dan tuntutan sosio-budayanya.

Dengan premis yang sedemikian seharusnyalah pendidikan di ITM diberikan penilaian kritikal, sama ada mampu dan berupaya memenuhi cabaran dan pengisian terkini dan masa depan.

Kertas kerja ini memberikan penilaian semula terhadap pendekatan dan pengisian pendidikan di ITM kini. Fokus penilaian ialah ke arah menganalisa keperluan dan kualiti tenaga manusia kini dan akan datang dalam konteks memenuhi pembangunan negara, dan sejauh manakah relevan dan berkesannya pendekatan dan pengisian pendidikan yang dilaksanakan di ITM bagi merealisasikan aspirasi tersebut. Beberapa cadangan akan dikemukakan sebagai asas perbahasan ke arah menjana proses pemikiran, justeru hasil yang lebih bermakna.

Konferensi Akademik ITM 1990, Segamat, Johor, 13-16 September 1990

INDUSTRI SERVIS DAN KEPUASAN PELANGGAN

Suhaimi Abdul Talib

ABSTRAK

Layanan terhadap pelanggan merupakan faktor yang sering diperkatakan dalam industri servis. Dalam tahun-tahun yang mendatang perkhidmatan berkualiti serta kepuasan pelanggan akan menjadi faktor penentu samada sesebuah organisasi yang beroreantasikan servis akan terus kekal di dalam pasaran atau akan menamat perniagaannya.

Kertas kerja ini membincangkan dua dimensi servis berkualiti, iaitu dimensi tatacara dan dimensi peribadi yang diperlukan dalam mewujudkan servis berkualiti di dalam sesebuah organisasi.

Seminar Pengurusan Bangunan, Shah Alam, 7 Disember 1993

KONSEP TANPA KEGAGALAN SEBAGAI MATLAMAT PENCAPAIAN PELAJAR DI ITM – SATU CADANGAN PENDEKATAN

Bahardin Baharom
Siti Hawa Hamzah

ABSTRAK

Institut Teknologi MARA (ITM) sebagai sebuah institusi pengajian tinggi (IPT) bumiputra telah berjaya menghasilkan ramai para graduan dalam berbagai profesyen yang telah mengisi tenaga kerja yang diperlukan oleh negara dalam sektor awam dan swasta. Ada diantara mereka telah mencapai tahap kerjaya yang sangat membanggakan dan telah meletakkan nama ITM sebagai sebuah institusi yang disegani dan dihormati bukan sahaja di dalam negara malah di luar negara.

Walaupun ITM telah berjaya melahirkan ramai graduan, pada masa yang sama masih terdapat pelajar-pelajar yang telah diterima masuk ke ITM yang gagal dalam pengajian mereka dan terpaksa diberhentikan. Sistem pembelajaran dan penilaian di ITM sentiasa mementingkan kualiti graduan yang ingin dilahirkan, malah halatuju ITM masa kini memperkukuhkan lagi aspek kualiti ini dengan penghayatan kepada konsep TQM dan Quality Assurance. Faktor-faktor kegagalan pelajar telah banyak dikenalpasti tetapi pendekatan dan kaedah-kaedah mengatasinya masih jauh dari mencapai matlamatnya.

Berdasarkan kepada kelayakan masuk kebanyakan kursus di ITM yang agak tinggi dan keperluan tenaga kerja professional negara yang sangat mendesak, maka kertas kerja ini ingin menyarankan konsep 'tanpa kegagalan (zero failure)' sebagai satu pendekatan baru kepada matlamat pencapaian pelajar di ITM. Konsep ini bukanlah bertujuan untuk meluluskan setiap pelajar yang masuk tanpa memikirkan kualiti pendidikan yang diterima. Malah konsep ini adalah bertujuan untuk menentukan bahawa setiap unit dan rangkaian di ITM yang bersangkutan dengan pembelajaran pelajar perlu memastikan yang masalah pelajar dapat dikenalpasti di peringkat awal dan dapat dibantu sebelum terlewat.

Konsep ini cuba diketengahkan kerana kita berkepercayaan bahawa setiap pelajar yang diterima masuk ke ITM mempunyai potensi untuk berjaya dalam pelajarannya, dan atas keperihatinan bahawa tenaga manusia adalah sesuatu yang sangat berharga untuk dibazirkan.

Persidangan Akademik ITM 1994, Santubong, Sarawak, 2-6 September 1994

PANDANGAN PARA AKADEMIK TERHADAP KEPERLUAN LATIHAN INDUSTRI DAN SUMBANGANNYA KEPADA KEBERKESANAN SISTEM PENGAJARAN DAN PEMBELAJARAN

Ramlah Mohd Tajuddin
Siti Hawa Hamzah
Azmi Ibrahim
Bahardin Baharom

ABSTRAK

Kertas kerja ini bertujuan untuk mendapatkan pandangan serta cadangan dari para akademia terhadap keperluan latihan industri dalam membentuk satu sistem pengajaran dan pembelajaran yang berkesan di Kajian Kejuruteraan. Ini adalah memandangkan kepada keperluan pengwujudan kecemerlangan akademik di kalangan para akademia dan siswazah.

Satu kaji selidik telah dijalankan ke atas para akademia Kajian Kejuruteraan. Kaji selidik ini menyentuh beberapa aspek seperti keperluan, tempoh, tempat serta lain-lain yang bersangkutan dengan latihan industri.

Dari maklum balas yang diterima, beberapa cadangan dikemukakan untuk menjadi garis panduan di dalam menyediakan perancangan program latihan industri untuk para akademia di Kajian Kejuruteraan.

**Bengkel Akademik, Kajian Kejuruteraan, ITM, Shah Alam,
17-18 September 1990**

RECENT ADVANCES IN STRUCTURAL ENGINEERING RESEARCH AND PRACTICE

Wan Mahmood Wan Ab Majid

ABSTRACE

This paper traces the development of structural engineering research and practice and highlights the recent achievements. Amongst the significant contribution by the structural engineers are those illustrated by a few recent development in offshore engineering, timber engineering, concrete engineering and technology. The paper also discusses the development potential and adaptation of these development in the ASEAN regions.

Siri syarahan utama ITM sempena perlatikan pensyarah utama setaraf Profesor pada 10 Ogos 1991

RESEARCH AND DEVELOPMENT - THE ROLE OF ACADEMICIANS IN HIGHER INSTITUTION

Norhayati Abdul Hamid
Siti Hawa Hamzah

ABSTRACT

Of late Malaysia is going towards industrialization, putting its people into full gear development. The year 2020 will see the vision of Malaysia being fully industrialised. The high influx of professional from neighbouring countries is a natural phenomena for any country undergoing massive development. Towards this end, higher institutions being an engine of growth in providing professionals to the nation, has work hand in hand with the industries through placements of students for practical training and collaborating research works. Presently shifting of emphasis in education; technology based, academicians cum professional played important role in conducting research works. The findings is now shared between higher institution and the industries. This paper addresses the achievement of research and development work through symbiotic effects of School of Civil Engineering, Institut Teknologi MARA and industries, focusing on behaviour and application of prestressed hollow core slabs and prestressed concrete sleepers manufactured locally.

Keywords : Smart Partnership, Academicians, Structural Behaviour, Static Loading, Dynamic Loading.

14th Conference of ASEAN Federation of Engineering Organizations (CAFEO 14), Melaka, Malaysia, 25–27 November 1996, pp. 290

THE ROLE AND CHALLENGES OF THE STRUCTURAL ENGINEER IN OIL AND GAS OPERATIONS OFFSHORE

Wan Mahmood Wan Ab Majid[1]
Mohammad Embong[2]

ABSTRACT

The first oil field in Malaysia was discovered in 1971 and since then more fields, either onshore or offshore have been exploited. Cost effectiveness in the design and construction of offshore platforms is a major concern to structural engineer. This feature attempts to show how, through recent developments in fabrication, structural analysis and design, and installation the structural can make a significant contribution to the cost effectiveness of an offshore platform.

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THE UNTAPPED POTENTIAL OF TWINNING PROGRAMS

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ABSTRACT

The main objectives of twinning programs are to enable students studying at a host University to obtain qualification, which is awarded by the parent University. An important added advantage of such programs is that they provide savings in cost of obtaining a foreign degree by undergoing a significant portion of the course locally. This paper looks at the running of some of the twinning programs conducted at the Center of Preparatory Studies, Institut Teknologi MARA (CPS/ITM) in Malaysia. Future potentials and other forms of twinning involving the engineering industry are also discussed.

Keywords : Engineering Education, Twinning Programs

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