

'Child Pedestrians Crossing Behavior Near School Areas in Dhaka City'

This thesis paper is presented to the Department Of Civil Engineering, University of Asia Pacific (UAP) in partial fulfillment of the requirements for the Degree of B.Sc. in Civil Engineering.

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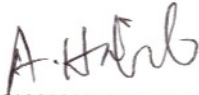


Department of Civil Engineering
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May 2015

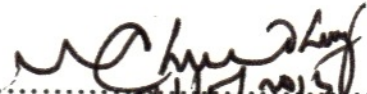
**UNIVERSITY OF ASIA PACIFIC
DEPARTMENT OF CIVIL ENGINEERING**

CERTIFICATE OF APPROVAL

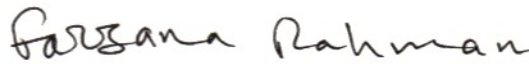
We hereby recommend, that the thesis presented by Sams-Un-Naher, Jannatun Nahar, Mehedi Hasan entitled "Binary Logistic Regression Model to Evaluate the Crossing Behavior of Child Pedestrians around School Premises" be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.



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ABSTRACT

Children are particularly vulnerable as pedestrians. In Bangladesh, about one third of the pedestrian fatalities are the children under 13 years of age group. In the road of the near of schoolchild are affected by it. Vehicular travel is adopted as the main mode of school transport challenges the role of urban planners in creating a pedestrian environment, which encourages children to make active transportation choices. Child pedestrian safety has become a significant issue in Bangladesh. The objective of this thesis is, "To develop a "Binary Logistic Regression Model" to evaluate the crossing behavior of the child pedestrians around school premises. From ARI four schools were found to have major accidents in front of them. Then a Questionnaire Survey was done. 17 questions were asked to the guardians and child above 10. The questionnaire was divided into three parts first part named demographics information, second part named existing condition and third part named safety situation. In the field survey, doing questionnaire survey respondents were asked whether they think crossing facilities adjacent to the schools are adequate or not. About 63.5% of them mentioned crossing facilities are adequate while 36.5% said no. In this study, maximum number of the children (61%) crosses the road with guardian. From respondents' opinion, there are three major reasons of accidents. These are: fault of drivers, defective vehicles & lack of knowledge of pedestrian and fault of drivers which obtained highest vote (35%) from respondents. Result shows that awareness should be increased to reduce accident/injuries while crossing the road. The solution of this research has been derived from "Binary Logistic Regression" model in SPSS software that was well fitted. Also, found two independent variables, those are "Defective Vehicles" and "Ability of Children for Safely Cross the Road" which values were (.011) and (.051). For child pedestrian safety footpath should be free from hawkers and traders and motor cycle or car parking, and speed breakers should be placed before every school. Over bridge on major arterial roads is essential for the safety of child pedestrian.

ATTRIBUTES OF BUS SERVICE QUALITY IN DHAKA CITY BY MULTINOMIAL LOGISTIC REGRESSION MODEL

This thesis paper is presented to the Department Of Civil Engineering, University of Asia Pacific (UAP) in partial fulfillment of the requirements for the Degree of B.Sc. in Civil Engineering.

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Recommendation of Board of Examinees

I hereby recommend that the thesis paper prepared by Khadija khatun, Md. Isreq Hossen Real, S.M Ifthakher Mahamud, and Ashaduzzaman Nur entitled **ATTRIBUTES OF BUS SERVICE QUALITY IN DHAKA CITY BY MULTINOMIAL LOGISTIC REGRESSION MODEL** be accepted as fulfilled the requirement for the Degree of Bachelor of science in Civil Engineering.

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ABSTRACT

Efficient operation of the public transport is a key factor for the improvement of living condition in Dhaka city. As transport service performance should be considered from the passengers' perspectives, it is essential to determine passengers' perceptions of service performance and to understand the role of these perceptions in travel decisions. The objective of this research is to evaluate bus service quality and to develop a multinomial model for evaluating bus service quality in Dhaka using SPSS. To achieve this research objective, a questionnaire survey is conducted to obtain bus passengers' perception. The study draws upon a data set of 250 questionnaires that were randomly asked to the passengers across 5 major locations in Dhaka City. Excel and SPSS analysis are used to measure passengers' perceptions and to extract the main factors from the bus service quality attributes. Finally, multinomial logit modeling is used to explore the impact of perception factors on bus service quality. The findings of the research show 4 quality indicators that have a significant influence on the perceptions of users towards the service. The implications in terms of improving bus service reliability, ac/fan/light availability, cleanliness, seat condition and seat availability can increase bus service quality. It was observed that passengers don't need a large waiting time for bus. This waiting time is mostly due to low frequency of bus headway, and sometimes a few passengers is unable to get up in the bus because there is no seat/space and hence have to wait for the next one. The research explored the overall situation of bus service; particularly the major problems the passengers are facing, based on their experience and gave some suggestions for improving the services quality. The present research tried to point out the important factors which affect bus service quality in the city of Dhaka.

This research differs from the other public transport service satisfaction research because the type of statistical methodology employed for analyzing the overall satisfaction on bus service quality of bus users.

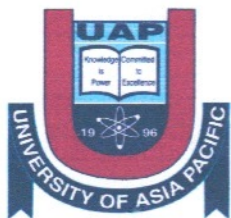
APPLICATION OF STEEL FIBER IN RECYCLED BRICK AGGREGATE CONCRETE

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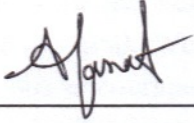
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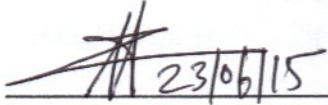
UNIVERSITY OF ASIA PACIFIC
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CERTIFICATE OF APPROVAL

We hereby recommend that the thesis prepared by **Md. Jahidul Kabir, Md. Mottasim Billah, and Md. Emam Mehedi** entitled “**Application of Steel Fiber in Recycled Brick Aggregate Concrete**” is accepted as fulfilling the part of the requirement for the degree of Bachelor of Science in Civil Engineering.



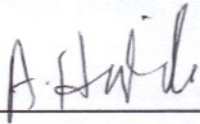
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ABSTRACT

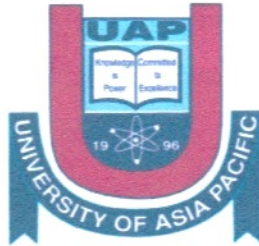
A detailed study on mechanical properties of steel fiber reinforced concrete was conducted. For this steel concrete beam specimens of 11.2" x 4" x 4" dimension. W/C ratio was 0.4 and aspect ratios were 47 and 64. For comparison, specimen were made with stone aggregate without using any fiber. After 28 days curing, the specimens were tested under the Universal Testing Machine (UTM) as per ASTM A-820 to determine the mechanical properties of concrete made with different percent of fiber. Based on the experiment results, a comparative study on mechanical properties of concrete made with different percentage of fiber and recycled aggregate.

Keyword: steel fiber, aspect ratio, ductility, load-displacement, flexural strength.

Seismic Vulnerability Assessment of Buildings at Dhanmondi

A Thesis

**Submitted to the Department of Civil Engineering
UNIVERSITY OF ASIA PACIFIC**



By

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BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

**Under the supervision of
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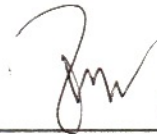
**DEPARTMENT OF CIVIL ENGINEERING
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We hereby recommend that the thesis presented by **Md. Sakiur Rahman, Md. Jabet Miadad** and **Md. Saiful Islam** entitled “**Seismic Vulnerability Assessment of Buildings at Dhanmondi**” is accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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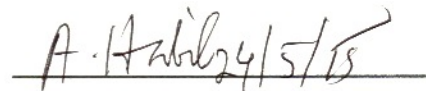
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ABSTRACT

A major earthquake can destroy any town. Only recently scientists have come to recognize that Bangladesh is positioned at the juncture of several active tectonic plate boundaries. Moreover, it sits atop the world's largest river delta at close to sea level, facing both the risk posed by a quake and secondary risks of tsunamis. So the country is on the verge of facing a hazardous earthquake according to the specialist which may cause a great havoc to the densely populated and structurally unorganized city like Dhaka. Hence the term "*Seismic Vulnerability Assessment of Buildings*" demands to be introduced among the people with great interest.

The main objective of this study is to assess the seismic vulnerability of R.C.C and U.R.M structures of the selected area by R.V.S (Rapid Visual Screening) method. The selected area has covered part of Dhanmondi. The survey has mainly focused on earthquake vulnerability parameters such as Building type, number of story, vertical irregularity, plan irregularity, pre-code, post benchmark, soil type and no. of inhabitants etc. Digital Photographs of each building have been taken from two directions.

Distinct categories of buildings based on earthquake vulnerability scores were made. According to our study 5% buildings are on direct threat of earthquake damages. Most of the buildings of the study area are well planned.

After surveying we have found 448 structures in the study area. About 410 buildings are RCC, 29 buildings are URM and 9 buildings are wooden structures. About 237 buildings are soft storied. The ground floor parking is basically used as parking space.

The results of these studies can be integrated into a local seismic building vulnerability map. The evaluated vulnerability maps give useful information for emergency and evacuation planning as well as for identification of critical objects and further investigations.

DEALING WITH CONSTRUCTION STATUTES OF RESIDENTIAL BUILDING IN DHAKA CITY, BANGLADESH

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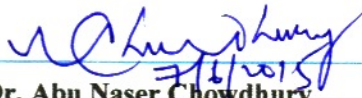


University of Asia Pacific
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Certificate of approval


We hereby recommended that the thesis presented by **Nahid Akther Shammi, Jakariya Islam, Syed Tozammel Azrifi, Minhazul Islam Ratin**, entitled “**Dealing with Construction Statutes of Residential Building in Dhaka City, Bangladesh**” is accepted as fulfilling the part of the requirements for degree of Bachelor of Science in Civil Engineering.

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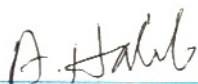
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ABSTRACT

Construction is the backbone of economic development of a country. Efficient construction regulations can avoid excessive constraints and play an important role in the economy of a country. According to Doing Business 2014 database report by World Bank, Bangladesh ranks 93 out of 189 countries. It is therefore observed that in Bangladesh, the rules and regulations, policy of building construction, and land use permits are complex and not well known to the relevant authorities or citizen for building construction. Moreover it is tedious and fuzzy for one to know step by step requirements of building construction and land utilization permits. Moreover, the steps are not clear to the client who wants to get construction statutes as mostly not aware of steps which are also not organized in a proper sequence. A research is thus conducted to arrange the required forms of land use clearance and building construction permits so that one can easily understand the step wise requirements of Rajdhani Unnayan Kortipokho (RAJUK) – the main authority for land use and building construction permits in Dhaka city, Bangladesh. Finally, a flow diagram is thus developed for land use clearance and building construction permits from a project inspection to its completion

REVIEW OF STUDIES ON THE CRITICAL SUCCESS FACTORS FOR PUBLIC-PRIVATE PARTNERSHIP INFRASTRUCTURE PROJECTS FROM 1992 TO 2015

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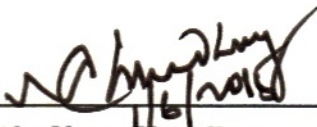


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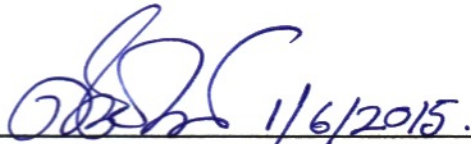
We hereby recommended that the thesis presented by **S.M. Jamil Uddin, Md. Masud Hasan Rana, A Z M Shamsuddin Khan & Md. Mehedi Hasan** , entitled **“Review of studies on the critical success factors for public-private partnership infrastructure projects from 1992 to 2015”** is accepted as fulfilling the part of the requirements for degree of bachelor of science in Civil Engineering.

**Chairman of the Committee
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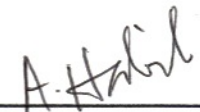
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Abstract

Critical Success Factors (CSFs) for Public Private Partnership infrastructure projects is a significant area of research worldwide. This study aims to methodically identify and analyze the top most CSFs for implementing PPPs which are cited mostly in the selected top tier academic journals from 1992 to 2015. This search is done using search engines by restricting the area of search within the boundaries of CSFs for PPP projects. The search results indicate an increasing and diverse research trend in exploring the CSFs for PPP projects since 1992. The top 10 identified CSFs are: (1) Appropriate risk allocation and sharing; (2) Competitive and transparent procurement process; (3) Stable and Transparent Political Situation; (4) Technical Capabilities; (5) Well Defined Contracts; (6) Legal Framework; (7) Available Finance Market; (8) Economic Viability; (9) Strong Private Consortium and (10) Strong Government support and guaranty. It is further noticed that different CSFs came up through the research works by the passage of time. Finally, the findings revealed provide an overview on CSFs for implementing PPPs so as to enhance future implementations. Moreover a checklist of CSFs for PPPs has been developed, which can be used for further researches.

Flood Risk Analysis of Ganges Basin

Fall 2014

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We hereby recommend that the thesis prepared by **Mufazzal Hossain** entitled “**Flood Risk Analysis of Ganges Basin**” is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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Abstract

Bangladesh is a low lying country which was created due to the sedimentation process because of the flow of rivers such as Ganges, Brahmaputra, Jamuna, Surma etc. which ultimately gave Bangladesh the recognition of the largest delta in the world. Now, as Bangladesh is a riverine country, it is likely to be a very much fertilized land. This is the advantage of Bangladesh when it comes to growing crops. But there is a major disadvantage as well which makes Bangladesh face the loss of agricultural goods, habitats, and man power etc. resources every year. Rain-fed flood has been a problem in this region for a very long time and during the rainy season, it becomes quite impossible for people to live in the flood prone areas. This thesis concentrates on the Ganges Basin of Bangladesh, where due to flood, not only loss of crop is a problem but also a lot of people are affected by flood which spreads diseases rapidly and in extreme cases, death occurs. Because of flood, people who have domestic animals, also has to go through a lot of sufferings.

Keywords: Development, Ganges River Basin in Bangladesh, Risk Analysis, Mitigation & Flood.

NONLINEAR SEISMIC ANALYSIS BY ETABS AND ABAQUS

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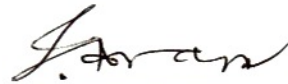
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We hereby recommend that the thesis presented by **MD. AHSANUL HAQUE TALUKDER** and **MD. MOSHIUR RAHMAN** entitled **NONLINEAR SEISMIC ANALYSIS BY ETABS AND ABAQUS** be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

Supervising Committee

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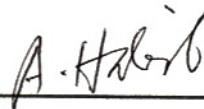
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ABSTRACT

The numerical investigations carried out on concrete structural models subjected to earthquake motions are presented in this paper. Sixteen concrete column models without and with four types of confinement are analyzed to investigate the dynamic behavior of the structures using software (ETABS 13 and ABAQUS).

The modified EI Centro earthquake motion was used in software (ETABS 13 and ABAQUS) as ground motion. EI Centro earthquake motion was modified from the original EI Centro earthquake (1940) ground data.

Wire mesh, tape and Fiber Reinforced Polymer (FRP) are used as confined material. The software (ETABS 13 and ABAQUS) result shows that the confined structural models have greater capacity of strength and ductility than the unconfined structural models. FRP confined models show better seismic resistance capacity than the models confined by wire mesh and tape.

The experimental work was done before and the comparison between experimental and numerical results using software (ETABS 13 and ABAQUS) shows a very good agreement for maximum displacement of structural models.

WATER SCARCITY REDUCTION BY RAINWATER HARVESTING IN DHAKA CITY

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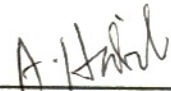
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ABSTRACT

The increasing amount of city dwellers in Dhaka city faces a non avoidable problem of water scarcity. Increasing amount of people increases the demand of water day by day. In countries like Bangladesh, where annual rainfall is high, rainwater could meet a significant amount of total water demand. The inability of public water facilities to function effectively in Dhaka City has made it impossible for most of the city dwellers to have access to safe water supply. Water supply in dry season becomes a big challenge for DWASA to meet the demand. In Dhaka, 87% of the total supplied water comes from groundwater and remaining 13% comes from surface water. Due to increasing population in Dhaka the pressure over groundwater increases heavily. The withdrawal of groundwater is taking place at a faster rate than recharge. For this reason the groundwater table of Dhaka decrease about 3m annually and the aquifers also become dry. In order to address this problem, in this study, rainwater harvesting has been considered as a sustainable solution. The objective of this study is to increase water during dry season and increasing groundwater level by recharging of rainwater. For this study we have chosen Japan garden city as our study area. We have analyzed the previous 21 years(1991-2012) rainfall data and analysis of the catchment availability and size of storage tanks are required to find the potential of rainwater harvesting in the building and the capacity of buildings to store and use of rainwater.

QUALITATIVE ANALYSIS ON SUSTAINABLE SURFACE WATER SOURCE FOR DHAKA CITY

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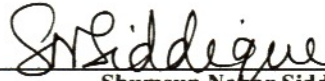
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ABSTRACT

Water Supply of Dhaka City mostly relies on groundwater sources, while groundwater levels are depleting every year. To solve this problem, DWASA plans to bring water to Dhaka City from Padma River which is 60 kilometers away. However, Dhaka City has other peripheral rivers around, like Shitalakha River which is close at hand will therefore save costs of transmission. This study compares the river water from Padma and Shitalakha by using qualitative cost analysis of the treatment to determine the suitability and sustainability in terms of costs. The results show that treatment from both sources will be similar in respect to costs. This study also uses a cost calculation to find the total energy for transmission and thus transmission cost of water over the distance of 60 kilometers. The cost comes to about 2.5 BDT at the least, which is about 25% the cost of treatment of water. Therefore, the overall results show that bringing water from Padma River will be overall more expensive and thus, Shitalakha River will be a more suitable source as the surface water source for Dhaka City over Padma River.

'Sangu River's Contribution of the Livelihood of local People'

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CERTIFICATE OF APPROVAL

We hereby recommend, that the thesis presented by **Tonmoy Paul, Khandokar Mahmudul Hassan, Mohammad Soharab Hossen** entitled “**Sangu River’s Contribution of the Livelihood of local People**” be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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18-05-15

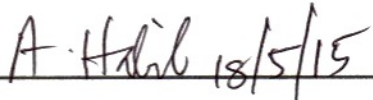
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Abstract

This study contributes to understand the dependency of the people of the Sangu River watershed, an eastern hilly river of Bangladesh. Understanding local people's socio-economic values of wetlands and traditional mechanisms of managing natural resources forms the basis of conserving them in the basin area. A questionnaire survey was conducted to know the livelihood of local people and analyzed hydrological data to know the water availability in the river. The study was carried out in different periods in the year 2014 and 2015 and includes collection of hydrological data, administration of questionnaires, interviews and focused group discussions. The first stage of this work was to collect a large data set to characterize the nature and agricultural contexts of the Sangu valley watershed. The watershed has a contrasting topography, with mountains upstream and large plains downstream. It experiences high rainfall with a monsoonal pattern and an average of 3031 mm/year. From the hydrograph of monthly average discharge of Sangu River, highest peak flow nearly 165m³/s and lowest was nearly 18m³/s. Sixty one residents were interviewed from five villages in the bank of Sangu River. The study found that Sangu River acts as lifeline of the local people in that area. Farming, transportation, social-cultural values of the local people are mainly depend on Sangu River. These values formed an important premise for conservation. Farming was the main economic activities of the local people. In the month of November to March water flow of Sangu River is reduced and it increased from April. Irrigation and transportation system during the winter season were totally affected as the water flow is reduced

ANALYSIS OF RC JOINTS BY ETABS AND ABAQUS

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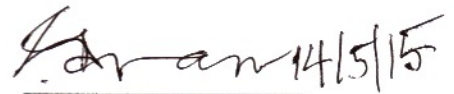
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CERTIFICATE OF APPROVAL

We hereby recommend that the thesis presented by **MD. JULHASH UDDIN** and **PARTHOPROTIM PAUL** entitled **ANALYSIS OF RC JOINTS BY ETABS AND ABAQUS** be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

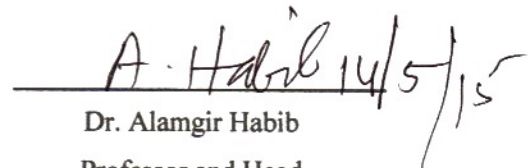
Supervising Committee

Chairman
(Supervisor)



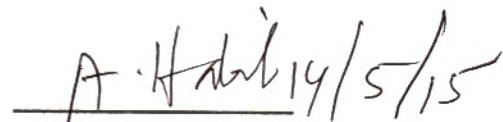
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ABSTRACT

Beam-column joint is one of the most sensitive portions in RC building, but their design and detailing are not given adequate attention to in most structures in Bangladesh. This study tries to observe the status of the joint of a RC structure after applying static and reversible loads. These loads are applied through two renowned softwares ETABS and ABAQUS. The study also aims to determine the adequate spacing of tie bar which can take the above mentioned loads. Different tie bar spacings are used to check their ability to withstand the loads in the joint. Change in displacement at the top of the column in the joint is also checked in this study.

Structural modeling by ETABS and ABAQUS are found to match adequately for linear structural analyses but vary somewhat for nonlinear analyses. Since linear analysis in ETABS does not account for steel reinforcements, it produces different results from linear analysis by ABAQUS considering steel reinforcements. In nonlinear analysis, 3 inch tie bar spacing is found to produce stiffer, stronger and more ductile joints than 9 inch tie bar spacing, as well as unconfined joint.

**A STUDY OF BUILDING FAILURE AND COLLAPSES, PARTICULAR
REFERENCE TO RANA PLAZA COLLAPSE, BANGLADESH .**

A Thesis

Submitted to the Department of Civil Engineering

UNIVERSITY OF ASIA PACIFIC



By

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**In partial fulfillment of the requirements for the degree of
BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

Under the supervision of

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Vice Chancellor

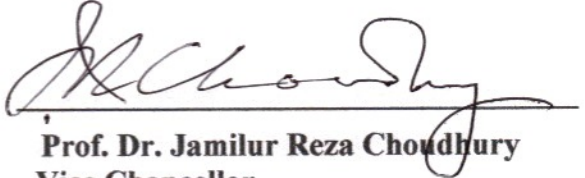
UNIVERSITY OF ASIA PACIFIC

Fall 2014


UNIVERSITY OF ASIA PACIFIC
DEPARTMENT OF CIVIL ENGINEERING
CERTIFICATE OF APPROVAL

We hereby recommend that the thesis presented by **Md. Sahidul Hoque, M.M. Jahir Hassan and Md. Tarequl islam** entitled “**A Study of Building Failure and Collapses, Particular Reference to Rana Plaza Collapse, Bangladesh.**” is accepted as fulfilling part of the requirements for the degree of Bachelor of Science in Civil Engineering.


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ABSTRACT

Building failures and collapses are becoming a common phenomenon. Ever since construction of buildings started thousands of years ago, buildings around the world have collapsed from year to year, many of them resulting in human. In Bangladesh, some major buildings have collapsed that resulted in huge loss. Collapse of Rana Plaza on 24 April, 2013 in Bangladesh which is considered the deadliest garment-factory accident in history, highlights the loss. That kind of failure draws attention on investigation to find out the causes. This thesis focuses on studying of some building failure and collapses specially collapse of Rana Plaza. In addition 45J Ma Tau Wai Road collapse in Hong Kong, Katowice Trade Hall Roof collapse in Poland, Maxima supermarket collapse in Latvia and Spectrum Garment Factory collapse in Bangladesh were studied and causes of these collapses identified. Moreover, forensic investigation of Rana Plaza collapse was focused highly. Pre-collapse and post-collapse investigations are carried out based on the design, material test data and software analysis, images taken before and after the collapse, reports from different organizations and interviews with the survivors. Software Analysis was carried out using ETABS Software and actual loading condition of Rana Plaza was considered in analysis.

From interviews with survivors, it was learnt that there were some vibration issues of emergency electric generators. Accordingly, a RC (Reinforced Concrete) floor slab element was constructed to investigate generator induced vibration on that element. Theoretical and experimental analyses were done for both static and dynamic loads. Newmark- β method was used for analysis of dynamic load and high resolution camera was used for recording the deflection of the slab element due to generator induced vibration. Deflection data was measured by converting video to image using video to picture converter software. It was found that for the difference between theoretical and experimental values of deflection was 4.57% and the figure was 27.5% for dynamic loads. Moreover, it is seen that maximum deflection is higher at the starting of the generator compared to stopping of the generator and during full motion. From mobile accelerometer data used in this study, it was found that acceleration is higher at the starting of the generator.

From the investigations on Rana Plaza, it is concluded that the building did not collapse due to foundation failure; it failed because of loads and some of the columns exceeded maximum capacity over the years. High axial load on the column and very large variable live load on the building led to eccentric loading condition and made the columns vulnerable and consequently they failed. Most probably starting of the generators has triggered the collapse of the building.

Identification of Hazardous Road Locations and Black Spots on Dhaka-Barisal National Highway

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ABSTRACT

Road traffic accidents and corresponding causality are the most concerning issue in the transportation sector of the world. According to police reported road traffic accident database, every year about 2800 or more accidents occur in Bangladesh. With rapid growth of population and motor vehicle, road safety is a major concern in present situation of Bangladesh. Road safety is very poor than international standard. The objective of this research is determining accident prone locations on N8 route (Dhaka-Mawa-Barisal-Patuakhali National Highway). This research analyzes the various accident data (2007-2012) using Microcomputer Accident Analysis Package (MAAP5) software in N8 route in Bangladesh. The analysis involves the determination of accident and severity. Based on accident frequency accident prone locations was determined on N8 highway, commonly termed as Black-spot and Hazardous Road location (HRL) that is followed by analysis and established a map based on Geographic Information System (GIS). Traffic accident reports were collected from Accident Research Institute (ARI), BUET, Bangladesh. Analysis also is done for accident and severity according to the variables Accident Severity, Collision Type, Road Class, Pedestrians Accident, and Road Surface Quality. In order to decrease the rate of traffic accident analysis should be carried out to determine which section of road is faulty in other word HRL or Black-spot. Following a GIS based map will be established. Head-On, Rear-End, Overturning, Side-swipe and Hit-Pedestrian are the most dominant. Accident and casualty statistics of 6 years (2007-2012) shows that, these five types account for 90% of total accidents in N8 route. With fatality index (1.27), the consequences of single vehicle accidents are much severe than any other accidents. Accident and corresponding causality is 1.75. In 2007 casualty/accident rate was 1.45 and in 2010 the rate was maximum (2.12). In 2012 the casualty/accident was 1.70. Pedestrian causality is account for 51% of total accident in N8. 50% vehicles have found that no damage was occurred during accident. They are supposed to be responsible for pedestrian causality. Finally recommends specific engineering countermeasures. By doing this method of identification black-spot and HRL, accident prone area can be identified on all national highways at a glance.

MECHANICAL AND BOND PROPERTIES OF VARIOUS BAMBOOS AVAILABLE IN BANGLADESH

FALL 2014

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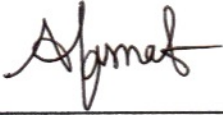


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University of Asia Pacific**

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DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE OF APPROVAL

We hereby recommend that the thesis prepared by **Md.Al-Amin Mahmud, Md.Imte Masud Islam, and Md. Ibrahim Islam** entitled “Mechanical and bond properties of various bamboos available in Bangladesh ” is accepted as fulfilling the part of the requirement for the degree of Bachelor of Science in Civil Engineering.



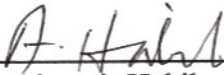
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ABSTRACT

Bamboo is a material of choice for making sustainable low cost houses and bridges in Bangladesh. Utilization of bamboo as a replacement of steel reinforcement has been a topic of research for the decades as bamboo has very good tensile and flexural strength capacity along its fiber direction. However, no systematic research work have been undertaken to understand the fundamental phenomenon to utilize bamboo in civil engineering structure. Four types of bamboo were tested to determine the strength, Young's modulus, and stress-strain responses. In addition to this, shear bond behavior of these bamboos were also determined considering different bond length and bond surface area. Test results revealed that the tensile strength of bamboo is analogous to the tensile strength of steel reinforcement commonly used in Bangladesh. A linear stress-strain response was observed in all the test specimens before rupture took place. No bond failure was seen in the concrete-bamboo interfaces. Among all bamboos, Barak (*Bambusa balcooa Roxb*) shows best performance in terms of bond and mechanical properties.

Immediate Settlement of Square Footing in Cohesion less layered Soil

A Thesis Submitted by

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Under the supervision of

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Fall 2014

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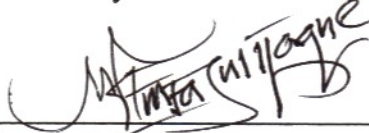
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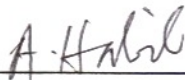
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ABSTRACT

Many methods are available in literature for the prediction of immediate settlement of shallow foundations resting on cohesive soils. Of these, eight popular methods that are commonly used in practice are summarized briefly and compared using both hypothetical and real cases. In hypothetical cases, various scenarios with respect to the foundation geometry and embedment depth (i.e., different L/B and D_f/B ratios) under fixed loading and soil conditions were considered. Real cases, including all parameters required for the immediate settlement computations, were derived from literature after intensive effort. The results obtained from the comparisons of the hypothetical cases showed that the immediate settlements computed by the methods evaluated in this study are considerably different depending on the ratios of L/B and D_f/B . When the real cases were considered, for the majority of the cases, the best settlement estimates were obtained from the Bowles method. However, for square footing foundations, the best settlement estimates were obtained from the Schultze & Mezenbach (1961) and Bowles (1988) method. In addition, immediate settlement values of foundations founded on multi-layer soil profiles were also compared for both hypothetical and real cases. Two soil layers having different elastic modulus and thickness under fixed loading conditions, embedment depth, and aspect ratio for the foundation were considered in the hypothetical cases. Immediate settlements were calculated by weighted mean, harmonic mean, and principles of superposition in conjunction with the Mayne method, as well as with the full Mayne method with Gibson modulus. Results obtained from the hypothetical cases demonstrated that the immediate settlements