A Typological Analysis on the Strategies of Bus Priority Lanes

A Thesis submitted

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We hereby recommend that the thesis prepared by Alex Ruben Bayen, Shams Tasnuva, Umme Kulsum, Jubaer Ahmed "A Typological analysis on the strategies of bus priority lanes" is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

In Bangladesh, public transport has become less popular in these days due to lack of proper traffic management, congestion, vehicle condition, safety etc. Congestion has become a major problem in Bangladesh down to increase of private vehicles. Bus priority is a name for various techniques to improve service and reduce delay for mass transit vehicles at streets controlled by traffic systems. Bus priorities can be given in a roadway to increase the popularity of public transport. The concept of bus priority lanes started to become popular in 20th century in UK and Paris. Bus priority lanes are now modernized with other technologies like traffic signal priority (TSP) etc. to make the system more efficient The objectives of this research are to study on different methods of bus priority lane system which are using in different cities in the world, compare the effectiveness and analyzing process and recommend effective features for Bangladesh. In this study, different types of bus priority lanes are discussed according to how much priority is given to buses as well as according to their alignment in a roadway. The discussed types of bus priority lanes are currently practiced worldwide in some well-known cities such as Sydney city, London city, Paris city etc. In this study, three types of bus priority lanes are found. According to priority there are 4 types of bus priority lane. Type A is dedicated bus priority lane which gives maximum bus frequency, Type B is intermittent bus priority lane which operations system is easy, Type C is bus lane with intermittent priority which is good for high volume of traffic and the Type D is multiple combinations of bus lane which has low negative impacts on general traffic for continuous lanes. According to alignment, bus priority lanes are 3 types. Type A is curbside alignment which is alongside the curb, Type B is offset bus lane which is separated from curb by a single lane and the Type C is median bus lane which is along the median. Before applying any of these bus priority lane concepts in Bangladesh, two things need to be confirmed beforehand. There should be enough road width to place a bus priority lane and also, the vehicle intensity must not exceed the capacity of the roadway. The study also recommends that, in Bangladesh, intermittent bus lanes could give more effective results than exclusive bus lanes. Additionally, curbside or offset lanes should be considered rather than median bus lanes.

Addressing the Water Demand in Bangladesh due to Climate change impacts and Exploring the challenges in Rain water Harvesting

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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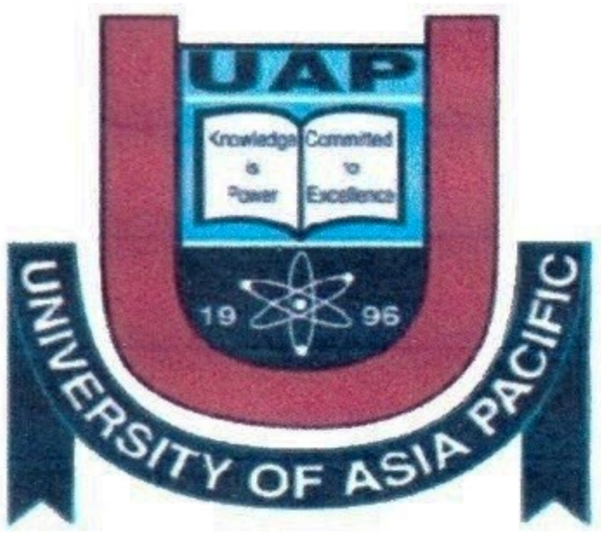

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ABSTRACT

Most recent climate science report have determined with a high level of certainty that global climate is changing. Climate change is disrupting the world's rainfall patterns, meaning some parts of the developing world are suffering from a drastic drop leading to a fall in water levels in many reservoirs and rivers. The solution is rainwater harvesting (RWH) as it retains it in the soil or in tanks below ground so it can be later used as a source of clean water. Harvested rainwater can be used for gardens, livestock, irrigation, domestic use with proper treatment, and indoor heating for houses etc. It can also be used as drinking water, longer-term storage and for other purposes such as groundwater recharge. Rainwater harvesting provides an independent water supply during regional water restrictions and in developed countries it is often used to supplement the main supply. It provides water when there is a drought, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable ground water levels to be sustained. Application of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution system as well as less generated storm water in sewer system. This evaluative research is an inquiry to find out the challenges in addressing the future water demand in Bangladesh partially through rain water harvesting technique.

In this research four rain water harvesting plants installed in BUET, VERC, IUB and UITS were visited in order to evaluate the deficiencies in water storing capacity with the existing water demand in Bangladesh. The collected water samples from the mentioned locations were analyzed and water quality was compared with the drinking water standard for Bangladesh and WHO. Water supply deficiency in each of the divisions in the country has been estimated by taking into account the storage capacity of RWH plant and demand of water. It has been observed that VERC has a storage capacity of 2500L and it can sufficiently fulfill the demand of each division.RWH plants were assessed taking into account the data assembled through survey and difficulties were considered. Among fourteen water quality parameters examined in four RWH plants, it was found that except for a small deviation in color, almost all of the water quality parameters of the harvested rainwater in BUET, VERC, IUB, UITS were within the drinking water standard.

Computer Aided Interaction Diagram for Bi-axially Loaded Column

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ABSTRACT

Biaxial bending means the column is carrying bending by one or both axis with axial load and with calculations it is possible to put those unique values into a pattern to make an interaction diagram with balanced failure zone, tension failure zone and finally compression failure zone of a short or slender column. By using programming it is possible to make the calculations in seconds. The method is to make functions and calling them to solve certain specific values to generate the diagram pattern. The outcome was diagram data generating application having the ability to combine programming and "Civil Logic". This is made for students and Civil Engineers who want to make interaction diagrams for designing a short, square and even slender columns with ease.

EFFECTS OF FLY ASH ADDITION IN SELF-COMPACTING CONCRETE

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We hereby recommend that the thesis prepared by **Md. Galib Hossain (11205041) and Md. Monirozzan Toshar (11205068)** entitled **"Effects of fly ash addition in Self-compacting Concrete"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

Self-compacting concrete is a fluid mixture suitable for placing in structures with congested reinforcement without vibration. Compaction of this concrete is accomplished in all the parts of the form, including the hardly accessible parts, with no additional external force, except the gravity, that is, as a result of the concrete weight. In Bangladesh concrete construction works are increasing rapidly. Planning for building high rise building, long span bridges is undergoing. To meet the goal for construction of these structure normal concrete is not feasible in some cases. To overcome the compaction problem in normal concrete used in Bangladesh, use of self-compacting concrete is necessary. With this background, this study was planned.

Self-compacting concrete development must ensure a good balance between deformability and stability. Also, compactibility is affected by the characteristics of materials and the mix proportions; it becomes necessary to evolve a procedure for mix design of SCC.

The paper presents an experimental procedure for the design of self-compacting concrete mixes and find the effects of fly ash addition in self-compacting concrete. The test results for acceptance characteristics of self-compacting concrete such as slump flow, V-funnel and L-Box are presented. Further, compressive strength at the ages of 7 and 28 days was also determined and results are included here.

100 Years Exposure Test on Carbonation of Concrete in Bangladesh Part-II

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ABSTRACT

Carbonation induced corrosion is major concern for Bangladesh. The temperature and relative humidity of Bangladesh made susceptible for higher rate of carbonation. The quality of construction work is not good in most of the cases. This study aims to generate a databank related to carbonation and compressive strength of concrete for long term exposure test. The variable includes, water to cement ratio, sand to cement ratio with different types of Fineness modulus. Total 9 cases are cast consist of 378 plain cement mortar sample to be tested in 28 days to 100 years. No carbonation was observed for samples tested in 28 days. Additionally, a comparison was made for around 400 test samples that have been tested for evaluating the carbonation coefficient. The samples were taken from existing structures situated in South Africa and Italy.

Keywords:

Carbonation, Corrosion, Compressive Strength, Long term exposure, Mortar.

Structural Analysis and Comparison of Industrial High Rise Building by Using ETABS

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ABSTRACT

Engineering must be considered for the structure design (Safety, Serviceability, Aesthetics, Economy, Environmental condition). In modern times, the advancement of technology and soaring land costs in cities have led engineers to consider the size of a building's footprint while continuing to think vertically. To using this advancement of technology for creating a super tall building and save our land, we have selected this topic. The objective of this paper is to give a brief introduction of the structural analysis consideration, stability and the lateral deflection of 20 stories high rise building. Structure design of high rise buildings is governed by lateral loads due to wind or earthquake.

Many of the consideration in the analysis of this thesis are stated as follows: (1) two structural system, beam-column and flat-slab system (2) the lateral loads behavior of the different concrete frame systems in two different zones (Dhaka and Chittagong) (3). Typical concrete strength is used in high rise building (4) shear walls are used different location in the structural plan. ETABS software is used to obtain the analysis of frame systems. In this study, an attempt has been made to study the effects of various types of structural systems, its position in the building and deflection inter storey. By analyzing all the models, we select model 2 is the best one.

STRUCTURAL RESPONSE OF LOW COST BRICK MASONRY BUILDINGS

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ABSTRACT

The main objective of this work is to propose a house model which will give good response against natural disasters and also be low cost, since the poor people of natural disaster prone areas in Bangladesh can not afford expensive houses those are technically sound against natural disaster.

Field visits are an important part of this work. Photos are presented from Satkhira and Gazipur to observe the conditions of existing low cost houses, particularly the ones made recently by local prople as well as various government and non-government organizations. The visits also include feedback from local peoples. It also covered the effects of trees on low cost houses. Field visit to the Housing and Building Research Institute (HBRI) is another part of this work. Several low cost and efficient structural models developed by HBRI are shown.

Two different types of structural models (i.e. flat slab and folded plate) are taken for static analysis using the structural analysis software ETABS 15. Live loads, current forces, hydrostatic pressure and wind loads are applied to determine displacements, maximum stress and maximum moments from the structural analysis. Results from the structural analysis are positive in general in that the structural deflections are minimal and the stresses calculated from the analyses are also within the allowable stress limits of the structural materials.

Cost is also estimated for the two models. However, the estimated costs for both models (around one lakh Taka) may not be affordable for low income families in Bangladesh. This suggests other alternatives (e.g. sharing space, taking loans from various government and non-government organizations, devising new material options) to minimize the cost of safe buildings.

STUDY ON HATIRJHEEL'S WATER QUALITY & TREATMENT

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ABSTRACT

Hatirjheel is the largest water body of Dhaka city. The place is surrounded by Tejgaon. Gulshan, Badda, Rampura, Niketon, Maghbazar etc and it made the transportation of the people living near these areas much easier. The total area of Hatirjheel is about 122 ha (302 acres). It is located at the center of the capital city Dhaka.

Hatirjheel imposed a severe environmental pollution and drainage problems to Dhaka city. Gradual encroachment, illegal filling and continued discharge of solid and liquid wastes converted the area virtually into a wasteland. As a result, Hatirjheel was unable to perform the very important hydrologic function of draining and detaining storm water from large areas (about 30 km^2) of Dhaka city as well as water from nearby rivers during monsoon season when the Rampura regulator is closed for about two months to prevent back-flow into the city.

The severe environmental pollution of Hatirjheel was not only a threat to the people living in the surrounding areas, but also to Sitalakhya River via Begunbari-norai Khal-Balu River system. This is a major threat to the Saidabad water treatment plant (SWTP) which draws water from the Sitalakhya River at Sarulia, just 400m downstream of its confluence with Balu River.

This study will represent the water quality assessment of Hatirjheel. Research work been carried out to determine some vital water quality parameters those abate the water quality and find out the most vulnerable location of Hatirjheel. It has been found that pH varied from 6.79 to 7.38 with a weighted average of 7.17. DO varied from 2.91 to 3.69 mg/l with a weighted average 3.39 mg/l units. BOD varied from 14.5 to 18 mg/l with a weighted average of 16.567 mg/l. TDS varied from 132.6 to 338 mg/l with a weighted average 265 mg/1 units. EC varied from 276 to 685 µS/cm with a weighted average 526.5 µS/cm. Salinity are 0.3 g/kg and 0.1 g/kg Turbidity varied from 49.34 FTU to 137.59 FTU with a weighted average of 79.375 FTU. TSS varied from 16 to 39 mg/l with a weighted average of 24 mg/l. NO_3-N varied from 0.3 mg/l to 0.5 mg/l with a weighted average of 0.4 mg/l.

NO_2-N varied from 4.0 mg/l to 15 mg/l with a weighted average of 7.6 mg/l. NH_3-N varied from 2.90 to 5.22 mg/l with a weighted average of 4.15 mg/l. Total Hardness varied from 101 mg/l to a higher 125 mg/l with a weighted average of 110.67mg/l. SO_4 varied from 14 to 23 mg/l with a weighted average of 19.17 mg/1. PO_4 varied from 1.8 to 2.9 mg/1 with a weighted average of 2.3 mg/l.

Finally, it can be concluded that Hatirjheel is indirectly a great threat for the Saidahad Water Treatment Plant (SWTP) so; this study will help to assess the water quality of Hatirjheel and the necessity for prevention of lake contamination. More intensive sampling and analysis, including sampling of water from different depths and more spatial locations, would better describe the Lake water quality. The floral and faunal population (including fish) of Hatirjheel should be carefully monitored in order to assess the effect of water quality on the local ecology. To prevent the pollution of the Lake various attempts should be taken which are (1) Identifying new toxic substances and implementing pollution prevention and control strategies;(2) Preventing and controlling harmful discharge:(3) Necessity of reusing of surface water for sustainable development;(4) Preventing environmental threats before they turn into actual problems; (5) Developing water quality and ecosystem health objectives;(6) Increased awareness of the importance and fragility of freshwater resources.

STATUS OF WATER QUALITY IN THE DHALESHAWARI RIVER AND ITS EFFECT ON AQUATIC ORGANISM

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We here by recommend that the thesis presented by **Bipasha Sharmin Akhi,Toukir Ahmed Zamy and Md. Faozul Kabir** entitled **"STATUS OF WATER QUALITY IN THE DHALESHAWARI RIVER AND IT'S EFFECT ON AQUATIC ORGANISM"** be accepted as fulfilling this part of the requirements for the degree of Bachelor of science in Civil Engineering.

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Abstract

Dhaleshwari is a river relatively less polluted than other rivers surrounding Dhaka. People by the side of the river still highly dependent for aquaculture and domestic purpose. But with the increasing demand for industrial growth has threatened the river. This study was carried out to assess the water quality for the purpose of fish culture and domestic use by calculating Water Quality Index (WQI) at Hemayetpur on Savar (One of the heavy Industrial zone at the bank of the river Dhaleshwari). To calculate the WQI by using Brown Method four parameters were matched with our collected data from BWDB (from 2001 to 2009). In the way to finding out the feasibility for aquaculture in the following parameters: P^H, DO, EC, TDS were collected through pre-monsoon, monsoon, post-monsoon and were analyzed later on. Besides, sample from the same location were collected and analyzed into UAP laboratory (2014 to 2015) and compared those with previous results and presented graphically. Finally the values of the parameters were compared with the standard value of fish culture.From the data analysis it was found that pH is always in acceptable average range whereas DO, EC, TDS showed variability in existing acceptable range from year to year.From the sample of (2014-2015), we found that almost most of the parameters of pre monsoon season were higher compared to post monsoon seasons, whereas TDS was higher in post monsoon, this happened due to increase in hardness of samples increases cation and that leads to increase TDS.From the BWDB data, most of the water quality parameters were high in monsoon and post-monsoon season, this is due to during monsoon period nearby industrial effluent water came along with runoff and deposited into the river.

STRUCTURAL RESPONSE OF LOW COST HOUSES

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ABSTRACT

The prime objective of this thesis is to suggest a structurally sound and affordable housing model for the people of Bangladesh. As the majority of population lives below the poverty level natural disasters are common phenomena here, this low cost housing should be durable with good living conditions for the low income people.

This thesis suggests two options of housing for the low income people considering the structural stability, durability, affordability, local construction and convenience of maintenance. It proposes a Reinforced Concrete house model and CI sheet house model as two options of low cost housing. These structures are analyzed for the design wind loads using the software ETABS 15.

The models studied here are found to be adequate against the axial forces, bending moments and shear forces obtained from software analyses. The stresses calculated due to the axial force and bending moment prove the structures to be adequate against the allowable limits of the stresses and the bolt connections between members as well as the connections between the columns and base plates have also been found adequate.

However the estimated costs for both models are found to be quite high. Although the RC model is relatively low cost, it is still not cheap and the CI sheet model costs in excess of Tk. 1 lakh. These may not be affordable for most low income families in our country, which calls for other alternatives to minimize their costs.

Evaluation of Young's modulus, tensile strength, and modulus of rupture of recycled brick aggregate concrete.

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ABSTRACT

This paper discusses the properties of recycled aggregate concrete (RAC) and development of different models for evaluating different mechanical properties of RAC. In the literature review, it was yielded the following findings in regards to concrete material properties: (1) replacing NA in concrete with RAC decreases the compressive strength, but yields comparable splitting tensile strength; (2) the modulus of rupture for RAC concrete was slightly less than that of conventional concrete, likely due to the weakened the interfacial transition zone from residual mortar; and (3) the modulus of elasticity is also lower than expected, caused by the more ductile aggregate. Based on detailed analysis and model evaluation it was observed that, most of the models shows poor performance in predicting the Young's modulus, tensile strength and modulus of rupture for recycled aggregate concrete.

PRE-PAID METER PRICING SYSTEM OF IRRIGATION WATER AND IT'S EFFICIENCY UNDER BARIND MULTIPURPOSE DEVELOPMENT AUTHORITY (BMDA)

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We thereby recommend that the thesis presented by M. Wasif Ashraf, Md. Abdulyah Al Baki and Md. Zaminul Islam entitled **"PRE-PAID METER PRICING SYSTEM OF IRRIGATION WATER AND IT'S EFFICIENCY UNDER BARIND MULTIPURPOSE DEVELOPMENT AUTHORITY (BMDA)"** be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering .

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Dr. Alamgir Habib
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ABSTRACT

Prepaid meter was first introduced in Bangladesh by Barind Multipurpose Development Authority. This study focuses on the prepaid meter pricing system of irrigation water and it's efficiency in the Godagari, Paba and Nawabganj upazilas of Rajshahi district of the high Barind tract. Data regarding prepaid card users, collection of water, price of irrigational water, rainfall and groundwater fluctuations were collected from BMDA office and farmers in Rajshahi. The data were analyzed to show water price differences, prepaid card users number, rainfall variations and groundwater fluctuation levels in different years. The study results show that prepaid card users number is increasing day by day, water pricing system is reasonable for the farmers because it is less than other systems they used till now and as they can now grow crops three times where a single crop per year was so hard for the farmers to grow earlier. These results also illustrate that BMDA income is decreasing if the average rainfall of the area is increasing and the overall ground water table was declining day by day due to over withdrawal of ground water for irrigational purpose.

SOIL STABILIZATION USING LIME AND CEMENT

A thesis submitted by

HAFIZUR RAHMAN

MD.TAHSHIN UDDIN

MD.TAWHIDUZZAMAN

In partial fulfillment of the requirements

For the Degree of Bachelor Science in Civil Engineering

Under the supervision of

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Spring -2015

University of Asia Pacific

Department of Civil Engineering

Certificate of Approval

We thereby recommend that the thesis prepared by Hafizur Rahman, Md.Tahshin Uddin, Md. Tawhiduzzaman and entitled **"Soil Stabilization using Lime and Cement"** is accepted as full filling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

Soil stabilization is one of the soil improvement techniques conducted to obtain desired quality of the soil. The main objectives of the soil stabilization are to increase the bearing capacity of the soil, its resistance to weathering process and soil permeability. The long-term performance of any construction project depends on the soundness of the underlying soils. Unstable soils can create significant problems for pavements or structures, Therefore soil stabilization techniques are necessary to ensure the good stability of soil so that it can successfully sustain the load of the superstructure especially in case of soil which are highly active, also it saves a lot of time and costs as compared to the method of cutting out and replacing the unstable soil. In this study, the effects of two additives (lime and cement) on two types of soil (Dhaka Clay and River Sand) are investigated. In this respect, Atterberg limit tests and standard proctor tests have been carried out in the geotechnical laboratory at UAP.

USERS MODE CHANGE BEHAVIOR IN RESPONSE TO APPLIED ON-STREET PARKING CHARGE

A Thesis submitted

By

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Registration No: 11205067

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We hereby recommend that the thesis prepared **by Steve Evan Halder, Bourhan Uddin and Mirza Safayet Hossain** entitled **"Users mode change behavior in response to applied on-street parking charge"**is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

In Dhaka city the number of motor vehicles has increased tremendously. This has worsened the traffic condition in not only arterial roads but also collector road and local road. So, environment of these roads has deteriorated due to on-street parking. In the city most of the on-street parking places are charge free and for this reason car users are parking their car randomly for different purpose (such as educational purpose, medical, office, shopping etc). The objective of this study is to determine the most suitable independent variable for estimating the on-street parking user's behavior changes due to applied charge in the Dhaka city. Based on questionnaire survey and respondents opinions a model was developed to determine the demand and possible activities on on-street parking. From the survey it was found that 71% car users said that they will not change their transport mode, 7% said that they will change and 22% said that they will change their transport mode sometimes if charges were applied. The main mode of transport is Car/CNG/Taxi and mostly they stay for less than one hour. Multinomial regression method was used to develop the model. The Multinomial regression equation established for this study found to have a degree of coefficient of variation, $R^2 = 0.05$ for "Education qualification", "Main mode of travel" and "Educational purpose" independent variables. The equation established in this study has a high goodness of fit and can be used with a high level of confidence.

SPT Based Liquefaction Susceptibility Assessment

A Thesis submitted by

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We hereby recommend that the thesis prepared by Md. Abu RayhanParvej, AshakinAfsar, Md. Imam Hossian, entitled "SPT Based Liquefaction Susceptibility Assessment" is accepted as fulfilling the part of the requirements for the degree of bachelor of Science in Civil Engineering.

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Abstract

Liquefaction refers to the loss of strength in saturated,cohesionless soils due to the build-up of pore water pressure during dynamic loading.Susceptibility to liquefaction is evaluated in terms of factor of safety against liquefaction and liquefaction potential index.Evaluation of liquefaction may be carried out according to cyclic stress based method, cyclic strain based method and energy based method. Among all these methods, simplified procedure, which is widely used and based on cyclic stress ratio, is employed in this study. The present study to evaluate liquefaction resistance of soil was carried out based on SPT test results.Two method are follow the general format of Seed &Idriss(1971) and Liao & Whitman(1986) simplified procedure for evaluating Cyclic stress ratio(CSR) compared in this paper.By using analysis (deterministic and probabilistic), estimated magnitudes andaccelerations of earthquake were taken 7.5 for magnitudes and from 0.1 -0.30 g for accelerations.For several design earthquake parameters,cyclic stress analysis ofliquefaction were applied data (SPT (N)).In the first phase of the study of liquefaction,the cyclic stress ratio approach was applied for all data toanalysis of soil liquefaction.Then FS (factor of safety) values of liquefaction were estimated with this approach. The effect of fines content on the factor of safety against liquefaction has been analyzed.

IDENTIFICATION OF POTENTIAL HAZARDS AND SAFETY ISSUES IN CONSTRUCTION SITES IN DHAKA, BANGLADESH

A Thesis is submitted by

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We hereby recommend that the thesis prepared by **Mehedi Hasan Showrav**, **Mohammad Nakib Al Ahasan** and **Md. Tauhidul Islam** entitled "IDENTIFICATION OF POTENTIAL HAZARDS AND SAFETY ISSUES IN CONSTRUCTION SITES IN DHAKA, BANGLADESH" is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

Construction work is a very familiar job in our modern age. It is running since many years to reach a zone of civilization around worldwide. To make easier life and to be civilized, construction industry is highly required to grow and it is growing also day by day highly. But the most important thing is the risk of it because it is very high risky job. Construction accidents have been causing many human tragedies, loss of life, productivity and delay projects etc. That is why there is a big issue that should to have for the construction workers who do this job and make our life luxury. To make work and their life safe, construction safety concern is the main issue in this sector. In this research, there are two basic objectives that identify the real scenario of Bangladesh about construction safety in workplaces by comparing with other countries and another one is the identification of most risky hazards and the reasons behind between these two. The given importance of construction sites locations for research was most high rise and most number of construction workplace that is in Dhaka. The study will help to gather some knowledge on all about construction safety and where the lacking existing in Bangladesh and it will help to properly maintain the materials to be act as hazard minimum and to get the prevention ideas for minimize fatal rates, accidents and injuries in construction work.

'Evaluation and Ranking of Slum Areas in Dhaka City based on Access to Proper Water, Sanitation, Hygiene and Solid Waste Disposal Facilities'

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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MD. TAUKIR ISLAM — Registration No: 10205067

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Supervised By:

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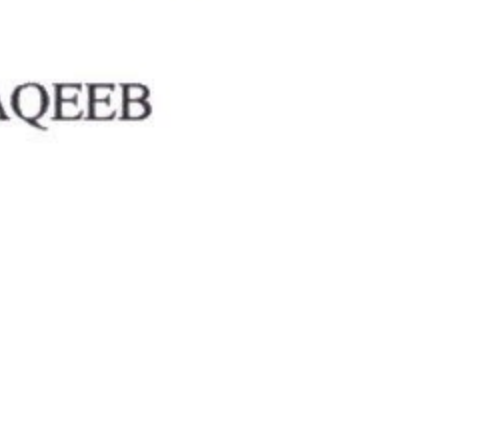

Department of Civil Engineering

University of Asia Pacific (UAP), Dhaka, Bangladesh

September 2015

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DEPARTMENT OF CIVIL ENGINEERING

CERTIFICATE OF APPROVAL

We hereby recommend, that the thesis presented by Md. Taukir Islam, Mahmood Nazmun Saqueeb entitled "Evaluation and Ranking of Slum Areas in Dhaka City based on Access to Proper Water, Sanitation, Hygiene and Solid Waste Disposal Facilities" be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

Ever increasing population growth in Bangladesh and increasing needs for better lifestyle are compelling the rural people to move towards urban centers making mega cities like Dhaka unlivable. Slum dwellers are living an extremely stressful life amidst poor sanitation, improperly managed pile of solid waste and lack of access to safe water. The total number of slums in the Dhaka city corporation area is approximately 5000, which are not distributed uniformly throughout the Dhaka Metropolitan area, but rather they are concentrated mostly on the fringes of the city being very close to the riversides. Nevertheless, the growing needs of the dwellers of these slums for proper sanitation, access to safe water and solid waste disposal facilities are making the environment surrounding them polluted, vulnerable and unproductive. This is because in absence of proper facilities, slum dwellers are being forced to adopt unhygienic practices like open defecation, hanging latrines, open dumping of waste etc. making the surrounding environment including the water bodies extremely polluted. Needless to say, health and hygiene scenario is also not encouraging as emergence of waterborne disease continues to remain a concern. Such compelling condition requires frequent monitoring and assessment of the slum environment in Dhaka city. Urban sanitation is still under challenge as proper coverage could still not be ensured for the slum dwellers that comprise a big portion of the city population. With this motivation in mind, this study investigated four slums in Dhaka city naming Korail Slum, Godown Slum,Tejgaon Slum and Bou Bazar Slum in terms of the existing conditions on sanitation facility, access to safe water and solid waste management and disposal practices. The study was carried out by assessment of the sanitation parameters and existing sanitation practices through visual observation and also through questionnaire survey. Quality of water that the slum dwellers use was also evaluated through laboratory analysis. The hygiene situation was evaluated through learning about their daily practices before and after defecation, availability of water for bathing, washing etc. Availability of solid waste collection and management system was evaluated and also the frequency of open dumping practices was investigated. Finally, the types of sanitation facilities that are in practice were investigated. Based on all these information collected, the slums under investigation were characterized and ranked following a scoring system in a semi-quantitative approach. The continuum of ranking was poor to satisfactory condition with respect to the WASH parameters: availability of facility/practice, proper

utilization of the facility/technology, maintenance of the facilities and impact on the surrounding environment and health due to the existing practices of the slum dwellers. Findings showed that, sanitary situation, water supply options, health perspective & solid waste disposal facilities in Korail, Godown, Tejgaon & Bou Bazar slums are insufficient. Collection facilities of water or water supply options in all of the slums are inadequate. Again for sanitary situation, hand washing & other facilities in these slums were very poor. Findings showed that latrines are not maintained regularly. People face certain kinds of diseases for unhygienic situation. Open defecation still exists in the slums, but people do not readily accept the fact. Open dumping is the main practice followed with regards to solid waste disposal in all the slums. Evaluation of drinking water quality showed that the certain water quality parameters of only Godown slum were measure to be above WHO and ECR'97 standard. But in other slums, water quality was mostly acceptable. After application of the ranking technique, the overall ranking results suggested that the Bou Bazar slum can be placed in the 1^{st}, and Korail, Tejgaon and Godown slums can be placed in 2^{nd}, 3^{rd} and 4^{th} positions respectively.

CONSTRUCTION PRODUCTIVITY IN BANGLADESH

A Thesis Submitted

By

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Registration No.: 11205062

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SPRING 2015

University of Asia Pacific

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CERTIFICATE OF APPROVAL

We hereby recommend that the thesis prepared by **Md. Abir Hossain Khan, Saidul Goni & Sabit Rakin Ahmed** entitled **"Construction Productivity in Bangladesh"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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Abstract

The history of the construction industry worldwide is full of projects that were completed with significant time and cost overruns. In an attempt to reverse this trend, this study aims at establishing the relationship between time overrun and labor productivity on construction sites in Dhaka, Bangladesh. Proper management of resources in construction projects can yield substantial savings in time and cost. As construction is a labor-intensive industry, this paper focuses on labor productivity in the construction industry. This study considers the current state-of-the-art issues relevant to this subject. It covers the construction labor productivity definitions, aspects, measurements, factors affecting it, different techniques used for measuring it and modeling techniques. The main outcome from the literature is that there is no standard definition of productivity. This study provides a guide for necessary steps required to improve construction labor productivity and consequently and the project performance. It can help improve the overall performance of construction projects through the implementation of the concept of benchmarks. Also, it gives an up to date concept of loss of productivity measurement for construction productivity claims. Three major case studies, are presented to show construction labor productivity rates, factors affecting construction labor productivity and how to improve it.

Evaluation of Effluent Treatment Plants of Textile Industries in Dhaka city

A Thesis Submitted By :

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Sakib Sadman

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We hereby recommend that the thesis prepared by **Md. Habibullah Nayem & Sakib Sadman** entitled **"Evaluation of Effluent Treatment Plants of Textile Industries in Dhaka city"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

05/11/2015

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ABSTRACT

The increase in the number of industries in Bangladesh, including textile dyeing operations, has seriously elevated the level of water pollution that the country had already been experiencing. The main attempt of this thesis was to study the evolution of existing condition of textile effluent treatment plants (ETPs) of Bangladesh. In this motivation, at first we listed most of the textile industries that have ETP around Dhaka city. Then we listed 35 textile industries having ETP around Dhaka city. Analysis of the effluent discharge points according to the locations of the industries led us to obtain a list of 11 major industries having common probable discharge points near Dhaka and nearby rivers. The probable discharge points of these industrial ETPs were alongside the major water bodies of Dhaka city such as Balu river, Turag river, Shitalakhya river, Dhalewshwari river and Hatirjheel. In this study, we also surveyed two standard biological ETPs along with their operational configurations, discharge water quality and typical contaminant removal rates in order to check the adequacy of the ETPs. The ETPs that were surveyed are Echotex limited and Padma polycotton limited. Samples were collected from the major phases of the ETPs to obtain the percent removal of the contaminants. The analyzed water quality parameters were compared with the national water quality guidelines for inland waters. The amount of effluent that is discharged from Echotex Limited ETP is 2200 m^3/day & for Padma polycotton ETP is 1500 m^3 /day. Percent removal of total dissolved solid for Echotex Limited was 28.76% and the Padma polycotton was 70.34%. Percent removal of total suspended solid of Echotex limited was 94.51% and for Padma polycotton was 94%. Percent removal of biological oxygen demand (for 5 days) of Echotex limited was 89.47% and the Padma Polycotton was 90.9%.Percent removal of chemical oxygen demand of Echotex limited was 86.96% and the Padma polycotton was 47.05%. Percent removal of color of Echotex limited was 78.17% and the Padma polycotton was 98.73%. Thus satisfactory removal was optimum with respect to total suspended solid, BOD_5 and color for both of the ETPs. Its worth mentioning that analysis of three months' water quality results obtained from Echotex limited exhibited consistence performance. The analysis for the ETP sample from Padma polycotton was performed only for once which showed satisfactory result but consistency of performance could not be evaluated.

A Typological Analysis on the Strategies of Bus Priority Lanes

A Thesis submitted

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We hereby recommend that the thesis prepared by Alex Ruben Bayen, Shams Tasnuva, Umme Kulsum, Jubaer Ahmed "A Typological analysis on the strategies of bus priority lanes" is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

In Bangladesh, public transport has become less popular in these days due to lack of proper traffic management, congestion, vehicle condition, safety etc. Congestion has become a major problem in Bangladesh down to increase of private vehicles. Bus priority is a name for various techniques to improve service and reduce delay for mass transit vehicles at streets controlled by traffic systems. Bus priorities can be given in a roadway to increase the popularity of public transport. The concept of bus priority lanes started to become popular in 20th century in UK and Paris. Bus priority lanes are now modernized with other technologies like traffic signal priority (TSP) etc. to make the system more efficient The objectives of this research are to study on different methods of bus priority lane system which are using in different cities in the world, compare the effectiveness and analyzing process and recommend effective features for Bangladesh. In this study, different types of bus priority lanes are discussed according to how much priority is given to buses as well as according to their alignment in a roadway. The discussed types of bus priority lanes are currently practiced worldwide in some well-known cities such as Sydney city, London city, Paris city etc. In this study, three types of bus priority lanes are found. According to priority there are 4 types of bus priority lane. Type A is dedicated bus priority lane which gives maximum bus frequency, Type B is intermittent bus priority lane which operations system is easy, Type C is bus lane with intermittent priority which is good for high volume of traffic and the Type D is multiple combinations of bus lane which has low negative impacts on general traffic for continuous lanes. According to alignment, bus priority lanes are 3 types. Type A is curbside alignment which is alongside the curb, Type B is offset bus lane which is separated from curb by a single lane and the Type C is median bus lane which is along the median. Before applying any of these bus priority lane concepts in Bangladesh, two things need to be confirmed beforehand. There should be enough road width to place a bus priority lane and also, the vehicle intensity must not exceed the capacity of the roadway. The study also recommends that, in Bangladesh, intermittent bus lanes could give more effective results than exclusive bus lanes. Additionally, curbside or offset lanes should be considered rather than median bus lanes.

Addressing the Water Demand in Bangladesh due to Climate change impacts and Exploring the challenges in Rain water Harvesting

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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November 2015

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CERTIFICATE OF APPROVAL

We hereby recommend, that the thesis presented by Md. Imam Hossaen Khan, D. M. Ashaduzzaman, Md. Anwar Parvez, Nazmun Nahar entitled "**Addressing the Water Demand in Bangladesh due to Climate change impacts and Exploring the challenges in Rain water Harvesting**" be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

A Habib 17/4/16
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ABSTRACT

Most recent climate science report have determined with a high level of certainty that global climate is changing. Climate change is disrupting the world's rainfall patterns, meaning some parts of the developing world are suffering from a drastic drop leading to a fall in water levels in many reservoirs and rivers. The solution is rainwater harvesting (RWH) as it retains it in the soil or in tanks below ground so it can be later used as a source of clean water. Harvested rainwater can be used for gardens, livestock, irrigation, domestic use with proper treatment, and indoor heating for houses etc. It can also be used as drinking water, longer-term storage and for other purposes such as groundwater recharge. Rainwater harvesting provides an independent water supply during regional water restrictions and in developed countries it is often used to supplement the main supply. It provides water when there is a drought, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable ground water levels to be sustained. Application of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution system as well as less generated storm water in sewer system. This evaluative research is an inquiry to find out the challenges in addressing the future water demand in Bangladesh partially through rain water harvesting technique.

In this research four rain water harvesting plants installed in BUET, VERC, IUB and UITS were visited in order to evaluate the deficiencies in water storing capacity with the existing water demand in Bangladesh. The collected water samples from the mentioned locations were analyzed and water quality was compared with the drinking water standard for Bangladesh and WHO. Water supply deficiency in each of the divisions in the country has been estimated by taking into account the storage capacity of RWH plant and demand of water. It has been observed that VERC has a storage capacity of 2500L and it can sufficiently fulfill the demand of each division.RWH plants were assessed taking into account the data assembled through survey and difficulties were considered. Among fourteen water quality parameters examined in four RWH plants, it was found that except for a small deviation in color, almost all of the water quality parameters of the harvested rainwater in BUET, VERC, IUB, UITS were within the drinking water standard.

Computer Aided Interaction Diagram for Bi-axially Loaded Column

A Thesis Submitted By:

Md. Alvee Islam Navid

In partial fulfillment of the requirement for the degree of Bachelor of Science in Civil Engineering

DEPARTMENT OF CIVIL ENGINEERING

UNIVERSITY OF ASIA PACIFIC, DHAKA,

BANGLADESH

SPRING 2015

Certificate of Approval

We hereby recommend that the thesis prepared by **Md. Alvee Islam Navid** entitled **"Computer Aided Interaction Diagram for Bi-axially Loaded Column"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

22.11.15

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Ariful Hasnat
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ABSTRACT

Biaxial bending means the column is carrying bending by one or both axis with axial load and with calculations it is possible to put those unique values into a pattern to make an interaction diagram with balanced failure zone, tension failure zone and finally compression failure zone of a short or slender column. By using programming it is possible to make the calculations in seconds. The method is to make functions and calling them to solve certain specific values to generate the diagram pattern. The outcome was diagram data generating application having the ability to combine programming and "Civil Logic". This is made for students and Civil Engineers who want to make interaction diagrams for designing a short, square and even slender columns with ease.

EFFECTS OF FLY ASH ADDITION IN SELF-COMPACTING CONCRETE

A Thesis Submitted by:

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SPRING 2015

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Certificate of Approval

We hereby recommend that the thesis prepared by **Md. Galib Hossain (11205041) and Md. Monirozzan Toshar (11205068)** entitled **"Effects of fly ash addition in Self-compacting Concrete"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

Self-compacting concrete is a fluid mixture suitable for placing in structures with congested reinforcement without vibration. Compaction of this concrete is accomplished in all the parts of the form, including the hardly accessible parts, with no additional external force, except the gravity, that is, as a result of the concrete weight. In Bangladesh concrete construction works are increasing rapidly. Planning for building high rise building, long span bridges is undergoing. To meet the goal for construction of these structure normal concrete is not feasible in some cases. To overcome the compaction problem in normal concrete used in Bangladesh, use of self-compacting concrete is necessary. With this background, this study was planned.

Self-compacting concrete development must ensure a good balance between deformability and stability. Also, compactibility is affected by the characteristics of materials and the mix proportions; it becomes necessary to evolve a procedure for mix design of SCC.

The paper presents an experimental procedure for the design of self-compacting concrete mixes and find the effects of fly ash addition in self-compacting concrete. The test results for acceptance characteristics of self-compacting concrete such as slump flow, V-funnel and L-Box are presented. Further, compressive strength at the ages of 7 and 28 days was also determined and results are included here.

100 Years Exposure Test on Carbonation of Concrete in Bangladesh Part-II

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Md Sheikh Farid

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ABSTRACT

Carbonation induced corrosion is major concern for Bangladesh. The temperature and relative humidity of Bangladesh made susceptible for higher rate of carbonation. The quality of construction work is not good in most of the cases. This study aims to generate a databank related to carbonation and compressive strength of concrete for long term exposure test. The variable includes, water to cement ratio, sand to cement ratio with different types of Fineness modulus. Total 9 cases are cast consist of 378 plain cement mortar sample to be tested in 28 days to 100 years. No carbonation was observed for samples tested in 28 days. Additionally, a comparison was made for around 400 test samples that have been tested for evaluating the carbonation coefficient. The samples were taken from existing structures situated in South Africa and Italy.

Keywords:

Carbonation, Corrosion, Compressive Strength, Long term exposure, Mortar.

Structural Analysis and Comparison of Industrial High Rise Building by Using ETABS

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ABSTRACT

Engineering must be considered for the structure design (Safety, Serviceability, Aesthetics, Economy, Environmental condition). In modern times, the advancement of technology and soaring land costs in cities have led engineers to consider the size of a building's footprint while continuing to think vertically. To using this advancement of technology for creating a super tall building and save our land, we have selected this topic. The objective of this paper is to give a brief introduction of the structural analysis consideration, stability and the lateral deflection of 20 stories high rise building. Structure design of high rise buildings is governed by lateral loads due to wind or earthquake.

Many of the consideration in the analysis of this thesis are stated as follows: (1) two structural system, beam-column and flat-slab system (2) the lateral loads behavior of the different concrete frame systems in two different zones (Dhaka and Chittagong) (3). Typical concrete strength is used in high rise building (4) shear walls are used different location in the structural plan. ETABS software is used to obtain the analysis of frame systems. In this study, an attempt has been made to study the effects of various types of structural systems, its position in the building and deflection inter storey. By analyzing all the models, we select model 2 is the best one.

STRUCTURAL RESPONSE OF LOW COST BRICK MASONRY BUILDINGS

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ABSTRACT

The main objective of this work is to propose a house model which will give good response against natural disasters and also be low cost, since the poor people of natural disaster prone areas in Bangladesh can not afford expensive houses those are technically sound against natural disaster.

Field visits are an important part of this work. Photos are presented from Satkhira and Gazipur to observe the conditions of existing low cost houses, particularly the ones made recently by local prople as well as various government and non-government organizations. The visits also include feedback from local peoples. It also covered the effects of trees on low cost houses. Field visit to the Housing and Building Research Institute (HBRI) is another part of this work. Several low cost and efficient structural models developed by HBRI are shown.

Two different types of structural models (i.e. flat slab and folded plate) are taken for static analysis using the structural analysis software ETABS 15. Live loads, current forces, hydrostatic pressure and wind loads are applied to determine displacements, maximum stress and maximum moments from the structural analysis. Results from the structural analysis are positive in general in that the structural deflections are minimal and the stresses calculated from the analyses are also within the allowable stress limits of the structural materials.

Cost is also estimated for the two models. However, the estimated costs for both models (around one lakh Taka) may not be affordable for low income families in Bangladesh. This suggests other alternatives (e.g. sharing space, taking loans from various government and non-government organizations, devising new material options) to minimize the cost of safe buildings.

STUDY ON HATIRJHEEL'S WATER QUALITY & TREATMENT

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ABSTRACT

Hatirjheel is the largest water body of Dhaka city. The place is surrounded by Tejgaon. Gulshan, Badda, Rampura, Niketon, Maghbazar etc and it made the transportation of the people living near these areas much easier. The total area of Hatirjheel is about 122 ha (302 acres). It is located at the center of the capital city Dhaka.

Hatirjheel imposed a severe environmental pollution and drainage problems to Dhaka city. Gradual encroachment, illegal filling and continued discharge of solid and liquid wastes converted the area virtually into a wasteland. As a result, Hatirjheel was unable to perform the very important hydrologic function of draining and detaining storm water from large areas (about 30 km^2) of Dhaka city as well as water from nearby rivers during monsoon season when the Rampura regulator is closed for about two months to prevent back-flow into the city.

The severe environmental pollution of Hatirjheel was not only a threat to the people living in the surrounding areas, but also to Sitalakhya River via Begunbari-norai Khal-Balu River system. This is a major threat to the Saidabad water treatment plant (SWTP) which draws water from the Sitalakhya River at Sarulia, just 400m downstream of its confluence with Balu River.

This study will represent the water quality assessment of Hatirjheel. Research work been carried out to determine some vital water quality parameters those abate the water quality and find out the most vulnerable location of Hatirjheel. It has been found that pH varied from 6.79 to 7.38 with a weighted average of 7.17. DO varied from 2.91 to 3.69 mg/l with a weighted average 3.39 mg/l units. BOD varied from 14.5 to 18 mg/l with a weighted average of 16.567 mg/l. TDS varied from 132.6 to 338 mg/l with a weighted average 265 mg/1 units. EC varied from 276 to 685 µS/cm with a weighted average 526.5 µS/cm. Salinity are 0.3 g/kg and 0.1 g/kg Turbidity varied from 49.34 FTU to 137.59 FTU with a weighted average of 79.375 FTU. TSS varied from 16 to 39 mg/l with a weighted average of 24 mg/l. NO_3-N varied from 0.3 mg/l to 0.5 mg/l with a weighted average of 0.4 mg/l.

NO_2-N varied from 4.0 mg/l to 15 mg/l with a weighted average of 7.6 mg/l. NH_3-N varied from 2.90 to 5.22 mg/l with a weighted average of 4.15 mg/l. Total Hardness varied from 101 mg/l to a higher 125 mg/l with a weighted average of 110.67mg/l. SO_4 varied from 14 to 23 mg/l with a weighted average of 19.17 mg/1. PO_4 varied from 1.8 to 2.9 mg/1 with a weighted average of 2.3 mg/l.

Finally, it can be concluded that Hatirjheel is indirectly a great threat for the Saidahad Water Treatment Plant (SWTP) so; this study will help to assess the water quality of Hatirjheel and the necessity for prevention of lake contamination. More intensive sampling and analysis, including sampling of water from different depths and more spatial locations, would better describe the Lake water quality. The floral and faunal population (including fish) of Hatirjheel should be carefully monitored in order to assess the effect of water quality on the local ecology. To prevent the pollution of the Lake various attempts should be taken which are (1) Identifying new toxic substances and implementing pollution prevention and control strategies;(2) Preventing and controlling harmful discharge:(3) Necessity of reusing of surface water for sustainable development;(4) Preventing environmental threats before they turn into actual problems; (5) Developing water quality and ecosystem health objectives;(6) Increased awareness of the importance and fragility of freshwater resources.

STATUS OF WATER QUALITY IN THE DHALESHAWARI RIVER AND ITS EFFECT ON AQUATIC ORGANISM

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We here by recommend that the thesis presented by **Bipasha Sharmin Akhi,Toukir Ahmed Zamy and Md. Faozul Kabir** entitled **"STATUS OF WATER QUALITY IN THE DHALESHAWARI RIVER AND IT'S EFFECT ON AQUATIC ORGANISM"** be accepted as fulfilling this part of the requirements for the degree of Bachelor of science in Civil Engineering.

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Abstract

Dhaleshwari is a river relatively less polluted than other rivers surrounding Dhaka. People by the side of the river still highly dependent for aquaculture and domestic purpose. But with the increasing demand for industrial growth has threatened the river. This study was carried out to assess the water quality for the purpose of fish culture and domestic use by calculating Water Quality Index (WQI) at Hemayetpur on Savar (One of the heavy Industrial zone at the bank of the river Dhaleshwari). To calculate the WQI by using Brown Method four parameters were matched with our collected data from BWDB (from 2001 to 2009). In the way to finding out the feasibility for aquaculture in the following parameters: P^H, DO, EC, TDS were collected through pre-monsoon, monsoon, post-monsoon and were analyzed later on. Besides, sample from the same location were collected and analyzed into UAP laboratory (2014 to 2015) and compared those with previous results and presented graphically. Finally the values of the parameters were compared with the standard value of fish culture.From the data analysis it was found that pH is always in acceptable average range whereas DO, EC, TDS showed variability in existing acceptable range from year to year.From the sample of (2014-2015), we found that almost most of the parameters of pre monsoon season were higher compared to post monsoon seasons, whereas TDS was higher in post monsoon, this happened due to increase in hardness of samples increases cation and that leads to increase TDS.From the BWDB data, most of the water quality parameters were high in monsoon and post-monsoon season, this is due to during monsoon period nearby industrial effluent water came along with runoff and deposited into the river.

STRUCTURAL RESPONSE OF LOW COST HOUSES

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ABSTRACT

The prime objective of this thesis is to suggest a structurally sound and affordable housing model for the people of Bangladesh. As the majority of population lives below the poverty level natural disasters are common phenomena here, this low cost housing should be durable with good living conditions for the low income people.

This thesis suggests two options of housing for the low income people considering the structural stability, durability, affordability, local construction and convenience of maintenance. It proposes a Reinforced Concrete house model and CI sheet house model as two options of low cost housing. These structures are analyzed for the design wind loads using the software ETABS 15.

The models studied here are found to be adequate against the axial forces, bending moments and shear forces obtained from software analyses. The stresses calculated due to the axial force and bending moment prove the structures to be adequate against the allowable limits of the stresses and the bolt connections between members as well as the connections between the columns and base plates have also been found adequate.

However the estimated costs for both models are found to be quite high. Although the RC model is relatively low cost, it is still not cheap and the CI sheet model costs in excess of Tk. 1 lakh. These may not be affordable for most low income families in our country, which calls for other alternatives to minimize their costs.

Evaluation of Young's modulus, tensile strength, and modulus of rupture of recycled brick aggregate concrete.

SPRING 2015

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We hereby recommend that the thesis prepared by **Md. Golam Muktadir Riyad, Kamruzzaman, Md. Younus Mia, Md. Tauhidul Karim** "Evaluation of Young's modulus, tensile strength and modulus of rupture of recycled brick aggregate concrete." is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

This paper discusses the properties of recycled aggregate concrete (RAC) and development of different models for evaluating different mechanical properties of RAC. In the literature review, it was yielded the following findings in regards to concrete material properties: (1) replacing NA in concrete with RAC decreases the compressive strength, but yields comparable splitting tensile strength; (2) the modulus of rupture for RAC concrete was slightly less than that of conventional concrete, likely due to the weakened the interfacial transition zone from residual mortar; and (3) the modulus of elasticity is also lower than expected, caused by the more ductile aggregate. Based on detailed analysis and model evaluation it was observed that, most of the models shows poor performance in predicting the Young's modulus, tensile strength and modulus of rupture for recycled aggregate concrete.

PRE-PAID METER PRICING SYSTEM OF IRRIGATION WATER AND IT'S EFFICIENCY UNDER BARIND MULTIPURPOSE DEVELOPMENT AUTHORITY (BMDA)

SPRING 2015

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ABSTRACT

Prepaid meter was first introduced in Bangladesh by Barind Multipurpose Development Authority. This study focuses on the prepaid meter pricing system of irrigation water and it's efficiency in the Godagari, Paba and Nawabganj upazilas of Rajshahi district of the high Barind tract. Data regarding prepaid card users, collection of water, price of irrigational water, rainfall and groundwater fluctuations were collected from BMDA office and farmers in Rajshahi. The data were analyzed to show water price differences, prepaid card users number, rainfall variations and groundwater fluctuation levels in different years. The study results show that prepaid card users number is increasing day by day, water pricing system is reasonable for the farmers because it is less than other systems they used till now and as they can now grow crops three times where a single crop per year was so hard for the farmers to grow earlier. These results also illustrate that BMDA income is decreasing if the average rainfall of the area is increasing and the overall ground water table was declining day by day due to over withdrawal of ground water for irrigational purpose.

SOIL STABILIZATION USING LIME AND CEMENT

A thesis submitted by

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ABSTRACT

Soil stabilization is one of the soil improvement techniques conducted to obtain desired quality of the soil. The main objectives of the soil stabilization are to increase the bearing capacity of the soil, its resistance to weathering process and soil permeability. The long-term performance of any construction project depends on the soundness of the underlying soils. Unstable soils can create significant problems for pavements or structures, Therefore soil stabilization techniques are necessary to ensure the good stability of soil so that it can successfully sustain the load of the superstructure especially in case of soil which are highly active, also it saves a lot of time and costs as compared to the method of cutting out and replacing the unstable soil. In this study, the effects of two additives (lime and cement) on two types of soil (Dhaka Clay and River Sand) are investigated. In this respect, Atterberg limit tests and standard proctor tests have been carried out in the geotechnical laboratory at UAP.

USERS MODE CHANGE BEHAVIOR IN RESPONSE TO APPLIED ON-STREET PARKING CHARGE

A Thesis submitted

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SPT Based Liquefaction Susceptibility Assessment

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Abstract

Liquefaction refers to the loss of strength in saturated,cohesionless soils due to the build-up of pore water pressure during dynamic loading.Susceptibility to liquefaction is evaluated in terms of factor of safety against liquefaction and liquefaction potential index.Evaluation of liquefaction may be carried out according to cyclic stress based method, cyclic strain based method and energy based method. Among all these methods, simplified procedure, which is widely used and based on cyclic stress ratio, is employed in this study. The present study to evaluate liquefaction resistance of soil was carried out based on SPT test results.Two method are follow the general format of Seed &Idriss(1971) and Liao & Whitman(1986) simplified procedure for evaluating Cyclic stress ratio(CSR) compared in this paper.By using analysis (deterministic and probabilistic), estimated magnitudes andaccelerations of earthquake were taken 7.5 for magnitudes and from 0.1 -0.30 g for accelerations.For several design earthquake parameters,cyclic stress analysis ofliquefaction were applied data (SPT (N)).In the first phase of the study of liquefaction,the cyclic stress ratio approach was applied for all data toanalysis of soil liquefaction.Then FS (factor of safety) values of liquefaction were estimated with this approach. The effect of fines content on the factor of safety against liquefaction has been analyzed.

IDENTIFICATION OF POTENTIAL HAZARDS AND SAFETY ISSUES IN CONSTRUCTION SITES IN DHAKA, BANGLADESH

A Thesis is submitted by

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ABSTRACT

Construction work is a very familiar job in our modern age. It is running since many years to reach a zone of civilization around worldwide. To make easier life and to be civilized, construction industry is highly required to grow and it is growing also day by day highly. But the most important thing is the risk of it because it is very high risky job. Construction accidents have been causing many human tragedies, loss of life, productivity and delay projects etc. That is why there is a big issue that should to have for the construction workers who do this job and make our life luxury. To make work and their life safe, construction safety concern is the main issue in this sector. In this research, there are two basic objectives that identify the real scenario of Bangladesh about construction safety in workplaces by comparing with other countries and another one is the identification of most risky hazards and the reasons behind between these two. The given importance of construction sites locations for research was most high rise and most number of construction workplace that is in Dhaka. The study will help to gather some knowledge on all about construction safety and where the lacking existing in Bangladesh and it will help to properly maintain the materials to be act as hazard minimum and to get the prevention ideas for minimize fatal rates, accidents and injuries in construction work.

'Evaluation and Ranking of Slum Areas in Dhaka City based on Access to Proper Water, Sanitation, Hygiene and Solid Waste Disposal Facilities'

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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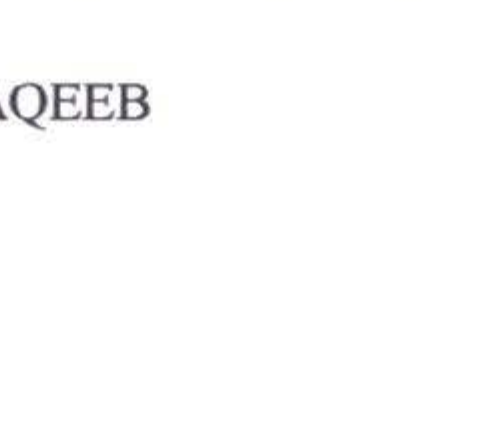

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UNIVERSITY OF ASIA PACIFIC
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CERTIFICATE OF APPROVAL

We hereby recommend, that the thesis presented by Md. Taukir Islam, Mahmood Nazmun Saqueeb entitled "Evaluation and Ranking of Slum Areas in Dhaka City based on Access to Proper Water, Sanitation, Hygiene and Solid Waste Disposal Facilities" be accepted as fulfilling this part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

Ever increasing population growth in Bangladesh and increasing needs for better lifestyle are compelling the rural people to move towards urban centers making mega cities like Dhaka unlivable. Slum dwellers are living an extremely stressful life amidst poor sanitation, improperly managed pile of solid waste and lack of access to safe water. The total number of slums in the Dhaka city corporation area is approximately 5000, which are not distributed uniformly throughout the Dhaka Metropolitan area, but rather they are concentrated mostly on the fringes of the city being very close to the riversides. Nevertheless, the growing needs of the dwellers of these slums for proper sanitation, access to safe water and solid waste disposal facilities are making the environment surrounding them polluted, vulnerable and unproductive. This is because in absence of proper facilities, slum dwellers are being forced to adopt unhygienic practices like open defecation, hanging latrines, open dumping of waste etc. making the surrounding environment including the water bodies extremely polluted. Needless to say, health and hygiene scenario is also not encouraging as emergence of waterborne disease continues to remain a concern. Such compelling condition requires frequent monitoring and assessment of the slum environment in Dhaka city. Urban sanitation is still under challenge as proper coverage could still not be ensured for the slum dwellers that comprise a big portion of the city population. With this motivation in mind, this study investigated four slums in Dhaka city naming Korail Slum, Godown Slum,Tejgaon Slum and Bou Bazar Slum in terms of the existing conditions on sanitation facility, access to safe water and solid waste management and disposal practices. The study was carried out by assessment of the sanitation parameters and existing sanitation practices through visual observation and also through questionnaire survey. Quality of water that the slum dwellers use was also evaluated through laboratory analysis. The hygiene situation was evaluated through learning about their daily practices before and after defecation, availability of water for bathing, washing etc. Availability of solid waste collection and management system was evaluated and also the frequency of open dumping practices was investigated. Finally, the types of sanitation facilities that are in practice were investigated. Based on all these information collected, the slums under investigation were characterized and ranked following a scoring system in a semi-quantitative approach. The continuum of ranking was poor to satisfactory condition with respect to the WASH parameters: availability of facility/practice, proper

utilization of the facility/technology, maintenance of the facilities and impact on the surrounding environment and health due to the existing practices of the slum dwellers. Findings showed that, sanitary situation, water supply options, health perspective & solid waste disposal facilities in Korail, Godown, Tejgaon & Bou Bazar slums are insufficient. Collection facilities of water or water supply options in all of the slums are inadequate. Again for sanitary situation, hand washing & other facilities in these slums were very poor. Findings showed that latrines are not maintained regularly. People face certain kinds of diseases for unhygienic situation. Open defecation still exists in the slums, but people do not readily accept the fact. Open dumping is the main practice followed with regards to solid waste disposal in all the slums. Evaluation of drinking water quality showed that the certain water quality parameters of only Godown slum were measure to be above WHO and ECR'97 standard. But in other slums, water quality was mostly acceptable. After application of the ranking technique, the overall ranking results suggested that the Bou Bazar slum can be placed in the 1^{st}, and Korail, Tejgaon and Godown slums can be placed in 2^{nd}, 3^{rd} and 4^{th} positions respectively.

CONSTRUCTION PRODUCTIVITY IN BANGLADESH

A Thesis Submitted

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SPRING 2015

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CERTIFICATE OF APPROVAL

We hereby recommend that the thesis prepared by **Md. Abir Hossain Khan, Saidul Goni & Sabit Rakin Ahmed** entitled **"Construction Productivity in Bangladesh"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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Abstract

The history of the construction industry worldwide is full of projects that were completed with significant time and cost overruns. In an attempt to reverse this trend, this study aims at establishing the relationship between time overrun and labor productivity on construction sites in Dhaka, Bangladesh. Proper management of resources in construction projects can yield substantial savings in time and cost. As construction is a labor-intensive industry, this paper focuses on labor productivity in the construction industry. This study considers the current state-of-the-art issues relevant to this subject. It covers the construction labor productivity definitions, aspects, measurements, factors affecting it, different techniques used for measuring it and modeling techniques. The main outcome from the literature is that there is no standard definition of productivity. This study provides a guide for necessary steps required to improve construction labor productivity and consequently and the project performance. It can help improve the overall performance of construction projects through the implementation of the concept of benchmarks. Also, it gives an up to date concept of loss of productivity measurement for construction productivity claims. Three major case studies, are presented to show construction labor productivity rates, factors affecting construction labor productivity and how to improve it.

Evaluation of Effluent Treatment Plants of Textile Industries in Dhaka city

A Thesis Submitted By :

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Sakib Sadman

In partial fulfillment of the requirement for the degree of Bachelor of Science in Civil Engineering

DEPARTMENT OF CIVIL ENGINEERING

UNIVERSITY OF ASIA PACIFIC, DHAKA,

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We hereby recommend that the thesis prepared by **Md. Habibullah Nayem & Sakib Sadman** entitled **"Evaluation of Effluent Treatment Plants of Textile Industries in Dhaka city"** is accepted as fulfilling the part of the requirements for the degree of Bachelor of Science in Civil Engineering.

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ABSTRACT

The increase in the number of industries in Bangladesh, including textile dyeing operations, has seriously elevated the level of water pollution that the country had already been experiencing. The main attempt of this thesis was to study the evolution of existing condition of textile effluent treatment plants (ETPs) of Bangladesh. In this motivation, at first we listed most of the textile industries that have ETP around Dhaka city. Then we listed 35 textile industries having ETP around Dhaka city. Analysis of the effluent discharge points according to the locations of the industries led us to obtain a list of 11 major industries having common probable discharge points near Dhaka and nearby rivers. The probable discharge points of these industrial ETPs were alongside the major water bodies of Dhaka city such as Balu river, Turag river, Shitalakhya river, Dhalewshwari river and Hatirjheel. In this study, we also surveyed two standard biological ETPs along with their operational configurations, discharge water quality and typical contaminant removal rates in order to check the adequacy of the ETPs. The ETPs that were surveyed are Echotex limited and Padma polycotton limited. Samples were collected from the major phases of the ETPs to obtain the percent removal of the contaminants. The analyzed water quality parameters were compared with the national water quality guidelines for inland waters. The amount of effluent that is discharged from Echotex Limited ETP is 2200 m^3/day & for Padma polycotton ETP is 1500 m^3 /day. Percent removal of total dissolved solid for Echotex Limited was 28.76% and the Padma polycotton was 70.34%. Percent removal of total suspended solid of Echotex limited was 94.51% and for Padma polycotton was 94%. Percent removal of biological oxygen demand (for 5 days) of Echotex limited was 89.47% and the Padma Polycotton was 90.9%.Percent removal of chemical oxygen demand of Echotex limited was 86.96% and the Padma polycotton was 47.05%. Percent removal of color of Echotex limited was 78.17% and the Padma polycotton was 98.73%. Thus satisfactory removal was optimum with respect to total suspended solid, BOD_5 and color for both of the ETPs. Its worth mentioning that analysis of three months' water quality results obtained from Echotex limited exhibited consistence performance. The analysis for the ETP sample from Padma polycotton was performed only for once which showed satisfactory result but consistency of performance could not be evaluated.