

January-June, 2019

Year 2, Issue 2

BUET-Japan Institute of
Disaster Prevention &
Urban Safety (BUET-JIDPUS)



NEWSLETTER

Biannual Newsletter of BUET-Japan Institute of
Disaster Prevention & Urban Safety (BUET-JIDPUS)

Technical Knowledge Exchange between Nepal and Bangladesh on Advanced, Cost- Effective and Climate Resilient Bridge Structures funded by The World Bank (24 September- 01 October, 2018)



Prof. Dr. Saiful Islam, Honorable Vice-Chancellor, BUET along with the Participants and Faculty Members

The World Bank showed interest in Bangladesh University of Engineering and Technology (BUET) for conducting a knowledge exchange program for climate resilient and cost effective bridge structure. In this process BUET-JIDPUS was chosen as a suitable platform to arrange this program. A 16 personnel team visited BUET-JIDPUS which included Nepalese engineers from Department of Roads, Nepal, bureaucrats, Nepalese contractors and two representative from The World Bank. They attended a 10 day long knowledge exchange program.

present as the chief guest of the inauguration ceremony. Both the organizers and the participants shared their field of works and expectations from the knowledge exchange program during the inaugural ceremony.

This program included classroom training sessions focusing on both theoretical and computer application. Dr. Tahsin Reza Hossain, Dr. K. M. Amanat, Dr. Shohel Rana, and Dr. Nazrul Islam were the resource persons from BUET. Resource persons from LGED, RHD were also associated with this knowledge exchange program. A half day meeting between contractors of Bangladesh and Nepal was also held in order to share the construction practices of two countries.

Field visits were also an important part of the activities. A day long visit to the Bangabandhu bridge site was arranged. The participants practically saw the construction and the structure of the bridge. Visits to other small bridges in and around Dhaka were arranged. The participants visited the pedestrian bridge at Rayerbazar, pedestrian bridge at Dhanmondi, under construction bridges at Purbachal, newly constructed arch



Prof. Dr. Saiful Islam, Honorable Vice-Chancellor, BUET awarding certificates to the Nepalese Delegates

The program commenced with an inauguration ceremony on 24 September, 2018. Prof. Dr. Ahsanul Kabir, Head, Dept. of Civil Engineering, BUET was

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bridges at Uttara third phase etc. Finally, meetings with officials of Roads and Highways Department and Local Government Engineering Department were held.

The closing and certificate awarding ceremony took place on October 1, 2018. Honorable Vice-Chancellor of BUET, Prof. Dr. Saiful Islam was present as the chief guest of the closing ceremony. He was delighted to have the Nepalese contingent at BUET. Ms. Oceane Keou, Transport Specialist from World Bank was present as a representative of The World Bank. During the closing ceremony she thanked BUET-JIDPUS team and the resource persons for arranging a well-coordinated program. She hoped that this knowledge sharing program will be the first step of a longer partnership that would benefit both countries.



Participants along with Faculty Members at Bangabandhu Bridge



Participants during Field Visit



Interactive Session between the Participants and Resource Persons

Training Program for RAJUK Officials and Engineers in Geotechnical and Earthquake Engineering Field Investigation Technologies and Laboratory Tests (Phase 1: 15 July-31 July, 2018; Phase 2: 05 August-08 September, 2018)

A training program had been arranged for the engineers of Urban and Resilience Project: RAJUK Part. It focused on the geotechnical investigations and earthquake engineering field tests. There were three parts of the training which included classroom lectures, practical demonstrations and field visits. There were two phases where two different groups of engineers participated in the training program. Phase one was arranged from 15 July to 31 July, 2018 and Phase 2 was arranged from 05 August to 08 September, 2018. Prof. Dr. Shamsul Hoque, Professor, Dept. of Civil Engineering, BUET and Dr. Mohammad Jahangir Alam, Director, The Directorate of Planning and Development, BUET was present as the chief guest in the closing ceremony of phase 1 and phase 2 respectively. The training was a very good opportunity to introduce the young engineers to the sophisticated testing facilities such as Cone Penetration Test, Ground Penetrating Radar Test, Down-hole Seismic Test, Microtremor Test, Electrical Resistivity Test etc.



Participants with the Invited Guests during the Closing Ceremony



Participants during the Field Tests of the Training Program



Resource Persons during Class Lectures

Professional Certification Course on “Safety Management” offered by BUET-JIDPUS

From September, 2018, BUET-JIDPUS started a one-year long certification course program on “Safety Management”. Participants of the course came from different backgrounds, especially the safety supervisors, safety managers and engineers of RMG factories. To have a holistic approach of safety management, the courses were designed by multidisciplinary faculty members of BUET. Resource persons were from Department of Civil Engineering, Department of Chemical Engineering, Department of Humanities, Department of Petroleum and Mineral Resources Engineering, Department of Mechanical Engineering, Department of Naval Architecture and Marine Engineering, Department of Urban and Regional Planning, and Accident Research Institute (ARI). Dr. J.W.F Erik Wiersma, Research Fellow, BUET-JIDPUS and Safety Expert Advisor assisted in the curriculum development process of the courses.

Under the courses, guest resource persons were also invited from different organizations, including Fire Service and Civil Defence (FSCD) and Bangladesh Garment Manufacturers and Exporters Association (BGMEA). With the help of the resource persons, the practical scenarios of industries in Bangladesh came up in the learning process which would make our professionals capable enough to address the industrial safety situations more promptly.

The certificate course aims for the students to understand risk analysis and management, learn principles of safe design, understand basics of structural, electrical and boiler safety, understand and apply basic concepts and theories of social and cultural issues, identify different types of workplace hazard, evaluate risk assessment to manage risk, apply various accident theories and also apply Hazard and Operability. The certification course includes theory lectures, visits to RMG factories, visit to different laboratories etc. It provides them both theoretical and practical knowledge.



Students of Safety Management Certificate Course Program during Interactive Debate Session



Class of Safety Management Certificate Course Program is being held

WORKSHOPS

Kickoff Workshop of Urban Resilience Project: RAJUK part

A day long workshop was held for the kickoff of URP Project: RAJUK part. In this workshop the Mr. Abdul Latif

Helaly, Project Director, URP Project introduced the visions of the project. Representatives from International Code Council, RTI International also documented their work regarding this projects. The workshop also contained

discussions among the audience. Three groups were formed and were given different questioners. The faculty members of different universities were part of the knowledge group. They were requested to give their opinions regarding how the existing building code can be made more comprehensive. The suggestions from different groups were also noted.

Seminar at Faculty of Earth and Environmental Science, University of Dhaka (8 August, 2018)

Ishfaq Aziz and Shamontee Aziz, Lecturer, BUET-JIDPUS attended a seminar on August 8, 2018 organized by Faculty of Earth and Environmental Sciences. Professor Peter Sammonds; Director and Professor of Geophysics, Institute for Risk and Disaster Reduction; University College London (UCL), UK was present as the key speaker in the seminar. He presented about 2011 Tōhoku Earthquake and Tsunami, Response and Recovery. Other guests presented on Geodynamics of Bangladesh and its potentiality of devastating earthquakes and Tectonics behind Tsunami generation and status of the Bay of Bengal. Finally the seminar ended with the presentation about Earthquake hazard and mitigation study of Bangladesh and our Way forward. The sessions were conducted by Professor Dr. A. S. M. Maksud Kamal, Founder Chairman, Department of Disaster Science and Management & Dean Faculty of Earth and Environmental Sciences, University of Dhaka.



Participants during the Seminar

Workshop on Geo Hazard Risk Management in Transport Sector in Bangladesh (17 October, 2018)

Shamontee Aziz, Lecturer, BUET-JIDPUS attended a day long workshop titled as Geo Hazard Risk Management in Transport Sector in Bangladesh. The workshop was organized by The World Bank. Officials from Local Government Division, Bangladesh Water Development Board, Geological Survey of Bangladesh, CEGIS etc. were present in the workshop. This was arranged to share the inception report regarding the landslide risks in Bangladesh and its effect in transport sector. It had an open discussion session among the participants. This workshop aimed to gather the existing studies and data

available in areas related to landslide. Different agencies shared their views regarding this study and appreciated the approach.



Lecturer Shamontee Aziz along with other Participants in the Workshop

Workshop on Adaptive Delta Management (24 October, 2018)

Md. Aminul Islam, Ishfaq Aziz and Shamontee Aziz, Lecturer, BUET-JIDPUS attended a day long workshop on adaptive delta management on 24 October, 2018. The workshop was organized as a part of DeltaCap project. Faculty members of DEot. Of Civil Engineering, Dept. of Water Resource Engineering, Dept. of Urban and Regional Planning, Dept. of Architecture, Institute of Flood and Water Management, BUET were present in the workshop along with officials from Bangladesh Water Development Board. This focused on the new Delta Plan 2100 of Bangladesh. It showcased some case studies, particularly on Halda River and emphasized the importance of delta management plan. It also included hands on exercise to understand the decision making procedure. The workshop also highlighted the importance of integrated approach for the successful implementation of the plan.

Project Implementation Concept Workshop by Urban Resilience Project: RAJUK part

A two day long workshop was arranged from December 8 to December 9, 2018 by Urban Resilience Project: RAJUK Part. Two components of the project were highl



Faculty members of BUET-JIDPUS, Dept. of Architecture and Dept. of URP during the Workshop

ighted in the workshop. It contained plenary sessions and question answer sessions. The workshop was attended by faculty members of Dept. of Civil Engineering, Dept. of Urban and Regional Planning, Dept. of Architecture and BUET-JIDPUS, BUET, engineers from RAJUK, foreign participants, important stakeholders for the project etc. It showcased the timelines and the approach to completion of these two components of the project. Prof. Dr. Raquib Ahsan, Director, BUET-JIDPUS conducted one session as a chair. Different sessions focused on risk sensitive land use planning, earthquake vulnerability etc.

Meeting with Representatives of International Code Council

A meeting with the representatives of International Code Council was held on 28 October, 2018 at BUET-JIDPUS. A project of RAJUK titled as Urban Resilience Project is being funded by the World Bank of which the International Code Council is a part. They will look into developing a sustainable model for RAJUK and Dhaka city regarding the implementation of the existing Bangladesh National Building Code. Dr. S. K. Ghosh, president of SKGA, was present during this meeting as a representative of ICC. He has a long affiliation with the Code Council that dates back more than 30 years. He has provided training and consulting services to ICC, has authored or coauthored numerous publications, and has written articles for the Code Council's own publications. Dr. Ahmadul Hassan, Chairman, EIMS along with Prof. Dr. Raquib Ahsan, Director, BUET-JIDPUS was also present during the meeting. Dr. Ghosh shared his views over the prevailing situation in Dhaka city in regard to construction practices and code implementation. He also praised BUET-JIDPUS for focusing on seismic vulnerability assessment and for its overall activities. According to the discussions it was understood that BUET-JIDPUS can be a potential stakeholder for capacity building and for research collaboration with RAJUK. Moreover, all the stake holders of this project, including BUET-JIDPUS should understand the needs of RAJUK and plan their initiatives accordingly.



Dr. S. K. Ghosh along with other members of RAJUK, EIMS and BUET-JIDPUS

Meeting with Representatives of RTI International

On 24 November, 2018 a meeting was held with the representatives of RTI International. RTI is an independent, nonprofit institute that provides research, development, and technical services to government and commercial clients worldwide. They are currently working in the Urban Resilience Project of RAJUK. They will be providing technical support to RAJUK in order to implement the project. During the meeting they learnt about the activities of BUET-JIDPUS. They wanted the views of BUET-JIDPUS regarding the opportunities for training the present engineers of URP Project: RAJUK Part. The counterparts of RTI also shared their views about the development procedure of the project and what potential risks they are currently taking into account. The discussion concluded with a mutual thought that in future RTI International and BUET-JIDPUS can work together for structured implementation of the URP project.



Discussions were held with Representatives of RTI International

Visit of Dr. Sharifah Sabrina to BUET-JIDPUS

CEO and Founder of BNG Global Holding SDN, BNG, Dr. Sharifah Sabrina visited BUET-JIDPUS on November 7, 2018. Her company has signed an agreement with Rajdhani Unnayan Kartipakkha (RAJUK) for constructing 13,920 apartments in Jhilmil residential area. They will introduce Industrial Building System (IBS) for construction of buildings. Dr. Sabrina along with her colleague visited BUET-JIDPUS and discussed about the IBS system and its construction procedure of Malaysia. They also discussed how this can be successfully implemented in Bangladesh. They visited the Earthquake Engineering Laboratory of BUET-JIDPUS and observed the demonstration of shake table test.



Dr. Sharifah Sabrina with her Colleague during the visit to Earthquake Engineering Laboratory

Visit of Prof. Peter Sammonds, Director, Institute for Risk and Disaster Reduction (IRDR), University College London (UCL) on August 04, 2018

Prof. Peter Sammonds, Director, Institute for Risk and Disaster Reduction (IRDR), University College London (UCL) visited BUET on August 4, 2018 (Saturday). A seminar was arranged at BUET-JIDPUS where Prof. Sammonds talked about the activities of IRDR, UCL and future collaboration with BUET. He also presented his research findings from East Japan Earthquake (2011). Dr. Bayes Ahmed, Humanitarian Institute Research Associate, IRDR, UCL accompanied Prof. Sammonds in his visit. The seminar was also attended by various faculty members of BUET, including Department of Architecture, Department of Civil Engineering, Department of Urban and Regional Planning and Institute of Water and Flood Management (IWFM).

RESEARCH

Shaking Table Test of Masonry Building

During the month of November 2018, shaking table test of an unreinforced masonry (URM) room was done which was a part of M.Sc. thesis of Mr. Md. Aminul Islam, Lecturer, BUET-JIDPUS. Half scale URM room was constructed using half-scale bricks. Time history of Imperial Valley Earthquake was used as an input motion and it was applied in an incremental procedure. The tested specimen was retested after retrofitting using wire mesh. Retrofitting was done on one face. The failure pattern, deflection of the walls (in-plane and out-of-plane) and others dynamic parameters were investigated and analyzed.



View of specimen under setting

Actuator Test of Masonry Wall

During the month of November 2018, actuator test of an unreinforced masonry (URM) wall was conducted which was a part of a M.Sc. thesis. This was a full scale model. Pseudo Dynamic test was conducted. The tested specimen was retested after retrofitting using wire mesh. The whole wall was retrofitted. The failure pattern, deflection of the walls (in-plane and out-of-plane) and others dynamic parameters were investigated and analyzed.



Masonry Wall under Test Setup

TESTING AND CONSULTATION

Structural and Seismic Vulnerability Assessment of Structures

i) Office Building of Department of Telecommunication

The 2 story office building of Department of Telecommunication was assessed for seismic vulnerability. The assessment contained preparation of as built drawing, non-destructive and semi-destructive tests like core cutting, ferro-scanning, soil tests, standard penetration test, foundation checking etc. The whole structure has been modeled and the adequacy for different load combinations has been checked. It was a masonry building and due to this the modeling and analysis were different from the conventional modeling of Reinforced Concrete Structures. The detailed engineering assessment provides recommendations about the structural condition of the existing building.



Checking the Foundation during Seismic Vulnerability Assessment

ii) Project of Population Services and Training Center

BUET-JIDPUS has performed the Structural Vulnerability Assessment of three hospital buildings and three school buildings in Dhaka city as a part of the project given by the Population Services and Training Center (PSTC) during the months of October and November, 2018. Like other Detailed Engineering Assessments activities like Core cutting and concrete strength determination, Ferroskan, Foundation checking by excavation, Soil testing etc. were carried out here. Finite Element Analysis were conducted after which results and recommendations were presented in the final reports.



Brick Shear Strength Test on Masonry Structures



Core Cutting is being performed

iii) Project of Community Participation and Development

BUET-JIDPUS conducted structural vulnerability assessment of hospital and schools (General Hospital (Victoria), Narayanganj; Borabo Mohonpur Govt. Primary School, Mohammadpur, Dhaka; 31 & 32 No. Nayamati Boys and Girls Govt. Primary School, Nayamati, Narayanganj) according to the guideline of ASCE 41 from September to November 2018. This was a part of the project of Community Participation and Development. The assessments were conducted during October- November, 2018. The objectives of this work was to know whether the structures are adequate or not, in terms of existing seismic force resisting system(s). Therefore, the adequacy of the seismic-force-resisting system was evaluated considering the capacity of each element.



Data is being collected for As-built Drawing Preparation

iv) VISUAL INSPECTION OF THE THREE STORIED RESIDENTIAL BUILDING AT GULSHAN 2, DHAKA, BANGLADESH

Visual Inspection was conducted of a residential building at Gulshan 2. Initial visits were conducted before the assessment. The assessment was done as per ASCE 41 - 13 TIER-1. The inspection focused on the features of the buildings which may be vulnerable during an earthquake event. The advantage of the visual observation is it does not require any destructive tests and so no disturbance to the existing building is caused.

Ground Penetrating Radar Test

i) Bridge site in Cox's Bazar as a part of World Food Program (WFP) Project

During the month of December, 2018, scanning of a slab bridge was done in Rohingya refugee camp, Ukhiya, Cox's Bazar by Ground Penetrating Radar (GPR) which was a part of the project conducted by the World Food Program (WFP). The reinforcement details of the slab, a pier and the foundation system of the bridge was determined from the post scan analysis.

These information will be further used to carry out a detailed engineering assessment of the bridge which will be helpful to assess the need of further retrofitting of the bridge.



Team from BUET-JIDPUS performing the GPR scan on the slab bridge

ii) Checking Thickness of Foundation at Gulistan

BUET-JIDPUS checked foundation (mat) thickness at Jaker Market, Fulbaria Super Market-2 (Block C) on July 2018. Total four nos. 3D grid scan were done to check the foundation thickness.

iii) Checking Grade Beam at Savar

BUET-JIDPUS conducted Ground Penetrating Radar (GPR) survey at HR Textile Mills Ltd. at Savar, Dhaka. The purpose of the GPR survey was to identify the grade beams. Before taking any steps for retrofitting, HR Textiles Mills Ltd. had foresight to conduct GPR survey to avoid unexpected damage of the foundation.



GPR Survey is being conducted at HR Textile Mills Ltd., Savar, Dhaka

iv) Ground Penetrating Radar (GPR) Survey on Two Underground Cable Routes in Dhaka City

BUET-JIDPUS conducted GPR survey along the route at Gulshan -1 Substation (SS) (DESCO) to Rampura Grid SS (PGCB) and Karwanbazar SS (DPDC) to Dhanmondi Grid SS (PGCB). The purpose of this survey was to identify buried objects such as utility service lines and other miscellaneous objects. This survey will help to locate the alignment of buried utilities lines. As an alternative to excavations, the GPR technology is identified for its ability in predicting locations and type of buried objects without excavation works. The Power Division of the Government of Bangladesh (GoB) has decided to introduce Underground Cable (UGC) based transmission and distribution lines in the PS network. Therefore, to ease the work this survey was done on December 2018.



Ground Penetration Test is being performed to Scan Underground Utility Lines

Medlar Factory Building-Cost Estimation of the Structure and Retrofitting

BUET-JIDPUS has carried out the work of cost estimation of the Eight Story factory building of Medlar group and the estimation of the costs associated with retrofitting required for two separate fire incidents that took place in the same building. In order to carry out the work, a team from BUET-JIDPUS has visited the factory building during July, 2018 and collected necessary information about the structural formation of the building and the two separate retrofitting works. The structure was unique in Bangladesh in a sense that it had prestressed concrete structural slabs. All types of costs required for the construction of the super-structure of the building and the retrofitting works were estimated and presented finally as three summed up figures viz. Cost of the Structure, Cost of 1st retrofitting and Cost of 2nd retrofitting.

Cone Penetration Test and Microtremor Test

Cone penetration tests were conducted during September at various sites of Madani Avenue, Dhaka and Jolshiri for the pipe laying project undertaken by Dhaka WASA. The project is under the supervision of a British consultancy form named "Mott MacDonald". The CPT has emerged as a reliable method for determining soil layers. This test provides a complete and continuous profile of the soil layer. CPT can provide continuous data of larger depths and is more reliable than Standard Penetration Test (SPT). Microtremor tests were conducted during September in the same points where the CPT was done. It was a part of the pipe of the same project. The tests were conducted to determine the shear wave velocity of the soil. This test can also provide the amplification of the waves that are generated by the secondary sources.



Cone Penetration Test is being performed