

BCL NEWSLETTER

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TO OUR READERS

As I write this, delegates from some 170 countries held a weeklong negotiation in China ahead of the next climate summit in Cancun in December aimed at achieving a global plan for curbing greenhouse gases, blamed for global warming. The meeting ended inconclusively. In the midst of this seemingly gloomy scenario, the embattled environmental lobby has got a huge boost from the top climate skeptic Bjorn Lomborg's declaration that global warming is "undoubtedly one of the chief concerns facing the world today" and a "challenge humanity must confront". In his book published in September, *Smart Solutions to Climate Change*, he calls for \$100 bn annually to fight global warming. Not that it will bring in overnight converts to the cause but Lomborg's unexpected advocacy for huge investment in fighting global warming, which he claims would essentially resolve the climate change problem by the end of this century, is likely to inject renewed vigour into a deadlocked debate between the two camps that appear to be increasingly entrenched in their positions.

Hopefully, the world's major polluters will look beyond their national interests and allow good senses to prevail in Cancun. ■

Mahbub Haque
Mahbub Haque
Managing Director

3RD KARNAPHULI BRIDGE - USE OF HIGH STRENGTH CONCRETE

The recently opened 3rd Karnaphuli Bridge at Chittagong is an important landmark in the port city. It was opened to traffic on 08 Sep 2010. The construction was carried out by Major Bridge Engineering Company of PRC and was completed in 48 months under a design-build contract at a total cost of approximately US \$59 million. The supervision of construction was provided by a consortium of three firms led by Katahira Engineers International of Japan. The other two firms were STUP Consultants Ltd of India and BCL Associates Ltd of Bangladesh. Earlier BCL provided pre-contract services including the parameters for contract design and bid documents.

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IMPERIAL HOSPITAL AT CHITTAGONG

The Port City of Chittagong has become a megacity with one of the fastest growing population in the world. Among other problems, access to quick, effective and economical medical treatment remains illusive for the city's mainstream population. The government and the private sector had in the past built various physical facilities including Medical College Hospital and other medical facilities in Chittagong but a large modern hospital to deliver unified health services remained a dream.

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CenTR News

The quarter under review was partly occupied by the holy month of Ramadan which generally is marked by a drop in the activities of the CenTR, in particular its educational programmes. However, the CenTR's consultancy activities relating to the recently awarded ERPP (Employment and Remittance Promotional Programme), with financial support from the Department for International Development (DFID), kept



A view of seminar on 'Water Supply in Building' at CenTR

the members occupied with meaningful activities. As reported in the previous issue of the NL, the ERPP is mandated for promoting training for raising the skills of local migrant workers aimed at creating job opportunities overseas, raising the remittance flow to the country which is the second largest foreign exchange earner for the country. The concerted initiatives by the consortium partners yielded almost instant success through the primary selection of six workers by a recruitment delegation from Dubai who were invited to the country by COCL, a consortium partner under the ERPP.

Together with the successful six another twenty-one shortlisted workers were invited for participating in a training on different trades at the Multicraft Training Institute (MTI), also a partner under the ERPP. The training in various trades

formally started on at the MTI following a brief ceremonial launching at the same venue on the previous day. The training programmes will conclude on the 15 Oct with the exception of electrical house wiring which will continue for another 15 days.

To keep the ERPP going, a call for application was responded by 57 candidates whose interview at the ERPP project office was conducted on 21 Sep, out of which 49 were formally selected for training on various trades. The

training of the second batch will start on 18 Oct at the Simon Technical Centre located at Mirpur in the city. The interview for the 3rd batch has been fixed on 09

Oct. We hope that the response will be equally, if not more, enthusiastic in the future.

As part of the programme the six selected participants have applied for loan from Southeast Bank Limited which happens to be a major financial partner of ERPP besides the DFID. The Bank will play a key role in offering loans to the outgoing migrant workers to enable them secure their visas, airfare and pay their commission to the manpower agencies responsible for securing their jobs overseas. SEB has also been mandated to process the remittances of the migrant workers from overseas to ensure

security and greater transparency in the transfer of remittances. SEB is further mandated to offer loans, if necessary, to the returnee migrants to set up Small and Medium Enterprises (SMEs) as income generating activities for security of the livelihood of returnee worker and his family members.

CenTR, meanwhile, returned to its routine activities and organized a seminar entitled 'Water Supply in Building: Problems and Remedies' at the CenTR Seminar Hall on 29 Sep. The seminar was conducted by Engr Syed Azizul Haq, PEng a Superintending Engineer at Public Works Department.

Starting with the presentation on water supply system, Engr Haq led his audience through a series of slides demonstrating the weaknesses and problems in the plumbing profession as a whole in the country illustrating the major problems obtaining in the building water supply system. The slides depicted impacts, effects and causes. He also provided suggestions for remedial measures relevant to the obtaining situations.

He also took pains to lead his audience through a series of slides focusing on service connection pipes, water reservoirs, water supply systems in buildings, relating to water flow, water



A view of launching of technical training at MTI under the ERPP

pressure in high rise buildings in general, piping layouts, imperfect pipe installations, alternatives to unavailable fittings, emergency responses and seismic provisions for the supply systems. Lastly, he demonstrated the loss of water from faulty faucets and the uncared water tanks in governmental installations and emphasized the importance of rain water harvesting.

Engr Md Shamsul Huda chaired the session and had all praise for the presentation of Engr Haq to the real life scenario. Engr Huda impressed upon the audience demonstrating that the pipe borne WASA water was more contaminated than the rain water collected from the ducts in his house. Being a sanitary engineer himself and occupying responsible positions at the UNICEF and the WHO, Engr Huda advised that water in Dhaka is extremely unsafe for human consumption and use unless it is boiled.

An interactive Question - Answer session involving the floor followed and both the presenter and the chairperson responded to the queries and contributions from the floor. A very informative and professionally rewarding CenTR Seminar rounded up with appreciation from the attendees. This is to be noted that for the first time the number of attendees from the guest institutions exceeded the number of participants from BCL.

On recommendation from the CenTR Engr Md Rashedul Haque, P.Eng attended a 5-day training programme on 'Application of GIS for Natural Hazard and Risk Assessment' held from 25-29 Sep at the Disaster Management Bureau which was organized by Asian Disaster Preparedness Centre (ADPC) of Thailand.

Information on the training activities in the next quarter is available from the Head of CenTR at:

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Dr AAM Shamsur Rahman

3RD KARNAPHULI BRIDGE - USE OF HIGH STRENGTH CONCRETE

[contd. from page 01]

This 950m long 24.47m wide Extradosed Concrete Box-girder Bridge is the first of its type in Bangladesh and has three 200m long spans, which is the longest in an extradosed concrete bridge in the world. In order to make the box-girder segments shallower in depth and durable against marine environment, 50 MPa (cylinder strength) concrete was specified for the superstructure. American Concrete Institute in ACI-363R defines concrete with compressive strength equal to or greater than 40 MPa as High Strength Concrete (HSC).

Due to heavy reinforcement and access limitation, pumpable mix with high slump (150 ~ 200 mm), was required for

concreting of pier heads, box-girder segments and bridge towers. Moreover, concrete specification limited maximum cement content to 480 kg/m³, concrete temperature at the time of placing to 35⁰C, heat of hydration to 70⁰C. and water cement ratio to 0.4. The author was in-charge of ensuring quality of the HSC mix and its field production that satisfied all the set criteria.

Target Strength:

To avoid end treatment for cylindrical specimen in compression testing, 150x150 mm size cube specimen was chosen for quality control of mix design and field concreting. The 28-day cylinder strength of 50 MPa is equivalent to 28-day cube strength of 62 MPa (8,990 psi). From previous experience on 45 MPa concrete mix of the Jamuna Bridge, was set a bottom line for initial target strength at 62+15 = 77 MPa (11,165 psi) for this HSC mix design.

The margin of 15 MPa was taken on the basis of: a) anticipated strength drop from laboratory mixing to large volume plant mixing; b) standard deviation of plant production and c) impact of change in weather. Four computerized mixing plants, two on each side of the river, with auto-run capability in



Panoramic view of the 3rd Karnaphuli Bridge from upstream

loading, precise weighing, mixing and discharge were used. The output capacity of the plants was 60 to 80 ton/hr.

Mix design:

The methods and technology for producing HSC mix are basically same as those of Normal Strength Concrete. Both ACI and BS methods are applicable. Additionally, good understanding is required on: a) the properties of ingredients and their compatibility in strong and durable bonding with cement paste; b) super-plasticizer and c) excellent level of quality control.

To produce a highly workable and cohesive HSC mix with minimum air voids, ACI-211 recommended procedure was followed.



Longitudinal view of the 3rd Karnaphuli Bridge

Coarse aggregate from Bholagonj, conforming to AASHTO M80 and project specification, was used in HSC mix. Coarse aggregate was prepared in 20 and 10 mm nominal sizes, to meet grading and to avoid segregation. Sand from Sylhet conforming to grading zone-2 of BS-882 was used.

Cement type-1, was selected on the basis of physical and chemical test results and quality assurance system at factory level. Two brands: 1) Ruby CEM-1, 52.5N and 2) Holcim Red CEM-1, 52.5N, both conforming to ASTM standard C-150 and BDS EN 197-1: 2003, were used for HSC trial mixes. Chemical properties

indicated that both brands released relatively low alkali content during hydration.

The initial mix trials with maximum cement content of 480 kg/m³ failed to achieve target strength and needed changing the cement content. On the

Conc. Class (Cyl)	Cube strength MPa	Cement content kg/m ³	Coarse aggregate kg/m ³	Sand content kg/m ³	Admixture content L/m ³	Water content L/m ³	W/C ratio	Slump range mm	28-day cube strength MPa
C-50	62	495 (Ruby CEM-1)	1067	719	5.44 (JM-PCA)	139	0.29	150-200	76.20
C-50	62	495 (Holcim Red CEM-1)	1051	709	5.44 (JM-PCA)	139	0.29	150-200	77.60

basis of the author's experience on previous work and in view of maximum cement content limitation of BS 5400, an upper limit of 500 kg/m³ was set. This new limit was based on anticipated heat of hydration and alkali content limitation.

Water from deep tube wells, conforming to AASHTO T-26, was used for mixing and curing concrete.

To keep the fresh concrete temperature within limit, ice lumps were used with mixing water.

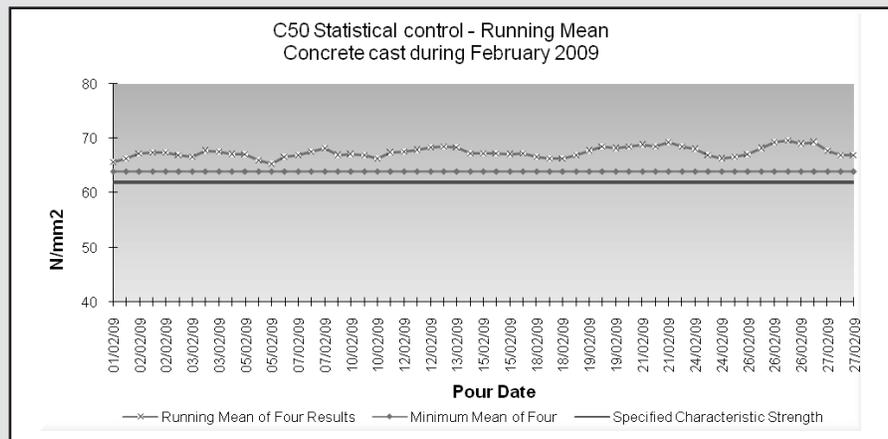
Initial trial mixes were carried out using

FOSROC made super-plasticizer SP-430 conforming to type G of ASTM C-494. But the mixes failed to achieve target strength. A Chinese made super-plasticizer named JM-PCA conforming also to type G of ASTM-494, was used and found meeting target strength as will be seen from the Table below.

Use of JM-PCA was the turning point in achieving satisfactory HSC design mix. JM-PCA is a polycarboxylate polymer-based composite admixture with high range water reducing, strengthening, slump retention and self-compacting abilities.

Quality Control:

An effective quality control plan was maintained using statistical computer programs to monitor ingredient's properties, production quality and cube strengths and succeeded in ensuring good quality concrete with required workability at the point of pumping. About 630 sets of cube, representing approximately 16,000 m³ of HSC, were taken for strength check. After initial 40 results of standard deviation, only seven (7) sets marginally had fallen below



running mean target strength. Whereas not a single test result had fallen below characteristic strength of 62 MPa. A typical graphical presentation is shown below. It was a satisfactory achievement in QC works.

Conclusion:

Making High Strength Concrete with locally available materials is possible. Without any hesitation, design engineers may now specify HSC to limit the dimensions of superstructure of bridges as well as high rise buildings in the country. ■

Ghulam Ahmed

IMPERIAL HOSPITAL AT CHITTAGONG

[contd. from page 01]

The Imperial Hospital Limited has come forward to establish just such a facility in the city. The proposed hospital will be suitably furnished and provided with modern equipment to cater for the



An architectural view of the proposed Imperial Hospital

required level of service, which would include:

- All types of Medical, Surgery, Gynae and allied functions like Gastroenterology, Cardiology, Neurology, Paediatric with outdoor and indoor facilities,

- Diagnostic services like Pathology and Radiology and Imaging laboratories and other modern diagnostic facilities including those of EEG, EMG, ECG, TMT, MRI, Ultrasonogram, Endoscopy etc

- General and Special Wards and Cabins with sophisticated facilities.

The multi-storied hospital will have central air-conditioning system, suitably designed passenger, bed and cargo lifts, modern fire detection and fire fighting systems, electrical substation and emergency generator. The cabins, wards and other procedure rooms will be facilitated with central gas system, vacuum and high velocity air for pneumatic devices where required. There will be a parking facility of about 100 vehicles. Security system will include provision of CCTV and Digital systems in Out Patient Department for monitoring smooth patient flow. Incinerator for bio-hazard waste may also be provided on discussion with the promoters.

and engineering designs undertaken earlier by an expatriate consultant, preparation of detailed design drawings, project management, monitoring and full time on-site supervision. ■

Sufee Mustaque Ahmed

RETROFITTING AND VERTICAL EXTENSION WORK OF ARZED CHAMBER

The construction of ARZED Chamber Building was awarded to Associated Builders Limited and the Contract Agreement was signed on 26 October 2009. The contract is divided into two phases - retrofitting of existing structure from basement to 2nd floor (in phase 1) and vertical extension from 3rd to 8th floor (in phase 2). The phase 1 works started immediately after the contract was signed.

The existing building is a framed structure with 35 columns out of which 14 columns on the north and south side have been demolished and relocated inside by 750mm from its original position. Ten existing inner columns have been retrofitted with larger section. Two existing inner columns have been demolished to accommodate shear wall and lift well of passenger elevator. Two additional columns have also been constructed to reduce span in a specific area. During dismantling of existing columns including those retrofitted, adequate specially designed support system using steel I-sections have been used.

The reinforcement required for construction of new and retrofitting columns have been inserted by drilling 25mm dia 150mm deep hole with power driller inside the existing mat foundation and filling the drilled holes by approved grouting. The strengthening of existing mat foundation has been done by overlaying additional 500mm thick reinforced concrete. The work is progressing in full swing and the retrofitted works are expected to be completed by December 2010. The

vertical extension of phase 2 will follow. The project is expected to be completed by August 2011.



Retrofitting work of ARZED Chamber

Meanwhile the tendering process for 2-passenger elevators, 750KVA sub-station and 700 KVA generator and fire fighting works are already completed and the selection of the Contractor is expected to be made very soon.

BCL has prepared the detailed design and documentation of the project and supervising the construction work also. ■

AKM Fazlul Haque

REHABILITATING NARAYANGANJ WATER SUPPLY SYSTEM

Narayanganj is an old riverport in eastern Bangladesh. The town is situated on the River Shitalakhya about 20 km southeast of the capital Dhaka. Narayanganj Water Supply was a division of DPHE - Department of Public Health Engineering, which was annexed to DWASA - Dhaka Water

Supply and Sanitation Authority in 1990. Subsequently water supply system of adjoining Kadam Rasul Municipality (Pourashava) was brought under Narayanganj system which also is now under the management of DWASA. The present population of Narayanganj is about 0.65 million, estimated to rise to about 1.0 million, including population of Kadam Rasul, by 2015. The project aims at providing piped water supply to these people.

The estimated water demand for 2015 is 160 mld (million litres per day). DWASA currently supplies only about 46 mld. The present system consists of 15 DTWs, 2 Surface Water Treatment Plants (WTP), one at Sonakanda built prior to mid 1900s and the other at Godnail installed in 1988. Presently both are in poor condition needing immediate rehabilitation.

In order to provide stable piped water supply to meet the projected demand of 2015, DWASA has taken up the project to (a) rehabilitate the old DTWs including total replacement of five existing DTWs (b) construct 12 new DTWs, (c) rehabilitate the two existing WTPs, (d) rehabilitate 35km of existing distribution lines and (e) construct 65 km new supply lines.

DWASA has commissioned the services of BETS-BCL Joint Venture for providing consulting services for the planned works and signed a contract on 18th Feb. 2010 to modernize, expand and rehabilitate the Narayanganj Town Water Supply System. The Consultants will plan, design and supervise the intended works. The project is expected to be completed by Feb 2012. ■

Sufee Mustaque Ahmed

REGIONAL SEMINAR ON CLIMATE CHANGE

A 2-day seminar on "Role of Engineers in Tackling Climate Change" was held on 16-17 June 2010 at Dhaka. Organized by Bangladesh Association of Consulting Engineers (BACE), the seminar was attended by about 90 participants and was inaugurated by Dr Muhammad Abdur Razzaque, MP, Hon'ble Minister for Food and Disaster Management of Bangladesh. Two of the country's eminent thinkers in the subject, Dr Ainun Nishat and Dr Assaduzzaman made the keynote presentation. The inaugural and the valedictory sessions were presided over by BACE President Mr Mahub Haque.

On the occasion BACE published a colourful Souvenir containing 16 articles covering virtually the entire gamut of impending perils and catastrophe Bangladesh may face in the coming years, thereby jeopardizing its fauna, flora and the eco system and threatening the socio-economic fabric of the country. The engineers and scientists have an important role to play in tackling the aftermaths of disasters. The regional countries may need to assess their own country's situation and design and build sustainable infrastructure to replace the existing ones, which may prove unacceptably vulnerable in the days and years to come. Increased food production, building new sea defenses in the coastal belts, introduction of new and/or green technology including opting for harnessing renewable energy for reducing greenhouse gases, designing structures with high earthquake resistance, development of mass transit systems and above all education and human resources developments for adaptation and mitigation in tackling the

challenges of the changing climate were identified as necessary steps which need to be urgently taken in hand in this respect.



A view of the Valedictory Session of the Seminar

It is hoped that that the seminar has succeeded in its objective of generating a momentum in the community of engineers and scientists and encourage them to get involved further in developing appropriate adaptation and mitigation for our survival in the days to come.

For further information please contact :
BACE website: www.bacenet.org
Email: bace@citechco.net. ■

Mujibur Rahman Khan
General Secretary, BACE

FACILITATING CROSS BORDER TRADE IN SOUTH ASIA

South Asia Sub-regional Economic Cooperation (SASEC) Transport Logistic and Trade Facilitation Project is a part of a million dollar ADB Regional Technical Assistance program. The project will examine development of: (i) road corridor; (ii) railway link; and (iii) cross border trade regime in the region and is particularly aimed to serve the

sub-regional land-locked countries with access to land and sea ports in Bangladesh and India. The present Study covers the cross-border component aimed at preparing investment projects to facilitate sub-regional trade and transactions among the SASEC member countries, namely Bangladesh, India, Nepal and Bhutan. The component has the following three sub-components (i)

trucking operations at the border crossings; (ii) customs arrangements for transit cargoes at the border crossings and draft operational framework including necessary bilateral and multi-lateral agreements on transport and customs arrangement; and (iii) developing trade related infrastructure including identification of investment projects and needs for capacity building of land port management.

The TA program was initiated in 2008 and will be completed in two stages. The first stage is aimed at: (i) reviewing the existing and planned arrangements of trucking operation, customs procedures and bilateral or multilateral transit agreements including recommendations of SAARC and Corridor Efficiency Studies; (ii) reviewing development of frameworks for trucking operations, simplified customs procedures including preparations of draft bilateral agreements to be executed by the member countries; (iii) identifying areas of institutional and financial assistance needed. The second stage is aimed at selecting potential viable projects, undertaking economic cost-benefit analysis including drafting

bilateral and multilateral agreements; and identifying capacity building requirements and training programs. BCL Associates Limited is executing the Bangladesh part of the Study. Similarly, consultants in India, Nepal and Bhutan are providing inputs on their respective country while PADECO of Japan has been providing international expertise to each country chapter separately and will integrate them to prepare a consolidated sub-regional development plan for the ADB financing.

The Bangladesh Chapter started working in April 2010 and is currently preparing the draft final report. Bangladesh has 182 land customs (LC) stations along the borders with India and Myanmar many of which are in operation for only one third of the year. In the spirit of regional cooperation for development, Bangladesh has already undertaken several initiatives to open up its borders with India and Myanmar and in 2001 declared 24 of her existing LC stations as land ports under the Customs Act, 1969 authorizing all sorts of port activities. At many of these 24 ports the government has undertaken port infrastructure development of these six of the land ports are being operated on BOT basis under public-private partnership arrangement.

The government established the Bangladesh Land Port Authority (BLPA) in 2001 as a regulatory and service providing authority under the BLPA Act, 2001 by the Parliament. Adequate power and authority have been given to the Land Ports to look after their own administration, operation, development and expansion of the ports facilitating imports and exports over land routes. Signing of bilateral



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and tripartite agreements between Bangladesh, India, Bhutan and Nepal has led to increased volume of trade and transactions in recent years even before adequate infrastructure have been developed.

Although our foreign trade is transacted mostly through maritime ports and shipping, the share of trade over land route has been increasing. Total value of import was \$20 billion and export \$15 billion in 2009 of which 15% was transacted through land routes. Before 2001 it was 4-5%. The customs revenue earning from land ports in recent years accounted for US \$0.36 million in 2009 versus \$0.26 million in 2006, a 40% increase in three years.

The TA has identified and selected four land ports for feasibility study and design to create port facilities and logistics in Bangladesh. These are Benapole-Petrapole, Bhomra- Gozadanga, Burmari- Chengrabandha and Tamabil- Dauki. The initial analysis shows that except Tamabil the other three ports are economically viable for investment. The review of land ports suggests that except Akhaura all land ports are mainly being used for imports. Bangladesh imports more than exports from India and the neighboring countries both in value and volume, resulting mainly from the Indian tariff and non-tariff barriers on exports to India.

Md. Rafiqul Islam

IN THE COMPANY

Badruddin Ahmed,42,

obtained M.Com in Accounting from the University of Dhaka in 1992 and joined BCL as an Accounts Assistant in the same year in projects. He was promoted to Office Manager-cum-Accountant in 1996. In Sep 1999, Badr was posted at the BCL HO as an Accountant where his familiarity with Accounting software has made him a useful hand at the operation of the section's MIS.



Md Abul Hossain, PEng, 47,

obtained BSc Engg Civil from BUET in 1988, MSc in Environmental Science from State University of Bangladesh in 2006 and PEng in 2005. He joined BCL in 1999 and worked as Field Engineer in WB-funded FDRP 1999-2000; as Asst Structural Engineer in JBARP 2003-05; and as Site Engineer/Site Coordinator for Laamu Gan Housing Project 2006-07 in Maldives and recently as Highway/Pavement Engineer in Third Karnaphuli Bridge Project.



JOINING BCL FAMILY

We welcome the joining of:



(1)



(2)

Messrs Md Abul Kashem (1) and Md Shamim Hossain (2) both of whom as Office Assistants at the BCL HO with effect from 02 and 14 Sep, respectively. We expect that the new

members will perform their duties at the expected level in the tradition of the company's professional commitment and culture.

CONGRATULATIONS

We congratulate:



Rahman the total number of P.Engs at BCL stand at 22.

Engr S M Shamimur Rahman, Environmental Engineer at BCL for his successful registration as a Professional Engineer (P.Eng) under the Bangladesh Professional Engineers Registration Board on 9 April, 2010. With the registration of Engr Shamimur



Ms Tazrin Jahan Juthi, youngest daughter of Senior CAD Operator Md Dewan Jahangir on her passing the Secondary School Certificate Examination held this year under the Dhaka Board.



Md Asifuzzaman, son of Driver Md Arif Hossain, on his passing the Higher Secondary School Certificate Examination of Dhaka Board.