

Newsletter

International Graduate Program on Civil & Environmental Engineering

MUMBAI-AHMEDABAD HIGH SPEED RAILWAY CORRIDOR

The end of the last year saw an interesting chapter in the successful realization of a cross-border civil engineering project. A memorandum of understanding was signed between the Government of Japan and the Government of India on December 15, 2015 for building a high-speed railway corridor running between Mumbai (often dubbed as the financial capital of India) and Ahmedabad (one of the fastest growing cities in India). This project has been one of the most highly sought after projects by India in the recent years, aimed at modernizing its vast railway network both in terms of efficiency and travel times, keeping the security and safety of passengers at the highest possible levels. The project is expected to create opportunities for the development of the regional economy by improving the connectivity between the two urban centers and encompassing other small and medium cities along the corridor. In addition, the project is envisaged to generate socio-economic benefits by providing easy access to health, education, and employment.

This corridor will be the first high-speed rail line for India with an expected operating speed between 300 and 350 km/hr, reducing the current journey time between Mumbai to Ahmedabad by more than half to just 3 hours. The distance between Mumbai and Ahmedabad is set to be covered by 11 stations along the length of the corridor with a brief segment of the corridor near Mumbai running undersea. Construction of this nearly 500 km long high-speed corridor at an approximate cost of US\$ 15 billion is expected to start from early 2018 and set to be completed in five years. Japan Investment Co-operation Agency (JICA) will provide 81% of the total project cost as a soft loan with a 50-year term.

The Japanese Shinkansen technology is to be adopted for the corridor. Moreover, approximately 20% of the components will



Figure 1: Map of India with Mumbai-Ahmedabad High Speed Rail-way Corridor

be sourced from Japan, while the manufacturing will be carried out in India. Beside the technological transfer, Japan will also provide support and training to the staff members of the Indian railways. The initial phase of the support and trainings for the Indian railway staff has already materialized in the current year. The first batch of individuals from the Indian railways has arrived in Japan and is enrolled in various academic programs at several universities across Japan. At the Saitama University, two staff members of the Indian railways have enrolled in the International Graduate Program on Civil and Environmental Engineering from April of the current year, working towards their master's degree in Civil and Environmental Engineering.

Message from the Head of the Foreign Student Office

It is our profound joy to share with all of you that Dr. Takaaki Kajita, who graduated from Saitama University in 1981, has been awarded the Nobel Prize in Physics 2015.

It is my pleasure to announce that three more scholarship programs have been added to the list of scholarships available to foreign students this year at the International Graduate Program on Civil and Environmental Engineering. The first is the Japanese Grant Aid for Human Resource Development Scholarship (JDS) for students from Myanmar. The second is the African Business Education (ABE) initiative for students from Africa. And the third is the Japanese Governmental scholarship for staffs of Indian railways. We welcome applications from interested candidates for these scholarships; applications for the first two scholarships are administered by

the Japan Investment Co-operation Agency (JICA). Additionally, we invite applications for Monbukagakusho (MEXT), Asian Development Bank (ADB), and World Bank (WB) scholarships. Please feel free to convey this information on scholarships to anyone, who you think befits the criteria of our program.



I wish you all well. Please stay connected with us; we look forward to hear news from your end.

Prof. Hiroshi Mutsuyoshi

Head of the Foreign Student Office
Saitama University

Research Profile Series (20)

Structural Engineering, Mechanics and Materials Group

Development of GFRP and UFC Composite Beams for Short-span Bridge Construction

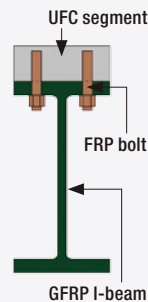
This study was conducted by the Fiber Reinforced Polymer (FRP) research group, belonging to the Structural Material Laboratory of the Department of Civil and Environmental Engineering in the Saitama University. The FRP research group is engaged in developing FRP composite beams for the construction of short-span pedestrian bridges. The current study was supervised by Professor Hiroshi Mutsuyoshi, and it consisted of one doctoral student, two masters students, and two undergraduate students.

The FRP materials have superior features, such as high tensile strength, high corrosion resistance, high fatigue resistance, and low weight. Even though the FRP structures have a high initial cost, they are economical when the life cycle cost of the structure is considered. In addition, the FRP bridges are environment friendly because they have lower carbon dioxide emissions than prestressed concrete and steel bridges. However, the low stiffness of the FRP materials limits their use in long-span bridges. By the collaborative work of the Saitama University FRP research group and some Japanese companies, the first hybrid FRP (carbon FRP and glass FRP) pedestrian bridge in Japan was constructed in Kure City, Hiroshima Prefecture, Japan. The bridge is 12 m long, and it is located in a fishery harbor.

In this study, glass FRP (GFRP) and ultra-high-strength fiber reinforced concrete (UFC) composite beams were developed for the construction of short-span pedestrian bridges. The main advantages of using GFRP-UFC composite beams for bridge construction are the durability and the rapidity of construction. The durability of the GFRP-UFC composite beams has been significantly enhanced by using high corrosion resistant materials. The UFC segments were used to prevent the premature delamination of the GFRP I-beam compression flange and to increase the stiffness and flexural capacity of the I-beam.



GFRP-UFC Pedestrian Bridge in Onagawa, Miyagi Prefecture



The materials containing resin matrices, such as GFRP and FRP bolts, are susceptible to deterioration when the temperature exceeds their glass transition temperature. Therefore, the flexural behavior of the GFRP-UFC composite beams can be affected by high temperatures when they are located in hot environments. This was tested by conducting material tests and large-scale beam flexural tests at room and elevated temperatures. The material tests include glass transition temperature tests, coefficient of thermal expansion tests, tensile tests, compressive tests, and lap-shear tests.

The FRP research group in the Saitama University used the GFRP-UFC composite beams to construct another pedestrian bridge in Japan by collaborating with the local authorities and some Japanese companies. The bridge is located in a fishery harbor in Onagawa City, Miyagi Prefecture. As all components of the bridge were prefabricated in a factory and transported to the construction site, the bridge was constructed rapidly. The GFRP was used for the handrails and bracings to enhance the durability of the bridge. The length and the width of the bridge are 6,000 mm and 960 mm, respectively.

(Written by - Dr. Isuru Sanjaya Kumara Wijayawardane)

Graduation Time Congratulations

September 2015

Mr. Malik Adnan Anwar from Pakistan was awarded his Ph.D. degree under the guidance of Prof. J. Kuwano. His doctoral thesis was entitled "Effect of helix bending deflection on load settlement behavior of screw pile in dense sand".

Ms. Yodhasinghege Nadeeka Senani Wijewardana from Sri Lanka was awarded her Ph.D. degree under the guidance of Prof. K. Kawamoto. Her doctoral thesis was entitled "Characterization of water repellency for natural soil and hydrophobized sand:

Development of a hydrophobized capillary barrier system for surface water control at solid waste landfills".

Ms. Daraporn Phusing from Thailand was awarded her Ph.D. degree under the guidance of Prof. K. Suzuki. Her doctoral thesis was entitled "Discrete element simulations on granular materials under generalized three-dimensional stress system".

Mr. Aung Aung Soe from Myanmar was awarded his M.Eng. degree under the guidance of Assistant Prof. S. Tachibana. His master's thesis was entitled "Experimental study on the behavior of geogrid reinforced sand".

Mr. Md. Shajib Ullah from Bangladesh was awarded his M.Eng. degree under the guidance of Prof. M. Saitoh. His master's thesis was entitled "Effects of soil nonlinearity upon kinematic and inertial interactions in soil-pile-structure systems".

Ms. Nepal Sandhya from Nepal was awarded her M.Eng. degree under the guidance of Prof. H. Kawakami. Her master's thesis was entitled "Development of a smart device system for the identification and interactive visualization of structural response".

March 2016

Mr. Isuru Sanjaya Kumara Wijayawardane from Sri Lanka was awarded his Ph.D. degree under the guidance of Prof. H. Mutsuyoshi. His doctoral thesis was entitled "Structural behaviour of composite girders using high strength fibre reinforced concrete and fibre reinforced polymers".

Mr. Nguyen Anh Dung from Vietnam was awarded his Ph.D. degree under the guidance of Prof. Y. Okui. His doctoral thesis was entitled "A rheology model of high damping rubber bearings for seismic analysis at room and low temperatures".

Ms. Sazia Afreen from Bangladesh was awarded her Ph.D. degree under the guidance of Prof. N. Tanaka. Her doctoral thesis was entitled "Investigation of downstream equilibrium scour pattern and gully scouring after levee overtopping".

Ms. Ekanayaka Achchillage Ayesha Dilrukshi from Sri Lanka was awarded her Ph.D. degree under the guidance of Prof. K. Kawamoto. Her doctoral thesis was entitled "Gas transport and thermal properties of compost-mixed landfill cover soils under variable water saturation".

Mr. Ganila Nuwan Paranavithana from Sri Lanka was awarded his Ph.D. degree under the guidance of Prof. K. Kawamoto. His doctoral thesis was entitled "Development of geomaterial-based media for permeable reactive barriers to treat leachate from solid waste landfills in Sri Lanka".

Mr. Peng Zhang from China was awarded his M.Eng. degree under the guidance of Associate Prof. T. Maki. His master's thesis was entitled "Experimental and numerical investigations on time-dependent behavior of headed stud shear connector in steel-concrete hybrid structures".

Mr. Rahman Abdur from Bangladesh was awarded his M.Eng. degree under the guidance of Prof. H. Kawakami. His master's thesis was entitled "Project simulation and preparedness against the effects of earthquake by using virtual reality".

Mr. Ashish Shrestha from Nepal was awarded his M.Eng. degree under the guidance of Assistant Prof. J. Dang. His master's thesis was entitled "Structural vibration sensing and monitoring methods using smart devices".

Mr. Chavin Nilanga Naotunna from Sri Lanka was awarded his M.Eng. degree under the guidance of Prof. H. Mutsuyoshi. His master's thesis was entitled "Safety of bridges subjected to tsunami".

Welcome New Students

October 2015



Rasool Ali Murtaza
Pakistan, Doctor



Aung Aung Soe
Myanmar, Doctor



Imam Md Hasan
Bangladesh, Doctor



P.P.U Kumarasinghe
Sri Lanka, Doctor



Nepal Sandhya
Nepal, Doctor



Nguyen Trong Lam
Vietnam, Doctor



Pongprasert Pornraht
Thailand, Doctor



Amo Nurudeen Tomiwa
Nigeria, Master



Achmad Fuadi Noor
Indonesia, Master



Khin Kalayar Thein
Myanmar, Master



Saw Wut Yee
Myanmar, Master



Sohail Amir
Pakistan, Master



Thandar Tun
Myanmar, Master



Ulenge Mwanaisha Nganzi
Tanzania, Master

April 2016



Mahmudur Rahman
Bangladesh, Doctor



Ashish Shrestha
Nepal, Doctor



Zhang Lei
China, Master



Mai Thi Nguyen
Vietnam, Master



Gantulga Nergui
Mongolia, Master



Pradeep Pokrel
Nepal, Master



Subash Ghimire
Nepal, Master



Peter James Amaho Esmala
Philippines, Master



T.L.C Vinodh
Sri Lanka, Master



Anh Tuan Tran
Vietnam, Master



Liaqat Ali
Pakistan, Master



Muhammad Atif Anwer
Afghanistan, Master



A.S.K.T Piumali
Sri Lanka, Master



Agha Zafar Ali
Pakistan, Master



Mohd Saufi Bin Mohd Redzuan
Malaysia, Master



Jyoti Singhal
India, Master



Jayanta Kumar Khamari
India, Master

Mr. Dileepa Chaturanga Hettiarachchi from Sri Lanka was awarded his M.Eng. degree under the guidance of Prof. Y. Matsumoto. His master's thesis was entitled "An investigation of changes in modal damping characteristics of RC beam due to corrosion induced damages".

Mr. Dang Truong Giang from Vietnam was awarded his M.Eng. degree under the guidance of Prof. T. Asaeda. His master's thesis was entitled "Modeling mangrove propagule dispersal in Olango island, Cebu, Philippines".

Mr. Jayruel Rojas Delabajan from Philippines was awarded his M.Eng. degree under the guidance of Associate Prof. T. Maki. His master's thesis was entitled "Cyclic behavior of laterally loaded pile with cement treated sand".

Mr. Kunj Anand Vaidya from Nepal was awarded his M.Eng. degree under the guidance of Associate Prof. H. Taniyama. His master's thesis was entitled "Numerical Investigation of Effectiveness of flexible joints on underground pipelines acted by strike slip fault movement".

Mr. Mahmudur Rahman from Bangladesh was awarded his M.Eng. degree under the guidance of Prof. Y. Okui. His master's thesis was entitled "Probabilistic distribution of buckling strength of stiffened steel plates".

Mr. Md. Moniruzzaman from Bangladesh was awarded his M.Eng. degree under the guidance of Associate Prof. S. Asamoto. His master's thesis was entitled "Adsorption performances study of Pb²⁺ and Cd²⁺ by autoclaved lightweight aerated concrete and cement paste as potentials for groundwater treatment".

Mr. Waqas Muhammad from Pakistan was awarded his M.Eng. degree under the guidance of Prof. H. Kawakami. His master's thesis was entitled "Analysis of external chemical blast loading on residential structures".

Mr. Sabin Singh from Nepal was awarded his M.Eng. degree under the guidance of Prof. M. Saitoh. His master's thesis was entitled "Soil-structure interaction for inclined pile under strong ground motion".

Mr. Saqib Habib from Pakistan was awarded his M.Eng. degree under the guidance of Prof. N. Tanaka. His master's thesis was entitled "Turbulence characteristics in open channel armored gravel bed with small water depth relative to roughness elements height".

News

New Appointments

Prof. Hiroshi Mutsuyoshi was appointed as the Director of International Institute for Resilient society of Saitama University in April 2016.

Dr. Chandra Shekhar Goit, a 2013 doctoral graduate of Saitama Univ., was appointed as an assistant professor of Earthquake Disaster Prevention and Mitigation group in April 2016. His research interest is earthquake engineering.

Faculty Promotion

Dr. Junji Yagisawa was promoted to Associate Professor of Hydraulic and Environmental Engineering Group in October 2015. His research field is river engineering.

Dr. Aya Kojima was promoted to Associate Professor of Transportation planning group in April 2016. Her research field is transportation planning.

Dr. Hisashi Taniyama was promoted to Associate Professor of Earthquake Disaster Prevention and Mitigation group in April 2016. His research fields are earthquake engineering and seismology.

Faculty on Move

Prof. Kiichi Suzuki of Geotechnical and Geosphere Research Group retired from Saitama University in March 2016.

Associate Professor Han Soo Lee of Hydraulic and Environmental Engineering Group resigned from Saitama University in March 2016. He is currently working at Hiroshima University.

Assistant Professor Shinya Tachibana of Geotechnical and Geosphere Research Group resigned from Saitama University in March 2016. He is currently working at Kobe University.

Awards

Prof. Jiro Kuwano was awarded the Best Paper of 2014 for Geosynthetics International, official journal of International Geosynthetics Society, together with Prof. Y. Miyata and Prof. J. Koseki for the paper entitled "Performance of reinforced soil walls during the 2011 Tohoku earthquake".

Prof. Hiroshi Mutsuyoshi was awarded the JSCE (Japan Society of Civil Engineers) Tanaka Thesis Prize (the highest prize in bridge engineering in Japan) together with Keiichi AOKI, Shinya WATANABE, Takashi SANGA and Kenichi MIYANAGA for the paper entitled "Assessment of the PC bridge estimated by the property of after 40 years passed PC Beam".

Dr. Hidenori Mogi was awarded the 2016 Japan Society of Dam Engineers Paper Award together with Hideki Soda, Hideji Kawakami and Tatsuo Ohmachi for the paper entitled "NIOM analysis of long-term earthquake observation records at earth dam and estimation of soil properties of dam body".

Dr. Takeshi Saito was awarded the Best Presentation Award for Young Researchers (Japanese Association of Groundwater Hydrology 2015 Fall Meeting) for the title "Changes in subsurface temperature and groundwater quality during in-situ long-term thermal loading experiment".

Dr. Rabin Tuladhar (Doctoral graduate of 2006), who is an Associate Dean of Learning and Teaching and a Senior Lecturer (Infrastructure and Design) at James Cook University, was awarded the "Australian Innovation Challenge (2015) in Manufacturing, Construction and Innovation category for the "Development of recycled plastic fibres to reinforce concrete footpath".

Dr. Isuru Wijayawardane (Doctoral graduate of 2016), who is a post-doctoral researcher at the structural material laboratory of Saitama University, was awarded the best presentation awards in the JCI Annual Convection 2015, Chiba for the paper entitled "Flexural behavior of GFRP and ultra-high strength concrete composite girders subjected to elevated temperature".

Mr. Dang Truong Giang (Master graduate of 2016), who is a Geodesy engineer at the National Remote Sensing Department in Vietnam, received the best presentation award at "The 19th Annual meeting of the Ecology and Civil Engineering Society (ECES)" in Koriyama City, Fukushima, Japan for the presentation entitled "Using remote sensing data for modeling mangrove propagule dispersal in Olang island, Cebu, Philippines".

Mr. Ashish Shrestha received the Excellent Presentation Award in Nov. 2015 from the Japan Association for Earthquake Engineering for the presentation entitled "Feasibility of smart devices in structural vibration measurement".

Mr. Ho Manh Hung received the excellent presentation award at the 50th Japanese Geotechnical Society (JGS) symposium 2015, for the paper entitled "Effects of the structure of geogrid-reinforced subgrade on suppression of large deformation".

Message from Alumni

In 2003, I joined the Structural Material Laboratory at Saitama University as a doctoral student under the supervision of Prof. Hiroshi Mutsuyoshi. I was also privileged to work under Mutsuyoshi sensei as a JSPS postdoctoral fellow from 2006 to 2008. Like Japan, my home country of Nepal also lies in a very seismically active region. This has been an impetus to my strong interest in seismic resilient design of concrete structures. During my PhD study and JSPS postdoctoral tenure at the Structural Material Laboratory, I had the invaluable opportunity to learn about state-of-the-art technologies in seismic design from world-renowned professors like Mutsuyoshi sensei, Machida sensei, Maki sensei, Yamaguchi sensei, Kawakami sensei, and Okui sensei. I absolutely enjoyed working in the concrete laboratory, and my regular interactions with Mutsuyoshi sensei, Maki sensei, and Asamoto sensei further strengthened my interest in seismic design and concrete engineering. The experience and knowledge I gathered during my stay in Japan has played a vital role in shaping my career in the academic field.



I am currently working as a Senior Lecturer and Associate Dean in the College of Science and Engineering at James Cook University in Australia, where I teach concrete engineering and structural design to undergraduate engineering students. I am also involved in translational research on sustainable construction materials and rehabilitation of aged infrastructures. In 2015, our research on the development of recycled plastic fibers to reinforce concrete footpaths won the Australian Innovation Challenge in the construction category. As an Associate Dean, I am also responsible for maintaining quality engineering education in the university and fostering industry engagement. I attribute my success in my academic career to the strong foundation in engineering built during my study and work at Saitama University.

For a short while, my wife Shreeti also worked at Saitama University as a web developer for the International Collaborative Graduate Program. Both of us immensely enjoyed our stay in Japan, not only from the perspectives of study and work but also from a social perspective. During our stay, we thoroughly enjoyed all the social activities organized by different social groups like the Cosmos group in the International House. Apart from quality education, the International Graduate Program at Saitama University also provides international students a golden opportunity to truly experience and enjoy Japan.

Finally, I would like to extend my best wishes to the current students in the International Graduate Program at Saitama University. Of course, hard work is absolutely important for successfully completing your degrees but, at the same time, please do take time to experience Japan's rich culture and heritage as well. There is so much to see and learn while you are in Japan.

Dr. Rabin Tuladhar
James Cook University, Australia

Message from the Foreign Student Office

We are pleased to send you Issue No. 21 of our Newsletter. How have you been? We hope everyone is well.

We would like to inform you with great pleasure that last year we celebrated the 50th establishment anniversary of the Department of Civil and Environmental Engineering. To mark this noteworthy occasion, three cherry trees were planted on the southern side of Building No. 1 of the Department. We cannot wait to see the beautiful flowers bloom!

It may come as a surprise, but Ms. Nakasone and Ms. Nakazawa who have long contributed to the secretarial duties of the Foreign Student Office (FSO) have resigned last September. We cannot thank them enough for their diligent assistance to the FSO. Since last October, we have Ms. Yuko Mori and Ms. Sachiko Shimodaira as the new FSO secretariat members. Please direct news and

updates to them from now.

In addition, we would also like to introduce a new FSO member Dr. Chandra Shekhar Goit, one of our alumni, who has joined us from April 2016. He has been working as an Assistant Professor at the university.

Thank you for your continuous support. Keep in touch and we look forward to your news and updates.

The Foreign Student Office (FSO)

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