

Towards the Sustainable Infrastructure Development in Developing Countries

Sustainable Infrastructure development is the need of the hour not only for developed countries but also for developing countries where resources to cope with the challenges are often limited. In this regard, research and teaching activities conducted under the International Graduate Program on Civil and Environmental Engineering at Saitama University focuses on several sustainable development goals (SDGs), enabling the transfer of state-of-the-art technologies to the developing countries and also aiding in human resource development. Two of the recent international collaborative projects under our program targeting SDG-6, SDG-9, and SDG-11, are listed here.

- (A) Establishment of environmentally sound management of construction and demolition waste and its wise utilization for environmental pollution control and for new recycled construction materials [JST-JICA SATREPS project: June 2017 to March 2024]

This project aims to establish guidelines for environmentally sound construction and demolition waste (CDW) management, quality standards for recycled materials produced from CDW, development of new technologies utilizing recycled materials produced from CDW, and to propose strategic business models designed to promote the CDW recycling in Vietnam. This project not only enhances the knowledge and skill of students from Vietnam but also from other developing countries who contributed to the project. The organizations from Vietnam that benefitted from this project in terms of innovation, transfer of advanced technologies, and human resource development are the Hanoi University of Civil Engineering (HUCE), Ministry of Construction, Institute of Strategy and Policy on Natural Resources and Environment, Hanoi University of Science and Technology, Hanoi Department of Construction, Hanoi Department of Natural Resources and Environment, and so on.

- (B) Collaborative research network on standardization of design and construction for hot weather concreting based on Asian climate and materials [JSPS Core-to-Core: April 2017 to March 2020]

This project aims to solve practical issues and establish specifications for hot weather concreting in Asia through the research network that includes universities and organizations from Japan (Saitama Univ., Hiroshima Univ., Univ. of Tokyo, Kagawa Univ., CRIEPI, PARI, and Ube industries) and also from Sri Lanka (Univ. of Moratuwa, Univ. of Ruhuna), Thailand (Thammasat Univ., King Mongkut's Univ.) and Vietnam (National University of Civil Engineering). The key issues addressed in this project are concrete structure deterioration in hot climates and the application possibility of chemical and mineral admixtures in each participating country.



(A) Newly installed crushing plant for recycling CDW in Hanoi, Vietnam (Sep. 2020)



(B) JSPS – Sponsored seminar on concrete technology, Vietnam (Dec. 2019)
(source: <http://park.saitama.ac.jp/~asamoto/seminar/20200109.html>)

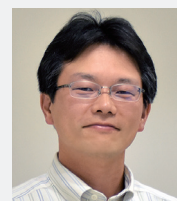
Greetings from the Head of the Foreign Student Office

I hope everyone who kindly reads this issue of Newsletter well after this prolonged COVID-19 pandemic. It has been nearly two and a half years since the last issue of Newsletter was published. The Newsletter from the International Graduate Program on Civil and Environmental Engineering is an annual publication to introduce people and activities in the program. During the pandemic, the Foreign Student Office has been extremely busy with so many unexpected and unpredicted tasks to support students and had no time to work on the publication of a new issue of the Newsletter. I am very pleased that we can publish a new issue.

This issue is a symbol of restart. In February 2023, I was able to visit Nepal to participate in meetings for the selection of scholarship awardees organised by Japan International Cooperation Agency, JICA. It was my first time to go abroad since the pandemic began. Nepalese alumni kindly arranged a gathering, and I was able to meet 12 alumni there. It was a pleasant and memorable time. It seems that things get back to normal and we can travel around again. I hope that I and the other faculty members of the program can meet you in various places.

It is worrying to hear that people in some countries are facing political and/or humanitarian issues. There is not much to do for us to resolve them, but our hearts are with those affected by such issues and we hope that you will have peaceful life with freedom soon.

With best regards,



Yasunao Matsumoto

Head of the Foreign Student Office

International Graduate Program on Civil and Environmental Engineering Saitama University

Research Profile Series (24)

Earthquake Disaster Prevention & Mitigation Group

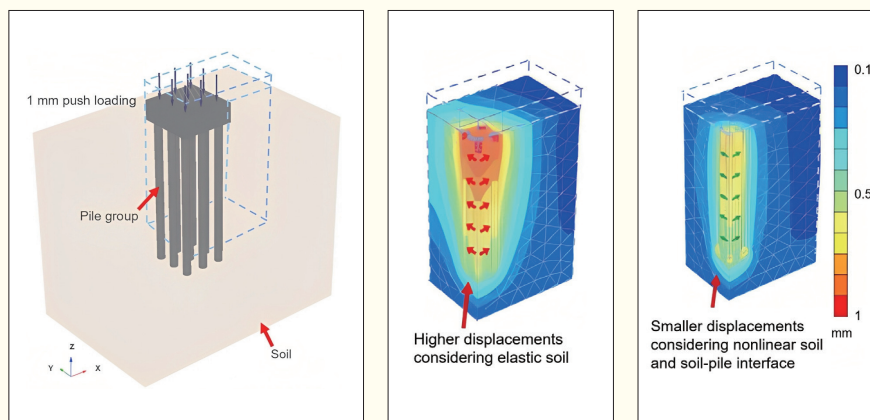
Nonlinear response of pile group foundation

Pile foundations have been widely used over the years to support different land-based and offshore engineering structures. These foundations are substantial to withstand gravity loads as well as dynamic loads by the earthquake, traffic flow, or any machine vibration. As these foundations mostly contain piles in groups, various studies have attempted to generalise the response of any pile group layout using the response of a single pile.

The response of pile group foundation changes from the summed responses of equivalent single piles due to the increase in displacement of one pile by its nearby pile in the group, often called 'pile-to-pile interactions'. This change is commonly addressed using conventional empirical approaches. Although, these approaches may hold success for simple capacity responses of pile group foundations. However, the engineering design practices are shifting from capacity-based responses to performance-based responses, i.e., by considering the actual deformation of pile foundations. For this purpose, the interactive behaviour among soil, pile foundation, and structure (soil-pile-structure interaction effects, SPSI effects) under earthquake loads is suggested by different design codes such as the Japan Society of Civil Engineers (JSCE) standard specifications for concrete structures (JSCE, 2010) and Eurocode 8. However, the literature usually referred to in determining the response of pile group foundation for the SPSI effects assumes linear elastic soil assumption for the pile-to-pile interactions. In reality, the soil may not behave linearly, affecting the pile-to-pile interactions and the resultant pile group foundation's response. Hence, there is a strong need to resolve the ambiguities regarding the effect of nonlinearities on the pile-to-pile interactions and the pile group foundation's response. Without considering such effects can make the foundation design unsafe. Alternatively, elastic-based pile-to-pile interactions may result in an overly conservative foundation design.

Considering the significance of the study, the Earthquake Disaster Prevention & Mitigation Group of the Department of Civil and Environmental Engineering, Saitama University, has studied to determine the effect of nonlinearities on responses of pile group foundations subjected to vertical loading. For that purpose, different pile group assessments have been performed using scale model experiments and three-dimensional finite element modelling.

Results show that considering nonlinearities (i.e., soil nonlinearity) is significant for determining reasonable 'pile-to-pile interactions' and their influence on the response of pile group foundation. These nonlinearities significantly decrease the displacements in the soil around the piles in the group and the resulting "pile-to-pile interactions". These findings will therefore be helpful for the research works and the analysis of vertically loaded pile foundations.



senior researcher at the National Institute of Advanced Industrial Science and Technology (AIST), Geological Survey of Japan, the Geo-Environmental Risk Research Group, from April 1, 2021.

Assist. Prof. Adnan Anwar Malik retired on March 31, 2022. He was appointed as a lecturer at the College of Engineering, Science and Environment/School of Engineering, Newcastle Australia Institute of Higher Education, the University of Newcastle, Australia, in Singapore.

Assist. Prof. Teppei Kato resigned on March 31, 2022. He was appointed as a lecturer at the Department of Civil and Environmental Engineering, Nagaoka University of Technology, Japan.

Promotion

Assoc. Prof. Taro Uchimura was promoted to Professor on October 1, 2020.

Assist. Prof. Ji Dang was promoted to Assoc. Prof. on October 1, 2020.

Alumni Information

Dr. (Mrs) G.H.M.J. Subashi De Silva, a 2005 doctoral graduate of Saitama University, was promoted to Professor at the Department of Civil and Environmental Engineering, University of Ruhuna, Sri Lanka with effect from Nov 2019. In 2021, she was awarded the Vice Chancellor's award for the most outstanding scholar of the University of Ruhuna.

Dr. Sudhira De Silva, a 2008 doctoral graduate of Saitama University, was promoted to Professor in Civil and Environmental Engineering, Faculty of Engineering, University of Ruhuna, Sri Lanka with effect from Nov 2019 and appointed as a head of the department of Civil and Environmental Engineering on Jan 2022.

Dr. Allan Manalo, a 2008 master's graduate of Saitama University, was promoted to Professor in Civil Engineering (Structural), University of Southern Queensland, Australia at the beginning of 2020.

Dr. Dashan Tharanga Udagedara, a 2016 doctoral graduate of Saitama University, was promoted to Assoc. Prof. in the Department of Applied Earth Sciences, Uva Wellasa University, Sri Lanka in Mar 2022.

Prof. K.B. Shameen Nishantha Jinadasa, a 2006 doctoral graduate of Saitama University, was nominated as Sri Lankan top ranked scientists in the field of Civil Engineering according to the AD Scientific Index in 2021.

News

New Appointments

Dr. Kengo Nakamura was appointed as an Assistant Professor of Geotechnical and Geosphere Group on Oct 1, 2022.

Dr. Usama Zafar was appointed as an Assistant Professor of Earthquake Disaster Prevention and Mitigation Group on Oct 1, 2022.

Dr. Atsushi Sugama was appointed as an Assistant Professor of Transportation and Planning Group on Nov 1, 2022.

Faculty on Move

Assist. Prof. Yuta Mizoguchi resigned on July 31, 2019. He was appointed as a research specialist at Water Environment Research Group (River Restoration Team) of Public Works Research Institute, Japan.

Assist. Prof. Takeshi Saito resigned on March 31, 2021. He was appointed as a

Awards

Assist. Prof. Adnan Anwar Malik et al. (left SU at the time of writing this Newsletter)

received the Best Presentation Award at the 1st International Symposium on Construction Resources for Environmentally Sustainable Technologies (CREST2020), for the paper titled “Tip shape effect on screw pile installation and ultimate resistance”.

Mr. Syed Kamran Hussain Shah et al. received the best presentation award for the paper entitled, “Effect of Moisture Content on Particle Breakage of Recycled Concrete Aggregates during Compaction” at the 1st International Symposium on Construction Resources for Environmentally Sustainable Technologies (CREST2020)” in Mar 2021.

Assist. Prof. Yota Togashi won ISRM Young Rock Engineer Award 2022. An award ceremony will be held at the International Society for Rock Mechanics and Rock Engineering (ISRM) Congress, Salzburg, Austria, in October 2023.

Prof. Masato Saitoh and SHODEN, Japan, have been awarded 2022 Governor of Tokyo Award from the Japan Institute of Invention and Innovation for the invention of base isolation systems for long-period earthquakes (JP, 2015-045171, A; Title of Invention: Displacement Suppressing Device and Displacement Suppressing System).

Visiting Prof. H. Mutsuyoshi and Prof. Maki received the 2021’s Principal’s Encouragement Award for Research on Nov 5, 2021. This award is given to those who have done distinguished achievements in education and research activities.

Ms. Fahmida Parvin, a 2021 master graduate, received the Best Paper & Best Presenter Award for her paper titled “Study of hydration and chloride binding properties of slag blended cement” at the 8th International Symposium on Advances in Civil and Environmental Engineering Practices for Sustainable Development (ACEPS-2021) held on Oct 7, 2021, co-hosted by Saitama University and the University of Ruhuna.

Ms. Katrina Montes, a doctoral student, et al. received Intelligence, Information and Infrastructure Excellent Data Award for the paper titled “Semi-autopilot UAV flight path control for bridge structural health monitoring under GNSS-denied environment” at the 2nd AI/ Data Science Symposium organized by Japan Society of Civil Engineers, Nov. 2021.

Mr. Sal Saad Al Deen Taher received the Award presented by the President of Saitama University for outstanding academic research and extracurricular activities. He also received Young Researcher Award at the 9th International Conference on Experimental Vibration Analysis for Civil Engineering Structures for the paper, “Autonomous Multiple Damage Detection and Segmentation in Structures Using Mask R-CNN”, in 2021.

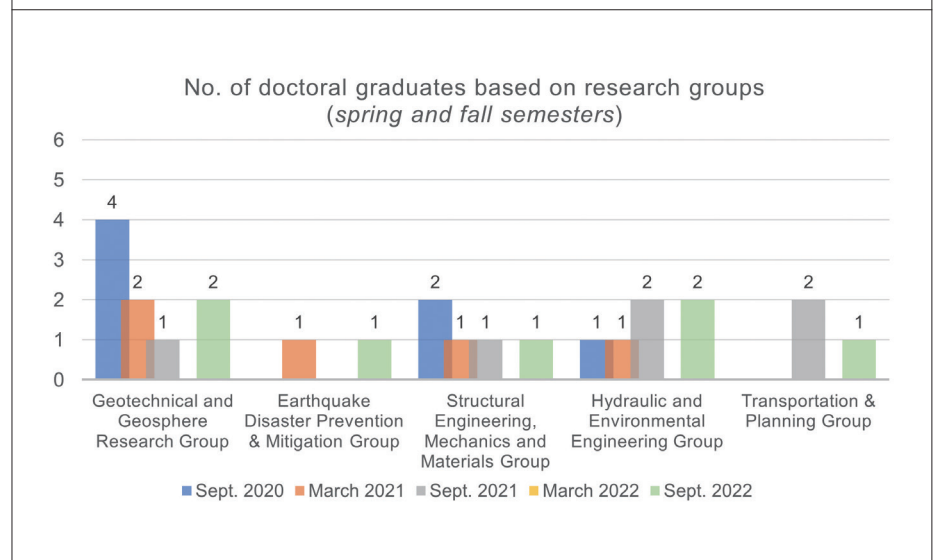
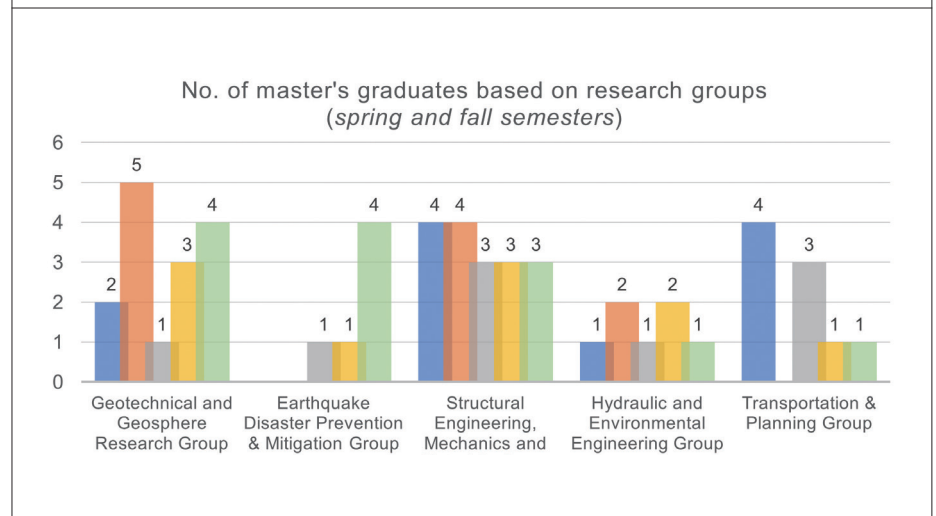
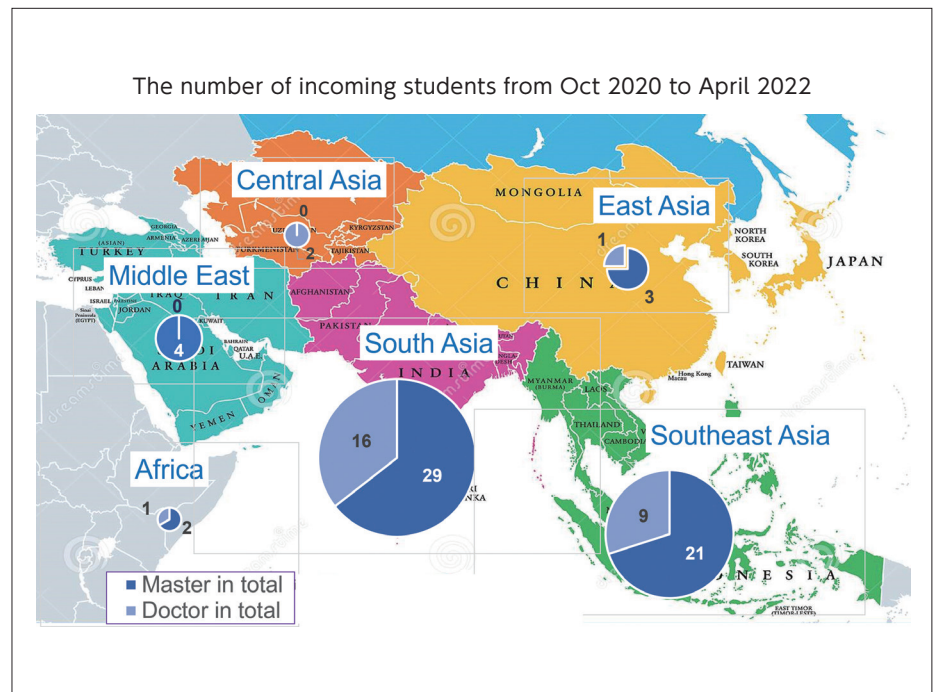
Dr. Mohammad Najmol Haque, a 2020 doctoral graduate of Saitama University, received the “Integrity Award” from Roads

and Highways Department, Government of the People's Republic of Bangladesh for his outstanding professionalism and integrity in government service for the fiscal year 2020-2021.

Mr. Upul Kumarage Chamara Sandaruwan, a 2021 master’s graduate, was awarded 3rd place of the Cluster Award for Infrastructure

by ADB-JAPAN Scholarship program under Thesis of the Year Award 2022.

Dr. Usama Zafar et al. received the best paper award at the 7th International Conference on Structural Engineering and Concrete Technology (ICSECT’22) for the paper “Influence of nonlinearities on the vertical kinematic Interaction of piles” on Apr 12, 2022.



Message from Alumni

It is my privilege to write this message on behalf of the Alumni of the International Graduate Program on Civil & Environmental Engineering at Saitama University.

I joined the Structural Materials Laboratory in April 2006 as a Master's student through the support from the Asian Development Bank - Japan Scholarship Program. I was awarded with a Master's of Engineering (MEng) degree in March 2008 under the guidance of Professor Hiroshi Mutsuyoshi. I then pursued my PhD studies at the University of Southern Queensland (UniSQ) in Australia under the supervision of Professor Thiru Aravinthan, also an alumnus of Saitama University. After my PhD completion in 2010, I started working for UniSQ as a Postdoctoral Research and Teaching Fellow and is promoted to full Professor in Civil Engineering in 2020. From August 2022, I am acting as the Executive Director (Institute for Advanced Engineering and Space Sciences) at UniSQ.



The year 2020 was remarkably difficult for everyone due to the Covid19 pandemic. While the pandemic may have created difficulties to foreign students in Japan, 2023 is showing encouraging signs for a new normal. It was very inspiring to see most countries around the world standing behind the Tokyo Olympics last July 2021. This was a very exciting event for people living in Japan as well as the rest of the world who followed the different events during the Games. The success of the Tokyo Olympics has demonstrated that the challenges of the global pandemic can be overcome when everyone will get together and make their individual contribution.

Working within a strong research team culture while working independently in implementing a research project is the most important aspect that I learned during my Master's studies at Saitama University. This is in addition to the knowledge learned from prominent professors in the different fields including concrete materials and design, fibre composites, earthquake engineering, among others. I also learned from the world leading researchers and industry professionals from Japan and other countries in various occasions like lectures and seminars. I got exposed to new technologies and advanced research in Japan when attending conferences organized by the Japan Society of Civil Engineers (JSCE), Japan Concrete Institute (JCI), and in joint workshops between the Structural Materials Laboratory and research groups in other Japanese universities. These are the opportunities that I am hoping foreign students at Saitama University are exploiting to help further in the practice and advancement of their civil engineering profession.

Studying at Saitama University has provided me great knowledge and experience in conducting high quality research. The opportunity also exposed me to fibre reinforced polymer composites in bridges and civil infrastructure, a topic which I have completed during my Master's research project in collaboration with Toray Industries. These experiences and knowledge learned have been an important part of my academic and professional career in Australia, which I am now imparting to my postgraduate research students and fellow professional engineers.

After earning my MEng degree in 2008, there were a number of opportunities where I visited Japan to share knowledge and at the same time learn the recent advances and new research capabilities in structural materials. Equally, I have welcomed professors and students from Saitama University to UniSQ for exchange of knowledge and exploration of research collaboration. I would strongly encourage therefore current students to establish collaboration and network with your Japanese professors and fellow foreign students since they can become your colleagues in the profession in the future.

If opportunity presents, I would encourage foreign students to explore and experience the rich culture and diversity that Japan has to offer. Try its delicious food, visit interesting places, view its hanami and hanabi, and be charmed with its temples and tradition. For me personally, it is always feel like home every time I visit Japan and meet my former professors and colleagues at Saitama University.

I wish everyone the best in their studies and to maximise the many opportunities of being a student at Saitama University and while staying in Japan.

Allan Manalo

PhD, MEng, BSCEng

Professor in Civil Engineering (Structural)

Executive Director (Institute for Advanced Engineering and Space Sciences)

Theme Leader – Civil Composites, Centre for Future Materials (CFM)

University of Southern Queensland

Message from the Foreign Student Office

A very warm greetings from the Foreign Student Office! We hope that you are doing well.

Though it has been two years since we last issued a newsletter, we are happy to introduce our new FSO member, Assist. Prof. Usama Zafar, who joined us from Oct. 2022. We also welcomed new FSO staff members, Ms. Kaori Teruya (from Feb. 2021), Ms. Yukari Asahi (from Apr. 2022), and Ms. Haruko Inagaki (from Jan. 2023). You may already recognize their names through recent email correspondences. Please do keep in touch with the new members!

As a retirement information, Ms. Yuko Mori resigned from FSO in Dec. 2020 and Assist. Prof. Adnan Anwar Malik in Mar. 2021. Ms. Sachiko Shimodaira will resign at the end of Mar. 2023. A farewell note from Ms. Shimodaira is as follows:

"It has been a great pleasure and full of exciting new experience to work at FSO for 7 and a half years. Meeting so many international students from all over the world is not what many people can experience.

One thing I always kept in mind was to try the best to support students so

that they can enjoy and feel comfortable throughout their stay in SU and in Japan. I am so grateful to the students, alumni, and faculty members of the Department of Civil and Environmental Engineering for their kind and endless support to FSO.

I'm wishing the best for your future success and family's happiness and health. I do hope to see you again."

FSO always looks forward to hearing from you!

Stay in touch and do share news and happening at your side!

The Foreign Student Office (FSO)

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