2025

Report on 2025 JSCE Study Tour Grant (STG) Program

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1. Introduction

I am honored to have participated in the 2025 Study Tour Grant (STG) Program, organized by the ISEF Committee of the Japan Society of Civil Engineers (JSCE), held in Japan from September 7 to 12, 2025. The program provided a unique opportunity to present my research, exchange knowledge with international peers, and gain exposure to Japan’s advanced civil engineering practices.

1.1 About JSCE

The Japan Society of Civil Engineers (JSCE) was established in 1914 as an incorporated association, with the mission of advancing scientific culture by promoting civil engineering and expanding civil engineering activities. Since its inception, JSCE has focused on achieving this mission through a variety of activities, including fostering scientific exchange among members, promoting research in civil engineering-related science and technology, and engaging in social involvement.

Over the years, JSCE's membership has grown significantly from an initial 443 members to approximately 39,000 members today. The organization is actively involved in a wide range of activities across the globe.

As JSCE entered the 21st century, it reconfirmed its goals, aiming to:

1. Propose ideas for the future development of social infrastructure from the perspective of civil engineers.
2. Establish a strong relationship of mutual trust with society.
3. Promote scientific and technological research with high transparency.
4. Evaluate public works from a neutral standpoint and build social consensus on proper standards.

JSCE plays a critical role in shaping the field of civil engineering, both in Japan and internationally, through its commitment to promoting innovation, professional development, and sustainable infrastructure practices.

1.2 About the Study Tour Grant (STG)

The Study Tour Grant (STG), launched in 1992 and supported by the Japan Society of Civil Engineers (JSCE) Academic Exchange Fund, invites young engineers from overseas academic societies with cooperative agreements to Japan. The program showcases Japanese civil engineering technology, promotes international knowledge exchange, and encourages participants to apply their learnings in their professional careers. Engineers receive financial support for travel and accommodation and participate in customized programs during the JSCE Annual Meeting, including site visits and expert discussions. After the program, participants submit a report summarizing their insights and experiences.

1.3 Participants of the STG

For the 2024 STG program, there were four participants from different countries:

Name	Country	Presentation Title
Munkhbat Tuvshintur (Mr.)	Mongolia	Damage Assessment of High Damping Laminated Rubber Bearing Using AI Based on Acceleration Records
Chaw Su Su Aye (Ms.)	Myanmar	Research on the Pilot Project for a Decentralized Wastewater Treatment System of Yangon City
Muhammed Huseyin MASLAK (Mr.)	Turkey	Parametric Evaluation of the Adequate Shear-Wall Index in Reinforced Concrete Building to be Constructed in High Seismicity Regions
Md Kamal Hossain Shikdar (Mr.)	Bangladesh	Performance-Level Seismic Assessment of a Bridge in Bangladesh Utilizing Recent Earthquake Records.

I was accompanied by Prof. Dr. A.F.M. Saiful Amin, JSCE STG Ambassador, Department of Civil Engineering, Bangladesh University of Engineering and Technology (BUET), and Dr. Mohammad Najmol Haque, Superintending Engineer, Narayangonj Road Circle, Roads and Highways Department, Alenbari, Tejgaon, Dhaka, Bangladesh. Their presence, guidance, and collaboration greatly enriched my overall experience during the STG program through learing.

2. Research Presentation

During the 27th International Summer Symposium in Kumamoto, I presented my research titled *"Performance-Level Seismic Assessment of a Bridge in Bangladesh Utilizing Recent Earthquake Records."* The study highlighted the importance of using locally recorded ground motions, collected by the Bangladesh Meteorological Department, for more realistic seismic performance assessments of bridges. By comparing structural responses from real earthquake data with those obtained from code-based spectra, the research demonstrated that actual records provide more reliable insights for service-level evaluations.

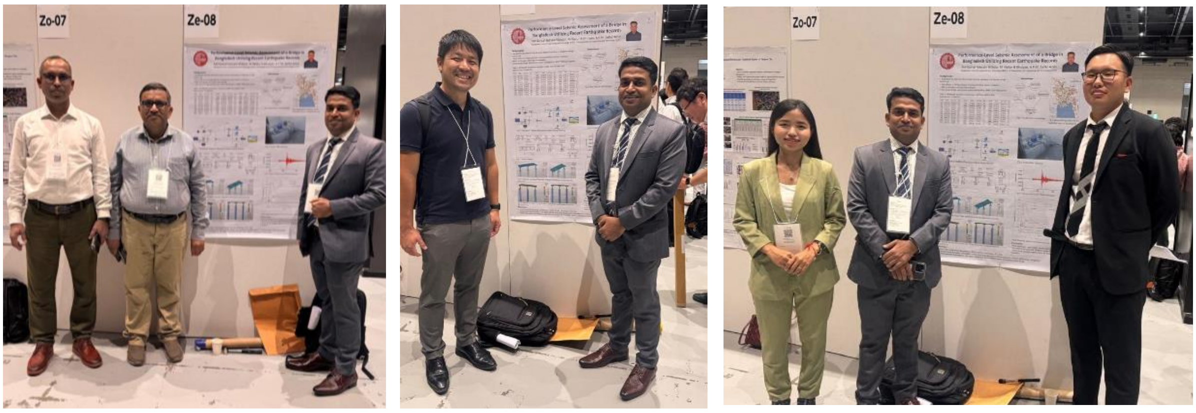

Photo 1: Poster presentation at Kumamoto Jo Hall

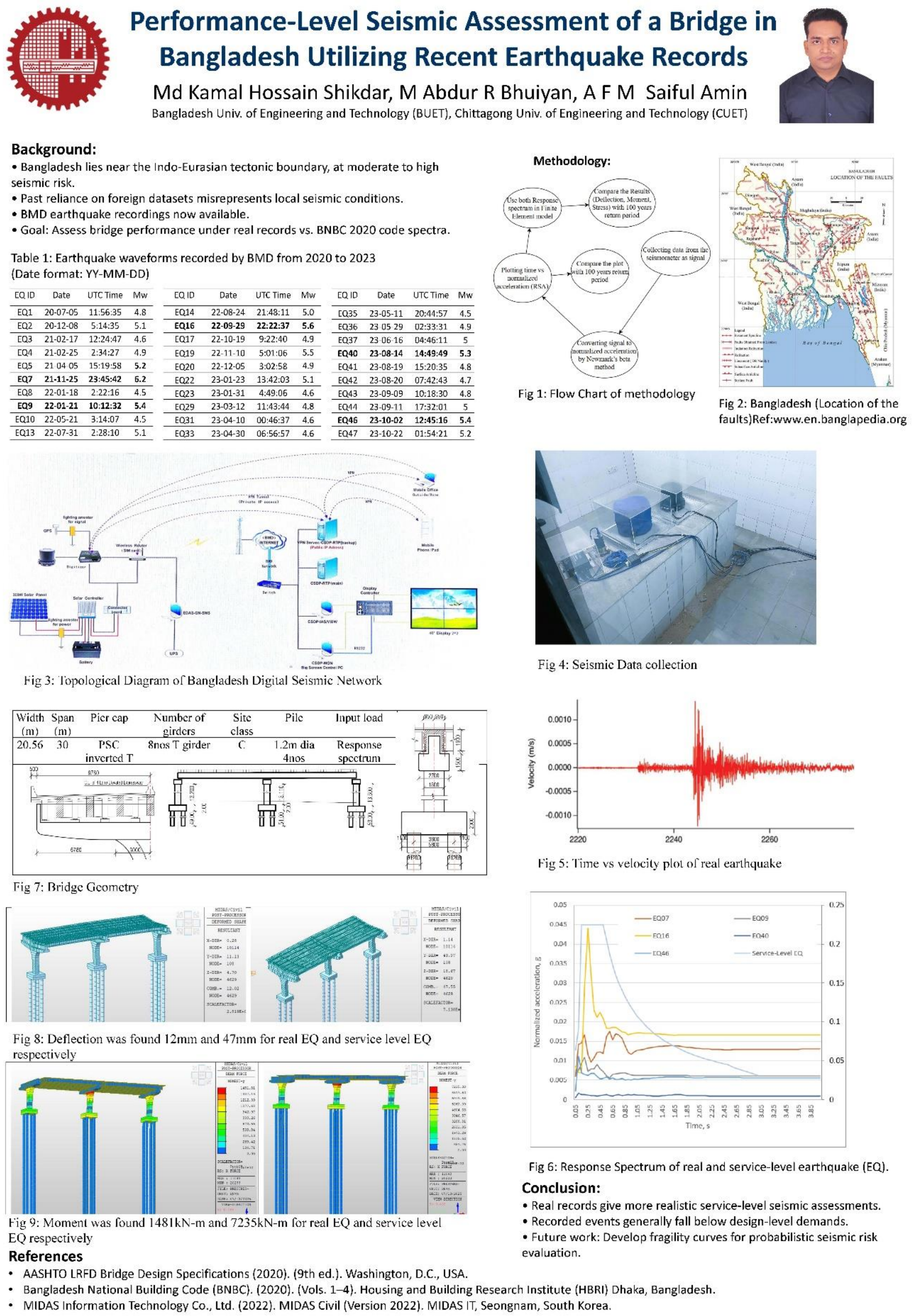

Photo 2: The poster presented at the 27th International Summer Symposium

The presentation generated valuable feedback from experts and fellow researchers, particularly in regard to the performance-based design and regional seismic risk assessment. The suggestions will help refine the methodology and strengthen the research outcomes.

3. Technical Visits and Learning

The STG program included several technical visits that deepened my understanding of earthquake engineering, structural design, and urban development:

3.1 Nihonbashi River Cruise, Tokyo

I attended an orientation and a Pre-River Cruising Study Session at the CTI Group Innovation Studio, which provided valuable background knowledge about Tokyo's rivers and bridges. This session enhanced my understanding of the structural and historical context before the Nihonbashi River Cruise.

The Nihonbashi River Cruise offered a unique perspective on the historical and structural evolution of Tokyo. Nihonbashi, the starting point of Japan's road network, is an area that still retains traces of the Edo Period while serving today as a transportation and financial hub filled with long-established department stores.

In 1604 (the 9th year of Keicho), it was declared that "Edo is Nihonbashi", establishing Nihonbashi as the symbolic starting point of the five trunk roads that spread across Japan. This declaration attracted craftsmen and merchants from various provinces, and Nihonbashi flourished as the main commercial area below Edo Castle. Near Nihonbashi Bridge, a vibrant fish market supported the city's food supply, its bustling atmosphere famously captured in the lively calls of Tasuke Isshin.

Photo 3: Pre-River Cruising Study Session at CTI group

The current Nihonbashi Bridge, built in 1911 (the 44th year of Meiji), is a stone bridge that replaced the earlier wooden structure and is today designated as a National Important Cultural

Property. As the official starting point of Japan's road network, the bridge remains both a functional and symbolic landmark. Incidentally, Kyobashi Bridge, the first bridge along the Tokaido route toward Kyoto, was removed in 1959 (the 34th year of Showa) when its river was filled in, though its main pillar still survives.

The surrounding district includes Kayabacho, historically a busy merchant quarter; Kabutocho, which transitioned from being the base of the shogunate navy to becoming Tokyo's financial district; and Muromachi Hongokucho, which still retains the atmosphere of Edo. Together, these areas represent the layered integration of historical heritage and modern development.

Photo 4: Red line shows the pathway of River cruise

During the cruise, we traveled through the Nihonbashi River, Kanda River, and Sumida River, gaining a unique view of Tokyo's water-based infrastructure. From onboard, we observed landmarks such as the Imperial Palace, Tokyo Dome, Nihon Bridge, Hijiri Bridge, Kiyosu Bridge, along with many other distinctive bridges that showcase Tokyo's diverse structural forms.

During the Nihonbashi River Cruise, we observed several floating restaurants, which serve as both dining spaces and cultural entertainment venues. These boats often feature live music, creating a unique social atmosphere while cruising through the rivers of Tokyo. The most iconic example is the Yakatabune, a traditional Japanese houseboat that offers dinner service while sailing along the Sumida River.

Photo 5: floating restaurants at Sumida River

Photo 6: Nihonbashi bridge; official starting point of Japan’s road network

From a civil engineering perspective, the Nihonbashi area and river systems illustrate the role of bridges and waterways in shaping urban growth, trade, and cultural identity. The transition from wooden to stone bridges reflects advancements in materials and structural durability, while the variety of bridge forms demonstrates Japan’s innovative approaches to combining aesthetics, functionality, and resilience. The preservation of key landmarks amidst dense redevelopment also highlights the balance between heritage conservation and modern infrastructure planning. This experience reinforced the importance of integrating historical preservation with modern structural design, a lesson highly relevant for rapidly urbanizing cities like Dhaka.

3.2 Kajima Technical Research Institute

One of the key highlights was the technical visit to the Kajima Technical Research Institute. There, I observed state-of-the-art testing and research facilities used to evaluate the seismic performance of structures. A particularly impactful experience was participating in the shake table demonstration. I experienced the 1995 Kobe Earthquake simulated on the table, which vividly illustrated the devastating effects of ground motion on conventional structures. Following this, I experienced the same earthquake simulation applied to a structure with base isolation technology, which demonstrated the remarkable reduction in structural response and damage. This direct comparison reinforced the importance of advanced seismic mitigation measures, and it has inspired me to consider how such technologies could be adapted for infrastructure in Bangladesh.

Photo 7: Shake Table to experience real earthquake[2]

The shaking table facility at the Kajima Technical Research Institute (KATRI) is equipped with both a large table and a detachable small table, each designed for specialized purposes. The large flatbed table measures 5 m × 7 m and has a rated load capacity of 600 kN, making it capable of reproducing virtually all earthquake motions, including the large displacements observed in Japan in recent years. Complementing this, the small detachable table is specifically designed to simulate the large amplitude displacements experienced by the upper floors of super high-rise buildings during long-period ground motions. When operated in combination with the main table, it can reproduce displacements of up to 2.7 meters, allowing for realistic and advanced testing of structural performance under extreme seismic conditions.

The entire shaking table system is mounted on the floating foundation made of 40,000 kN of reinforced concrete block, which is isolated from the outer structure by numbers of oil dampers and air springs in order to minimize the propagation of vibration to the residential neighborhood.

Photo 8: Kajima Complex[1]

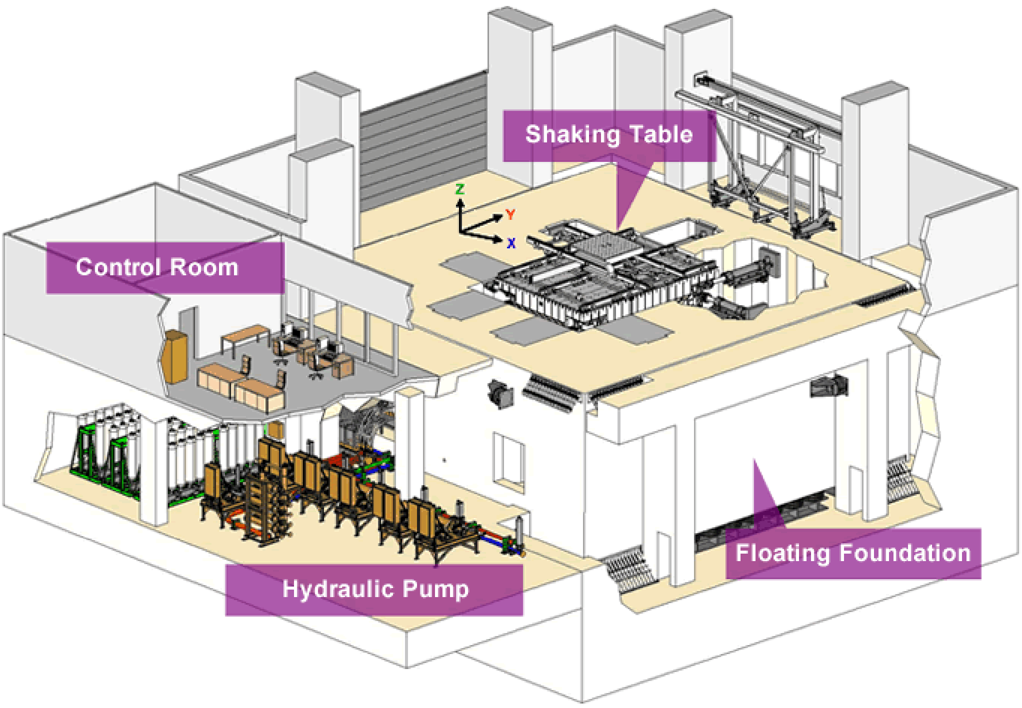

Photo 9: Shaking Table Laboratory at KATRI

[1] Source: Scanned from brochure

During our insightful visit to the KATRI, we had the unique opportunity to explore the Large-Size Structural Laboratory, a pivotal facility in advancing structural engineering research. This laboratory is equipped to conduct large-scale loading tests, critical for understanding the behavior of structural elements under significant stresses.

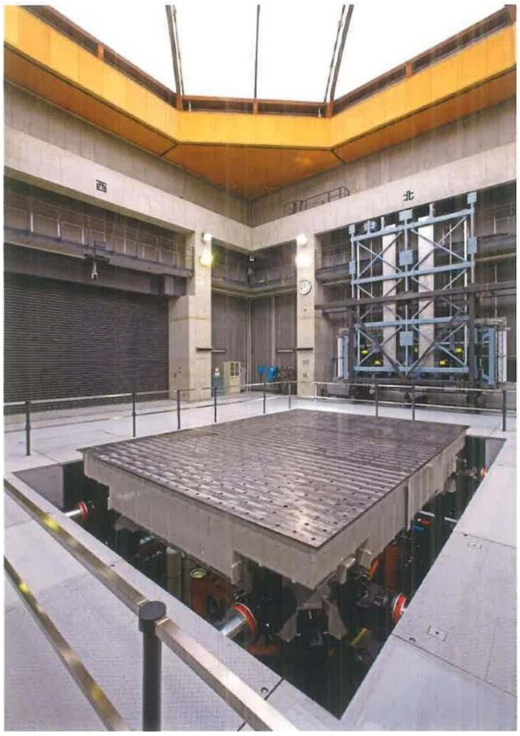

Photo 10: Shake table at Kajima Research Institute

The laboratory is renowned for its expansive reaction wall and reaction floor, which facilitate the testing of large structures under controlled conditions. These features enable researchers to apply complex load combinations to structural components, mimicking real-world forces they would experience, such as those in seismic events, high winds, or other demanding conditions. The ability to conduct these tests at a full scale differentiates this facility from many others, providing results that are directly applicable to real-life engineering challenges.

This facility plays a crucial role in gathering basic information that directly informs civil engineering and construction practices. Importantly, the laboratory allows for the clarification of quake-resisting behavior, insights that can only be obtained through rigorous experimental procedures.

The results from these experiments provide foundational data that significantly contribute to achieving designs with high reliability. For instance, by understanding how large panel elements behave under different stressors, engineers can design safer and more efficient structures. Moreover, these insights are invaluable for developing new technologies and innovative materials, pushing the boundaries of what is currently achievable in structural engineering.

These innovations provided a valuable perspective on how advanced material technologies can be applied to achieve both performance and environmental objectives an area that is becoming increasingly important for the future of structural design.

The KOLabo (Exhibition Room) further enriched my understanding through hands-on experiences such as the Earthquake Movement Simulation and OPSODIS1 (3D Sound Retro Production System).

3.3 Base-Isolated Acoustic Laboratory Building

We began our tour in the base-isolated acoustic laboratory building, a 2-story reinforced concrete structure supported by 18 specialized elastomeric bearings. Kajima's base isolation system is distinct due to its use of unfilled, steel-laminated elastomeric bearings reinforced with steel bars for enhanced damping. These bearings are engineered to exhibit more flexibility in the vertical direction compared to other systems used throughout Japan, with a vertical isolation frequency set at 5 Hz.

The experience at Kajima's Base Isolation Building was profoundly educational, offering a comprehensive look at state-of-the-art seismic isolation technologies. It underscored the importance of cutting-edge research and innovative engineering solutions in safeguarding structures from natural hazards. This visit was not just an observation of technical prowess but a deep dive into how engineered solutions can profoundly impact safety and stability in a challenging natural world.

3.4 Visit to Kajima Concrete Base

During our insightful tour of the Kajima Technical Research Institute, a notable highlight was the visit to the Kajima Concrete Base, a museum dedicated to the innovations and advancements in concrete technology. This unique museum provides a comprehensive exploration of the various concrete products developed through Kajima's extensive research and development efforts.

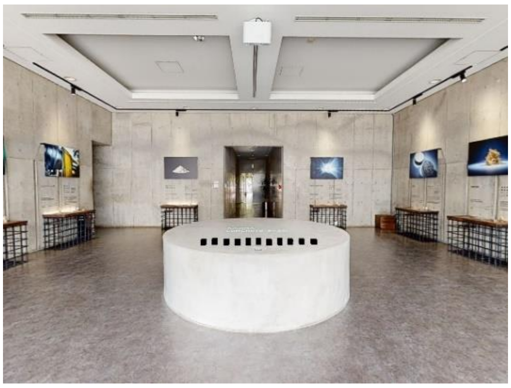

Photo 11: Kajima Concrete Base[3]

[3] Source: https://www.kajima.co.jp/english/tech/c_sus_con/index.html

At the Kajima Concrete Base (Exhibition Room), I gathered knowledge about several pioneering materials and sustainable construction technologies being developed to reduce environmental impact and enhance durability. These included:

CO_2-SUICOM: a groundbreaking concrete that traps and utilizes carbon dioxide to achieve carbon reduction.

Eco-Crete series (R3, ECM, KKC, BLS): sustainable concrete materials designed for improved resource efficiency and lower environmental footprint.

CUCO-SUICOM Formwork and SUQCEM: innovative systems that integrate sustainability with construction efficiency.

High-Fluidity Concrete: enabling easier placement in congested reinforcement areas without compromising strength or durability.

EIEN: designed for enhanced durability and extended service life.

Carbon-Neutral 3D Concrete Printing Technology: a state-of-the-art development aligning digital construction methods with sustainability goals.

Technologies such as CO_2-SUICOM and Carbon-Neutral 3D Printing demonstrated practical pathways for sustainable infrastructure development, offering potential applications in Bangladesh, where reducing emissions and improving durability are urgent challenges.

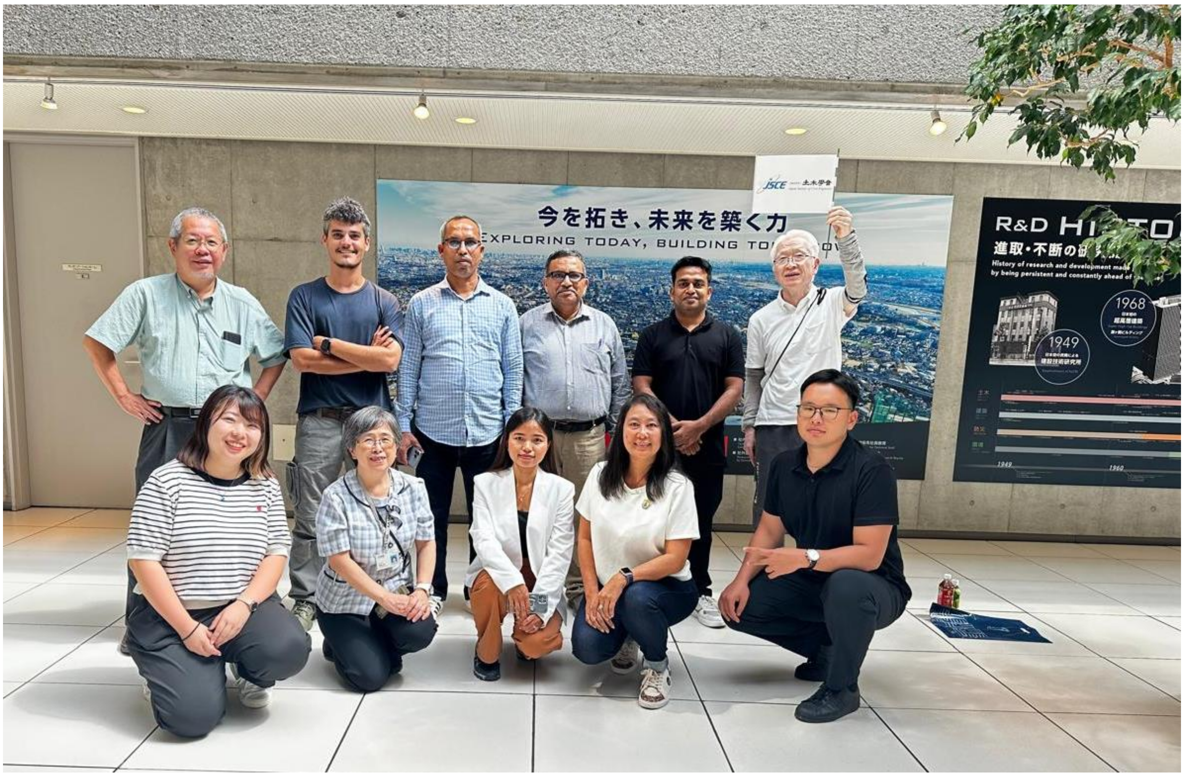

Photo 12: STG Technical Tour at the (KATRI) Nishichofu Complex, Chofu, Tokyo.

3.5 Visit to JSCE Headquarters

I visited the Japan Society of Civil Engineers (JSCE) Headquarters, where I was able to understand more deeply the society's role in advancing civil engineering knowledge, promoting international collaboration, and supporting professional development. The discussions at JSCE highlighted how the society provides a bridge between research, practice, and policy, and how international exchange programs such as the STG are instrumental in fostering cross-border knowledge sharing. This visit inspired me to consider how professional societies in Bangladesh could enhance their role in connecting engineers with global research and practice.

Photo 13: JSCE headquarter

These visits were instrumental in understanding Japan's approach to seismic resilience, infrastructure maintenance, and urban transformation.

3.6 Kumamoto Earthquake Memorial Museum

Kumamoto Earthquake Memorial Museum offered lessons from the 2016 Kumamoto earthquake, focusing on structural failure mechanisms, disaster preparedness, and post-earthquake recovery strategies.

Photo 14: Kumamoto Earthquake Memorial Museum (KIOKU)

Photo 15: Understanding the cause of Kumamoto 2016 earthquake

The museum, located near the visible fault line of the 2016 quakes (Photo 15), teaches visitors to respect the earth's harsh reality and shows the dramatic difference in damage between structures that met and those that failed to meet revised seismic standards.

Photo 16: Visible fault line of the 2016 earthquakes

Key takeaways include the necessity of personal actions like preparing an emergency "go-bag", the challenges of managing misinformation and large-scale evacuation, and the importance of "Creative Reconstruction" the long-term effort to rebuild communities and infrastructure stronger and safer than before.


Photo 17: Geography of Kumamoto

My visit to the Kumamoto Earthquake Memorial Museum provided valuable insights into community resilience and the importance of preserving lessons learned from past disasters. The museum showcased not only structural damages but also societal impacts, which underscored the role of engineers in safeguarding both lives and heritage. The exhibits highlighted structural failure patterns typical in reinforced concrete, reinforcing the need for stricter seismic detailing in Bangladesh's bridge and building projects.

4. Impact on Research and Career

The STG experience significantly enriched my research perspective by strengthening the case for adopting performance-based seismic design in Bangladesh, particularly through the use of real ground motion records. Furthermore, it highlighted the crucial role of structural health monitoring and full-scale testing in enhancing the long-term safety and serviceability of bridges. Finally, the program demonstrated advanced retrofitting and resilience strategies that offer practical, adaptable solutions for improving Bangladesh's existing infrastructure context.

Professionally, the program has expanded my international network, improved my capacity to present research in global forums, and inspired me to integrate advanced design methods into my projects at BCL Associates Limited.

5. Reporting Back Home

Upon my return to Bangladesh, I shared my experiences with colleagues at BCL Associates Limited, focusing on lessons from Japan's seismic design practices and structural innovations. I also discussed my research findings and feedback received during the symposium, with the aim of enhancing our ongoing and future bridge design projects. In addition, I plan to disseminate key learnings through academic collaborations and technical seminars to benefit the wider civil engineering community in Bangladesh.

6. Conclusions

The 2025 JSCE Study Tour Grant Program was an invaluable and transformative experience that deepened my understanding of earthquake engineering, seismic resilience, and sustainable infrastructure development. Through the research presentation, technical visits, academic interactions, and cultural immersion, I gained both theoretical insights and practical exposure to advanced Japanese practices in civil engineering.

The program strengthened my research on performance-level seismic assessment of bridges in Bangladesh, especially by reinforcing the importance of using locally recorded ground motions for realistic structural evaluation. The technical visits to Kajima Technical Research Institute, Kumamoto Earthquake Memorial Museum KIOKU, and the JSCE Headquarters, along with the Nihonbashi River Cruise study session, provided unique opportunities to connect engineering theory with practical solutions and community resilience.

In conclusion, the STG program has been a milestone in my career and academic journey. I am committed to applying the lessons learned to contribute to resilient, sustainable, and safe infrastructure development in Bangladesh, while continuing to foster international collaboration in civil engineering.

7. Acknowledgements and Gratitude

I would like to extend my sincere gratitude to Professor Koji Ikeuchi, President, Japan Society of Civil Engineers (JSCE), and the International Scientific Exchange Fund (ISEF) Committee, for granting me the honor of representing Bangladesh in the 2025 STG program.

My heartfelt thanks go to my respected teacher, Prof. Dr. A.F.M. Saiful Amin, Bangladesh University of Engineering and Technology (BUET), for his invaluable guidance and support, as well as for providing me with the opportunity to publish my research paper. His mentorship greatly strengthened my presentation at the 27th International Summer Symposium (ISS).

I am deeply grateful to Ms. Yukiko Shibuya and Ms. Mika Ashida of the International Activities Center (IAC), JSCE, for their constant support and for patiently addressing all of my questions regarding the STG program. I would also like to express my appreciation to Associate Professor Tetsuhiro Ishizaka, whose thoughtful guidance and kind assistance during the program enhanced my learning experience, and to Mr. Tasaka Goichi of Kajima Corporation, who generously reviewed my paper, provided insightful comments, and shared valuable ideas as a mentor.

Finally, I wish to acknowledge, with deepest gratitude, the unwavering support and encouragement provided by BCL Associates Ltd. for this tour.