

Monir Hossain

Geotechnical Engineer | PhD Student

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PROFESSIONAL SUMMARY

Specialized Geotechnical Engineer and PhD researcher with over 5 years of experience in the design, construction, and stability monitoring of large-scale earthen & railway embankments, dams and critical geotechnical infrastructure. Expert in implementing advanced ground improvement and nature-based stabilization techniques, supported by peer-reviewed research in unsaturated soil mechanics and computational modeling.

EDUCATIONS (Selected)

Portland State University | Portland, Oregon, USA

Doctor of Philosophy (PhD) in Civil & Geotechnical Engineering | Sept 2025 – to date

- **Thesis:** Liquefaction Mitigation of Fine-Grained Soils with Different Plasticity using Microbially Induced Desaturation
- **Funding:** The United States National Science Foundation (NSF).

Kasetsart University | Bangkok, Thailand

Master of Engineering in Civil & Geotechnical Engineering | July 2022 – March 2024

- **Thesis:** Influence of biochar and vetiver-root on unsaturated soil, soil erosion, and slope stability.
- **Funding:** Research scholarship awarded by Kasetsart University and JICA.

Bangladesh University of Engineering & Technology | Dhaka, Bangladesh

Master of Engineering in Civil & Geotechnical Engineering | August 2017 – March 2019

- **Thesis:** Soil Improvement using PVD, SCP, and SD For Railway Embankment (Note: Thesis Not submitted).

RESEARCH & PUBLICATIONS

Selected Peer-Reviewed Journals:

- **Monir Hossain**, Apiniti Jotisankasa, Surachet Aramrak, Viroon Kamchoom, Satoshi Nishimura, Supakij Nontananandh, Tananop Muanlhao, and Surat Semmad. "Increased erosion in biochar-amended soil: importance of integrating erosion control blankets and vegetation." *Biogeotechnics* (2025): 100161. <https://doi.org/10.1016/j.bgtech.2025.100161>
- **Monir Hossain**, Apiniti Jotisankasa, Surachet Aramrak, Satoshi Nishimura, Wanchai Yodsudyai, "Influence of biochar on unsaturated hydraulic characteristics of a tropical residual silty sand". *International Journal of Geosynthetics and Ground Engineering (IGGE)*-IGGE-D-23-00340. 10, 78 (2024). <https://doi.org/10.1007/s40891-024-00588-6>.
- Apiniti Jotisankasa, **Monir Hossain**, Nisa Leksungnoen, Lise Dubois, Satoshi Nishimura, "Root suction-characteristic and its relation to biomechanical properties of *Cnidioscolus aconitifolius* and *Bougainvillea glabra*: a potential tool for screening drought tolerant species". *Rhizosphere* 31 (2024): 100949. <https://doi.org/10.1016/j.rhisph.2024.100949>.
- Warakorn Mairaing, Apiniti Jotisankasa, Nisa Leksungnoen, **Monir Hossain**, Chatchai Ngernsaengsaruy, Prem Rangsiwanichpong, Jarunee Pilumwong, Sony Pramusandi, Surat Semmad, Abu Noman Faruq Ahmmmed. A biomechanical study of potential plants for erosion control and slope stabilization of highland in Thailand. *Sustainability* 16, no. 15 (2024): 6374. <https://doi.org/10.3390/su16156374>.
- **Monir Hossain**, Tanvir Hasan, Abul Hasanath, Shoma Hore, Ripon Hore, "Stability analysis of rainfall - induced landslides: A case study of a hilly area in Bangladesh". *Journal of Earthquake*, Volume-1, Issue 1 (2023-12-04). DOI: <https://doi.org/10.59429/ear.v1i1.95>.
- Ahmed, Zamiul, Shoma Hore, Mushfika Ansary, Md **Monir Hossain**, Mosharof Al Alim, Shahida Syeed Konok, Ripon Hore, and Mehedi A. Ansary. "Geotechnical insights into Louisiana soil: a comprehensive review paper." *Discover Soil* 2, no. 1 (2025): 77. <https://doi.org/10.1007/s44378-025-00100-0>
- **Monir Hossain**, Tanvir Hasan, Shoma Hore, Abul Khair, and Ripon Hore. "Integrating unsaturated soil mechanics for sustainable landslide mitigation strategies." *Arabian Journal of Geosciences* 18, no. 5 (2025): 114. <https://doi.org/10.1007/s12517-025-12259-5>

Conference Papers:

- **Hossain, M., Jotisankasa, A., et al. (2024).** "Influence of Biochar-Soil Amendment on Crack Depth Reduction." *29th National Convention on Civil Engineering (NCCE29)*, Chiang Mai, Thailand.

PROFESSIONAL EXPERIENCE

Italian-Thai Development Public Company Limited | Dhaka, Bangladesh

Senior Civil Engineer (Geotechnical Focus) | July 2017 – July 2022

- **Project Oversight:** Led the construction supervision and site management for large-scale infrastructure projects, Dhaka MRT Line-6.
- **Subsurface Investigation:** Managed comprehensive sub-soil investigations (SPT) to characterize site conditions and foundation design.
- **Ground Improvement:** Engineered and supervised advanced soil improvement techniques, including Prefabricated Vertical Drains (PVD), Sand Drains (SD), and Sand Compaction Piles (SCP).
- **Embankment Engineering:** Directed the design and field supervision of earthen embankments, ensuring structural stability and compliance with safety standards.
- **Contractor Management:** Supervised multiple subcontractors to ensure technical specifications were met and project timelines were maintained.

SELECTED GEOTECHNICAL PROJECTS

Kasetsart University | Bangkok, Thailand

Graduate Research Assistant | Advisor: Dr. Apinit Jotisankasa | December 2022 – June 2024

Assessment of Rain-induced Landslides and Slope Stabilization for the Northern Highway Department, targeting critical infrastructure in the Chiang Mai Province.

- **Advanced Slope Stability Modeling:** Performed complex limit equilibrium and finite element analyses to evaluate the factor of safety for tropical residual soil slopes under varying rainfall intensities.
- **Bioengineering Solutions:** Investigated the biomechanical properties of native vegetation (Vetiver grass) and the hydraulic influence of biochar-soil amendments to develop sustainable, nature-based slope stabilization techniques.
- **Field Instrumentation & Monitoring:** Managed the installation and data collection of field sensors to monitor suction, pore water pressure, and volumetric water content, correlating real-time environmental data with slope performance.
- **Technical Reporting & Policy Support:** Authored comprehensive technical reports and design recommendations for the Thailand Northern Highway Department to improve regional landslide early-warning systems and restoration protocols.

Motorway No. 7 Slope Stabilization & Erosion Control | Bangkok-Pattaya, Thailand

- **Climate-Resilient Design:** Engineered an integrated erosion control system for high-risk embankments, mitigating hazards from steep gradients and high-intensity tropical runoff.
- **Bioengineering & Soil Reinforcement:** Designed and supervised the contour planting of Vetiver grass, leveraging its deep-root architecture for natural soil binding and long-term slope reinforcement.
- **Hybrid Stabilization Systems:** Deployed geotextile-encased soil bags for immediate localized stability alongside Biodegradable Erosion Control Blankets (ECB) to prevent surface sediment transport.
- **Performance Monitoring:** Developed site-specific design protocols and managed a rigorous monitoring program to quantify vegetation growth rates and soil retention efficiency.

Bangladesh University of Engineering & Technology | Dhaka, Bangladesh

Graduate Research Assistant | Advisor: Dr. Tahmeed M.Al-Hossaini | August 2017 – January 2022

Seismic and Geotechnical Site Characterization for Nuclear Power Plant | Southern part of Bangladesh | Bangladesh Atomic Energy Commission.

- **Multi-Site Evaluation:** Led the seismic and geotechnical feasibility studies for five prospective nuclear power plant sites, incorporating comprehensive topographic and hydrological survey data.
- **Expansive Soil Assessment:** Performed comparative assessments of sub-soil expansion potential to mitigate risks associated with differential settlement and heave.
- **Ground Improvement Design:** Developed technical specifications for ground stabilization using Prefabricated Vertical Drains (PVD) and Deep Cement Mixing (DCM), tailored to stringent nuclear safety design constraints.

- **Earth Retention Systems:** Designed earth retaining structures and established detailed construction methodologies to ensure stability during deep excavation phases.

Gopalganj-Tungipara New Railway Embankment | Bangladesh

- **Design Verification:** Conducted detailed design verification for foundation treatments across an 11km section (Chainage 32+400 to 43+650), focusing on soft-soil stabilization.
- **Foundation Treatment:** Optimized ground improvement strategies using a combination of Sand Compaction Piles (SCP), PVD, and Sand Drains (SD) to accelerate consolidation.
- **Stability & Reinforcement:** Performed slope stability analyses and designed Geogrid reinforcement layers, specifying material properties to ensure embankment performance under heavy rolling stock loads
- **Instrumentation & Monitoring:** Developed a monitoring scheme for staged construction and preloading to track pore water pressure dissipation and settlement in real-time.

SASEC Railway Connectivity: Akhaura-Laksam **Double Track Project** | Bangladesh | *Asian Development Bank (ADB) / SASEC Funded.*

- **Railway Infrastructure Expansion:** Managed technical supervision for the construction of a dual-gauge double rail line and the conversion of existing tracks to enhance regional connectivity.

TECHNICAL SKILLS

Laboratory and Field Test:

- **Advanced Laboratory Characterization:** Triaxial Test-Single & Multistage (CD, CU, and UU) | Cyclic simple shear test (CDSS)| Consolidation test (Vertical and Horizontal Sample) | Direct shear test | Physical and Index Properties | Soil-water characteristic curve (SWCC) | IPM-instantaneous profile method | Root Tensile Strength and suction analysis.
- **Geophysical & Field Investigations:** Standard penetration test (SPT) | Cone penetration test (CPT) | Microtremor Test | Dynamic Cone Penetrometer (DCP) | Downhole seismic testing.

Computational Modeling & Engineering Software:

- **Programming language:** Python.
- **MS Office:** Microsoft Office Word | PowerPoint | Microsoft Excel.
- **Engineering Software:** AutoCAD | Sketch Up | ETABS | Geo-05 | SLIDE-6 | Geo-studio | Plaxis-2D, 3D.

VOLUNTEER EXPERIENCE:

- Role: Head of Application as Volunteers
- Organization Name: Kasetsart University-International Students Club
- Dates of Service: October 2023 to June 2024

LEADERSHIP/ EXTRA CURRICULAR ACTIVITIES

- General Member, Concrete Society of Bangladesh
- General Member, KU Debating Society
- Volunteers head at Kasetsart University-International Students Club

LANGUAGES:

- **Bengali:** Native / Mother Tongue
- **English:** Full Professional Proficiency (IELTS Band 7.5)
- **Arabic:** Advanced Reading & Writing Proficiency; Basic Speaking
- **Hindi & Urdu:** Full Conversational Proficiency

I APPRECIATE YOUR TIME AND CONSIDERATION.