

Md Sojib Hossain

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EXPERTISE IN

Dissimilar Metal Welding & Solidification Cracking Mitigation
Laser Surface Processing for Corrosion Mitigation
Metal Casting & Process Optimization

EXPERIENCE

UNIVERSITY OF VIRGINIA | RESEARCH ASSISTANT
August 2021 - Present | Charlottesville, Virginia

Collaborating with Virginia Transportation Research Council on Dissimilar Metal Joining Standards for Bridge Construction

- Optimized processing parameters to prevent solidification and cold cracking in dissimilar metal joints, improving reliability in bridge infrastructure.
- Revised constitutional diagrams for accurate delta ferrite prediction and refined filler metal selection criteria for robust joints.
- Contributed to standardized procedures for dissimilar metal joining, aiding the Virginia Transportation Research Council in establishing new guidelines.

Advancing Laser Surface Modification Techniques to Mitigate Intergranular Corrosion of AA5XXX Alloys

- Enhanced corrosion resistance of AA5083 alloy through excimer and ADAPT laser surface melting (LSM), reducing susceptibility to intergranular corrosion in marine environments.
- Showed excimer LSM creates a homogenized surface layer with fine sub-grains, interrupting IGC pathways and increasing durability.

TITAS GAS TRANSMISSION & DISTRIBUTION COMPANY LTD. | ASSISTANT ENGINEER
December 2018 – August 2021 | Dhaka, Bangladesh

- Gas pipeline design, welding, NDT, and cathodic protection.

WALTON HI-TECH INDUSTRIES PLC | DEPUTY DIRECTOR
November 2016 – December 2018 | Dhaka, Bangladesh

- Developed cost-effective metal casting processes, enabling compressor blocks export to European markets.
- Innovated gating and feeding systems for seamless compressor block casting.
- Integrated thermal analysis to ensure metallurgical consistency and reduce costs.
- Scaled up as-cast ferritic gray iron production, minimizing annealing needs.
- Designed economical melting processes, replacing costly pre-conditioners while maintaining quality.
- Optimized inoculant usage across varying sulfur levels to improve process reliability.

Developed and scaled up the metallurgical processing parameters of 1.6 million annual compressor blocks manufacturing foundry and led the technical team exporting compressor blocks from Bangladesh to various European countries.

EDUCATION

UNIVERSITY OF VIRGINIA
PHD IN MATERIALS SCIENCE & ENGINEERING.
Expected Summer; 2025 |
Charlottesville, Virginia

BANGLADESH UNIVERSITY OF ENG. & TECH. (BUET)
BS IN MATERIALS & METALLURGICAL ENGINEERING.
2016 | Dhaka, Bangladesh

COURSEWORK

GRADUATE

Electronic and Crystal Structure of Materials, Thermodynamics of Materials, Continuum Mechanics, Defects & Microstructure in Materials, Kinetics of Solid-State Reactions, Deformation and Fracture of Materials, Characterization of Materials, Fracture Mechanics of Engineering Materials, Additive Manufacturing of Metals.

LABORATORY SKILLS

X-ray Diffraction, Optical and Scanning Electron Microscopy (SEM), Electron Backscattered Diffraction (EBSD), Elemental Analysis (EDS, XRF, OES), Laser Surface Modification, Electrochemical Analysis, Hardness Testing, Universal testing machine (UTM).

TECHNICAL SKILLS

CALPHAD, ANSYS workbench, AutoCAD, Solid Works, TOPAS, STRESS, DIFFRAC.EVA, HighScore, C, MATLAB.

SOCIETIES

Diversity, Equity, and Inclusion Chair, Graduate Student Board, MSE, University of Virginia (UVA).
Life-long blood donor, Quantum blood bank, Bangladesh.
Outreach Chair, Association of Bangladeshi Students (ABS), UVA.
Member of TMS, AVS and ASM international.

INTERESTS

Traveling, Sports, Cooking, Fishing.

SELECTED PUBLICATIONS

- Hossain, Md Sojib, Jonathan Skelton; William Moffat; James Fitz-Gerald. "Laser Surface Melting to Mitigate Intergranular Corrosion of Sensitized AA5083." CORROSION (2023).
- Hossain, Md Sojib, "A Process of As-Cast Ferritic Gray Cast Iron Production." Archives of Foundry Engineering (2021).
- Hossain, Md, S. Sojib, Bazlur B. Rashid. "Preconditioning and Inoculation of Low Sulphur Grey Iron." Archives of Foundry Engineering (2020).
- Hossain, Md Sojib, Md Nasrul Haque, and Mahbub Hasan. "Thermo-Mechanical Properties of Banana and Jute Fiber Reinforced Polypropylene Composites." International Journal of Composite Materials and Matrices (2019).

MANUSCRIPTS IN PROCESS

- Hossain, Md Sojib, Stephen Sharp, Jason Provines, Sean Agnew, James Fitz-Gerald. "Effects of Manganese and Other Alloying Elements on Austenite Stabilization in Dissimilar Steel Welds: Implications for Ferrite Prediction." (Presented in Technical Meeting and Exhibition MS&T24, and ready to submit for journal publication) Meeting and Exhibition MS&T24 (2024).
- Hossain, Md Sojib, Jonathan Skelton, William Moffat, James Fitz-Gerald. "Optimizing Laser Surface Melting Parameters for Enhanced Corrosion Resistance of AA5083." (Presented in AVS 70th International Symposium Exhibition and the manuscript is in process) AVS 70th International Symposium Exhibition (2024).
- Hossain, Md Sojib, Stephen Sharp, Jason Provines, James Fitz-Gerald, Sean Agnew. "Mitigating Solidification Cracking in Dissimilar Metal Welds (Mild Steel to Dual Phase Stainless Steel)." (Accepted for oral presentation and manuscript in TMS 2025 Annual Meeting Exhibition) TMS 2025 Annual Meeting Exhibition (2025).
- Hossain, Md Sojib, Stephen Sharp, Jason Provines, James Fitz-Gerald, Sean Agnew. "Dissimilar Metal welding of Carbon steel to Ferritic-Martensitic Stainless Steel: Weldability, Metallurgical and Mechanical properties."
- Rahman, Arafat, Hossain, Md Sojib, Siddique, Abdullah-Bin, "A Comprehensive Review on Machine Learning in Alloy Design"

SELECTED CONFERENCE PRESENTATIONS

- AVS 70th International Symposium and Exhibition in Tampa, Florida, November 3-8, 2024.
- The Materials Science & Technology (MS&T) technical meeting and exhibition, David L. Lawrence Convention Center, Pittsburgh, Pennsylvania, USA, October 6-9, 2024.
- AVS 68th International Symposium and Exhibition in Pittsburgh, PA, November 6-11, 2022.
- Solidification and Crystallization of Metals 2020 conference in Poland Organized by the Alumni Association of Silesian University of Technology for September 28-30. 2021.
- TMS 2025 Annual Meeting & Exhibition, Las Vegas, Nevada, USA, March 23-27, 2025.

PROJECT EXPERIENCE

- **Dissimilar Metal Welds Between ASTM A709 Grade 50CR and Bridge Steels (Aug. 2023-Sep. 2025):** Evaluated weldability, mechanical, and electrochemical properties to establish nationwide standards for joining these steels.
- **Mitigating Intergranular Corrosion in 5XXX Series Aluminum Alloys by Laser Surface melting (Aug 2021-Aug 2023):** Applied laser surface melting to reduce intergranular corrosion in sensitized 5XXX aluminum alloys.
- **Metallurgical Process Development at Walton's Casting Plant (Nov. 2016-Dec. 2018):** Collaborated with Panasonic (Singapore) to establish metallurgical parameters for a 1.6 million-unit metal casting plant for compressor blocks in Bangladesh.
- **Successful Export of Compressor Blocks from Bangladesh:(2018):** Led the technical team of Walton Metal Casting Plant to meet European and Japanese standards, securing partnerships with SECOP, NIDEC, and Panasonic.

AWARDS

- Conference Travel Grant, AVS. 2022, 24
- Departmental Conference Travel Grant, University of Virginia. 2022, 24
- Recipient of multiple R&D grants from Walton Hi-Tech Industries PLC for innovative solutions to complex industrial problems 2017-2018