Md Sojib Hossain

Metallurgical Engineer | PhD in Materials Science & Engineering
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EXPERTISE IN

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

EXPERIENCE

CATERPILLAR INC. (VIA CINTAL INC.) | Metallurgical Engineer

Aug 2025 – Present | Peoria, Illinois

- Support cross-functional teams to improve wear performance of ground-engaging tools.
- Conduct SEM and analyzed the microstructure of different carburized samples.
- Assist in carburizing and solid-state quenching process optimization.

UNIVERSITY OF VIRGINIA | Research Assistant

Aug 2021 – Jul 2025 | Charlottesville, Virginia

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

- Optimized parameters to prevent solidification and cold cracking in dissimilar joints.
- Revised constitutional diagrams and refined filler-metal selection criteria.
- Contributed to developing standardized procedures for dissimilar metal joining with the Virginia Transportation Research Council.

Laser Surface Modification of AA5XXX Alloys for Corrosion Resistance

- Enhanced corrosion resistance of AA5083 using excimer and ADAPT laser surface melting.
- Demonstrated homogenized sub-grain microstructure interrupting IGC pathways.

TITAS GAS TRANSMISSION & DISTRIBUTION CO. LTD. | Assistant Engineer

Dec 2018 – Aug 2021 | Dhaka, Bangladesh

- Designed gas pipeline and supervised welding, NDT, and cathodic-protection operations.

WALTON HI-TECH INDUSTRIES PLC | Deputy Director

Nov 2016 – Dec 2018 | Dhaka, Bangladesh

- Developed cost-effective casting processes enabling compressor-block exports to European market.
- Designed and optimized gating and feeding systems for five compressor-block castings on a DISAMATIC vertical molding line.
- Integrated thermal analysis ensuring metallurgical consistency and reduced cost.
- Scaled up ferritic gray-iron production, minimizing annealing steps.
- Optimized inoculant and melting practices for stable microstructure.

Developed and scaled up metallurgical processes for a 1.6 M-unit compressor block metal casting foundry, leading the technical team exporting to European markets.

EDUCATION

UNIVERSITY OF VIRGINIA

PhD, Materials Science & Engineering
July 2025 | Charlottesville, VA

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

BS, Materials & Metallurgical Engineering
2016 | Dhaka, Bangladesh

GRADUATE COURSEWORK

Electronic & Crystal Structure of Materials
Thermodynamics of Materials
Continuum Mechanics
Kinetics of Solid-State Reactions
Deformation & Fracture Mechanics
Characterization of Materials
Additive Manufacturing of Metals

LABORATORY SKILLS

XRD, GIXRD, Residual Stress Analysis,
SEM, EBSD, EDS, XRF, OES,
Laser Surface Modification,
Electrochemistry,
Hardness & Tensile Testing

TECHNICAL SKILLS

CALPHAD, ANSYS Workbench, Python,
AutoCAD, SolidWorks,
TOPAS, DIFFRAC.EVA, HighScore,
MATLAB

SOCIETIES

DEI Chair – Graduate Student Board (UVA)
Outreach Chair – ABS UVA
Member: TMS, AVS, ASM International
Lifelong blood donor – Quantum Blood Bank (BD)

INTERESTS

Traveling, Sports, Cooking, Fishing

SELECTED PUBLICATIONS

- **Hossain, Md Sojib**, Skelton, J.; Moffat, W.; Fitz-Gerald, J. "Laser Surface Melting to Mitigate Intergranular Corrosion of Sensitized AA5083." *CORROSION* (2023).
- Rahman, A.; **Hossain, Md Sojib**; Siddique, A.-B. "Machine Learning Approaches for Diverse Alloy Systems." *J. Mater. Sci.* (2025).
- **Hossain, Md Sojib**. "A Process of As-Cast Ferritic Gray Cast Iron Production." *Archives of Foundry Engineering* (2021).
- **Hossain, Md Sojib**, Rashid, B. "Preconditioning and Inoculation of Low-Sulphur Grey Iron." *Archives of Foundry Engineering* (2020).
- **Hossain, Md Sojib**, Haque, M.; Hasan, M. "Thermo-Mechanical Properties of Banana and Jute Fiber Reinforced Polypropylene Composites." *IJCMM* (2019).
- **Hossain, Md Sojib**, Sharp, S.; Provines, J.; Fitz-Gerald, J.; Agnew, S. "Dissimilar Metal Welding of Carbon Steel to Ferritic-Martensitic Stainless Steel: Metallurgical Properties and Weldability." (Under Review in "Welding in the world")

MANUSCRIPTS IN PROCESS

- "Optimizing Laser Surface Melting Parameters for Enhanced Corrosion Resistance of AA5083." Presented at AVS 70th International Symposium (2024).
- "Mitigating Solidification Cracking in Dissimilar Metal Welds (Mild Steel to Dual Phase Stainless Steel)." Presented at TMS 2025 Annual Meeting (2025).

SELECTED CONFERENCE PRESENTATIONS

- *TMS 2025 Annual Meeting & Exhibition*, Las Vegas, NV.
- *MS&T 2024 Conference*, Pittsburgh, PA.
- *AVS 70th International Symposium*, Tampa, FL.
- *AVS 68th International Symposium*, Pittsburgh, PA.
- *Solidification and Crystallization of Metals*, Poland.

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 Metal Casting Plant (Nov 2016–Dec 2018):** Collaborated with Panasonic (Singapore) to establish metallurgical parameters for a 1.6 M-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, 2024*
- Departmental Conference Travel Grant, University of Virginia. *2022, 2024*
- Recipient of multiple R&D grants from Walton Hi-Tech Industries PLC for innovative solutions to complex industrial problems. *2017–2018*