

Mohammad Khalikujjaman

TEST, VALIDATION &
R&D; ENGINEERING · MSc
CANDIDATE

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PROFILE

Experimental and validation engineer in training with 23 tribology rig trials, progressive-load scratch testing, three-point-bending correlation and formal CFD verification. Nearly three years of vessel commissioning and acceptance testing add site-level experience in deciding whether evidence is sufficient for handover.

CORE CAPABILITIES

Test & measurement Bruker UMT TriboLab · ball-on-disc · progressive scratch testing · three-point bending · Gwyddion · commissioning trials

Analysis Python test pipelines · mean / SD / CV / drift · Hertz contact · FFT · uncertainty · model-test correlation

Simulation & CAD OpenFOAM · COMSOL · ANSYS APDL / pyMAPDL · Abaqus · AutoCAD · ParaView

TEST & VALIDATION PROJECTS

Food-grade grease benchmarking for industrial robot reduction gears

Feb – Jun 2026

Industry-linked R&D; · Two-person team · Aarhus University · 10 ECTS, grade 10 (ECTS B)

- Planned and executed 23 ball-on-disc trials on a Bruker UMT TriboLab across 20–70 N and 75–367 rpm; most runs lasted 1,800 s.
- Built one Python workflow that removed the 0–300 s run-in and calculated mean COF, standard deviation, coefficient of variation and drift consistently.
- Best food-grade condition achieved mean COF 0.0946 at 2.0% CV, but visible material removal prevented a replacement recommendation based on friction alone.

Progressive-load scratch testing of HDPE

Dec 2025

Tribology course · Team of five · Aarhus University

- Tested 0.1–4 N ramps at 10 and 20 N/min, measured scratch widths in Gwyddion and calculated scratch hardness.
- Observed near-linear depth versus load and no hardness collapse; plateau COF ranged 0.20–0.29 across the two load rates.

Sandwich-composite characterisation and test-to-model correlation

2026

Design of Composite Structures · Aarhus University

- Combined microscopy and two-span three-point bending to estimate a 66.39 GPa face modulus and 146 MPa core shear modulus.
- Correlated COMSOL solid and ABD shell models with measured force; long-span shell error was –0.08%, increasing to +4.81% at short span where transverse shear dominated.

COMPUTATIONAL VERIFICATION

Verification and validation of an OpenFOAM cylinder-wake benchmark

May 2025

CFD course · Team of four · Aarhus University

- Established mesh independence at 25,100 cells and time-step independence with CFL-consistent refinement.
- Extracted a 0.17 Hz shedding frequency by FFT, giving $St = 0.17$: within 3.1% of an empirical correlation and 3.4% of published drag data.

ADDITIONAL R&D;

Reliability-oriented structural analysis with pyMAPDL

2026

Computational mechanics · Team project · Aarhus University

- Automated a parameterised ANSYS model, generated a 15-point central composite design and fitted a quadratic response surface.
- Monte Carlo evaluation found no samples above the 50 MPa yield criterion inside the investigated geometry and loading range.

Waste-heat seawater desalination prototype

2017 - 2018

BSc thesis · Team of three · BUET

- Designed and fabricated a 2 m floating-head shell-and-tube heat exchanger with 13 tubes; used a 1 MW Caterpillar engine exhaust as the heat source.
- The original prototype produced 0.7 g/s at a 4 g/s inlet and 450 kW engine load — approximately 60 kg/day. A later 2025 peer-reviewed study reported the higher 1.18 tonnes/day system result.

PROFESSIONAL EXPERIENCE

Assistant Naval Architect — BIWTA Dredging Department

Jun 2019 - Mar 2022

Contracted via Shahin Engineering & Services · Dhaka, Bangladesh

- Supported three national dredger procurement programmes covering 65 vessels; ran launching, commissioning and acceptance trials across six vessel classes.
- Inspected 700, 600 and 500 mm cutter-suction dredger construction, checked work against specification, and prepared tender documentation and AutoCAD drawings.

Probationary Officer → Senior Officer — United Commercial Bank PLC

Mar 2022 - Jan 2025

Business Operations Division · Dhaka, Bangladesh

- Diagnosed core-banking system and process faults, coordinated fixes and tested results before live release; left to begin full-time MSc study.

EDUCATION

MSc Mechanical Engineering — Aarhus University, Denmark

Feb 2025 - Jan 2027
(expected)

90 of 120 ECTS completed as of August 2026; MSc thesis in progress.

- Focus: CFD, wind and renewable energy, tribology, FEA, reliability, composites, applied mathematics and data science.

BSc Naval Architecture & Marine Engineering — BUET, Bangladesh

2013 - 2018

CGPA 3.36 / 4.00.

- Undergraduate thesis on waste-heat desalination and full preliminary design of a 1,300-tonne inland cargo vessel.

PUBLICATION

M. S. A. Towhid, M. R. Islam, M. Khalikujjaman and B. T. Costa, "Waste heat recovery-based seawater desalination for sustainable maritime operations: a study on heat transfer, techno-economic feasibility, and environmental impact," Journal of ETA Maritime Science, 13(3), 260-276, 2025. DOI 10.4274/jems.2025.76259. Contribution: data collection and processing, analysis and interpretation, software and validation.

LANGUAGES & AVAILABILITY

Languages: Bengali (native) · English (professional working; IELTS Academic 6.5, November 2022) · Danish (currently studying)
Availability: Full-time graduate roles from February 2027 · References available on request