

MOHAMED SHEHATA ALY

MATERIALS/CORROSION ENGINEER

I'm a Chartered Metallurgical Engineer, professional member of the Institute of Materials, Minerals and Mining (IMMM) in the UK and Institute of Professional Engineers in New Zealand (IPENZ) with MSc and PhD degrees in Metallurgical Engineering from the Steel Institute of the RWTH-Aachen University in Germany and post-doctoral studies at Kyoto Uni, Japan.

I have a proven track record of success with strong analytical skills as well as negotiation, execution and delivery of strategic industrial projects in materials testing, failure analysis of metals, alloys and polymers, corrosion investigation, monitoring and mitigation, integrity and inspection, cathodic protection, welding qualification procedure, PQR/WPS, NDT, quality control and auditing, casting and heat treatment of ferrous and non-ferrous alloys, powder metallurgy, product development and fracture analysis, research and development, results interpretation, presentation and report preparation. I'm a holder of the IOSH managing safely certificate.

Qualifications

PhD
MSc
BSc (Hons)

Professional Memberships

Institute of Materials, Minerals and Mining (MIMMM)
Chartered Engineer, Engineering Council UK (CEng).
Institute of Professional Engineers (IPENZ), New Zealand

Specialisms/Skills

Forensic Analysis
Metallurgical Engineering Investigations
Materials Testing & Characterization
Dispute Resolution
Expert Witness

Geographic Areas

UK
Ireland
Europe
Africa
Middle East
Asia
New Zealand

Dispute Experience

I utilise my knowledge and experience as a metallurgist to analyse and resolve complex issues, providing technical expert advice as required.

Sectors

I have experience offering forensic technical consultancy to the oil & gas, metal, power, defence and automotive industries, as well as carrying out damage assessments on metals, alloys and powder metallurgical manufactured parts. I also investigate losses resulting from escapes of water & oil and mechanical failures. These have included the failure of plumbing fittings and various building services appliances as well as corrosion investigations. My mechanical failure investigations include a variety of lifting equipment and commercial processing equipment.

Since 2018, I have been working as forensic Materials/Metallurgical Engineer. I have undertaken a number of material failure investigations including the failure of various wind turbines across the UK (a partial list of the completed projects is included below). This sample shows an overview of this experience:

SECTOR EXPERIENCE

WIND TURBINE TOWER COLLAPSE

I was instructed to investigate following the collapse of a tower. A site visit determined that the collapse was initiated at a weld at the base of the tower. Further investigations revealed the index weld, and others, were defective. They did not confirm to prevailing British Standards (BS 614001:2005) and ASTM A 53. Had a sufficient inspection regime been in effect per the Standards, the defective welds would have been identified and so remedial actions could have been taken.

BLADE FAILURE - ABERGELE

Following the failure of several blades across a site, I was instructed to investigate the cause. The problem was excavated due to the site owner damaging the blades during removal works. Nevertheless, with the remaining fragments, I was able to determine that the blades failed due to fatigue and manufacturing defects. Furthermore, in-depth material analysis determined that they had not been overhauled as alleged.

MECHANICAL ENGINEERING FAILURES

The mechanical failures I have investigated include a variety of lifting equipment and commercial processing equipment. These have included losses resulting from escapes of water and /or oil, mechanical failures, including plumbing fittings, and various building services appliances.

NET SHAPE ADVANCED MATERIALS AND PROCESSING LABORATORY (2018)

Responsibilities involved the development and characterization of aluminum silicon (AlSi) alloys produced by the Selective Laser Melting (SLM) machine, powder metal characterization, HIPing, 3D printing. Laboratory capabilities include:

- Optical microscopy
- Scanning Electron Microscopy with Energy Dispersive X-ray analysis to examine fracture surfaces, identify and analyse features of interest
- Chemical analysis
- Mechanical properties
- Thermal analysis (DSC & TGA) and FTIR

CENTRAL METALLURGICAL R&D INSTITUTE (2015-2018)

I delivered tailored-prepared training courses to young engineers and technicians from the industry, offered technical consultancy and troubleshooting to oil & gas, metal, power, defence and automotive industries, carry out R&D activities on metals, alloys and powder metallurgical manufactured parts, coach and mentor of technicians, engineers and research assistants, participate in seminars, workshops and technical conferences, supervise of Master and PhD students.



MAERSK OIL (2012-2015)

Materials/Corrosion Engineer at Maersk Oil in Qatar, responsible for the corrosion related issues like for example following up the retrieval/installation/evaluation of corrosion coupons, ER probes, chemical injection points etc.), performing failure analysis and assessment of damage mechanisms as per codes and standards, corrosion trend analysis using CREDO, corrosion assessment and inspection of topside piping, risers, caissons, dead-legs and subsea pipelines, in line inspection (ILI) of pipes and pipelines, review and updating of technical data, CIP/CC points, preparation of task risk assessment, assisting in the preparation and implementation of the RBI Methodology, materials evaluation for the CSCC-Project, reviewing and preparation of cathodic protection design documents, coating, chemical treatment, liaising with vendors and sub-contractors, technical presentation in conferences and workshops, etc.

EXOVA (CURRENTLY ELEMENT) (2009-2012)

Senior Failure Investigation Specialist for Exova Abu Dhabi, UAE carrying out failure analysis in a commercial, UKAS accredited materials testing laboratory. I performed materials testing and characterisation, metallographic examination, SEM fracture surface analysis, equipment calibration, maintain HSE regulations, site visits, sampling and replication, third party inspection, contribute in achieving the KPIs of financial and strategic targets, client interfacing, contracts negotiation, business development, project management from design, execution through reports preparation and submission, coaching and training of young engineers.

GREATER CAIRO FOUNDRIES, EGYPT (2007-2009)

Consultant Engineer managed the operation of three induction melting furnaces; I was responsible for delivering technical support and troubleshooting in the cast house. I developed the casting practice and updated Quality management System (QMS). I also worked as internal and external auditor, maintain and adherence to HSE standards. I was the technical focal point who is responsible in solving all clients' technical-related enquiries. I also was in charge of materials characterisation Laboratory.

MITSUBISHI MATERIALS CORPORATION, JAPAN (2005-2007)

A postdoc position within the framework of a postdoctoral fellowship from the Japan Society for the Promotion of Science (JSPS). I studied the tensile mechanical properties of different kinds of metallic foams which were processed by powder metallurgy technique using CCD camera and non-contact type extensometers.

AWARDS

Japan Society for the Promotion of Science (JSPS)	(2005 - 2007)	Post-doctoral fellowship
Egyptian Ministry of Higher Education	(1999 - 2004)	Post-graduate fellowship
Cairo University, Best achievement certificate	(1994 -1997)	Top-class student

List of Projects- UK

Site investigation and materials analysis of a failed crane
Metallurgical analysis of braided flexible hose
Microscopic analysis of sand sample
Metallurgical analysis of cracked lead water pipe
Failure analysis of corroded copper pipe
Investigation of escape of water incident from an embedded copper pipe section
Metallurgical analysis of external expansion vessel
Metallurgical analysis of a threaded plastic adapter
Metallurgical analysis of corroded square iron plug
Failure investigation of corroded flexible hoses
Metallurgical analysis of corrugated flexible hose
Metallurgical analysis of corroded cylinder liners from a diesel generator
Metallurgical analysis of a failed float plastic valve
Visual inspection of a damaged intermediate bulk container (IBC)
Metallurgical analysis of a failed 2-stage valve
Metallurgical analysis of a defective washing machine inlet hose
Investigation of a failed plastic cartridge from a pressure reducing valve (PRV)
Metallurgical analysis of fractured copper tubes
Metallurgical investigation of a collapsed wind turbine tower
Failure analysis of a failed nut made from brass alloy
Metallurgical analysis of hot water storage cylinder
Failure analysis of a fractured timing chain tensioner and plastic guide rail
Metallurgical analysis of a brake calliper
Failure analysis of damaged glass panels
Failure investigation of a damaged refrigeration system
Metallurgical assessment of contaminated metallic samples
Metallurgical analysis of a failed plastic stopcock valve
Metallurgical investigation of a failed plastic fitting
Failure analysis of a failed TPR valve
Metallurgical analysis of a thermal mixing valve
Metallurgical analysis of a failed immersion heater
Failure analysis of a damaged crane

On the corrosion/degradation of alkaline batteries
Failure investigation of a defective chiller
Failure analysis of underground power cables
Microscopic examination of a damaged glass pane
Metallurgical analysis of a failed plastic pipework
Failure analysis of a damaged wind turbine rotor blade
Metallurgical analysis of a damaged cable granulator
Metallurgical analysis of a failed copper pipework T-Joint
Metallurgical analysis of a failed vacuum stainless steel cooker
Investigation of escape of water from a failed tube
In-situ visual examination of a failed heat exchanger
Analysis of agitators from anaerobic digester
SEM analysis of a cracked plastic adapter
Failure analysis of a faulty tiger loop
Metallurgical investigation of a failed sprinkler head

List of Projects- Middle East

Inspection and NDT Support Services in the DUKHAN Fields (Qatar Petroleum)
Cathodic Protection System Monitoring and Maintenance in RLTO and CLLNG Facilities (Qatar Gas)
Corrosion Monitoring Services Onshore and Offshore Locations (Qatar Petroleum)
Provision of Corrosion Monitoring Services (DOPET)
Cathodic Protection Works for Gas Operations at MESAIEED (Qatar Petroleum)
Metallurgical Analysis of Failed Weld/Joint Pipe (ADGAS, UAE)
Failure Analysis of Drillable Cast Iron (ADMA-OPCO, UAE)
Corrosion Analysis of Steel Spools (ADMA- OPCO, UAE)
Analysis of Retrieved Pothead, Thrust Bearing & Top Mechanical Seal Deposits Using SEM/EDS (Baker Hughes, UAE)
Metallurgical Analysis of Failed Wire Rope (GASCO, UAE)
Metallurgical Analysis of Fractured Stator's Upper Saver Sub (Halliburton Int., Kazakhstan)
Metallurgical Analysis of Corroded Steel Pipes (IOEC)
Metallurgical Analysis of Fractured Gas Turbine Rotor Disk (Mitsubishi Maintenance, UAE)
Corrosion Analysis of steel Tubes (Q- Chem, Qatar)
Failure Analysis of Butt-Welded Cracked Pipes (TEKFEN, Turkey)

Failure Analysis of Cracked Pulsation Dampener (Top Oil Field, UAE)
Metallurgical Analysis of Failed Bearing Samples (ZADCO, UAE)
Fracture Analysis of a broken Air Supply Tube (ADGAS, UAE)
Coating Analysis of Aluminium Panels (Chadwick, UAE)
Metallurgical Analysis of Fractured Elbow (Tubular Int., Bahrain)
Failure Analysis of Fractured Rotors (Clydeunion, UAE)
On site Investigation of a Fractured Kneader Shaft (EMAL, UAE)
Fracture Analysis of a Broken Bolt (Oman)
Metallurgical Analysis of a Fractured Arm Bracket (Galvaccoat, UAE)
Metallurgical Analysis of Cracked Welded Pipes (Kang Lim CSP Co. Ltd., Korea)
Failure Analysis of a Fractured Flex Hub (Schlumberger, KSA)
Metallurgical Analysis of Fractured Body-Holding (Schlumberger, KSA)
Corrosion Analysis of Drilling Pipes (Sterling Energy, IRAQ)
Metallurgical Analysis of a Fractured Boiler Tube (Borouge, UAE)
Corrosion Analysis of Cu-Ni Water Cooling Pipes (ZADCO, UAE)
TPI of Vibration Test of a Tunnel Fire Rated Suspended Ceiling (Samsung, UAE)
Metallurgical Analysis of a Perforated Gas Flow Line Pipe Section (ADCO, UAE)
Corrosion Analysis of Perforated Cu Tubes (ADMA- OPCO, UAE)
Metallurgical Analysis of a Fractured Stainless Steel Coupon Holder (ADMA, UAE)
Failure Analysis of a Fractured Drill Pin (Halliburton, UAE)
Metallurgical Analysis of a Fractured Upper Saver Sub (Halliburton, UAE)
Corrosion Analysis of a Perforated Pipe Section (Al Mabani, KSA)
Failure Analysis of a Cracked Shaft (UAE)
Metallurgical Analysis of a Fractured Drill Pipe Section (Al Mansoori, UAE)
Metallurgical Analysis of Broken Oil Field Product (Baker Hughes, UAE)
Failure Investigation of 1" Water Ball Valve (KSA)
Metallurgical Analysis of a Fractured 1" Fillet Welded Pipe (Crescent, UAE)
Metallurgical Analysis of a Broken Shaft (Oman)
Corrosion Analysis of Perforated Elbow (GASCO, UAE)
Metallurgical Analysis of Transverse Cracks on a Welded Plate Section (Lamprell, UAE)
Fracture Analysis of a broken Nippo Flange (McDermott ME, UAE)
Metallurgical Analysis of Fractured Anchor Screws (NMDC, UAE)
Failure Analysis of a Parted Jar (Sino gulf, Oman)

Metallurgical Analysis of Fractured Heavy Weight Drill Pipe (Sino gulf, Oman)
Failure Analysis of a Fractured Joint Pipe Section (Sipetrol,Egypt)
Metallurgical Investigation of a Corroded Pipe Manifold (Taisei, UAE)
Metallurgical Analysis of a Fractured Weapon Slide (TAWAZUN, UAE)
Metallurgical Analysis of a Broken Shaft (TDW, UAE)
Metallurgical Analysis of a Fractured Shaft (TOTAL, UAE)
Corrosion Investigation of Storage Tank (Velosi, Qatar)
Metallurgical Analysis of a Fractured Valve Stem of 8"TK Ball Valve (ZADCO, UAE)
Third Party Inspection (TPI) of a Vibration Test of a Suspended Ceiling (Nurol, UAE)

PUBLICATIONS

Mohamed Shehata Aly, Fracture of Open- Cell Nickel Foams under Quasi Static Tensile Loading, Journal of Materials Engineering and Performance 19, Issue 9, 1306- 1310 (2010).

Mohamed Shehata Aly, Effect of Pore Size on the Tensile Behaviour of Open Cell Ti Foams: Experimental Results, Materials Letters, volume 64, 935–937 (2010).

Mohamed Shehata Aly, Tensile Properties of Open Cell Nickel Foams, Materials and Design 31 (2010) 2237–2240. 4- Shojiro Ochiai, Satoshi Nakano; Yuya Fukazawa, Mohamed Shehata Aly, Hiroshi Okuda, Komei Kato, Takeshi Isobe, Koichi Kita, Keiichi Honma, Tensile Deformation and Failure Behaviour of Open Cell Nickel and Copper Foams, Materials Transactions, Vol. 51, No. 4, 699- 706 (2010).

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Mohamed Shehata Aly, A. Almajid, S. Nakano, S. Ochiai, Fracture of open cell copper foams under tension, Materials Science and Engineering A, 519, Issues 1-2, 211-213 (2009).

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Y. Fukasawa, Mohamed Shehata Aly, K. Morishita, S. Ochiai, H. Okuda, K. Kato, K. Kita, K. Honma, Fracture Deformation of Porous Nickel, Autumn Meeting of the Japan Institute of Metals, Niigata, Japan, 2006.

Mohamed Shehata Aly, W. Bleck, W. Dahl, High Temperature Mechanical Properties of Cast as well as Powder Metallurgical Manufactured Metallic Foams, Dr.-Ing. Dissertation, IEHK, RWTH- Aachen, Germany 2004.

Mohamed Shehata Aly, Wolfgang Bleck and Paul-Friedrich Scholz, how metal foams behave if the temperature rises, Metal Powder Report, Volume 60, Issue 9, pp. 38-45, October 2005.

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Mohamed Shehata Aly, Hochtemperaturdruckversuche an metallischen Schäumen, Mitteilungen Annual Report aus dem Institut für Eisenhüttenkunde, Mainz Verlag, pp. 87, 2003.

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S. Angel, U. Mohr, Mohamed Shehata Aly, P.-F. Scholz, W. Bleck, Functional and Structural Characteristics of Metallic Foams on Base of Low-alloyed and High Grade Steels, Euromat 2003, Switzerland.

Angel, S., Bleck, W., Mohr, U., Aly, M. S., Scholz, P.-F.: Herstellung und Eigenschaften von Stahlschaum nach dem SchlickerReaktionsSchaumSinter (SRSS)- Verfahren. Hagener Pulvermetallurgisches Symposium, eingeladener Vortrag, November 2003.

U. Mohr, Mohamed Shehata Aly, W. Bleck, P.-F. Scholz, Processing of Open-Cell Steel Foams by the SRFS-Process: State of the Art and Development Potentialities, Proceedings of Materials Week, International Congress Centre Munich, 2002.

M. Shehata Aly, U. Mohr, W. Bleck, Production of Slip Reaction Foam on Base of Steel Powders with Special Emphasis on Improving the Sintering Process, Master Thesis, IEHK, RWTH- Aachen, Germany, 2002.