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Mamoon Alyah, Principal Engineer

Chartered Engineer (CEng), Professional Engineer (PE), IRMCert, MIET

Over 36 years of experience acting as an expert on matters involving electrical power systems (generation, transmission and distribution) in industrial and energy applications including thermal, geothermal, wind (onshore and offshore), solar (PV and CSP) and hydro power in addition to petrochemical and heavy industrial applications (steel, aluminium, cement, plastic, fertilizers, carbon black)

Investigated hundreds of incidents (mechanical breakdown, fire, explosion, corrosion, structural collapse, electrical faults …etc) power generation and industrial plants. Acted as an expert preparing numerous expert reports and giving evidence in arbitration proceedings and jury trials involving disputes related to the construction and operation of power plants, transmission and distribution substations in addition to power equipment in industrial and commercial properties.

Also carried out risk surveys and condition assessments of critical properties and equipment providing expert opinions on operational condition of equipment, effectiveness of inspection and maintenance programmes and benchmarking.

Experience

CEERISK Consulting Limited – London, UK
Managing Director / Principal Engineer

- Investigate the root cause and liability following catastrophic failure incidents such as fires, explosions, machinery breakdown, natural catastrophes and human error.
  - Inspect the site of different incidents and examine relevant evidence
  - Design and preform forensic testing and examination of evidence
  - Gather data related to design, specifications and operational parameters of different types of equipment
  - Host meetings and engineering discussions on different systems
- Analyse design, specifications, drawings, tests and installations of various types of energy systems in different applications as part of a comprehensive RCA (Root Cause Analysis).
- Analyse performance and efficiency of different types of equipment (turbines, PV modules, battery cells, boilers, HRSGs and others) to opine on fitness for purpose and compliance with specifications, including analysis of operational parameters, trends, SCADA records, DCS data and other types of technical information
- Determine root cause and contributing factors of deterioration of efficiency of different systems including PV modules, turbines and other types of equipment
- Analyse cause of serial failures in renewable energy systems (wind and solar)
- Prepare expert reports (CPR 35 compliant) in relation to disputes involving the use and application of energy systems including conventional and renewable resources (thermal, wind, solar, hydro, and geothermal).
- Give evidence in different types of legal proceedings and ADR in compliance with rules of evidence in different jurisdictions (UK, USA, Australia, DIFC – Dubai, including ICC Arbitration).
- Provide engineering consultation on loss mitigation and prevention to utilities (public and private), contractors, manufacturers, large corporation and government agencies and municipalities in matters related to engineering risks.
- Carry out risk surveys and assessment of electromechanical equipment in large in critical infrastructure sites including power generation (thermal power, wind farms, utility-scale PV, CSP, combined-cycle) and heavy industrial plants (steel, cement, aluminium …etc) and petrochemicals.
- Provide training to risk engineers, underwriters and claim handlers of international, regional and local insurance companies on methodologies and techniques of risk assessment and incident investigations

Qualifications

- **Bachelor of Science in Electrical Engineering**
  KWT University, September 1986
- **Fire Inspector/Investigator**
  Hennepin Technical College
  Minneapolis, MN, USA – 1996
- **Master of Business Administration (MBA)**
  Lake Forest Graduate School of Business, IL, USA – 2008
- **Chartered Engineer (Registration No. 593908),** Engineering Council, UK
- **Professional Engineer (Registration No. 26809),** Board of Architecture, State of Minnesota, USA in addition to registration in multiple states
- **Into Court Training Course** – The Academy of Experts, London, United Kingdom February 2010
- **Expert Witness Courses,**
  Bond Solon Wimington Legal – UK
  - Excellence in Report Writing – July 2011
  - Excellence in Report Writing - Written Evidence – July 2011
  - Courtroom Skills Training – January 2012
  - Civil Law & Procedure – September 2012
  - Cross Examination - January 2013
- **International Certificate in Enterprise Risk Management,**
  IRM – London, UK 2016

Professional Associations

- Member – IEEE PES (Power and Energy Society)
- Member IET – Institute of Engineering Technology,
- Sr Member – National Academy of Forensic Engineers (NAFE), USA
- Member – International Association of Arson Investigators (IAAI), USA
- Member – UK Association of Fire Investigators, UK
- Member – Energy Institute, UK
- Corporate Member – The Association for Renewable Energy and Clean Technology, UK
- Corporate Member – Solar Energy UK
- Member – IMIA (International Association of Engineering Insurers)

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Sample Forensic and Expert Witness Instructions

- Acted as an expert witness in **ICC arbitration proceeding in DIFC courts** concerning a construction dispute involving the design, accreditation and installation of **switchgear and MCC assemblies** at a district cooling plant.
- Prepared an expert report related to the installation of **earthing system in a large PV utility-scale** power plant in Egypt in the Middle East.
- Investigated and prepared an expert opinion in a dispute related to the failure of a large utility-scale PV plant (1.2 GW) to meet the **GRP (Guaranteed Performance Ratio) in the EPC contract.** The plant was in the Middle East and the instruction involved investigating the cause of the failure to meet the GRP and how the quality of the PV panels caused or contributed to the performance shortfall.
- Investigated multiple failures in **gas turbines** at **power and desalination plants in Kingdom of Saudi Arabia.** The investigations covered review of the HV design in the power plants as well as metallurgical analysis of failed GT parts. During the investigation, collaborated with the OEM through joint review and analysis of the design, manufacturing and operation of the GTs.
- Investigated a **fire at a wind turbine** in rural **Jordan.** The investigation led to a successful identification of a workmanship defect that led to ignition of cables inside a control panel at the bottom of a WTG.
- Prepared an expert report dealing with the **power performance of PV panels** installed north of Manchester, UK. The claim involved analysis of the orientation, tilt angle and shading projected on a number of PV strings installed on the roof of a large house.
- Investigated a **thermal energy storage system failure in a Solar CSP plant** in Morocco which involved review and analysis of the design, construction and fabrication of the thermal system at the plant.
- Acted as an expert witness testifying in jury trial regarding the failure of an **underground cable joint in Minnesota, USA.** The failure of the cable joint led to severe injury to one of the excavation contractor operatives working on site.
- Investigated fire and explosion in a 374-MVA **power transformer in a transmission substation in California, USA.** The investigation involved forensic testing and examination of HV bushing in Germany and tear down of the transformer in San Diego, California, USA.
- Instructed to provide an expert opinion regarding the design practices of **utility-scale PV power plants in Japan** and the impact of snow accumulation on the ability of the plant to meet and deliver **GRP levels in the EPC contract.** Other issues included the method of calculating the PR based on formulas in the EPC contract. Provided expert testimony in arbitration proceedings seated in Tokyo.
- Instructed to provide expert advice in relation to a major incident involving the **OLTC (On-Line Tap Changer) in a HV power transformer** at a manufacturing plant in Tiawan. The investigation covered thorough and complete analysis of the protection coordination design at the plant.
- Investigated an **explosion in a 345-kV (EHV) bushing** in a generation substation in Connecticut, USA. Following a 2-year investigation of damaged components, prepared an expert report and testified in deposition for over two days, presenting opinions related to the incident. Case was litigated in **Superior Court – State of Hartford, USA**
- Investigated the root cause of a fire in a **VAR-Compensator** used at a **PV solar power plant** in south Jordan to improve power quality before connection to the EHV transmission substation. The investigation involved performing inspections, design review and analysis of power output of the PV plant and the connection to the grid.
- Investigated a major incident in **HF (Harmonic Filter)** at a **wind farm in Ireland,** which failed catastrophically few weeks following commissioning and energisation. The investigation involved analysis of the HV design of the protection circuits including analysis of the SCADA system and relay records.
- Prepared an expert report and scheduled to give evidence in litigation involving the supply and installation of **LV electrical cables** and systems inside wind turbine generation tower in **West Australia.**
- Instructed an expert to investigate serial failures of **converters inside offshore wind turbine generation in the Irish sea.** This included full analysis of failure rates in different systems, failure modes and mechanisms, environment factors impacting operation of the wind turbines.

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- Investigated and prepared an expert report with opinions related to **cable ducting defects in wind turbine towers** in Scotland, UK. This included verification of adequacy of design specifications, installation methods, impact of variations on various electrical systems in addition to a number of other issues.
- Investigated damage to underground **oil-filled HV cables in Portsmouth, UK**. The damage to the cable was discovered after the cable was relocated by a contractor to facilitate the installation of new cables in the same trench.
- Prepared expert report and provided expert testimony at an arbitration matter in Singapore which involved the design of **junction boxes in thousands (182,000+) of PV modules** that were installed in different locations throughout the USA. The dispute involved claims of design defect and the impact of partial shading on the different PV modules.
- Prepared an expert witness report in relation to a catastrophic failure in **cable boxes at an off-shore wind farm** off the shores of London. The failures were caused by **workmanship deficiencies** during the installation of HV busducts into the cable boxes at the substation.
- Prepared an expert report on multiple **failures of underground HV cable joints** that connected a newly constructed PV power plant to a grid substation in **Wales, UK**. The failures were due to installation deficiencies by the contractor which could not be rectified and required the replacement of the entire power circuits.
- Investigated a large number of underground cable failure at multiple infrastructure construction sites in the State of Qatar. The investigation was commissioned by the insurance broker of the mega road projects in and around Doha in preparation to FIFA 2020. The investigation led to the development of a detailed risk management plan to secure the underground cables and ensure proper protection during mechanical excavation on sites.
- Investigated total loss at a **utility-scale PV plant in north Jordan** that was damaged as a result of windstorm. The investigation led to conclusions that dealt with defects of design of the PV panel tracker systems and PV modules which were litigated in a European court.
- Prepared an expert report and testified at arbitration hearing regarding a dispute during the construction of a large gas turbine power plant in **Jordan**. The dispute centred on decisions by the EPC contractor to delays **energisation of the plant following a catastrophic failure** in one of the HV circuits connected to the substation that allowed the plant to supply power to the grid.

Examples of Investigation of Turbine Failures

- Investigated and prepared expert reports regarding turbine failures at several power plants around the world:
  - Corrosion and erosion of blades caused by steam contamination in steam turbine at plant in **Wolverhampton, UK**
  - Overspeed in an Ansaldo steam turbine at geothermal power plant in **Jakarta, Indonesia.**
  - Blade liberation in an Alstom steam turbine at thermal power plant in Helwan, **Egypt**
  - Thrust bearing failure in MAN S-Series GT Type 3 gas turbine at co-generation power plant in **Slovakia**
  - Blade failure at a GE IDF (Induced Draft Fan) at a power plant under construction in **Yanbu, KSA**
  - Turbine blade fractures in gas turbine in a power plant **in KSA (Eastern Province)**
  - Combustor failure in dual fuel gas turbine in a power plant in **KSA (Eastern Province)**
  - Compressor Blade failure in multiple gas turbines at a power plant in **KSA (Eastern Province)**
  - High vibration and damage to turbine section of GT at a power plant in **Sandbach; UK**

Professional Activities

- Presented webinars on different topics related to power systems and equipment including:
  - Investigating insurance claims in utility-scale solar power plants, CEERISK Webinar series- 2019
  - Investigation of Renewable Energy Claims; CEERISK Webinar series – 2019
  - Solar Energy Plants (PV and CSP); CEERISK Webinar Series – 2020
  - Investigating Turbine Failures; CEERISK Webinar Series – 2020
  - Thermal Power Plants; CEERISK Webinar Series – 2020
  - Insuring Renewable Energy; CEERISK Webinar Series – 2021

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  - Energy Storage Systems; CEERISK Webinar Series – 2021
  - Turbine Blade Failures; CEERISK Webinar Series – 2021
  - Investigating Power Transformer Failures; CEERISK Webinar Series – 2021
  - Green Hydrogen; CEERISK Webinar Series – 2022
  - Rapid Transition to Renewable Energy; CEERISK Webinar Series – 2022
  - Subsea Cable Claims; CEERISK Webinar Series – 2022
  - Investigation of Dispute related to Performance Ratio in Utility-Scale PV plants, CEERISK Webinars Series - 2024
- Contributed and chaired a number of working groups at IMIA (International Association of Engineering Insurers) on different topics related to power energy systems, including:
  - Chaired workgroup on the design, installation and engineering risks at Combined Cycle Power Plants; IMIA Annual Conference, Merida, Mexico 2015
  - Contributed to workgroup on Solar Thermal Power Plants; IMIA Conference 2014
  - Contributed to workgroup on Biomass Power Plants, IMIA Conference 2014
  - Chaired workgroup on Electrical Failures; IMIA Conference 2018
- Speaking engagements at different events in USA, UK, UAE and other locations on topics related to energy, power and insurance, including:
  - **Root Cause Investigation of Engineering Claims**, Xchanging, London, UK – June 2013
  - **Investigating Gas Turbine Losses**; Construction, Engineering and Energy SIG – CILA; Lloyd's, London, UK – April 2012
  - **Investigating Power Line Incidents**; Edison Electric Institute – Claims Conference, Alabama, USA 2008
  - **Engineering Losses**: CILA Construction Energy and Engineering Special Interest Group, UK, October 2014
  - **Challenges of Investigating Turbine Losses**: CILA Annual Claims Conference, UK – September 2013
  - **Root Cause Investigation of Transformer Failures**: CEERISK Consulting Engineering Webinars, London, UK
  - **Electrical Failures not related to Weather Conditions**: IMIA Annual Conference, Singapore 2018 – Chaired working group on investigation and risk assessment of electrical failures.
  - **Investigating Renewable Energy Claims in Remote Locations**; Onshore Energy Conference, London, 2018
  - **Renewable Energy in the MENA Region**; Dubai International Financial Centre, Dubai, UAE March 2019
  - **Location, Location' Location: Does it Matter – Sitting of Power Plants**, Onshore Energy Conference, London, UK 2016
- Authored articles on different topics including:
  - Challenges of offshore wind disputes – My Expert Witness Magazine – Summer Issue number 62
  - Insuring New renewable Technologies in Remote Locations – Middle East Insurance Review
  - Assessing Risk of Failure in Ageing Electrical Equipment – CEERISK Newsletter