



# HALLIWELL

## MATTHEW SENN, P.E.

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### SPECIALTIES

- Wind Energy Power Plants
- Solar PV Power Plants
- Multi-Megawatt Asynchronous, Doubly-fed and Synchronous Generators
- Battery Energy Storage Systems (BESS)
- Transformers
- Transmission Lines
- Large Gauge Conductor Cables
- Electrical Equipment Failure Analysis
- Industrial Control Systems and Fault Analysis

### BIOGRAPHY

Matthew T. Senn, P.E. is a licensed Professional Engineer specializing in forensic analysis of Renewable Energy systems, including wind turbines, Battery Energy Storage Systems (BESS), and solar PV plants. He has extensive experience investigating equipment failures during construction, transport, and operation, with expertise in root cause analysis of components such as large generators, motors, wind turbine blades, gearboxes, converters/inverters, battery modules, and photovoltaic modules.

Matthew has conducted fire scene investigations and analyzed failures in electrical and electromechanical systems, including bearings, cables, contactors, and control panels. He has designed monitoring systems, authored repair procedures, and developed electrical safety protocols. His work supports accurate evaluation of damage, repair feasibility, and cost alignment in renewable energy infrastructure.

### QUALIFICATIONS

Bachelor of Science, Electrical Engineering – Purdue University, West Lafayette, IN

### INDUSTRY CERTIFICATIONS, LICENSES AND MEMBERSHIPS

- Licensed Professional Engineer: CA, FL, HI, IL, IN, IA, MI, MN, MO, ND, NM, NY, OK, OR, TX, WA, WI, WY
- GWO Onshore Certification – Working at Heights

### PROFESSIONAL EXPERIENCE

- Halliwell, Director of Renewable Energy Services
- Envista Forensics, Practice Leader – Energy

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- Suzlon Wind Energy Corporation, Sr. Electrical Engineer
- Siemens Building Technologies, Systems Engineer I

#### REPRESENTATIVE ASSIGNMENTS

##### Wind Energy

###### **Wind Turbine Nacelle Fire | Greenwood, NY**

Reviewed and participated in cause analysis for GE Cypress 5.5MW wind turbine nacelle. Reviewed replacement costs for wind turbine.

###### **Wind Turbine Blade departure | Kingman, KS**

Inspected and performed cause analysis of blade root separation. Reviewed repair and replacement costs for wind turbine rotor.

###### **Wind Turbine Rotor departure | Vernon, TX**

Inspected failure and departure of wind turbine rotor (hub and blades) to determine cause of failure. Reviewed costs to repair and return wind turbine to service.

###### **Multiple Wind Turbine Collapse | Greenfield, IA**

Investigated six wind turbine collapses related to severe convective storm with tornados. Reviewed repair and replacement costs for wind turbines.

###### **Wind Turbine Nacelle Departure | desk review**

Performed cause analysis of GE 1.7MW wind turbine generator nacelle departure.

###### **Wind Turbine Generator Rotor Lock Damage | Freeborn Co., MN**

Performed cause analysis and repair plan review of Vestas 2.0 MW wind turbine generator rotor lock system during project construction. Reviewed repair costs.

###### **Wind Turbine Generator Fire | Haverhill, IA**

Inspected and performed cause analysis on Siemens Gamesa 3.1MW Wind Turbine Generator nacelle after turbine was recently upgraded via repowering.

###### **Wind Turbine Generator Blade Damage | Pawnee Rock, KS**

Performed damage assessment and repair evaluation of 15 Siemens Gamesa 64-meter blades at railhead storage facility.

###### **Wind Turbine Blade Bearing Fracture | Los Fresnos, TX**

Performed inspection and cause analysis of Acciona 3.0MW wind turbine generator blade detachment and pitch bearing failure.

###### **Wind Turbine Repowering | Tiskilwa, IL**

Developed and authored the electrical instructions for removing and installing the necessary components in an existing 2.1 MW wind turbine to convert it to a doubly fed induction generator machine

###### **Power factor correction capacitor automatic testing | Chicago, IL**

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Conceptualized and rigorously tested the software upgrade which automatically tested 14 banks of three phases each (42 capacitors) on a weekly basis. The new software upgrade evaluated each bank of capacitors and provided an alarm if any current asymmetry or reactive power thresholds were exceeded.

#### Solar PV Energy

##### **Commercial Solar Photovoltaic Power Plant – Hail Damage | Rockford, IL**

Inspected and coordinated electroluminescence testing on rooftop solar power plant to determine scope of damage. Reviewed cost of repair/replacement of damaged solar modules.

##### **Commercial Solar Photovoltaic Power Plant Fire | Indianapolis, IN**

Performed cause analysis of commercial rooftop solar PV system alongside origin and cause investigator.

##### **Utility-scale Solar Photovoltaic Power Plant, Hurricane Helene | Wadley, Toombs, Ailey, GA**

Inspected three utility-scale solar PV power plants that were under construction when impacted by Hurricane Helene (category 1). Estimated repair costs for scope of damage to equipment and site.

##### **Utility-scale Solar Photovoltaic Power Plant, Wind damage | Crystal Rivers, FL**

Participated in team inspections of 94 MW, ground-mounted, solar photovoltaic power plant after wind damage to modules and racking system.

#### Battery Energy Storage Systems (BESS)

##### **BESS Fire, Dedicated Building | Hampton, NY**

A battery energy storage system (BESS) in a dedicated building caught fire. Performed review of root cause analysis and review of repair costs.

##### **BESS Container Fire | Orange County, CA**

Supported cause investigation and repair cost estimate for damage to 14 BESS containers related to fire and discharge of fire suppression systems.

#### Multi-Megawatt Generators

##### **Nuclear Power Plant Generator Failure | Soddy Daisy, TN**

Participated in team root cause analysis review of 1.3GW generator failure. Contributing author to root cause review report.

##### **Generator cooling fan optimization | Chicago, IL**

Designed and built a full-scale test bench to determine the best performing generator cooling fan by measuring air flow through the air-to-air heat exchanger. The optimized fan blade improved air flow 9%

##### **Generator bearing failure root cause analysis | Chicago, IL**

Performed destructive analysis of over 100 generator bearings to identify the failure modes, presented results, and suggested mitigations to reduce generator bearing failure

##### **Generator conductor cable jacket failure root cause analysis | Chicago, IL**

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Developed a Shore A hardness testing method to estimate the brittleness and thus exposure to excess temperature of the CPE jacket of the conductor cable. This allowed the identification of conductor cables that were in acceptable condition and those that required replacement.

#### RECENT SPEAKING ENGAGEMENTS

- Lloyd's Market Association / International Underwriters Association Power Generation Committee, London, UK, October 2023, Presenter for "Inflation Reduction Act: 1 year later"
- Lloyd's Market Association / International Underwriters Association Power Generation Committee, London, UK, March 2023, Presenter for "Renewable Energy Technology Update & Emerging US Loss Trends"
- Houston Marine and Energy Insurance Conference, Houston, TX, September 2023, Panelist for "A Turbulent Affair: Things That Go Bump In The Night"
- Energy Insurance Americas Conference, Houston, TX, May 2023, Panelist for "The Claims Experience – Onshore Renewables"
- Onshore Energy Conference, London, UK, November 2023, Presenter for "Alternative energy technologies - BESS fire risks with lithium-ion batteries"

#### RECENT TESTIMONY

- Magna Properties v. Arch Specialty Insurance
- Estate of Michael Molina v. Albert Bruno