

## **EDUCATION**

1981 **Bachelor of Science, Mechanical Engineering**  
West Virginia University, Morgantown, West Virginia

## **EXPERIENCE**

August 2006 to Present **Engineering Design & Testing Corp.**  
**Hartford, Connecticut**

*District Engineering Manager (August 2006 – February 2020)*  
*Chief Engineer and Vice President (February 2020 – Present)*

Damage assessment of mechanical and process systems, including repair/replacement recommendations. Failure analysis of mechanical and process equipment related to gross overload, corrosion, off-design operation, and operator error. Recommendations for materials of construction for various chemical and refining process equipment.

August 1990 to July 2006 **ChemTech Consultants**  
**Pittsburgh, Pennsylvania**

*Vice President of Engineering*

Chief Engineer responsible for management and technical review of engineers and designers providing detailed engineering for steel, chemical, and refining clients. Performed failure investigations of machinery in the steel and process industries and provided replace/replace recommendations to insurance and legal clients.

*Senior Project Engineer*

Project Engineer responsible for management and oversight of all engineering associated with the installation of projects in the chemical and steel industry. Performed detailed mechanical and process design on projects involving hot metal machinery, steel processing equipment, pumps, steam turbines, compressors, and pressure vessels.

January 1982 to July 1990 **Chevron-Texaco**  
**Pascagoula, Mississippi**

*Project Engineer*

Responsible for planning and executing major refinery unit maintenance turnarounds for the FCC, Crude, Hydrocracker, and Hydrogen Units. Provided guidance on repairs to pressure vessels, rotating equipment, heat exchangers, boilers, and storage tanks. Performed detailed engineering design on capital projects including development of piping and instrument diagrams, piping specifications, design of pressure vessels, and specification of various process equipment including pumps, compressors, steam turbines, heat exchangers, and fired heaters.

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## **EXPERIENCE**

### ***Legal Consultation (partial list)***

#### **Appliance Glass Manufacturing Facility — Pittsburgh, Pennsylvania**

Expert testimony regarding the scope of damage and required period of restoration for glass tempering equipment.

#### **Commercial Power Station — Bow, New Hampshire**

Expert testimony involving foreign object damage experienced by a 360 MW steam turbine after repairs to a 2,400 psig once through boiler. Involved evaluation of boiler and turbine operating data and fluid analysis of steam flow through boiler and turbine.

#### **Ethanol Production Facility — Phillipsburg, Kansas**

Determined the root cause of a malfunction of a natural gas pressure reduction station, owned and maintained by the utility. The malfunction resulted in over-pressurization damage to downstream fired equipment at the facility.

#### **Meat Packing Facility — Hazelton, Pennsylvania**

Expert testimony to evaluate repairs conducted to a separator vessel comprising a screw refrigeration compressor.

#### **Commercial Power Station — Salem, Massachusetts**

Determined root cause of tube rupture in power boiler that resulted in the discharge of steam/water at high temperature and four fatalities.

#### **Landfill Energy Facility — Brookhaven, New York**

Determined root cause of sudden malfunction of 16-cylinder internal combustion engine driver for 1.3 MW generator set; cause determined to be due to errors during a recent overhaul; provided damage assessment.

### ***Field Experience and Consulting Activity (partial list)***

#### **Steel Production Facility — Irvin, Pennsylvania**

Stress and fatigue analysis anchor bolts used to affix a ladle metallurgy furnace (LMF) to determine the reason for cracking of the bolts

#### **Commercial Power Station — Milford, Connecticut**

Damage assessment and review of fatigue analysis involving a row four turbine blade failure on a 180 MW Alstom combustion gas turbine

#### **Steel Forging Facility — Reading, Pennsylvania**

Load and fatigue analysis of 4,500-ton hydraulic forge press tie rods and frame

#### **Pulp Mill — Port Mellon, British Columbia**

Fatigue analysis of cracking experienced by a kiln support ring

#### **Landfill Gas Energy Center — Chicopee, Massachusetts**

Root cause analysis and damage assessment of 16-cylinder, internal combustion engine comprising a 2 MW generator set.

#### **Powder Metal Component Manufacturer — Farmington, Connecticut**

Fracture mechanics and fatigue analysis of sudden fracture experienced by a cold isostatic press.

#### **Commercial Power Station — Homer City, Pennsylvania**

Determined root cause of sudden rupture of high-pressure steam piping comprising a 694 MW, 3,700 psig supercritical steam boiler; included review of boiler operating data and analysis of steam conditions at various locations in the boiler circuit.

**Chemical Facility — Lake Charles, Louisiana**

Damage assessment of equipment due to an explosion and fire (two separate losses, each totaling \$15 million).

**Liquefied Natural Gas Facility — Plymouth, Washington**

Damage assessment of piping, pressure vessels, pumps and equipment involved in an explosion (\$48 million).

**Carbon Manufacturing Facility — Coushatta, Louisiana**

Analysis of thermal overheating event that damaged large diameter ductwork; included review of and analysis of process data and combustion modeling of process.

**Ethylene Oxide Facility — Clearlake, Texas**

Conducted root cause analysis of fouling experienced by catalyst in Shell EO process; included analysis of process operation and EO reactor operating data.

**Ethanol Production Facilities — Various Locations**

Conducted process analysis to determine cause of damage to distillation tower internals, molecular sieves and process equipment.

**Hydro-Electric Power Station — Summer Falls, Washington**

Root cause investigation of bearing damage experienced by a 46.2 MW Kaplan turbine; conducted damage assessment and provided repair recommendations; reviewed operation and maintenance practices relative to incident.

**REGISTRATIONS and CERTIFICATIONS**

Registered Professional Engineer in Alabama (#18586)

Registered Professional Engineer in Arkansas (#7787)

Registered Professional Engineer in Connecticut (#25874)

Registered Professional Engineer in Florida (#74992)

Registered Professional Engineer in Illinois (#062-050753)

Registered Professional Engineer in Indiana (#PE11200199)

Registered Professional Engineer in Kentucky (#19286)

Registered Professional Engineer in Louisiana (#33560)

Registered Professional Engineer in Maine (#11376)

Registered Professional Engineer in Massachusetts (#47036)

Registered Professional Engineer in Michigan (#6201068028)

Registered Professional Engineer in Mississippi (#9709)

Registered Professional Engineer in Missouri (#2012010540)

Registered Professional Engineer in New Hampshire (#12150)

Registered Professional Engineer in New Jersey (#PE24GE05084500)

Registered Professional Engineer in New York (#085055-1)

Registered Professional Engineer in North Carolina (#048599)

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Registered Professional Engineer in Ohio (#E-57092)  
Registered Professional Engineer in Oklahoma (#31266)  
Registered Professional Engineer in Oregon (#92214PE)  
Registered Professional Engineer in Pennsylvania (#PE042186R)  
Registered Professional Engineer in Rhode Island (#8763)  
Registered Professional Engineer in Tennessee (#120929)  
Registered Professional Engineer in Texas (#91413)  
Registered Professional Engineer in Vermont (#8988)  
Registered Professional Engineer in Virginia (#0402 023060)  
Registered Professional Engineer in Washington State (#41710)  
Registered Professional Engineer in West Virginia (#011402)  
Registered Professional Engineer in Wisconsin (#45940-6)  
Registered Professional Engineer in Wyoming (#14513)  
National Council of Examiners for Engineers and Surveying Record (#16-891-25)

### **PROFESSIONAL ORGANIZATIONS**

American Society for Mechanical Engineers (ASME)  
ASM International (ASM)  
Failure Analysis Society (FAS) – Board Member 2017 to 2020

### **PUBLICATIONS**

*“Knowledge and Use of Heat-Treating Procedures Employed to analyze the Cause of a Pair of Aluminum Piston Fractures”* with Tim A. Jur, Journal of Failure Analysis and Prevention, Volume 10, Issue 1, February 2010; also presented at the Materials Science & Technology 2009 Conference, October 2009 in Pittsburgh, Pennsylvania.

*“Metallurgical Analysis to Evaluate Cracking in a 316L Grade Stainless Steel Spiral Heat Exchanger”* with Tim A. Jur, Journal of Failure Analysis and Prevention, Volume 12, Issue 2, April 2012, also presented at the Materials Science & Technology 2011 Conference, October 2011 in Columbus, Ohio.

*“Use of Mechanical and Metallurgical Analysis to Evaluate Cause of Fractures in a Cast 310 Stainless Steel Pintle Chain”*, with Tim A. Jur, Journal of Failure Analysis & Prevention, Volume 12, Issue 3, June 2012, also presented at the Materials Science & Technology 2011 Conference, October 2011 in Columbus, Ohio.

### **PRESENTATIONS**

*“Analysis of Crack Development in a Pressure Vessel at a Syn Fuels Facility”*, presented at the Materials Science & Technology 2013 Conference, October 2013 in Montreal, Quebec

*“Analysis of Tube Plugging and Wastage in a Cupola Off-Gas Recuperator”*, presented at the Materials Science & Technology 2014 Conference, October 2014 in Pittsburgh, Pennsylvania

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*“Fracture of 60,000 psig Pressure Vessel”*, presented at the Materials Science & Technology 2015 Conference, October 2015 in Columbus, Ohio

*“Implosion of Large Diameter Ductwork”*, presented at the Materials Science & Technology 2017 Conference, October 2017 in Pittsburgh, Pennsylvania

*“Leak in Water Line 45 Years in the Making”*, presented at the Materials Science & Technology 2019 Conference, October 2019 in Portland, Oregon

*“Tube Leaks in Black Liquor Recovery Boiler”*, presented at the Materials Science & Technology 2019 Conference, October 2019 in Portland, Oregon

*“Metallurgy for the Non-Metallurgist and Its Use in Root Cause/Damage Assessments”*, EDT, Orlando, Florida, February 17, 2018

*“Water Hammer Damage to a Steam Turbine”*, presented at the International Materials, Applications & Technologies 2021 Conference, September 2020 in St. Louis, Missouri

*“Damage to Landfill Gas-Engine Generator”*, presented at the International Materials, Applications & Technologies 2021 Conference, September 2021 in St. Louis, Missouri

*“Fracture of Induced Draft Fan Shaft at Commercial Power Station”*, presented at the International Materials, Applications & Technologies 2022 Conference, September 2022 in New Orleans, Louisiana

Co-chair of Corrosion Session at the Materials Science & Technology 2014 Conference, October 2014 in Pittsburgh, Pennsylvania

Co-chair of Corrosion Session at the Materials Science & Technology 2015 Conference, October 2015 in Columbus, Ohio

Co-Chair of Energy Session, at the Materials Science & Technology 2016 Conference, October 2016 in Salt Lake City, Utah

Co-Chair of Petrochemical and Piping Session at the Materials Science & Technology 2017 Conference, October 2017 in Pittsburgh, Pennsylvania

Co-Chair of Corrosion Session at the Materials Science & Technology 2018 Conference, October 2018 in Columbus, Ohio

Co-Chair of Industry Specific Failures: Boilers, Pressure Vessels, Welding & Joining Failures, Materials Science & Technology 2019 Conference, October 2019 in Portland, Oregon

Co-Chair of Energy Specific Failures at the International Materials, Applications & Technologies 2021 Conference, September 2021 in St. Louis, Missouri

Co-Chair of Gears, Shafts and Bearing Failures at the International Materials, Applications & Technologies 2022 Conference, September 2022 in New Orleans, Louisiana

### **SPECIALIZED TRAINING**

2006     *Confined Space Entry*, Compliance Solutions; Charlotte, North Carolina  
          *Corrosion*, ASM International; Pittsburgh, Pennsylvania

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- National Fire, Arson & Explosion Investigation Training Program, NAFI; Sarasota, Florida*
- 2000 *Principals of Failure Analysis, ASM International; Pittsburgh, Pennsylvania*
- 1999 *Basic Gas Turbine Technology, International Gas Turbine Institute; Pittsburgh, Pennsylvania*
- 1998 *Practical Welding Technology, A.S.M.E.; Orlando, Florida*
- 1997 *Repairs and Alterations of Boilers and Pressure Vessels, A.S.M.E.; Boston, Massachusetts*
- 1996 *A.S.M.E. B&PV Code: Section IX Welding and Brazing, A.S.M.E.; Boston, Massachusetts*
- 1995 *Failures, Failure Prevention, and Repairs of Pressure Vessels, A.S.M.E.; Boston, Massachusetts*
- 1993 *Pressure Vessel Design and Analysis, A.S.M.E; Pittsburgh, Pennsylvania*
- 1992 *Piping Design and Stress Analysis, A.S.M.E; Pittsburgh, Pennsylvania*