THE WARREN GROUP, INC. FORENSIC ENGINEERS & CONSULTANTS
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WARREN

Robert John Phillips, P.E., CFEI

Mechanical Engineer

Aerial Work Platforms

Cranes and Rigging

Construction Defects

Failure Analysis

Fire and Explosion Analysis: Origin and Cause

Heating Ventilation and Air Conditioning

Heavy Machinery

EDUCATION

1982 **Bachelor of Science, Mechanical Engineering**
University of South Carolina, Columbia, South Carolina

EXPERIENCE

2010 to Present The Warren Group, Inc., Irmo, South Carolina. Senior Consulting Engineer performing specialized consulting related to incidents, property loss and unintentional injuries involving mechanical engineering.

Cause of Incidents
Determine the cause of incidents involving cranes, equipment, property, and fires. Analyze the contribution of design, manufacturing, operation and maintenance in the causation of incidents. Conduct mechanical failure analysis of broken components. Investigate the origin and cause of fires.

Safety Design Analysis
OSHA compliance, standards and codes compliance, maintenance, products liability, product failures, failure analysis, consumer products.

Property Loss Analysis
Determine the cause of the loss, establish scope of damage, estimate cost to repair, evaluate replacement cost, establish actual cash value, estimate salvage value, estimate time required to complete repair.

1995 to 2010 Engineering Design & Testing Corp, Mt. Pleasant, South Carolina
District Engineering Manager, Consulting Engineer, Mechanical investigations, engineering analysis of fires, scope of damage and repair cost determination.

1994 to 1995 Norfolk Naval Shipyard, Portsmouth, Virginia
Supervisory Engineer, Engineering branch supervisor, provided written and on-site engineering guidance concerning operation and maintenance of fluid systems, lifting equipment, and related equipment, conducted engineering reviews of technical documents concerning the construction, modification, and repair of equipment and facilities used for nuclear maintenance.

1990 to 1994 Charleston Naval Shipyard, Charleston, South Carolina
Nuclear (Mechanical) Engineer, Project engineer for the design maintenance, and upgrade of production facilities and cranes, project engineer for lift equipment, project engineer for fluid, ventilation, and waste processing systems, managed small boat operation and maintenance program, developed bolt tightening standards for cranes, developed material specifications, evaluated vendor supplied equipment.

EXPERIENCE (Continued)

1982 to 1990 Charleston Naval Shipyard, Charleston, South Carolina
Mechanical Engineer. Project engineer for overhaul, modification, and troubleshooting of weapons launching and handling equipment. Project engineer for installation and testing of shipboard cranes and hoists. Managed a test program ranging from component tests to full system operational tests. Shift test engineer for combat systems and submarine hull, propulsion, and auxiliary equipment. Prepared instructions and cost estimates for the repair, maintenance, and testing of shipboard equipment. Developed machinery preventive maintenance schedules and techniques.

SUMMARY OF MACHINE AND SYSTEM DESIGN EXPERIENCE

Charleston Naval Shipyard
Designed and certified shipboard and facility mechanical and test equipment. Designed and certified crane components and lifting equipment. Developed crane and critical equipment bolt tightening specifications. Designed waste processing systems and techniques. Specified air conditioning systems for nuclear and general work areas. Specified, tested, and certified electrical and electronic systems.

SUMMARY OF CRANE SPECIFIC EXPERIENCE

Responsible for the installation, repair, load testing and certification of shipboard weapons handling equipment; cranes hoists, and rigging gear for conventional and nuclear weapons.

Project engineer for the Navy's East Coast Handling Equipment Maintenance Facility (HEMF). Oversaw the repair and refurbishment of ballistic missile lifting equipment by shipyard and contractor personnel. Conducted inspections, testing, and certification of ballistic missile lifting equipment used in various naval facilities throughout the Atlantic Region.

Designed and provided fabrication instructions for custom lifting equipment used in nuclear repair work for critical lifts.

Provided repair and maintenance instructions for dockside gantry cranes, bridge cranes, cargo elevators, and conveyors.

Conducted certification audits of material handling practices (rigging, lifting, and securement) by ship's crews.

Conducted investigations of shipyard and shipboard crane incidents individually and as part of investigation teams for larger incidents. Provided corrective actions for repair and the prevention of future accidents.

SUMMARY OF CRANE SPECIFIC EXPERIENCE, Continued

Determined the cause of land based and waterfront crane and rigging accidents. Determined the scope of damage and cost to repair cranes and equipment after accidents:

- Mobile crane tip overs
- Dropped crane booms
- Crane boom collapses while pile driving
- Friction crane clutch failures
- Dropped ladle at a steel mill
- Locking pin failure on a lifting spreader
- Hoist gearbox failures
- Dropped loads due to worn bridge crane hoist brakes

CERTIFICATIONS

Certified Fire and Explosion Investigator (#6118-2168)

Certified Fire and Explosion Instructor (#6118-2168I)

ASM International Applied General Metallurgy Certification, Extension Diploma

Transportation Worker Identification Credential (TWIC)

Certified Mobile Elevating Work Platform Operator

PROFESSIONAL ORGANIZATIONS

ASM International (#460417)

ASTM International (Forensic Sciences, Forensic Engineering, Performance of Buildings, Ships and Marine Technology Committees) (#276291)

International Code Council (#5195054)

National Association of Fire Investigators (#6118-2168)

REGISTRATIONS

Professional Engineer in South Carolina (#15288)

Professional Engineer in North Carolina (#21869)

Professional Engineer in Georgia (#22800)

Professional Engineer in Louisiana (#32575)

Professional Engineer in Ohio (#74460)

Professional Engineer in Minnesota (#53790)

The National Council of Examiners for Engineering and Surveying (NCEES) (#22738)

U.S. Council for International Engineering (#22738)

CONTINUING EDUCATION

July 8, 2021
"Mobile Elevating Platform Operator Training" presented by Sunbelt Rentals, including classroom and hands-on operation, South Carolina

November 16, 2019
"Investigating Motor Vehicle Fires," an online course presented by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

November 15, 2019
"What Every Engineer Should Know about Fire Protection," an online course presented by Suncam, Inc.

October 27, 2019
"Convection Heat Transfer Coefficient Estimation," an online course presented by Suncam, Inc.

October 26, 2019
"Forensic Analysis Involving Fugitive Natural Gas and Propane," an online course presented by Suncam, Inc.

October 26, 2019
"An Introduction to Heat Transfer and Structure Fires," an online course presented by Suncam, Inc.

December 19, 2017
"What Every Engineer Should Know about Structures – Part B – Statics Applications," an online course presented by Suncam, Inc.

December 19, 2017
"What Every Engineer Should Know about Structures – Part A – Statics Fundamentals," an online course presented by Suncam, Inc.

November 13, 2017
"Fire Chemistry," an online course presented by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

December 28, 2016
"Fuel & Comb: Controlling Combustion Risks: People," an online course presented by RedVector.

September 8, 2016
"Ethical Duties Beyond the Fire Scene," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

CONTINUING EDUCATION, Continued

August 6, 2015
Training in "Warren's Written Fall Protection Program & Policies," by Steve Hunt, CPCU, ARM, Fall Protection Manager, Irmo, South Carolina

August 6, 2015
"Fall Protection - 29 CFR 1926, Subpart M (1926.500- 1926.503) Training," Course designed by: Prosafe Solutions, Inc., conducted by Steve Hunt, CPCU, ARM, Fall Protection Manager, Irmo, South Carolina

- Part I – Guardrails & Personal Fall Arrest Systems
- Part II – Horizontal Lifelines, Safety Nets, Roofing Procedures & Training

July 28, 2015
"Multi Crane Lifts and the New Tappan Zee Bridge," a webinar presented by Industrial Training International

July 13, 2015
"Fall Protection 101 Training," presented by Kent Earle of Capital Safety, Irmo, South Carolina

May 20, 2015
"Residential Natural Gas Systems," an online course presented by The International Association of Arson Investigators, Inc. on CFITrainer.Net

January 27, 2015
"Building an Effective Safety Culture," a webinar presented by Risk Management Webinar Series

January 21, 2015
"Workshop: Demystifying Sling Tension," a webinar presented by Industrial Training International

September 30, 2014
"6 in 60: Six Diverse Load Handling Lessons in 60 Minutes," a webinar presented by Industrial Training International

September 16, 2014
"Fundamentals of Residential Building Construction," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 15, 2014
"Fire Protection Systems," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

CONTINUING EDUCATION, Continued

September 15, 2014
"Documenting the Event," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 15, 2014
"Introduction to Evidence," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 12, 2014
"Digital Photography and the Fire Investigator," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 12, 2014
"NFPA 921 and 1033 2014 Editions: Important Revisions," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 10, 2014
"Evidence Examination: What Happens at the Lab?" an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 10, 2014
"Construction Risk: The Value of Early Intervention," an online course by Aspen Insurance, in conjunction with Property Casualty 360°

September 10, 2014
"Process of Elimination," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 10, 2014
"Explosion Dynamics," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

September 9, 2014
"Charleston Sofa Super Store Fire," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

August 18, 2014
CAL-EMA Safety Assessment Program, 5-Year Damage Assessment Certification, presented by the CAL-EMA National Database in Irmo, South Carolina

March 27, 2014
"Ground Bearing Pressure: Practical Applications for Lifts of All Sizes," a webinar presented by Industrial Training International

CONTINUING EDUCATION, Continued

February 26, 2014
"Winch, Drag or Roll?" a rigging webinar presented by Industrial Training International

January 17, 2014
"NFPA 72: National Fire Alarm and Signaling Code: Major Changes in the 2013 Edition," a webinar presented by Simplex Grinnell

December 13, 2013
"Key Methods for Using Aerial Work Platform Equipment," a webinar presented by Safe-T Conference

December 2, 2013
"A Ventilation-Focused Approach to the Impact of Building Structures and Systems on Fire," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

December 2, 2013
"Preparation for the Marine Fire Scene," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 29-30, 2013
Property Loss Research Bureau, 2013 Eastern Regional Adjusters Conference, Concord, NC

- Equipment Breakdown and Property Coverage Interplay
- Hail Damage to Buildings, Roofs, Siding, and Vehicles
- SIU Resources: New Tools in Fraud Investigations
- Emerging Building Products and Features and their Likely Effect on Property Claims

September 25, 2013
"Safe Movement of Equipment on Jobsites," webinar presented by Maximum Capacity Media

February 25, 2013
"4 Major Lifting Considerations in Power Gen Environments," a webinar presented by Industrial Training International

December 4, 2012
"How Studies of Crane Accidents and Trends Lead to a Safer Work Environment," a webinar presented by Industrial Training International

November 30, 2012
"Tackling the Challenges of Training Site Supervisors, Lift Directors, and Other Leaders," a webinar presented by Industrial Training International

November 17, 2012
"Understanding Computer Estimating Systems," a webinar presented by Kevin Hromas & Associates

CONTINUING EDUCATION, Continued

September 13, 2012
"Ethical Decision Making for Engineers #2," RedVector.com

July 10, 2012
"Aerial Lift Inspections, What Do You Need to Know?" webinar presented by Maximum Capacity Media

April 15 – 18, 2012
Property Loss Research Bureau, 2012 Claims Conference, Orlando, Florida

- Wind Energy: Losses in the Sky
- Personal Watercraft Liability & Coverage Issues
- Fire Investigations: Current Challenges (Core Skills)
- Claim Investigation With Pending Litigation
- Construction Accident Litigation
- Pre-Engineered Metal Buildings: Design & Installation
- Subrogation on the Farm: Large Machinery Failures
- Subrogation Trends in Property Insurance: A Legislative Update
- Commercial Large Loss Arson/Fraud Case

March 5, 2012
"OSHA's Cranes and Derricks Standards Update: The Litigators' Perspective," a live audio conference/webinar presented by Lorman Education Services

July 24, 2011
"Principles of Metallography," an online course by American Society of Materials

March 31, 2011
"Accident/Occurrence, Faulty Workmanship or "fuzzy"...has Crossman clarified anything?" Columbia Conference Center, Columbia, SC

- Construction Issues
- Site Work - Earthwork Case studies
- Site Work - Utility Piping Case Studies
- Concrete Case Studies
- Falls on Concrete Walking Surfaces
- Plumbing
- Wood Framing/Trusses
- Water Intrusion in the Building Envelopes
- Harleysville vs. Crossman Supreme Court Case Presentation
- Construction Defect Litigation Roundtable Discussion

December 28, 2010
Metallurgy of Welding and Joining – American Society of Materials

CONTINUING EDUCATION, Continued

October 16, 2009
"Postflashover Fires," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 16, 2009
"Arc Mapping Basics," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 15, 2009
"Introduction to Fire Dynamics and Modeling," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 15, 2009
"Managing Complex Fire Scene Investigations," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 15, 2009
"The Scientific Method for Fire and Explosion Investigation," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 11, 2009
"Investigating Motor Vehicle Fires," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 11, 2009
"Insurance and the Fire Investigation," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 4, 2009
"Fire Investigator Scene Safety," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

October 4, 2009
"Fire and Explosion Investigations: Utilizing NFPA 1033 and 921," an online course by CFITrainer.net, in conjunction with The International Association of Arson Investigators, Inc.

December 30, 2008
IAQ: Humid Climate Issues, RedVector.com

December 30, 2007
Brittle Fracture of Materials, PDHonline.org

December 30, 2007
Identifying Risk Factors in Machinery, PDHonline.org

CONTINUING EDUCATION, Continued

December 30, 2007
Psychrometric Chart Fundamentals and its application to HVAC Troubleshooting, PDHonline.org

December 30, 2006
Basic Concepts of Photogrammetry, RedVector.com

December 30, 2006
Heavy Construction Equipment Basics – Lifting, RedVector.com

December 29, 2005
Elements of Metallurgy, American Society of Materials

March 22, 2004
Confined Space Safety Entry Supervisor Program, New Environment, Inc.

August 10, 2003
Certified Fire Investigation Instructor Course, National Association of Fire Investigators

February 10, 2003
Corrosion, American Society of Materials

August 13, 2003
Certified Fire and Explosion Investigator Course, National Association of Fire Investigators

December 27, 2001
Principles of Failure Analysis, American Society of Materials

November 7, 2000
Investigation of Vehicle Fires

June 4, 1999
Mobile Crane & Rigging Considerations, Crane Inspection and Certification Bureau

September 28, 1998
Fracture Mechanics Approach to Life Prediction, American Society of Mechanical Engineers

October 21, 1997
ABYC Accident Investigation Seminar, American Boat and Yacht Council

October 21, 1996
Identifying Structural Problems of Historic Houses, Cummings & McCrady, Inc.

January 31, 1996
Advanced Cause and Origin Expert Witness, International Training Association

COURSES, SEMINARS AND LECTURES PRESENTED

March 15, 2011
"Construction and Building Issues for the Claims Industry," presented at the AI Restoration sponsored seminar, Wrightsville Beach, NC

February 8, 2008
"Spontaneous Ignition and Pyrolysis – Can the Theories be Proven?" presented with G. Wayne Maltry, M.S., P.E., of the Columbia District Office, Engineering Design & Testing Corp.

May 17, 2006
"Fires: Hot Topics," Engineering Design & Testing Corp Spring Ed Seminar, Charlotte, NC

February 7, 2003
"Moisture in Residential Crawlspaces," presented with Glenn Stewart, M.E., P.E., of the Columbia District Office, Engineering Design & Testing Corp.

February 7, 2003
"Crane Loss Site Examination," Engineering Design & Testing Corp.

February 10, 2001
"Reporting on Common Structural Issues," Engineering Design & Testing Corp.

February, 1998
"Boat Fires Traceable to Electrical Systems," Engineering Design & Testing Corp.

PUBLICATIONS

"In Pursuit of the Perfect Pipe," Journal of Failure Analysis and Prevention, February 2004

"Can Combustion Be Spontaneous?" Journal of Failure Analysis and Prevention, March 2008