



WARREN

THE WARREN GROUP, INC. FORENSIC ENGINEERS & CONSULTANTS
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Amy Anderson, B.S.Ch.E., P.E., CFEI

Fire Protection Engineer

Codes and Standards Analysis

Commercial Kitchen Fires

Dust Explosions

Fire and Explosion Analysis: Origin and Cause

Fire Protection Systems

Fire Suppression Systems

Industrial Process Hazards

Scope of Damage/Cost to Repair

EDUCATION

2001 **Bachelor of Science in Chemical Engineering**
Clemson University, Clemson, South Carolina

EXPERIENCE

January 2022 to Present The Warren Group, Inc., Irmo, South Carolina. Senior Consulting Fire Protection Engineer performing specialized consulting related to property loss and unintentional injuries resulting from industrial accidents, fires and explosions.

Fire & Explosion Analysis

Determine the origin and cause, as well as scope of damage and cost to repair, of fires and explosions in residences, commercial locations and industrial sites.

Evaluate system failures in dust collectors and other dust handling equipment that result in fires, explosions, or deflagrations.

Fire Protection, Suppression, Detection and Alarm Systems

Evaluate fire protection and suppression system failure, operation and installation in industrial sites, commercial kitchens, multi-family residences, health care facilities, and other institutions such as schools.

Analyze the performance of fire detection and alarm systems, as well as sprinklers, clean agent, low-expansion foam-water systems and fire pumps during a fire or other events, in addition to compliance with applicable codes and standards.

Safety Design Analysis (both personal injury and property damage)

Industrial accident reconstruction, machine controls, OSHA compliance, standards and codes compliance, maintenance, fire and explosion analysis, products liability, product failures, failure analysis, consumer products.

2001 to 2022 Senior Engineering Specialist, FM Global – Southeast Region

- Partnered with clients to identify, assess, avoid, and reduce risk at their commercial and industrial properties. Advised clients at the local level on how to safeguard their properties from loss as well as maintain business continuity
- While specializing in chemical and active pharmaceutical ingredient facilities, would also evaluate a variety of factories and facilities all over the Southeastern Region

EXPERIENCE (Continued)

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| 2001 to 2022 | <p>Senior Engineering Specialist, FM Global – Southeast Region (continued)</p> <ul style="list-style-type: none"> • Assessed construction and occupancy hazards, process safety and control, as well as fire protection systems ranging from office buildings to chemical plants. • Supported clients with projects by assisting with the development of building and fire protection specifications for resiliency, reviewed plans, and performed site visits • Quantified extent of exposures from fire, explosion, flooding, hurricane, and wind damage during site audits for various sizes and types of facilities, both planned and operational • Reviewed client project documents for compliance with applicable standards: construction, fire protection, process hazards, and combustible dust explosion hazards • Shared knowledge by training newly hired fire and natural hazard engineers; prepared and presented at internal training courses, group meetings, and internal seminars • Peer-reviewed and critiqued engineering reports for quality and technical accuracy |
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SUMMARY OF PROFESSIONAL EXPERIENCE

Areas of professional experience include, but are not limited to:

- Chemical Facilities:
 - Pharmaceutical API (active pharmaceutical ingredient), bio-pharmaceutical, and secondary pharmaceutical facilities
 - Cryogenic air separation, LNG (liquefied natural gas) storage and peaking facilities
 - High-end plastics, synthetic fibers (polyester, nylon, and medical sutures), PET resin plants
 - Coatings, paint, and adhesives manufacturing processes using acrylic monomers
 - Ammonia and derivative processes including urea, nitric acid, and ammonium nitrate
 - Carbon fiber including PAN (polyacrylonitrile) and oxidation-carbonization
 - Electrochemical/chlor-alkali facilities
 - Tall oil refining facilities
 - Hydrogen cyanide and derivative plants
 - Fuel-grade ethanol facilities
- Textile Facilities: Traditional textile (spinning, weaving, cloth treatment), carpet manufacturing processes, non-woven fabrics, and novel applications
- Personal and beauty care producers including those that store and use flammable liquids (ethanol, acetone, ethyl acetate, etc.), or combustible dust in fragrances, nail polish, or make-up

SUMMARY OF PROFESSIONAL EXPERIENCE (Continued)

- Plastics production facilities including blow molding, injection molding, extrusion, and blown film
- Metal working facilities with processes such as sheet metal stamping and weld assemblies, machining, sintering of metal powders, laser cutting, and heat treating that includes ovens and special atmosphere furnaces
- Medical device plants manufacturing products such as pacemakers and surgical tools
- Municipal, commercial, and residential buildings such as hospitals including a multi-billion dollar “flagship” campus, higher education campuses, nursing home facilities, apartment complexes, hotel chains, office buildings and retail structures
- Warehousing and cold storage facilities evaluating fire protection and suppression systems including in-rack fire sprinklers and ESFR (early-suppression, fast-response) sprinklers
- Stone quarries conducting risk assessments to heavy mobile equipment and engine fire suppression systems. Assessing flood risk by looking at nearby flood exposures, pumping and dewatering systems, as well as flood emergency response planning
- Printing plants such as newspaper and lithography facilities which entailed roll paper and printing press fire protection including carbon dioxide local application suppression systems
- Food establishments and cooking operations including dairy, bakeries, and hazards such as dust in grain and corn silos

PROFESSIONAL ORGANIZATIONS

American Institute of Chemical Engineers

National Association of Fire Investigators

National Fire Protection Association

Society of Fire Protection Engineers

REGISTRATIONS

Professional Engineer in North Carolina (#055151)

Professional Engineer in South Carolina (#27746)

Professional Engineer in Texas (#145253)

CERTIFICATIONS

Certified Fire & Explosion Investigator – (#26648-15313)

CONTINUING EDUCATION

July 18-21, 2022

“2022 Fire Investigation Training Program”, a course presented by National Association of Fire Investigators, New Orleans, Louisiana

June 10, 2020

“Overview of Emergency Relief System Design Using DIERS Methodology”, an online course presented by DEKRA Process Safety

February 13, 2020

“2020 Kickoff Engineer Training”, presented by FM Global, Alpharetta, Georgia

- Loss Prevention Trends
- Boiler & Machinery Topics

June 21, 2019

“Flood – Lowering the Risk Training”, presented by FM Global, Alpharetta, Georgia

February 12-14, 2019

“2019 Kickoff Engineer Training”, presented by FM Global, Alpharetta, Georgia

- Combustible Dust
- Physical Flood Losses
- Fire Pump Alignment
- Boiler & Machinery Loss Expectancies
- Field Sketch Drawing Tool

September 12, 2018

“Safety Instrumented Systems”, presented by Process Improvement Institute, Knoxville, Tennessee

August 21-23, 2018

“Chemical Specialist Advanced Seminar”, presented by FM Global, Dallas, Texas

- Lessons from Losses
- Process Safety
- Occupancy Codes Revisions
- Tools and Resources

April 23-26, 2018

“Spring Meeting and 14th Global Congress on Process Safety”, presented by AIChE

February 7-9, 2017

“Kickoff Meeting Training”, presented by FM Global, Alpharetta, Georgia

- Flood and Flood Emergency Response Planning, and Natural Catastrophes
- Special Hazards
- MFL (Maximum Foreseeable Loss) Refresher

July 12-14, 2016

“Dust Fundamentals”, presented by FM Global, Norwood, Massachusetts

CONTINUING EDUCATION (Continued)

June 14-15, 2016

“East Coast Region Advanced Chemical Seminar”, presented by FM Global, Atlanta, GA

April 5, 2016

“Explosion Protection-Venting and Isolation”, a webinar presented by FM Global

February 11, 2016

“2016 Kickoff REAL Impact Engineering”, presented by FM Global, Alpharetta, Georgia

- Risk Improvement Strategy

February 10, 2016

Flood Training at “Kickoff Meeting Training”, presented by FM Global, Alpharetta, Georgia

- Flood Emergency and Response Plans
- Physical Flood Recommendations: flood walls, barriers, flood doors
- FM Global Approved Products for Flood Mitigation
- Understanding Coastal, Stormwater, and Riverine flood scenarios

February 9, 2016

“Equipment Hazards for Fire Hazards”, presented by FM Global, Alpharetta, Georgia

- FM Global Current Equipment Hazards (EH) risk evaluation process
- Equipment Hazard Process going forward
- Boilers
- Electrical Equipment
- Rotating Equipment
- Ovens & Dryers
- Power Presses

February 4-6, 2014

“Kickoff Meeting Training”, presented by FM Global, Alpharetta, Georgia

- Chemical Hazards of Ignitable Liquids
- Ignitable Liquids Discussion by John LeBlanc, the author and engineer of the standards on ignitable liquids. Explained changes to the Operating Standards and how to use judgment evaluating them.
- Location Based Engineering
- Field Engineer Flood Training, Evaluating 100- and 500-year floods
- Special Chemical Risk Training, Ignitable liquid theory and practical application for chemical plants

October 15-16, 2012

“Vapor Cloud Explosion and Pressure-Vessel Rupture Evaluations for Special Chemical Risk Engineers Training Course”, presented by FM Global, Patricia Lee, Principal Engineer Chemical and Pharmaceutical, Alpharetta, Georgia

July 22, 2011

“Dust Explosions”, an online training presented by AIChE

CONTINUING EDUCATION (Continued)

June 20-22, 2011

“Root Cause Analysis & Incident Investigation”, presented by ABS Consulting, Hilton Head, South Carolina

December 1, 2010

“2010 Advanced Windstorm”, a webinar presented by FM Global

- EIFS (Identification and evaluation)
- Uplift Testing (OS 1-52)

December 1, 2010

“2010 Advanced Windstorm”, a webinar presented by FM Global (Continued)

- Roof Expansion Joints (OS 1-27)
- Wind Evaluation Tool (WET)
- Flood/Storm Surge/Wind (Loss Expectancy development and reporting)
- Loading Dock and Airplane Hangar doors
- Line Loading
- White Paper report
- Wind Photo Library

September 15, 2010

“CoreLogic Flood Map Workshop”, presented by FM Global, Alpharetta, Georgia

July 27 - August 4, 2010

“Flammable Liquids Refresher”, presented by FM Global, Alpharetta, Georgia

March 17, 2010

“Fire Safety Seminar”, presented by Society of Fire Protection Engineers, Greater Atlanta Chapter, Atlanta, Georgia

January 27, 2010

“Kickoff Meeting”, presented by FM Global, Alpharetta, Georgia

- Operating Standards 8-9 & 2-0, presented by Mark Gryc
- Flood Training, presented by flood specialists Clint Green, Neill Bliss, and David Drnevich

November 18-19, 2009

“Advanced Chemical Specialist Seminar”, presented by FM Global, Norwood, Massachusetts

November 11-12, 2009

“Mechanical Integrity”, presented by ABS Consulting, Knoxville, Tennessee

February 20-21, 2007

“Wind Training”, presented by FM Global, Alpharetta, Georgia

February 9, 2007

“Kickoff Meeting Training”, presented by FM Global, Alpharetta, Georgia

CONTINUING EDUCATION (Continued)

January 25-26, 2007

“Compliance Auditing for Process Safety”, presented by PSI Consulting, Orlando Florida

October 5-6, 2006

“Special Chemical Risk Advanced Seminar”, presented by FM Global, Norwood, Massachusetts

June 12-14, 2006

“Thermal Process Safety”, presented by CIBA Expert Services, Norwood, Massachusetts

May 5, 2006

“Auto Sprink Training”, presented by FM Global, Alpharetta, Georgia

April 12-13, 2005

“Loss Prevention Symposium”, presented by AIChE, Atlanta, Georgia

March 14-16, 2005

“Process Safety Management”, presented by Process Safety Institute, Oak Ridge, Tennessee

January 20-21, 2005

“Kickoff Meeting Training”, presented by FM Global, Alpharetta, Georgia

May 11-12, 2004

“SCR ACR Advanced Seminar”, presented by FM Global, Houston, Texas

March 10-11, 2004

“Vapor Cloud Explosions”, presented by FM Global, Alpharetta, Georgia

January 21-22, 2004

“Kickoff Meeting Training”, presented by FM Global, Alpharetta, Georgia

November 13-14, 2003

“Understanding and Preventing Explosions”, presented by AIChE, Las Vegas, Nevada

May 12-16, 2003

“Fundamentals of Special Chemical Risk”, presented by FM Global, Norwood, Massachusetts