Exponent
Failure Analysis Associates®

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Mark Fecke, P.E., CFEI
Managing Engineer

Professional Profile

Mr. Fecke's mechanical engineering expertise focuses on steam or hot water generating systems, especially boilers and burners used to generate steam or hot water for electric power utilities, industrial plant utilities, agrochemical and specialty chemical processing plants, hospitals and multi-tenant buildings. He has provided consulting services to clients on most aspects of steam boiler and hot water systems including failure analysis, repairs, startup/shutdown, operation, safety/risk assessment, operator training and performance assessments. Mr. Fecke successfully works with his clients to define complex system problems and to assemble and lead the multi-disciplinary teams often necessary to address these issues.

Mr. Fecke is active in the field of combustion safety including the design and operation of various coal, biofuel, gas, and oil fuel trains, and burner management and combustion control system relating to boilers, furnaces, dryers, ovens, oxidizers, heat exchangers, and radiators. He has assisted his clients in identifying the appropriate level of safeguards necessary for safe operation and control of their systems, the implementation of those safeguards, and auditing their installations. He is well versed in the industry standards and has used those in combination with process hazard analysis techniques to conduct these studies.

In addition to his consulting on various types of combustion systems, Mr. Fecke applies his expertise as a mechanical engineer to the failure analysis and investigation of incidents, with particular emphasis on fires and explosions or failures of valves, pumps, fans compressors, regulators, and other mechanical systems. He has reconstructed incident sequences from various sources of evidence including witness interviews, process measurement data, electronic event logs, laboratory testing, and examinations of physical artifacts. His incident investigations have included fire and explosions or failures of residential, commercial, and industrial equipment.

Besides projects involving combustion systems and incident investigations, he has performed scientific investigations and failure analyses' on hazardous materials tank cars, induction furnaces, bulk solid and dust handling equipment, chemical process equipment, and rail accidents, He has significant experience operating in confined spaces under supplied air, Level B PPE. Prior to joining Exponent, he worked as a Field Service Engineer for The Babcock and Wilcox Company.

Academic Credentials and Professional Honors

M.S., Mechanical and Aerospace Engineering., Illinois Institute of Technology, 2010
B.S., Mechanical Engineering, University of Cincinnati, 2003

Licenses and Registrations

Registered Professional Engineer, Illinois, #062-061204

Confined Space Entry training program in accordance with OSHA 29 CFR Part 1910.146

40-Hour HAZWOPER training program in accordance with OSHA 29 CFR Part 1910.120

Certified Fire and Explosion Investigator (CFEI) in accordance with the National Association of Fire Investigators (NAFI) National Certification Board per NFPA 921 Section 11.6.4

Publications and Presentations

Morrison DR, Fecke M, Martens, JD. Migrating an incident reporting system to a CCPS process safety metrics model. Journal of Loss Prevention in the Process Industries 2011, in press.

Fecke M, Morrison DR, Martens J, Cowells J. A guide to developing and implementing safety checklists: Plant steam utilities. Process Safety Progress Aug 2011; 30(3).

Morrison DR, Fecke M, Ramirez JC. Using LOPA to understand necessary safeguards for steam boiler operation. 3rd CCPS Latin American Process Safety Conference and Expo, Buenos Aires, Argentina, August 8–10, 2011.

Ramirez JC, Fecke M, Morrison DR, Martens J. Root cause analysis of an industrial boiler explosion (and how hazard analysis could have prevented it). ASME International Mechanical Engineering Congress & Exposition, Vancouver, B.C., November 17, 2010.

Morrison DR, Fecke M, Martens J. Migrating an organizational incident reporting system to a CCPS process safety metrics model. 2010 Annual Symposium, Mary Kay O'Connor Process Safety Center, Texas A&M University, College Station, TX, October 2010.

Fecke M, Morrison DR, Martens J, Cowells J. A guide to developing and implementing safety checklists: Plant steam utilities. American Institute of Chemical Engineers, 2010 Spring National Meeting, 25th Center for Chemical Process Safety International Conference, San Antonio, TX, March 22–24, 2010.

Morrison DR, Fecke M, Dillon SE. Lessons learned from a thermal runaway incident involving an organic peroxide intermediate during a power outage. American Institute of Chemical Engineers, 2010 Spring National Meeting, Case Histories and Lessons Learned Joint Session, San Antonio, TX, March 22–24, 2010.

Morrison DR, Su YS, Fecke M. Spontaneous combustion tendency of household chemicals and clothes dryers—Part 2. Appliance Magazine, July 2006.

Morrison DR, Su YS, Fecke M. Spontaneous combustion tendency of household chemicals and clothes dryers—Part 1. Appliance Magazine, June 2006.

Morrison DR, Su YS, Fecke M. Spontaneous combustion tendency of household chemicals and clothes dryers. 2006 International Appliance Technical Conference, March 2006. This paper received the Dana Chase Memorial Award for the Best Paper presented at the conference.

Prior Experience

Field Service Engineer, Babcock and Wilcox, 2003–2005
Research and Development Co-op, Cintas, 1999–2002
General Laborer, Mulhall Becker Construction, 1997–1998
Research Apprentice, Compressor Aero Research Laboratory WPAFB, 1995–1996

Professional Affiliations

- American Society of Mechanical Engineers—ASME (member)
- National Fire Protection Association—NFPA (member)
- National Association of Fire Investigators—NAFI (member)
- Principal Member: Technical Committee on Stoker Operations, NFPA 85 *Boiler Combustion System Hazards*, National Fire Protection Association International, effective July 2006
- Principal Member: Technical Committee on Pulverized Fuel Systems, NFPA 85 *Boiler Combustion System Hazards*, National Fire Protection Association International, effective July 2006
- Principal Member: ASME CSD-1 Standard, *Controls and Safety Devices for Automatically Fired Boilers*, effective March 2011
- Alternate Member: ASME Codes & Standards *Reliability, Availability, and Maintainability of Power Plants* (RAM) Committee, effective May 2010