

Michael L. Hanks

PhD, PE, CFEI

Senior Managing Consultant



Dr. Michael L. Hanks has a Ph.D. in chemical engineering and is a Senior Managing Consultant for Engineering Systems Inc. (ESi). Dr. Hanks investigates industrial and residential fires and explosions, chemical process incidents, manufacturing process incidents, and hazardous materials release and exposure incidents. He is a NAFI certified fire and explosion investigator. He investigates failures caused by unexpected or uncontrolled chemical reactions and issues due to incompatible materials, analyzes chemicals to identify unknown materials or contaminants, and evaluates compliance with OSHA regulations for chemical hazard communication and general industry safety practices. Dr. Hanks managed a corporate laboratory that performed chemical analysis and product-performance testing and led the materials development function that was responsible for developing and evaluating coatings and adhesives, thermoplastic compounds, and thermoplastic elastomers. He has failure analysis experience with polyurethanes, polyolefins, PVC, EDPM rubber compounds, and other polymers.

Education

Ph.D., Chemical Engineering, Carnegie Mellon University, 1991

M.S., Chemical Engineering, Brigham Young University, 1988

B.S., Chemical Engineering, Brigham Young University, 1986

Licenses & Certifications

- State of Alabama P.E. License No. 31781
- State of Florida P.E. License No. 63487
- State of Illinois P.E. License No. 062-057676
- State of Kentucky P.E. License No. 24708
- State of Mississippi P.E. License No. 20092
- State of Ohio P.E. License No. PE68996
- State of Pennsylvania P.E. License No. PE071173
- State of Texas P.E. License No. 112566
- Certified Fire and Explosion Investigator, CFEI 14967-7795

Contact Information

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ESi Tampa

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St. Petersburg, FL 33716

Areas of Specialization

- Fire and Explosion Investigations
- Chemical Reactions
- Hazardous Materials
- OSHA General Industry Safety Regulations
- Process Safety Management
- Chemical and Manufacturing Processes
- Chemical Analysis and Testing
- Dust Explosions
- Hydraulic Hose Failures
- Polymers and Polymer Processing
- Product and Process Development
- Paints, Coatings, and Adhesives

Positions Held

Engineering Systems Inc., St. Petersburg, Florida

- Senior Managing Consultant, 2021-present
- Senior Consultant, 2008 – 2021

ITC Expert Services, St. Petersburg, Florida

- Vice President Chemical Technology, 2007 – 2008

Packer Engineering, Ann Arbor, Michigan

- Senior Director, 2002 – 2007

Cooper-Standard Automotive, Dearborn, Michigan

- Director of Materials Development, 1996 – 2002

Aeroquip Corporation, Ann Arbor, Michigan

- Associate Engineer, 1994 – 1996

DuPont, Brevard, North Carolina

- Technical Services Engineer, 1991 – 1993

Continuing Education

- **Industrial Fluid Mixing** – AIChE, September 11 – 12, 2025
- **DIERS Basic Emergency Relief System Design** – AIChE, September 18 - 22, 2023
- **Elements of Risk Based Process Safety** – AIChE, August 29, 2022
- **Distillation in Practice** – AIChE, June 3, 2021
- **Oil & Gas Production Processes – Fundamentals** - December 20, 2020
- **Atmospheric Dispersion Modeling** – AIChE, June 25, 2020
- **Estimating the Vaporization Time in Batch Reactors** - December 6, 2018
- **Runaway Reactions** – AIChE, October 2, 2018
- **Line Breaking Safety** - September 6, 2018
- **Lockout/Tagout: Put a Lock on Hazardous Energy** - September 6, 2018
- **Process Safety Management for Bioethanol Plants** – CCPS, September 28, 2017
- **PHAst Training** – DNV-GL, May 16 – 18, 2016
- **Pressure Relief Basics** - September 14, 2015
- **Dust Explosion Prevention** – AIChE, September 4, 2015
- **Pneumatic Conveying of Bulk Solids** – AIChE, June 26, 2015
- **Layer of Protection Analysis (LOPA)** – AIChE, May 8, 2014

- **OSHA GHS & Hazard Communication Course** – USF OTI, November 21, 2013
- **International Symposium on Fire Investigation Science and Technology** - 2012, 2014, 2016, 2024
- **Chemical Reactivity Hazards** – AIChE, March 15, 2013
- **SynerGee Gas and Unsteady Module Training** - January 16 – 20, 2012
- **HazOp – Process Hazard Analysis** – AIChE, November 14 – 16, 2011
- **NCFS/TWGFEX Fire Dynamics** – NCFS, UCF, September 15, 2009
- **Advanced Fire, Arson, & Explosion Investigation Training Program** - NCFS, UCF, August 3 – 5, 2009
- **OSHA 503 Update for General Industry Outreach Trainers** - October 31 – November 2, 2007
- **U.S. Industrial and Consumer Labeling** – ChemAdvisor, Inc., September 27, 2007
- **Design and Evaluation of Process Safety Management Systems** – AIChE, March 19 – 21, 2007
- **Dust Explosions: Fundamentals and Modern Developments** – AIChE, April 23, 2006
- **Fire Science & Fire Investigation** – University of Edinburgh, April 3 – 7, 2006
- **Electricity and Fire** – The Institute of Fire Science, September 15 – 16, 2005
- **Basic Fire Investigation** - The Institute of Fire Science, September 12 – 14, 2005
- **Permit Required Confined Space Entry** - December 8 – 10, 2004
- **Hazardous Materials Incident Response Operations (HAZWOPER)** - 2004, 2010
- **OSHA 501 Trainer Course, OSHA General Industry** - November 10 – 13, 2003
- **Investigation of Gas and Electric Appliance Fires** – Fire Findings, November 7 – 8, 2002

Professional Affiliations

- American Institute of Chemical Engineers (AIChE)
- American Chemical Society (ACS)
- National Fire Protection Association (NFPA)
- National Association of Fire Investigators (NAFI)

Publications

“Avoiding Accidents and OSHA Citations by Knowing Your Combustible Dust Hazards,” **M. L. Hanks**, R. Kenney, Powder and Bulk Engineering, Vol. 26, No.12, December 2012

“Challenges in Investigating Chlorinated Polyvinyl Chloride Pipe Failures,” M. D. Hayes, **M. L. Hanks**, F. E. Hagan, D. Edwards, D. Duvall, Journal of ASTM International, Vol. 8, No. 1, Paper ID JAI102854, January 2011

"Failures Due to Product Changes: The Importance of Performance Testing when Making Product Modifications," **M. L. Hanks**, Journal of Failure Analysis and Prevention, Vol. 9 No. 6, pp 499-503, 2009

"Relative Importance of Macro- and Micro-Mixing in Turbulent, Reacting Jets," **M. L. Hanks** and H.L. Toor, I&EC Research, Vol. 34, pp 3252-3256, 1995

Presentations

"Case Study: Fire Investigation Involving Polymeric Materials and the Potential of Self Heating as a Possible Ignition Source", International Symposium on Fire Investigation Science and Technology, Orlando, FL, ISFI 2024.

"Proposed Dimensionless Parameters for Correlating Long-Term, Low-Temperature Ignition of Wood", International Symposium on Fire Investigation Science and Technology, Orlando, FL, ISFI 2024.

"Fire Chemistry and Thermodynamics; Hazardous Materials (Topics for NFPA 1033)" presented to the Liberty Mutual Fire Investigation Unit, May 24, 2017.

"Stratification During Vapor or Gas Freeing of Storage Tanks," **M. L. Hanks**, A. E. Gray, R. Pape, 13th Global Conference on Process Safety, San Antonio, TX, 2017

"Estimating Fuel Gas Concentration in an Enclosed Room," **M. L. Hanks**, A. E. Richards, R. Pape, International Symposium on Fire Investigation, Scottsdale, AZ, ISFI 2016

"Product Development and Products Liability" presented at The Hartford Southeast Commercial Claim Center, August 24, 2010

"Failure Investigation of a Modified Product: The Importance of Performance Testing When Making Small Changes to Existing Products" presented at The Society of Plastics Engineers Annual Technical Conference 2009.

"Chemical Hazards Before, During, and After a Fire" presented at the Georgia Fire Investigator's Association Spring Meeting, March 26, 2009

"Investigating Explosions" presented at The Hartford Southeast Claim Center, March 12, 2009

"Introduction to Process Safety Management" presented to the University of Michigan Chemical Engineering Department graduate and undergraduate students, March 22, 2007

Invited Guest Lecturer (CIV ENG 395-0 Engineering Forensics) at Northwestern University, Robert R. McCormick School of Engineering and Applied Science, 2006

"Why OSHA: An Introduction to OSHA General Industry Safety Regulations" presented to the University of Michigan Chemical Engineering Department graduate and undergraduate students, December 1, 2005

"A Primer on the Investigation of Fires and Explosions" presented to the Illinois Strike Force on Fire and Arson, October 15, 2003, and to the Ohio Association of Civil Trial Attorneys, June 18, 2004

Chair of the 2002 Automotive Elastomers Conference, Dearborn, MI



“Optimizing Simulated Molding Conditions Using Designed-Experiment Methods,” **M. L. Hanks** and W. Noble, C-Mold Users Group, 1995