

Timothy C. Korinek | Senior Metallurgist, Materials and Mechanical Engineer
PE, CFEI

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Professional Summary:

As a multidisciplined forensic engineer with over a decade of materials, metallurgical, and mechanical engineering experience, Timothy provides clients with valuable information to make informed decisions. His extensive background in failure analysis includes projects serving major insurance companies, adjusters, attorneys, defense contractors, manufacturers, and municipalities. He performs analyses on fractures, corrosion, metals, plastics & ceramics, electrical arcing and overheating evidence, fireplace and chimney fires, explosions, and various other investigations. Timothy performs investigations in the field and manages the facilities of the EFI Global Milwaukee Laboratory which includes a metallurgical / materials testing suite with Scanning Electron Microscope (SEM). Timothy is currently growing the plastics testing capabilities at the Milwaukee lab, which will have Fourier Infrared Transform Spectroscopy (FTIR) in house.

Timothy has performed failure analysis on a wide variety of systems, products, and components such as appliances, industrial machinery, electric motors, pumps, valves, circuit boards, weldments, plumbing fittings, and furniture.

Tim's areas of expertise include:

- Mechanical, Metallurgical, and Materials Failure Analysis
- Failure Analysis of Plastics
- Chimney, Fireplace, and Gas System Analysis
- Fracture Analysis
- Corrosion Damage
- Casting and Weld Analysis
- Analysis of Mechanical Systems
- Analysis of Electrical Overheating Damage

Licenses and Certifications:

Professional Engineer, Wisconsin, #45814

Professional Engineer, Michigan, #6201070063

Professional Engineer, Minnesota, #58085

Project Experience:

Synergy Forensic Engineering, Cedarburg, WI **Gas explosion**

After recovering artifacts from a field investigation, Timothy led the laboratory exam to uncover the cause of the gas leak. This involved recreating the piping system in the lab, measuring the flow from

the various possible subject piping rupture locations, and comparing these with the actual flow measurements recorded by the subject smart meter on the day of loss. He then carried out a metallurgical inspection on the component in question.

**Synergy Forensic Engineering, Cedarburg, WI
Manufacturer Field Return Analysis**

Timothy evaluated why a relay on a circuit board failed by overheating. He examined the switch contacts and the internal surfaces of the relay case and found that arc-tracking and metallic electromigration was occurring.

**Synergy Forensic Engineering, Cedarburg, WI
Injury**

Timothy evaluated a weld which failed on a steel shipping bracket for automotive lifts. He examined the failed subject parts at a joint exam. This involved stereo microscopy, examination in the SEM/EDS, and metallography.

Court Qualifications / Depositions:

Litigation CV available upon request.

Professional Experience:

Synergy Forensic Engineering, Mechanical and Materials Engineer, 2012 – 2021

Synergy Forensic Engineering, Engineering Technician, 2005 – 2012

Specialized Education:

International Association of Arson Investigators (IAAI) Wisconsin Chapter 25, General Fire Investigation Seminar, Topics: Internet Profiling & Intelligence Gathering, Case Study Burn Boston Burn Stevens Point, WI, June 2021

National Academy of Forensic Engineers (NAFE) On-line Conference - Forensic Engineering of Pedestrian and Fall Accidents, Electrical Shocks, Forklift Accidents, Ethics, Remote Forensic Inspections, Report Writing, and Publication Review, January 2021

NAFE On-line Conference - Forensic Deposition and Court Testimony, Video Depositions, Evidence Handling, Engineering CV Preparation, Daubert Hearing Case Review, August 2020

IAAI Wisconsin Chapter 25, General Fire Investigation Seminar, Manitowoc, WI - Residential Electrical and Gas Fires, Semi-Tractor Trailer and Heavy Equipment Fires, Utility Theft, Statewide Information Sharing Systems, September 2017

ISFI Science and Technology NAFI, Scottsdale AZ - Lithium-Ion Batteries, Receptacle Overheating, Arc Mapping, Heating Elements, Circuit Breakers, Vehicle Fires, Case Studies, Corrugated Stainless Steel Tubing (CSST), Fan Coil Units, Battery Cables, Eastern Kentucky University (EKU) Fire Science Program Development, and Energized Structures, September 2016

IAAI Wisconsin Chapter 25, General Fire Investigation Seminar, Stevens Point, WI - Preparing for Daubert Challenges, Civil Litigation Issues, Case Studies, Analytical Interviewing Techniques, Materials and their Reactions to Fire, and Photography, National Fire Protection Association (NFPA) 1033 – 1.3.7 (1, 8, 10, 11, and 15), June 2015

IAAI Wisconsin Chapter 25, General Fire Investigation Seminar, Green Bay, WI - Smoke detectors, Ignitable liquid research, evidence collection, forensic examination of fire debris, Vertical

ventilation research study, and investigative programs for iPads and tablets, NFPA 1033 – 1.3.7 (2, 3, 5, 6, 8, 9, 10, 11, 13, 14, 15, 16)., September-October 2014
National Association of Subrogation Professionals (NASP) Subro College 200 Training Session, Marshfield, WI - Investigation, expert reports, to litigation, to settlement, September 2014
IAAI Expert Witness and Courtroom Testimony Course, Manitowoc, WI, February 2014
IAAI Wisconsin Chapter 25, General Fire Investigation Seminar, Brookfield, WI - Wildland Fire Investigation, NFPA 1033, Qualifications, Vehicle Fire Investigation, Arc Mapping, and Fuel/air Explosions, November 2013
Dane County Arson Response Initiative (DCARI), Steve Carson, Elevated Fires, September 2013
Fireplace, Chimney, and Vent Inspection Seminar (F.I.R.E) Service, Moorpark, CA - Fireplace, chimney, and vent construction, inspection, NFPA 211, International Residential Building Code, failure modes, hands-on testing, became a Certified Fireplace Inspector, September 2013
Fire and Materials (FM) Conference, San Francisco, CA - Interscience Communications, January 2013
Roofing Inspection Course, Fox Valley Technical College, May 2010
IAAI International Assoc. of Arson Investigators) General Fire Investigation Seminars, WI: June 2009. Topics included Safety at the Fire Scene and Arc Mapping.
IAAI International Assoc. of Arson Investigators) General Fire Investigation Seminars, WI: June 2008, Topics included: Large Loss Fires, Kitchen fires, and case studies.
IAAI International Assoc. of Arson Investigators) Vehicle Fire Investigation Seminar, Nov. 2006, Sun Prairie, WI, Topics included: Vehicle fires investigation seminar, hands-on investigation of one (pre-burnt) vehicle per group, verbal report for each group given to seminar attendees.

Education:

Bachelor of Science, Mechanical Engineering, University of Wisconsin-Milwaukee, Milwaukee, WI 2021
Bachelor of Science in Materials Engineering, University of Wisconsin-Milwaukee, Milwaukee, WI 2012

Affiliations:

International Association of Arson Investigators (IAAI)
Fireplace Investigation Research and Education (F.I.R.E)
National Academy of Forensic Engineers (NAFE)
National Fire Protection Association (NFPA)
National Association of Fire Investigators (NAFI)
American Society for Testing and Materials (ASTM)
ASM International (ASM)

Presentations and Publications:

"The Metallurgy of Molten Oxides due to Overheating Poor Connections", National Academy of Forensic Engineers (NAFE), On-line conference, January 2021
"Poor Electrical Connections: Physical Features, Material Characterization, and Newly Identified Characteristic Traits, Before and After Fire Exposure" (Copper-Copper, Brass-Brass), ISFI Science and Technology NAFI, September 2018
"Pre- and Post-Flashover Characteristics of an Electrically Heated Poor Connection between Copper and Steel", Fire and Materials Conference, Interscience Communications, January 2013

