Exponent®
Engineering & Scientific Consulting

Mahdi Tlemsani, P.E., CFEI

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Professional Profile

Mr. Tlemsani is a licensed fire protection engineer with specialized knowledge of fire protection engineering, heat transfer, fluid mechanics, fire dynamics, and life safety systems that he utilizes to evaluate fire protection, suppression, and life safety systems, fire and explosion events, material and consumer-product thermal performance, gas and vapor-phase flammable atmospheres, ignitable liquids, hazardous activity and material environments, and smoke alarms. Mr. Tlemsani also has experience in design and testing of fire protection systems, detailed codes and standards assessments, hazard and risk analysis, laboratory testing, and in the evaluation of thermal exposure related to burn injuries.

Mr. Tlemsani's experience in evaluating the origin and cause of fires and explosions in residential, commercial, industrial, and storage occupancies includes evaluation of building systems (HVAC, gas, and electrical), failure analysis of fire protection systems such as automatic sprinkler and standpipe systems (failure of system components due to freezing, corrosion, improper design, or mechanical damage), commercial kitchen suppression systems, fire extinguishers, fire detection and smoke alarm systems, consumer products, and battery energy storage systems.

Mr. Tlemsani has experience in code consultation related to the design, installation, performance, and inspection, testing, and maintenance of water-, foam-, and chemical-based fire suppression or extinguishing systems or products. His experience includes evaluation of code-requirements in a variety of municipalities, and evaluating the performance of a given system against those requirements. His experience encompasses codes published by the National Fire Protection Association (NFPA), International Code Council (ICC), as well as local municipal requirements.

Mr. Tlemsani provides expertise in the development and performance of various fire and smoke experiments including those standardized and published by recognized bodies such as ASTM International (ASTM), National Fire Protection Association (NFPA), International Organization for Standardization (ISO), Underwriter's Laboratories (UL), and the Code of Federal Regulations (CFR). He has practical experience performing testing in accordance with standards such as ASTM E1354 (Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter), ASTM D92 (Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester), and UL 94 (Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing) as well as evaluating testing methodologies and results from a number of other standard tests such as ASTM E84 (Standard Test Method for Surface Burning Characteristics of Building Materials), ASTM E119 (Standard Test Methods for Fire Tests of Building Construction and Materials), and UL 217 (Single and Multiple-station Smoke Detectors).

Mr. Tlemsani's background includes practical experience in software tools such as MATLAB and Python, and CFD modeling through Fire Dynamics Simulator, CFAST. and CONTAM. Combined with his knowledge in fire dynamics and heat transfer this allows Mr. Tlemsani to effectively model fire spread, gas

filling and movement in structures, model thermal exposure, and evaluate performance of smoke management systems.

Prior to joining Exponent, Mr. Tlemsani conducted firebrand pyrometry research at the University of Maryland in the Department of Fire Protection Engineering. The graduate research involved the development of a novel color-camera pyrometry method to evaluate the temperatures of firebrands at various windspeeds with unprecedented repeatability and resolution. This involved knowledge of camera optics and image analysis outside of the thermal science knowledge required such as radiative heat transfer and fluid mechanics. The research culminated in findings on the temperature-time distribution of firebrand piles on an inert substrate used to inform a model of heat flux to the surrounding surface around the firebrand pile. This research was funded by Underwriters Laboratories (UL). In addition, Mr. Tlemsani has experience conducting research for the National Institute for Standards and Technology studying the mass and size distribution of firebrands across multiple tree species and moisture contents.

Academic Credentials & Professional Honors

M.S., Fire Protection Engineering, University of Maryland, College Park, 2022

B.S., Fire Protection Engineering, University of Maryland, College Park, 2021

Alternate Member: NFPA 80, Standard for Fire Doors and Other Opening Protectives, National Fire Protection Association, 2024 – present

Licenses and Certifications

Professional Engineer Fire , California, #2395

Certified Fire and Explosion Investigator (CFEI)

Prior Experience

Graduate Researcher, University of Maryland (UMD), 2021-2022

Undergraduate Researcher, National Institute of Standards and Technology (NIST), 2020

Professional Affiliations

National Association of Fire Investigators — NAFI (member)

National Fire Protection Association — NFPA (member)

Society of Fire Protection Engineers — SFPE (member)

International Association of Arson Investigators – IAAI (member)

Publications

Presentations

Tlemsani, M. Measurement of Firebrand Pile Temperatures and Heat Fluxes Using Color-Camera Pyrometry. Society of Fire Protection Engineers (SFPE) SFPE 23 Annual Conference and Expo, October 8-12, 2023.

Additional Education & Training

Commercial Kitchen Fires 2: Investigation, (3 hours tested), 2025

Sprinklers, Systems & Fire Protection Solutions Hands-On Training, Viking, 2024

Appliance Fires Training, Maryland Fire and Explosion Investigators Association, (8 hours tested), 2024

Hands-on Fire Sprinkler System Inspection, Testing & Maintenance Training, General Air Products, 2024

Fire Chemistry, (3 hour tested), 2024

Fire Investigation Scene Safety, (3 hour tested), 2024

Residential Natural Gas Systems, (3 hour tested), 2024

Explosion Dynamics, (4 hour tested), 2024

Commercial Kitchen Fires 1: Fundamentals, (3 hour tested), 2024

Fire Flow Analysis, (3 hour tested), 2023

Effective Investigation and Testimony, (3 hour tested), 2023

Critical Evaluation and Testing of Commonly Reported Accidental Causes, (3 hour tested), 2023

Documenting the Event, (4 hour tested), 2023

Ethics and the Fire Investigator, (3 hour tested), 2023

NFPA 1033 and Your Career, (2 hour tested), 2023

The Practical Relationship Between NFPA 1033 and NFPA 921, (2 hour tested), 2023

FED Kitchen Suppression System Inspection, Testing, and Maintenance Hands-On Training, (13 hours tested), 2023

Fire Protection Systems, (3 hour tested), 2022

The Scientific Method for Fire and Explosion Investigation, (3 hour tested), 2022

National Association of Fire Investigators (NAFI), Advance Fire Investigation Training, 2022

Keyence VHX-7000 Microscope Training, 2022