ALI ASHRAFI, PH.D., P.E., CFEI

Principal

Summary

Dr. Ali Ashrafi joined Thornton Tomasetti in 2006 and has extensive experience in forensic investigations, emergency response, structural design, fire performance-based design, renovation, deconstruction engineering, seismic and performance-based design, advanced analytics, and nonlinear and dynamic analysis. He has also acted as an expert witness providing sworn testimony. Dr. Ashrafi is an adjuct professor at Columbia University, having taught Introduction to Structural Fire Engineering as well as Earthquake and Wind Engineering. He is a member of several professional organizations and has served as a vice-chair of ASCE Fire Protection Committee. Dr. Ashrafi is a frequent speaker at industry and technical events and has published widely on his work.

Areas of Technical Expertise

- Forensic Engineering
- Fire Investigations
- Deconstruction Engineering

Education

- Ph.D., Civil Engineering and Engineering Mechanics, 2006, Columbia University
- M.Sc., Civil Engineering, 2003, New Jersey Institute of Technology
- B.Sc., Civil Engineering, 2000, Sharif University of Technology, Tehran, IRN

Registrations

- Licensed Professional Engineer in CA, DC, MD, NY, TN and VA
- Certified Fire and Explosion Investigator

Professional Activities & Awards

- Adjunct Assistant Professor, Columbia University, Earthquake and Wind Engineering, 2011-present; Introduction to Structural Fire Engineering, 2020
- Fire Protection Committee, American Society of Civil Engineers (ASCE); Member, 2019-present; Vice-Chair, 2019-2021
- Dynamics Committee, American Society of Civil Engineers (ASCE), 2006-present
- Member, Society of Fire Protection Engineers (SFPE), 2018-present
- Fire Codes Committee, ACEC Metro Region, 2017-present
- Reviewer, Fire Safety Journal, Journal of Engineering Mechanics, Journal of Performance of Constructed Facilities, Journal of Geotechnical and Geoenvironmental Engineering

Select Project Experience

Investigations

Sceye, Inc. v. IF P&C Insurance Company Ltd., Roswell, NM. Litigation support services regarding the nature of the airship hangar structure and its cladding.

Wind Turbine Collapse, Bronx, NY. Investigation of the collapse of a wind turbine that was built on top of a 200-foot-tall support mast. The cause of the collapse was investigated and the report was issued to the New York City Department of Buildings.

Concrete Structure Fire, Undisclosed location. Investigation of a large concrete structure that experienced fire during construction and sustained significant damage to beams, columns, girders, retaining walls and bearing. Specified non-destructive and destructive testing and directed the structural repairs to the damaged building.

Parking Garage Fire, New York, NY. Fire investigation services to assess the conditions of a mixed steel-concrete parking structure after the building was exposed to fire and heat as a consequence of a fire event. Accessibility and safety of the venue was surveyed and reconstruction plans were reviewed to ascertain the safety of the building.

Parking Garage Fire, Undisclosed location. Fire investigation services to assess the conditions of a prestressed concrete parking structure after the building experienced a fire for several hours due to multiple vehicles catching fire. The conditions of the structural members were surveyed and the results of material tests were reviewed to assess the conditions of the structure.

House Fire, Undisclosed location. Investigation of a house fire resulting in a fatality.

Bike Shop Fire, Undisclosed location. Investigation of the damage by fire in a bike shop to determine the extent of damage to bikes.

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Ceiling Height Impact on Fire Safety, Undisclosed location. Performed an analytical study of the impact of ceiling height on fire safety in residential units. Considering heat and breathability, the study quantified how ceiling height affects the time that a room remains viable in the early stages of a fire.

Evacuation of Office Building in Fire, Undisclosed location. This project involved modeling evacuation of an office building during a fire including the effects of smoke and heat on occupants. Several fire scenarios were analyzed using agent-based models accounting for the distribution of age, health, and gender of occupants and the layout of the floors as well as the notification and evacuation procedures for the building. Vulnerabilities were identified and risk mitigation approaches were suggested.

Tower Crane Collapse, Undisclosed location. Investigation of a crane collapse involving a fire incident.

Tower Crane Collapse, Undisclosed location. Investigation of the cause of the collapse of two tower cranes in a wind event.

I-35 West Bridge Collapse, Minneapolis, MN. Forensic investigation of vehicular bridge collapse, on behalf of consortium of attorneys representing the victims. Scope included forensic information model to catalog and access 40 years of inspection data, collapse analysis, and nonlinear finite element model to simulate the collapse initiation.

Sherman Minton Bridge, Spans from Louisville, KY to New Albany, IN. Peer review of a fatigue-critical bridge connecting Kentucky to Indiana over the Ohio River. Thornton Tomasetti recommended shutting down the bridge and also provided peer review of proposed repairs and analysis of the existing structure.

Office Building Façade Investigation, Hauppauge, NY. Investigated the causes of cracking and leaking in the façade of a newly constructed office building.

Landslide Damage to House, Undisclosed location. Investigation of the cause of landslide and water main break leading to damage to a house.

Building Fire Damage, New York. Investigation of fire-induced damage in a hospital building during construction.

Canopy Walkway Collapse, Atlanta, GA. Evidence retention, safe demolition processes, and a forensic investigation following the 2008 collapse of a suspended pedestrian walkway during construction.

Blast Furnace Rupture, Undisclosed location. Forensic investigation of the explosion and rupture of the shell of a 90-year-old blast furnace.

203 West 90th Street, New York, NY. Investigation of the causes of damage to the façade of a 13-story structure, including a 6-story light gage steel-framed structure at the top.

CAT-90 Sandy, New York, NY. Damage assessment and repairs related to the water inundation of multiple facilities in New York, New Jersey and Connecticut; specifically as it relates to structural evaluation, HVAC, electrical, plumbing and fire protection equipment and systems.

Sworn Testimony

Deposition, Sceye, Inc. v. IF P&C Ins. Co., Ltd, United States District Court for the District of New Mexico, March 29, 2021.

Select Publications and Lectures

"Investigation of Fire Impact on Buildings and Their Occupants", DRI 2023 Fire Science and Litigation Seminar, Washington, DC, August 2023 (co-presenter)

"Fire Safety for Energy Storage Systems", Fire Science Show, August 2023 (co-presenter)

"Resilience of Structures in Fire", Resilience through Fire Engineering Seminar, Structural Engineers Association of New York, June 2023 (presenter)

"Advancing Structural Fire Engineering with Professional Committees", Structures Congress 2023, New Orleans, May 2023 (moderator)

"Comparison of Prescriptive and Performance-Based Wind Design: A Case Study", Structures Congress 2023, New Orleans, May 2023 (co-presenter)

"Why Lithium-ion Batteries Pose Fire Safety Concerns for Buildings," Building Design + Construction, January 9, 2023 (co-author)

"Allocation of Damage Between Multiple Events: the Role of the Expert," ABA Forum on Construction Law Regional Meeting, Washington, DC, December 2022 (co-presenter)

"Implications of Li-ion technology for structural design," SFPE Annual Conference, Detroit, MI, October 2022 (presenter)

"Protecting Critical Infrastructure – Safety Considerations for Lithium-ion Batteries in Data Center UPS and Energy Storage Systems," 7x24 Exchange Fall Conference, San Antonio, TX, October 2022 (co-presenter)

"After Twin Parks: Fire Safety Resilience of Existing Tall Buildings," Christian Regenhard Center for Emergency Response Studies, John Jay College of Criminal Justice, May 2022 (co-presenter)

"Changing Building Designs to Safely Accommodate Large-Scale Li-ion Energy Storage and Electric Vehicles," SFPE Grand Challenge Summit, April 2022 (presenter)

"Performance-Based Structural Fire Design of Buildings," NCSEA Structural Engineering Summit, New York, NY, February 2022 (presenter)

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"Why, When and How to Leverage Performance-based Structural Fire Design," Cross Section, Structural Engineers Association of New York (SEAoNY), Vol. 27, No. 2, 2022 (co-author)

"Energy Storage: Key Fire Research Needs on Path to Decarbonization," ASTM International Committee E05 on Fire Standards, December 2021 (presenter)

"Resilient Design for Firefighter Safety", Fire Science Show, October 2021 (presenter)

"Performance-Based Structural Fire Engineering for Firefighter Safety," SFPE Annual Conference, Baltimore, MD, October 2021 (presenter)

"Investigation of Fire Impact on Buildings and Their Occupants," DRI Fire Science and Litigation Virtual Seminar, February 2021 (presenter)

"Performance-Based Fire Design of Buildings: Implications for Firefighting," Christian Regenhard Center for Emergency Response Studies, John Jay College of Criminal Justice, February 2021 (presenter)

"Potential Insights from Performance-Based Design of Fire Protection in Tall Buildings," 2019 IABSE Congress, New York, NY, September 4-6, 2019 (co-author, co-presenter)

"Potential Insights from Performance-Based Design of Fire Protection in Tall Buildings," IFireSS 2019, Ottawa, ON, Canada, June 5-7, 2019 (co-author, co-presenter)

"Application of Performance-Based Fire Engineering to Existing Structures and Forensic Investigations," ASCE Forensic Engineering 8th Congress, Austin, TX, November 29-December 2, 2018 (co-author, co-presenter)

"Performance-Based Fire Engineering for Hazard Assessment of Tall Buildings," 40th IABSE Symposium, Nantes, France, September 19-21, 2018 (co-author, co-presenter)

"Performance-Based Fire Resilience Evaluation of a Tall Building Structure," Performance-Based Codes and Fire Safety Design Methods, Oahu, HI, April 25-27, 2018 (co-author, co-presenter)

"A modal approach to determine direct shear of beams subjected to impulse," Journal of Engineering Structures, Vol. 156, 2018 (co-author)

"Performance-Based Assessment and Mitigation of Fire Hazard for Bridges," 39th IABSE Symposium, Vancouver, BC, Canada, September 21-23, 2017 (co-author, co-presenter)

"Nonlinear Dynamic Analysis: Case Studies," Proceedings of NAFEMS World Congress 2017, Stockholm, Sweden, June 11-14, 2017 (co-author, co-presenter)

"Adaptive analysis for performance-based fire protection of bridges," IFireSS 2017, Naples, Italy, June 7-9 2017 (co-author, co-presenter)

"Performance Based Fire Engineering: Sensitivity Analysis and Design Parameters," 9th International Conference on Structures in Fire, Princeton, NJ, June 8-10, 2016 (co-author, co-presenter)

"Lifting Columns of Existing Structures under Existing Loads," ASCE Forensic Engineering 7th Congress, Miami, FL, November 15-18, 2015 (co-author, co-presenter)

"Performance Based Seismic Design of Soyak Crystal Tower–Getting a Safer and More Economical Design," Second European Conference on Earthquake Engineering and Seismology, Istanbul, Aug 25-29, 2014 (co-author, co-presenter)

"More Optimal Seismic Design of Highrise Structures Using Nonlinear Analysis Techniques," The Fifth International Conference on Structural Engineering, Mechanics and Computation, Cape Town, South Africa, Sep. 2-4, 2013 (author, presenter)

"Nonlinear Dynamic Analysis as a Tool for More Optimal Seismic Design of Tall Buildings," Structural Engineering International, 23(2), 141-147, 2013 (author)

"Evaluation of super-tall steel columns subjected to blast loading using SDOF and Finite Element Analysis methods," 11th International Conference on Structural Safety and Reliability, New York, NY, 2013 (co-author, co-presenter)

CONTACT

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