

LILING CAO, PH.D., P.E., LEED AP

Principal



Summary

Dr. Cao leads Thornton Tomasetti's Advanced Analytics group and has extensive experience analyzing structural performance. She is skilled in such areas as damage assessment, material durability and service life assessment, structural testing, failure investigation, structural stabilization and rehabilitations. Dr. Cao works with building owners and contractors to address structural and material issues that arise in design, construction and service conditions. She provides litigation support for design and construction investigations involving a wide range of structures including commercial and residential buildings, parking garages, bridges, temporary structures and industrial facilities.

Areas of technical expertise

- Forensic Structural Engineering
- Forensic Material Investigation
- Structural Stabilization and Rehabilitations
- Emergency Response

Education

- Ph.D., 2007, Lehigh University
- M.S.C.E., 2002, Zhejiang University, China
- B.S.C.E., 1999, Zhejiang University, China

Registrations

- Licensed Professional Engineer in NY, NJ, NV, MD, TN, WV and Nova Scotia, Canada
- LEED Accredited Professional

Professional activities

- Member, American Society of Civil Engineers (ASCE)
- Member, American Institute of Steel Construction (AISC)
- Member, American Concrete Institute (ACI)
- Adjunct Associate Professor, Manhattan College, since 2020

Honors and awards

- U.S. Frontiers of Engineering Symposium, National Academy of Engineering, 2017
- Charles C.Zollman Award, Precast/Prestressed Concrete Institute, 2006, 2009

Select project experience

Forensic Structural Engineering

I-35 West Bridge Collapse, Minneapolis, MN. Forensic investigation of vehicular bridge collapse including forensic information model, collapse analysis, and non-linear finite element model to determine the cause of bridge failure.

Confidential building, Brooklyn, NY. Investigation of damage in concrete shear wall during construction. Service included field investigation of the construction defects in reinforced concrete walls, columns, pilasters using destructive and non-destructive testing methods, code compliance review and repair schemes.

Confidential Project, Abu Dhabi, UAE. Investigation of the water damage and corrosions in the basement levels at the medical building.

Confidential Rail Investigation, PA. Forensic investigation of more than five miles of elevated light rail line, including the finite element analysis of the concrete haunch distress, expert report and repair schemes.

Grain Bin, Prince Rupert, British Columbia. Forensic investigation involving structural design and construction related defects of four 108-foot tall by 90-foot diameter bins and standard of care issues related to delegated design.

Studebaker Building, New York, NY. Condition assessment of the structural damage due to foundation settlement from adjacent construction and investigation of the structural stability.

Forensic Material Investigation

Confidential project, New York, NY. Condition assessment of the damage of concrete piers during construction. Service included concrete inspection, design review, material composition investigation to determine the cause of concrete damage.

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Fireproofing Matter, New York, NY. Material investigation and field testing to determine the cause of cementitious fireproofing material damage.

Structural Stabilization and Rehabilitations

315 E. 149th St, Bronx, NY. Condition assessment, structural stabilization and remedial measures of the post-tensioned parking garage following the damage of the concrete slab.

Pratt Institute Main Building, Brooklyn, NY. Structural stabilization and restoration of the extensive damage to the Main Building following a six-floor fire, including masonry repair, reconstruction of the heavy-timber structure at upper floor and design for a new green roof.

Sherman Minton Bridge, Spans from Louisville, KY to New Albany, IN. Peer review and retrofit of a fracture critical bridge.

Rockefeller University, Stavros Niarchos Foundation-David Rockefeller River Campus, New York, NY. Structural design, advanced analysis and on-site engineering service to brace frame field alternations during construction of an 180,000-square-foot laboratory building above a highway.

Emergency Response

94 E 208th Street, New York, NY. Emergency stabilization, deconstruction engineering for a multi-story under-construction building collapse.

215 Flatbush Ave, Brooklyn, NY. Emergency retrofit, shoring, monitoring and repair of three buildings due to foundation settlement from adjacent construction.

Hoist Platform, Long Island City, NY. Emergency response, peer review and site presence to determine the cause of hoist common platform leg failure, engineering service to deconstruction and reconstruction of the hoist platform framing.

Sworn testimony

Deposition, King Range, Jr. vs. 230 W. 41st Street LLC, NY. November 26, 2019.

Litigation

Grandview at Riverwalk Port Imperial Condominium, West New York, NJ. Litigation support for a claim regarding the structural damage due to foundation settlement.

Bridge Collapse, Bogota, COL. Litigation support to determine cause and origin of a bridge collapse over the Charte River.

Confidential Cable-Stayed Bridge, Ontario, Canada. Litigation support for a claim of the bridge bearing failure.

Waste Water Treatment Plant, OH. Litigation support to investigate the design and construction of precast concrete structure, and determine the cause of concrete damage and water leaks.

Confidential high-rise building, New York, NY. Litigation support for a claim of the building movement during construction.

Alternative dispute resolution

Brooklyn Park Bridge, New York, NY. Mediation with regard to the design and construction defects of a timber pedestrian bridge transversing a park and roadway.

Select papers, lectures and publications

"Construction Documents; Effects on Field Issues and Accidents," ASCE Forensics Engineering 8th Congress, Austin, TX, Nov.29 – Dec. 2, 2018 (co-author)

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

"Modeling Failure Progression in Structures Informed by Demolition," CFRAC 2015, the Fourth International Conference on Computational Modeling of Fracture and Failure of Materials and Structures, Paris, France, June 3-5, 2015 (co-author)

"Forensic Information Modeling in Bridge Renovation: Sherman Minton Bridge," IABMAS 7th International conference on Bridge Maintenance, Safety and Management, Shanghai, China, July 7-11, 2014 (presenter, co-author)

"Investigation of Sprayed Fire-Resistive Material and In-Situ Bond Failure," ASCE Forensic Engineering 7th Congress, Miami, FL, November 15-18, 2015 (co-author)

"Investigation of Fragment Impact and Blast Shock Wave on Window Breakage View Abstract," ASCE Forensic Engineering 7th Congress, Miami, FL, November 15-18, 2015 (co-author)

"Calculating Collapse: Analytical Approaches for Investigating the Cause of the I-35 West Bridge Failure," 5th International Conference for Forensic Engineering, London, UK, April 16-17, 2013 (co-author)

"Forensic Investigation Modeling: A New Forensic Tool," ASCE Civil Engineering, January, 2013 (co-author)

CONTACT

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