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

Senior Principal

Summary

Dr. Liling 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 NJ, NY, MD, NV, TN, WV, WY and Nova Scotia, Canada

Professional Activities

- Member, American Society of Civil Engineers (ASCE)
- 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

Arecibo Telescope Collapse, Puerto Rico. Investigation to determine the cause of a cable-supported 900-ton instrument platform collapse.

I-35 West Bridge Collapse, Minneapolis, MN. Investigation to determine the cause of the steel truss bridge collapse.

Confidential Building, Brooklyn, NY. Investigation of construction defects in the reinforced-concrete structure, including non-destructive testing, lab testing, analysis and preparing repair details.

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

Grain Bin, Prince Rupert, British Columbia, Canada.Investigation of structural design and construction-related defects of four 108-foot-tall by 90-foot-diameter bins.

Forensic Material Investigation

Confidential Project, New York, NY. Investigation to determine the cause of concrete pier damage.

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

Emergency Response

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

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

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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. Post-fire stabilization and restoration of the main building, including masonry wall repair and heavy-timber structure reconstruction.

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

Sworn Testimony

Deposition, King Range, Jr. v. 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 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

"Fracture-Critical Bridge Components Subject to Fatigue Loading," Proceedings of 11th International Conference on Bridge Maintenance, Safety and Management, Barcelona, Spain, July 11-15, 2022 (co-author)

"Influence of Diaphragm Flexibility on Response Modification Factor," 17th World Conference on Earthquake Engineering, Sendai, Japan, September 27–October 2, 2021 (co-author)

"Partial Damage Distribution and Progressive Collapse of Buildings," ASCE Structural Congress 2020, April 5-8, 2020, St. Louis, MO, 2020 (co-author)

"Rails in Retractable Roofs: Overview of the Design Methodology and a Case Study," ASCE Forensics Engineering 8th Congress, Austin, TX, November 29–December 2, 2018 (co-author)

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

"Analysis Method for Reinforcing Circular Openings in Isotropic Homogeneous Plate-Like Structures Subjected to Blast Loading," Advances in Civil Engineering, Vol. 2018, Article ID 4071732 (co-author)

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

"Equivalent SDOF Model for Estimating Blast-Induced Dynamic Reactions of Equilateral Triangular Hardened Wall Elements," Proceedings of VII European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS), Crete Island, Greece, June 5-10, 2016 (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)

"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-presenter)

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

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"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)

"Evaluation of Super-Tall Steel Columns Subjected to Blast Loading Using SDOF And Finite Element Analysis Methods," 11th International Conference on Structural Safety & Reliability (ICOSSAR), New York, NY, June 16-20, 2013 (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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