

# 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 under natural and man-made events. She is skilled in such areas as damage assessment, material durability and service life assessment, structural testing, failure investigation, emergency response, structural stabilization and rehabilitations. Dr. Cao is specialized in addressing 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. Dr. Cao is an Adjunct Professor teaching a course at Manhattan College.

## Areas of Technical Expertise

- Forensic Structural Engineering
- 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 CT, FL, 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 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

**Champlain Tower South**, Surfside, FL. Investigation to determine the cause of the tower collapse.

**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.

**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, *Aff. FM Ins. v. Budget Glass Cleaning, Inc.*, NY. September 27, 2023.

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 near Hudson River.

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

"Case studies of Construction Vibration Monitoring and Evaluation Through Soil-Structure Interaction," 9th ASCE Forensic Engineering Congress, Denver, CO, November 4–November 7, 2022 (co-author)

"Service Life Prediction of Concrete Parking Structures: Case Studies," 9th ASCE Forensic Engineering Congress, Denver, CO, November 4–November 7, 2022 (co-author)

"Silo Discharge Design and Construction Influences on Wall Pressures," 9th ASCE Forensic Engineering Congress, Denver, CO, November 4–November 7, 2022 (co-author)

"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)

"Improving High-rise Steel Moment-resisting Frame Seismic Performance by Using Modular Hinged Wall with BRBs," 12th National Conference on Earthquake Engineering, Salt Lake City, Utah, June 27–July 1, 2022 (co-author)

"Evaluation of Prestressed Reinforced Concrete Slab Punching Shear Using Finite Element Method," IABSE Symposium, May 25–May 27, 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)

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

"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)

"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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