Hamid Lotfi, Ph.D., P.E.

SENIOR ENGINEER

Dr. Lotfi has more than 25 years of experience in structural assessment, structural rehabilitation, failure investigation, seismic evaluation, and nonlinear finite element simulation of structures. He has applied his expertise to evaluation, retrofit design, and failure investigation of concrete, steel, and masonry structures including buildings, bridges, parking structures, industrial structures, environmental structures, pipelines, and foundations.

Dr. Lotfi has developed and implemented several finite element analytical models for failure analysis of concrete and masonry structures. He has conducted extensive static and dynamic finite element analysis of concrete, steel, and masonry structures that involve extreme geometrical and material nonlinearities, instability, impact, and collapse. He is experienced in nonlinear transient heat transfer finite element analysis of structures including mass concrete thermal control. He has developed special-purpose computer programs, linked to commercial finite element software, to make everyday analysis and design of complex structures feasible and easy for the design professionals.

Academic Credentials

Ph.D. in Civil Engineering
University of Colorado at Boulder, 1992

M.S. in Civil Engineering
University of Tehran, Iran, 1986

Licensure/Certification

Professional Engineer
CA

Professional Affiliations

American Concrete Institute

American Institute of Steel Construction

American Society of Civil Engineers (Past member)

Contact Information

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Skokie, Illinois 60077

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Representative Project Experience

Failure Analysis

- Conducted dynamic and stability analysis to identify the root cause of a prestressed concrete bridge girder collapse during construction in the Southeast.
- Conducted stability analysis to identify the root cause of a prestressed concrete bridge girder collapse during construction in the Southwest.
- Conducted nonlinear material and stability analysis to identify the root cause of a steel truss bridge collapse in the Midwest.
- Coordinated nonlinear finite element analyses to investigate the partial collapse of a reinforced concrete parking garage on the East Coast.

Structural Evaluation and Strengthening

- Conducted nonlinear finite element analysis to evaluate strength and failure mode of the roof of a post-tensioned concrete building in the Southwest and peer reviewed design and strengthening calculations.
- Conducted nonlinear phased finite element analysis and design calculations to evaluate the capacity of a cracked, prestressed concrete pressure pipeline in the Midwest and a distressed and failed large-diameter prestressed concrete pressure pipeline in a U.S. territory.
- Performed finite element structural analysis to evaluate the existing concrete mat foundation based on field conditions and the stability of the supported chimney for a power plant in Colorado.
- Performed finite element structural analysis of the reinforced concrete intake structure of a dam in Arizona to evaluate the response of the intake structure including the demand on the vanes due to hydrodynamic pressures generated by water flow.
- Performed finite element structural analysis of the precast concrete waste water tank at a chemical facility to investigate the cause of spalling and leakage and to develop repair methods.
- Performed finite element structural analysis of the concrete filter basins at an irrigation plant to evaluate extent, significance, and potential causes of basin wall cracking, and develop appropriate retrofit measures.

Seismic Investigation, Seismic Retrofit and Design

- Conducted nonlinear dynamic finite element analysis to assess seismic damage to buildings and parking structures on the West Coast.

- Performed finite element analysis of a Nuclear Plant Condensate Storage Tank subjected to gravity and seismic loads and designed the foundation retrofit to ensure that it be credited in the station FLEX plan.
- Analyzed and designed a reinforced concrete pedestal for the support of a large deep space antenna in California.

Bridges

- As a part of structural evaluation of a suspension bridge in Turkey, conducted rain flow analysis of strain gage data and finite element analysis of instrumented hanger connections.
- Conducted finite element analysis to identify the source of cracking and bond failure of precast prestressed concrete panels of a bridge on the West Coast.

Fire Engineering, Heat Transfer Analysis, Mass Concrete Thermal Control

- Conducted nonlinear steady state and transient heat transfer finite element analysis of high-strength concrete columns to determine ultimate capacity under fire.
- Conducted steady state heat transfer finite element analysis of an insulated concrete masonry unit to evaluate the thermal resistance and a reinforced concrete notched beam to study the heat flow.
- Performed finite element thermal and structural analyses to evaluate a reinforced concrete gasifier support structure, at an Energy from Waste Facility in UK, subjected to various gravity and high thermal loadings from the supported gasifier vessel.
- Participated in developing thermal control plans for mass concrete for more than a dozen projects.

Special-Purpose Programs

- Developed computer programs for the analysis and design of tank foundations
- Developed a computer program for nonlinear analysis of prestressed concrete pressure pipes.

Publications

Roller, J. J., and Lotfi, H. R, “Proposed Simplified Changes to ANSI/AWWA C304 Standard for Design of Prestressed Concrete Cylinder Pipe”, Proc. of the ASCE Pipeline Conference, Baltimore, MD, 2015.

Lotfi, H.R., Oesterle, R. G., and Roller, J., “Reliability Assessment of Distressed Concrete Cylinder Pipe”, Proc. of the ASCE Pipeline Division Specialty Conference, Houston, TX, pp. 838-852, 2005.

Lotfi, H. R. and Oesterle, R. G., “Analysis and Design of Slab Track Laboratory Specimens”, PCA R&D Serial No. 2795a, Portland Cement Association, Skokie, IL, 2007.

Lotfi, H. R. and Oesterle, R. G., “Slab Tracks for 39-Ton Axle Loads, Structural Design”, PCA R&D Serial No. 2832, Portland Cement Association, Skokie, IL, 2005.

Mehrabi, A. B., Tabatabai, H., and Lotfi, H.R., “Damage Detection in Structures Using Precursor Transformation Method”, Journal of Intelligent Material Systems and Structures, Vol. 9, No. 10, pp. 808-817, 1999.

Mehrabi, A. B., Tabatabai, H., and Lotfi, H. R., “Precursor Transformation Method for Damage Detection in Structures”, 5th Annual International Symposium on Smart Structures and Materials Proceedings, SPIE, pp. 232-243, 1998.

Oesterle, R.G. and Lotfi, H.R., "Transverse Movement in Skewed Integral Abutment Bridges", Proceedings of the FHWA Integral Abutment and Jointless Bridges Conference, Baltimore, 2005.

Azizinamini, A., Pavel, R., and Lotfi, H.R., "Effect of Cross Bracing on Seismic Performance of Steel I-Girder Bridges", ASCE Structural Congress, pp. 751-755, 1997.

Lotfi, H.R., and Munshi, J.A., "Preliminary Analytical Investigation of High-Strength Concrete Column Structural Performance Under Fire Loading", Report to Portland Cement Association, Skokie, IL, 2001.

Lotfi, H.R., and Shing, P.B., "Embedded Representation of Fracture in Concrete with Mixed Finite Elements", International Journal of Numerical Methods in Engineering, V38, pp. 1307-1325, 1995.

Lotfi, H.R., and Shing, P.B., "Analysis of Concrete Fracture with an Embedded Crack Approach", Proc. of International Conference on Computer Aided Design of Concrete Structures, Austria, 1994.

Lotfi, H.R., and Shing, P.B., "Interface Model Applied to Fracture of Masonry Structures", ASCE Journal of Structural Engineering, V120(l), pp. 63-80, 1994.

Shing, P.B., Brunner, J.D., and Lotfi, H.R., "Analysis of Shear Strength of Reinforced Masonry Walls", Proc. of 6th North American Masonry Conference, pp. 1133-1144, 1993 (Outstanding Conference Paper Award).

Shing, P.B., Brunner, J.D., and Lotfi, H.R, "Evaluation of Shear Strength of Reinforced Masonry Walls", Masonry Society Journal, 1993.

Lotfi, H.R., and Shing, P.B., "Analysis of Masonry Walls with Smeared and Discrete Crack Models", ASCE Structural Congress, pp. 1179-1184, 1993.

Shing, P.B., Lotfi, H.R, Barzegarmehrabi, A., and Brunner, J.D., "Failure Analysis of Masonry Structures", Proc. of 9th ASCE Engineering Mechanics Conference, New York, NY, pp.780-783, 1992.

Shing, P.B., Lotfi, H.R, Barzegarmehrabi, A., and Brunner, J.D., "Finite Element Analysis of Resistance of Masonry Wall Panels With and Without Confining Frames", Proc. of 10th World Conference on Earthquake Engineering, pp. 2581-2588, 1992.

Lotfi, H.R., and Shing, P.B., "Nonlinear Finite Element Analysis of Reinforced Masonry Shear Walls", Computational Methods and Experimental Measurements V, A. Sousa et al., Eds., Elsevier Applied Science, New York, NY, pp. 519-530, 1991.

Lotfi, H.R., and Shing, P.B., "An Appraisal of Smeared Crack Models for Masonry Shear Wall Analysis", Computers and Structures Journal, 41(3), pp. 413-425, 1991.

Shing, P.B., and Lotfi, H.R., "Experimental and Finite Element Analysis of Single-Story Reinforced Masonry Shear Walls", Computer Methods in Structural Masonry, J. Middleton, and G.N. Pande, Eds., Books and Journals International, Swansea, UK, pp. 74 83, 1991.

Hamid Lofti, Ph.D., P.E.

Prior Experience

CTLGroup, Skokie, Illinois
Senior Engineer, 2000 - Present
Engineer, 1997 – 1999

University of Nebraska-Lincoln, Nebraska
Research Associate, 1995 – 1996

University of Colorado at Boulder, Colorado
Research Associate, 1993 - 1994
Research Assistant, 1988 – 1992

Architectural and Urban Design Consulting Engineers, Mashad, Iran
Engineer, 1986 - 1987

Sano Consulting Engineers, Tehran, Iran
Engineer, 1985