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Engineering & Scientific Consulting

Vijay Saraf, Ph.D., P.E.

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Professional Profile

Dr. Saraf is a Principal Engineer with more than 25 years of experience in failure analysis, design, damage assessment, and repair design of steel, concrete, wood, and composite structures; evaluation of structural response to blast, impact, earthquake, flood, and fire loading; and assessment of structural performance. His expertise extends to the evaluation of bridges and transportation structures, buildings and building components, pipelines and other buried structures, storage tanks and silos, shoring systems and temporary works, cranes and mechanical equipment, and marine and port structures.

He has conducted numerous reviews of design and construction or installation procedures to assess code compliance, margin of safety, and standard-of-care considerations in matters involving structural collapses, component failures, construction defects, material-related issues, contractor means and methods, fatigue- and fracture-related failures, independent technical peer review of critical structures, construction-stage accidents, and technical review of construction delay claims.

In his forensic practice, Dr. Saraf is retained in matters involving structural collapses, component failures, construction defects, and construction-stage accidents. His work commonly involves investigation of failures and disputes related to bridges and transportation infrastructure, including permanent structures as well as falsework, shoring, and other temporary works. These engagements typically require integration of site observations, review of design and construction records, evaluation of material behavior, assessment of construction sequencing and means and methods, field and/or laboratory testing, consideration of maintenance and usage history, and technical analysis to determine causation and responsibility.

Prior to joining Exponent, Dr. Saraf performed extensive research in reliability and risk analysis, including development and application of risk-based design and evaluation methodologies. He has applied these principles to probabilistic assessment of systems and products to evaluate both historical performance and expected future behavior.

Dr. Saraf's work has been published in peer-reviewed engineering journals and conference proceedings addressing structural performance, reliability, and failure analysis. He has authored expert reports and provided testimony in deposition, arbitration, appraisals, and trial in matters involving bridges, buildings, marine structures, infrastructure systems, and construction disputes.

Academic Credentials & Professional Honors

Ph.D., Civil Engineering, University of Michigan, Ann Arbor, 1997

M.S., Civil Engineering, University of Cincinnati, 1994

B.Tech., Civil Engineering, Indian Institute of Technology, Kanpur, India, 1992

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Rackham Pre-Doctoral Fellow, University of Michigan, Ann Arbor, 1996-1997

Licenses and Certifications

Professional Engineer Civil, Arizona, #82532

Professional Engineer Civil, California, #61004

Professional Engineer Mechanical, California, #38488

Professional Engineer, Colorado, #PE0058954

Professional Engineer Civil, Florida, #84974

Professional Engineer, Georgia, #PE041369

Professional Engineer, Mississippi, #32745

Professional Engineer, North Carolina, #047573

Professional Engineer, Ohio, #PE.80392

Professional Engineer, Rhode Island, #PE0013021

Professional Engineer Civil, Texas, #141248

Professional Engineer, Virginia, #0402055990

Professional Affiliations

American Society of Civil Engineers (member)

American Concrete Institute (member)

American Institute of Steel Construction (member)

Society of Petroleum Engineers (member)

ANSI/SAIA Subcommittees A92.2 and A92.20 (member)

Publications

Freidenberg A, Saraf V, Hunt J, McDonald B, Osteraas J. "Load and Capacity Considerations for Stringers in Shoring Towers." Proceedings, Forensic Engineering, Seattle, WA, 2024.

Ray, R, Zhao, K, Taylor, P, Saraf, V. "Evaluation of the Robustness of Statistical Software for Warranty Analysis." Reliability and Maintainability Systems (RAMS) Conference, January 2019.

Hilbert, LB, Saraf VK, Birbiglia DKJ, Shumilak EE, Schutjens PMTM, Hindriks COH, Klever FJ. "Modeling horizontal completion deformations in a deepwater unconsolidated sand reservoir." SPE Journal of Drilling & Completion 2011 Mar; (26)2:68-83.

Hilbert LB, Saraf VK. "Salt mechanics and casing deformation in solution-mined gas storage operations."

Paper ARMA 08-383, Presented at San Francisco 2008, the 42nd US Rock Mechanics Symposium and 2nd U.S.-Canada Rock Mechanics Symposium, San Francisco, CA, June 29-July 2, 2008.

Ross B, McDonald BM, Saraf V. "Big blue goes down. The Miller Park crane accident." Engineering Failure Analysis 2007; 14(6):942-961.

Ross B, McDonald BM, Saraf V. "Big Blue goes down: The Miller Park crane accident." Proceedings, 6th International Symposium on Risk, Economy and Safety, Failure Minimization and Analysis, Cape Town, South Africa, March 8-12, 2004.

McDonald BM, Saraf V, Ross B. "A spectacular collapse: The Koror-Babeldaob (Palau) balanced cantilever prestressed post-tensioned bridge." Indian Concrete J 2003; 77(3). Also in Proceedings, 27th Conference on Our World in Concrete and Structures, XXI:57-68, August 29-30, 2002.

Shahrooz B, Saraf V, Godbole B, Miller R. "Response of Slab Bridges Before, During, and After Repair." Journal of Bridge Engineering, ASCE, Vol. 7, No. 5, pp. 267-275, September 2002.

Singh MP, Khaleghi B, Saraf V, Jain SK, Norris G, Goel R, Murty CVR. "Bhuj, India Earthquake of January 26, 2001, Reconnaissance Report—Chapter 19: Roads and Bridges." Earthquake Spectra: July 2002, Vol. 18, No. S1, pp. 363-379.

Moncarz P, Eiselstein L, Saraf V. "Prestressing wire failures in prestressed concrete pipeline." Proceedings, Awarie Budowlane, 20th Engineering Conference on Construction Failures, Szczecin-Miedzyzdroje, Poland, May 22-26, 2001. (In Polish).

Saraf V, Nowak A. "Proof Load Testing of Deteriorated Steel Girder Bridges." Journal of Bridge Engineering, ASCE, Vol. 3, No. 2, pp. 82-89, May 1998.

Saraf V. "Evaluation of Existing RC Slab Bridges." Journal of Performance of Constructed Facilities, ASCE, Vol. 12, No. 1, pp. 20-24, February 1998.

Saraf V, Nowak AS. "Field Evaluation of Steel Girder Bridge." Transportation Research Record, No. 1594, pp. 140-146, 1997.

Saraf V. "Reliability-Based Criteria for Proof Load Testing of Bridges." Ph.D. Dissertation, Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, MI, August 1997.

Kim S, Nowak AS, Saraf VK. "Diagnostic and Proof Load Testing for Bridge Evaluation." Proceedings, Conference on Structural Faults and Repair, Edinburgh, UK, Vol. 1, pp. 571-580, July 1997.

Nowak AS, Saraf V, Kim S. Evaluation of Bridges using Field Testing. Proceedings, International Conference on Rehabilitation and Development of Civil Engineering Infrastructure Systems, Beirut, Lebanon, Vol. 1, pp. 391-402, June 1997.

Nowak AS, Saraf V. Verification of Capacity by Proof Loading. Proceedings, IABSE Workshop on Evaluation of Existing Steel and Composite Bridges, Lausanne, Switzerland, Vol. 76, pp. 121-127, March 1997.

Jain SK, Saraf V, Mehrotra B. "Experimental Evaluation of Fundamental Period of R.C. Frame Buildings with Brick Infills." Journal of Structural Engineering, Structural Engineering Research Center, India, Vol. 23, No. 4, pp. 189-196, January 1997.

Saraf V, Sokolik AF, Nowak AS. "Proof Load Testing of Highway Bridges." Transportation Research Record: Journal of the Transportation Research Board (TRB), No. 1541-07, pp. 51-57, 1996.

Nowak AS, Saraf V. "Reliability Analysis of Plank Decks for Bridges." Proceedings, National Conference

on Wooden Transportation Structures, Madison, WI, pp. 225-231, October 1996.

Saraf VK, Nowak AS. Verification of Load Carrying Capacity of an Old Bridge. Proceedings, Third Conference on Nondestructive Evaluation of Civil Structures and Materials, Boulder, CO, September 1996, pp. 431-440.

Saraf VK, Nowak AS., Till R. "Proof Load Testing of Bridges." Proceedings, ASCE Seventh Specialty Conference on Probabilistic Mechanics and Structural Reliability, Worcester, MA, pp. 526-529, August 1996.

Saraf VK, Nowak AS. "Bridge Evaluation using Proof Load Testing. Recent Advances in Bridge Engineering - Evaluation, Management and Repair." Proceedings, US-Europe Workshop on Bridge Engineering, Barcelona, Spain, pp. 383-403, July 1996.

Saraf V, Nowak AS, Kim S. "Nondestructive Testing of Bridges." Proceedings, Fourth National Workshop on Bridge Research in Progress, NCEER, Buffalo, NY, pp. 47-50, June 1996.

Nowak AS, Park CH, Saraf VK. "Reliability Analysis for Buried Structures." IFIP WG 7.5 Working Conference on Reliability and Optimization of Structural Systems, Boulder, CO, pp. 281-288, April 1996.

Nowak AS, Saraf V. Target Safety Level for Bridges. Proceedings, ASCE Structures Congress XIV, Chicago, Vol. 2, pp. 696-703, April 1996.

Shahrooz BM, Miller RA, Saraf V, Godbole B. "Behavior of Reinforced Concrete Slab Bridges During and After Repair." Transportation Research Record, No. 1442, pp. 128-135, 1995.

Saraf V. Effect of Repair on Behavior of Reinforced Concrete Slab Bridges. M.S. Thesis, Department of Civil and Environmental Engineering, University of Cincinnati, Cincinnati, OH, June 1994.

Presentations

Saraf VK, Hilbert LB. Buckling of multiple concentric casings. Presentation, West Regional ABAQUS User's Conference, Las Vegas, NV, October 2007.

Sire RA, Saraf VK, Moncarz PD. Simulation of hull rupture during ship collision with dock. ASM Materials Solutions Conference, Failure Analysis and Prevention Symposium, Columbus, OH, October 2004.

Saraf V. Performance of Bridges in Bhuj, India Earthquake of January 26, 2001. India and Nisqually Earthquake Briefings, EERI, San Francisco, CA, April 3, 2001

Saraf V. Performance of Bridges in Bhuj, India Earthquake of January 26, 2001. India and Nisqually Earthquake Briefings, EERI, Pasadena, CA, April 4, 2001.

Saraf V. Performance of Buildings in Bhuj, India Earthquake of January 26, 2001. ASCE Structures Congress and Exposition, Washington D.C., May 21, 2001.

Saraf V. Case Studies in Failure Analysis. Engineering Seminar Series, Department of Engineering Science and Mechanics, Virginia Tech, Blacksburg, VA, November 7, 2001

Saraf V, Nowak AS, Sokolik AF, "Proof Load Testing of Steel Girder Bridges," presentation at 1996 meeting of ASCE Committee on Safety of Bridges, ASCE Structures Congress XIV, Chicago, IL, April 1996.

Reports

Nowak AS, Saraf VK. Load Testing of Bridges. Research Report UMCEE 96-10 submitted to Michigan

Department of Transportation, Lansing, MI, October 1996.

Nowak AS, Saraf VK. Pre-Test Analysis of New Lothrop Bridge. Research Report UMCEE 96-15 submitted to Carl Walker Inc., Kalamazoo, MI, June 1996.

Nowak AS, Park CH, Saraf V. Reliability Analysis for Selected Bridges (for Euro Code). Research Report submitted to Highway Agency (UK), London, UK, December 1995.

Nowak AS, Park CH, Saraf V. Calibration of Load and Resistance Factors for TTC Structural Design Manual. Research Report submitted to D.S. Lea Associates Ltd., Toronto, Canada, December 1995.

Nowak AS, Saraf VK, Kim S. Load Distribution for Plank Decks. Research Report UMCE 95-02 submitted to USDA Forest Service, Madison, WI, January 1995.

Nowak AS, Kim S, Laman JA, Saraf V, Sokolik AF. Truck Loads on Selected Bridges in the Detroit Area. Research Report UMCE 94-34, Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, Michigan, December 1994.

Shahrooz BM, Miller RA, Saraf V. Strength Continuity of Deteriorated Continuous Slab Bridges. Report No. UC-CII 94/01, Cincinnati Infrastructure Institute, January 1994.

Project Experience

Bridges

- FIU Sweetwater Pedestrian Bridge Collapse – Miami, FL: Evaluated design and construction standard-of-care and causation issues related to the collapse of a post-tensioned concrete pedestrian bridge during construction. Reviewed structural design, post-tensioning layout, construction sequencing, site inspections, and crack development observed prior to collapse, including assessment of localized post-tensioning repairs implemented shortly before the incident. Addressed engineering design, construction practices, and compliance with applicable codes and standards.
- Zakim Bunker Hill Cable-Stayed Bridge – Boston, MA: Investigated concrete voids discovered in the reinforced-concrete back span of a cable-stayed bridge shortly after construction. Evaluated the effects of severe reinforcement congestion and whether voids resulted from design-specified reinforcement density or contractor placement and execution. Assessed compliance with AASHTO detailing requirements and addressed design versus construction responsibility. Provided expert testimony at mediation.
- Cast-in-Place Post-Tensioned Box Girder Bridges: Investigated extensive concrete defects during construction of two cast-in-place post-tensioned box-girder bridge spans constructed sequentially on falsework. Evaluated rock pockets, voids beneath post-tensioning ducts, and soffit defects through forensic review of construction photographs, drawings, and field documentation. Provided testimony at depositions and trials.
- Ironton–Russell Cable-Stayed Bridge – OH: Performed a forensic investigation of distortion and cracking in steel box tower sections of a cable-stayed bridge following hot-dip galvanization. Conducted coupled thermal-mechanical analyses to evaluate residual stresses, plastic strains, and permanent distortions, and identified the mechanisms responsible for observed damage.

- Sanquin River Diversion Channel Bridge Collapse – Liberia, Africa: Investigated the collapse of a newly constructed half-through steel truss bridge. Performed site inspections and engineering evaluation of truss design, member detailing, construction practices, and loading, including vehicle-impact effects. Identified contributing design, construction, and loading factors and established the primary cause of collapse.
- Koror–Babeldaob (Palau) Bridge Collapse – Republic of Palau: Investigated the catastrophic collapse of a long-span prestressed concrete balanced-cantilever box-girder bridge shortly after retrofit under benign loading conditions. Performed structural analyses to evaluate long-term creep behavior, stress redistribution, and the effects of retrofit actions, and determined that damage introduced during removal of the existing roadway surface contributed to collapse.
- Wake Technical Community College Pedestrian Bridge Collapses – Raleigh, NC: Evaluated the collapse of two timber pedestrian bridges under construction, focusing on the effects of end notching in glulam beams located in high-shear regions. Assessed stress concentrations, reduced shear capacity, and compliance with NDS and AASHTO provisions governing timber member detailing.
- Bon Air Bridge – City of Larkspur v. Jacobs Engineering Group, Inc., CA: Investigated concrete spalling in reinforced-concrete piers of a multi-span steel girder bridge with composite deck. Evaluated causation and responsibility related to design and construction, and provided expert testimony at deposition and trial.
- Gerald Desmond Bridge – Seismic Retrofit, Long Beach, CA: Reviewed design and construction issues associated with change orders for the seismic retrofit of the existing Gerald Desmond Bridge and provided expert testimony at deposition. Separately investigated cracking in a post-tensioned box-girder during construction of the replacement bridge and provided expert opinions at mediation.
- Additional Bridge Investigations and Design Experience: Investigated numerous additional bridge collapses, construction accidents, and damage claims involving interstate highway bridges, iconic structures, and private bridges. Addressed failure mechanisms including material defects, vehicle impact, overloading, long-term degradation, flooding, and scour. Served as Engineer of Record (EOR) for the structural design of three new bridges in California.

Buildings

- Transbay Transit Center – San Francisco, CA: Investigated fracture of critical structural steel components, including long-span tapered steel girders supporting the rooftop garden and bus deck at a major transportation hub. Reviewed design, fabrication, erection, shoring, and root-cause conditions, and evaluated pre-damage repair concepts and post-failure retrofit measures. Authored expert reports and provided deposition testimony in litigation.
- Lucas Museum of Narrative Art – Facade Tolerance and Constructability Dispute – CA: Retained to assist with a construction dispute involving installation of a complex three-dimensional FRP facade system. Evaluated manufacturing versus installed (system) tolerances, constructability constraints, and the effects of predicted versus actual structural behavior, including super-elevation assumptions and measured deflections, on facade alignment and installation sequencing. Presented findings at mediation.
- Laurel Cherry Creek High-Rise – Denver, CO: Evaluated excessive deflections in reinforced-concrete balcony slabs of a high-rise residential building, including cantilever behavior, thermal break connector performance, and post-tensioned slab deformation. Assessed

compliance with building-code serviceability/deflection limits and the roles of design, detailing, and construction-stage conditions. Provided expert opinions in arbitration.

- Royal Palms Resort (Earthquake Damage / Partial Collapse) – Guam: Investigated partial collapse and earthquake damage to multi-story reinforced-concrete hotel buildings following a Magnitude 7.8 event. Evaluated structural behavior and contributing mechanisms, including infill interaction and short/captive-column effects, through detailed engineering analysis. Supported causation assessment in the context of dispute/litigation over design and architectural detailing.
- Steel Moment Frame Buildings – Northridge Earthquake, SoCal: Investigated brittle cracking of welded steel moment frames in high-rise buildings subjected to strong ground motion during the Northridge earthquake. Evaluated connection behavior and stress demands using engineering analysis to support failure causation and performance assessment.
- New Casino Construction (Precast Slab Collapse) – Las Vegas, NV: Investigated collapse of a precast reinforced-concrete floor slab during construction of a large casino building, where the slab had not been grouted/made composite with supporting steel framing. Reviewed geometry and construction condition immediately prior to collapse and evaluated the failure sequence based on eyewitness and field measurements.
- New Apartment Buildings Construction (Helical Piles/ Podium Slab)– CO: Investigated foundation-related distress at a multi-building residential development supported on helical pile foundations beneath post-tensioned concrete podium slabs. Conducted site inspections; reviewed foundation/structural drawings, pile load test data, and elevation survey data; and performed selective destructive evaluation to assess relative movements between piles, columns, and podium slabs.
- Parking Structures (Construction Collapses / Serviceability Claims): Investigated parking structure failures and claims of excessive deflection, including double-tee beam collapse during concrete placement, mat slab distress related to post-tensioning force application, and serviceability-driven slab deflections. Evaluated reinforcement placement, slab thickness, construction sequencing, and timing of shoring/reshoring removal.
- Additional Building Investigation Experience: Investigated wind, water, earthquake, fire, and explosion damage to hundreds of buildings (industrial, multi-family, and single-family), including tilt-up concrete, masonry, wood-frame, steel, and reinforced-concrete structures. Also instrumented a steel moment-frame building to evaluate in-service performance and recurring cracking of welded connections associated with suspected high-cycle fatigue effects.

Marine Structures and Ports

- Crescent City Harbor – Crescent City, CA: Reviewed standard-of-care and construction defect claims related to a newly constructed harbor facility. Evaluated cracking in floating concrete docks, plumbness of steel guide piles, and corrosion affecting plumbing and electrical systems. Provided expert testimony at mediation.
- M/V Kure Allision – Louisiana Pacific Dock, Eureka, CA: Investigated a vessel allision with a concrete dolphin at an industrial berthing facility that resulted in a significant environmental damages claim involving a fuel release. Reviewed dock and fender design, estimated allision forces, and evaluated damage to marine structures and vessel hull behavior with and without rubber fenders.
- Honolulu Harbor – Matson Shipping Terminal, Honolulu, HI: Investigated damage to reinforced-concrete marine piers at a commercial shipping terminal. Reviewed design and

construction features relative to the likelihood of vessel allision, including interaction with bulbous bows of berthing ships.

- Kawaihae Harbor – Big Island, HI: Assessed earthquake-related damage to harbor piers and adjacent structures following the October 2006 Hawaii earthquake. Conducted site inspections, reviewed design and construction records, and supported owner decision-making regarding repair and reconstruction.
- Port of Santa Cruz – Santa Cruz, CA: Investigated tsunami-induced damage to berthing docks resulting from the March 2011 Japan earthquake. Reviewed harbor design and construction relative to standard-of-practice expectations and assessed damage attributable to tsunami wave action.
- Additional Maritime Structures – Multiple Locations: Reviewed design, construction, and condition of numerous maritime facilities, including ports, marinas, and waterfront docks in Washington, California, and Hawaii. Evaluated alleged damage and defects affecting dolphins, finger piers, floating docks, and associated marine infrastructure.

Construction Accidents

- Digester Tank Falsework Collapse – Torrance, CA: Investigated the collapse of temporary falsework supporting a large reinforced-concrete digester tank roof during construction. Evaluated falsework design, installation, shoring tower geometry, bracing configuration, and screw-jack detailing through site inspection, testing, and engineering analysis.
- Bridge Falsework Collapses: Investigated a falsework collapse during concrete placement for cast-in-place post-tensioned box-girder bridge spans. Reviewed falsework design drawings, revisions, and calculations, and evaluated construction sequencing, bracing, and restraint conditions. Also investigated additional bridge falsework collapses.
- Hoover Dam Bypass Bridge – Post-Tensioning Incident, NV: Investigated a post-tensioning construction accident involving sudden release of stored strain energy from a mono-strand jack that injured a worker. Reviewed stressing procedures, equipment condition, tendon alignment, and construction-stage safety practices, and identified off-center jack positioning as a primary contributing factor.
- Highrise Construction Horizontal Barrier Failure - Evaluated the performance and OSHA compliance of temporary construction elevator doors installed at high-rise elevator openings. Performed field and laboratory load testing to assess strength, stiffness, creep, and dynamic response. Provided expert testimony in OSHA appeals proceedings.
- Self-Launching Construction Gantry Collapse – OH: Investigated the collapse of a self-launching construction gantry used to erect precast concrete bridge segments. Reviewed gantry design, erection and launching procedures, support and restraint conditions, and construction sequencing to assess collapse causation.

Buried Structures / Pipelines / Tunnels

- Central Arizona Project (CAP) – Underground PCP Siphon Failure – Investigated the failure of one of the world’s largest prestressed concrete pipes (PCP) forming part of a 23-ft-diameter inverted siphon conveying Colorado River water to central and southern Arizona. Evaluated failure mechanisms and contributing design, construction, and operational factors affecting large-diameter buried pipelines.

- Penstock Failure Analysis: Investigated penstock failure due to unintended vacuum loading. Performed engineering analyses to evaluate failure causation and assessed remediation options, supporting the owner in identifying effective and constructible repair strategies.
- Energy Plant Recirculating Water Pipeline Failure: Recirculating Water Pipe Buckling, IL: Evaluated buckling and bulging of an 11-ft-diameter underground recirculating water pipeline at a power station. Reviewed operating conditions, burial depth, and ground conditions, and assessed stabilization and temporary repair options while the pipeline remained in a sensitive state.
- Steel Arch / Ski Tunnel Collapse – Mammoth Mountain, CA: Contributed to the forensic investigation of the collapse of a long-span, multi-plate steel-arch tunnel carrying a ski run over a public roadway. Reviewed tunnel configuration, adjacent excavation sequencing, and construction activities to assess collapse causation during nearby tunneling operations.
- New Irvington Tunnel (SFPUC) – Welded Steel Pipe Buckling / Liner Failure: Provided engineering consultation regarding buckling failure of an 18-ft-diameter welded steel liner within a major water conveyance tunnel. Conducted site visits, reviewed design and construction records, and evaluated deformation and buckling behavior to support failure assessment and remedial planning.
- Middle Fork Irrigation District Penstock, OR: Reviewed inspection data of over 2,000 feet of penstock and investigated observed damage. Performed engineering analyses to determine root cause and assisted the owner in evaluating and comparing repair alternatives.
- Conduit Relocation Project – Vertical Shaft Failure, OR: Investigated buckling of a 9-ft-diameter steel liner in a vertical shaft associated with a conduit relocation project. Reviewed design and construction documentation, observed exploration and retrofit activities, and evaluated liner loading and stability.
- Atlantic City Sewer Pipe and Liner Failure: Investigated failure of a 54-inch-diameter steel liner and concrete saddle supports in a buried sewer line. Evaluated soil loads, liner–saddle interaction, and construction tolerances, and assessed potential weld-related contributors to failure.
- Underground Natural Gas Pipeline Explosion: Participated in a multidisciplinary investigation of an underground natural gas pipeline explosion. Evaluated structural loading scenarios, including vehicular loading on buried pipes and effects of potential above-ground explosions, to support root-cause determination.

Cranes, Aerial Devices, and Heavy Equipment

- Miller Park Crane “Big Blue” Collapse, WI: Performed forensic engineering analyses related to the collapse of the “Big Blue” heavy-lift crane during construction of the Miller Park retractable roof. Evaluated crane structural capacity, wind-induced side loading, and load effects from lifted roof sections, and assessed competing failure hypotheses in support of litigation.
- Self-Climbing Tower Crane Section Collapse - Miami, FL: Investigated a fatal tower-crane jumping accident involving the fall of a 20-ft mast section during construction of a 46-story high-rise building. Conducted site inspections to document crane configuration, building tie-ins, mast sections, and hoisting systems, and evaluated causation related to erection and climbing operations.
- Gaddy v. Terex Corporation (XT Aerial Device): Performed forensic engineering analysis of a vehicle-mounted aerial device boom failure that resulted in serious operator injury. Evaluated

fracture characteristics, load history, and alternative failure mechanisms, and reviewed compliance with ANSI/SAIA A92.2 and OSHA requirements. Provided deposition testimony.

- Standards Committee Participation (Aerial Devices / MEWPs) – Member of the ANSI/SAIA A92.20 Subcommittee on Mobile Elevating Work Platforms (MEWPs) and the A92.2 Subcommittee on Vehicle-Mounted Elevating and Rotating Aerial Devices, contributing to development of design, calculation, and safety requirements.

Infrastructure

- The Big Dig Project, Boston, MA: Evaluated design and construction issues for bridges, falsework, temporary works, retaining walls, and foundations across multiple contracts on the Central Artery/Tunnel ("Big Dig") Project, involving change orders exceeding $550 million. Reviewed design and construction records and prepared expert opinions related to structural design standard of care.
- Las Vegas Monorail – Expansion Joints – NV: Performed forensic structural engineering analysis of recurring expansion-joint failures in the Las Vegas Monorail elevated guideway. Evaluated design vs construction for the expansion joint finger plates, load transfer and fatigue demands.
- Phoenix Sky Train – Phase 1A Ride Plate Fatigue Design Review: Conducted an independent structural engineering review of steel ride plate fatigue at expansion joints supporting the Phoenix Sky Train people-mover system. Evaluated fatigue design assumptions, stress cycles, and demand levels, and prepared an expert report and presentation for mediation
- San Vicente Dam Raising - RCC: Evaluated the performance of roller-compacted concrete (RCC) formwork used on the downstream face of a major dam-raising project. Reviewed formwork design, construction sequencing, early-age material behavior, and field performance issues, and provided expert testimony in deposition and at trial.
- Cabrera Services, Inc. v. APTIM Federal Services, LLC: Served as structural engineering expert in a federal construction dispute involving concrete compressive strength testing, acceptance criteria, and contractual responsibilities. Analyzed cylinder and core test data, evaluated testing protocols, and provided deposition testimony.
- Toronto-York Spadina Subway Extension (TYSSE) – Reviewed changes to mass-concrete specifications and evaluated concrete defects, including honeycombing and poor consolidation, at a major subway station. Assessed curing duration, temperature limits, and form-removal timing, and evaluated proposed repair specifications for compliance with project requirements.

Blast/Explosion Analysis and Investigation

- Jahn Foundry Dust Explosion - Performed blast analysis of a dust explosion resulting in multiple fatalities and injuries. Estimated blast pressures by correlating observed damage to structural and non-structural elements (walls, roof, glazing). Used damaged and undamaged components to establish upper and lower bounds on overpressure and to narrow potential ignition sources.
- Semiconductor Facility Scrubber Explosion – Investigated explosion of a roof-mounted fume scrubber that produced high-velocity fragments damaging surrounding equipment. Redesigned protective cage to contain fragments. Verified improved performance through subsequent events, enabling rapid resumption of operations.
- Industrial Gas Plant Explosion – Estimated explosion magnitude using structural damage assessment. Evaluated damage to walls, roof, and doors at varying distances to determine TNT-

equivalent energy and corresponding peak pressures and impulses. Applied dynamic load factors and distance corrections to bound explosive yield.

- Pierce v. Miller Electric Manufacturing Co. – Performed forensic engineering analysis of a fire and explosion incident involving welding equipment and a diesel fuel tank. Evaluated competing causation scenarios using structural deformation, load-path reconstruction, and pull-force testing of weld trailer components. Conducted dynamic pressure assessment and correlation with observed damage to assess plausibility of internal explosion versus mechanical loading mechanisms. Provided expert testimony including deposition.
- Hydrostatic Pressure Testing Incident – Investigated a fatal incident during hydrostatic pressure testing of a fire suppression piping system pressurized to approximately 200 psi. Evaluated failure of a riser assembly that became dislodged and violently propelled, causing fatal injury. Assessed installation deficiencies (incomplete mechanical joint connection) and the role of entrapped compressed air.

Other/Special Structures

- Cedar Point Insane Tower - Wind-Induced / Vortex Shedding Response: Performed structural engineering evaluation of a tall, slender amusement tower subjected to wind-induced vibration and vortex shedding. Estimated wind loads and assessed dynamic response, resonance effects, and fatigue-related failure potential under cyclic cross-wind loading.
- Montreal Olympic Stadium Roof (Tensioned Fabric Roof): Performed engineering evaluation of the Montreal Olympic Stadium tensioned fabric roof system following a panel failure under snow loading. Assessed load paths, cable pretension effects, and structural performance relative to original design assumptions to support failure assessment.
- Fiber-Optic Cable Galloping: Evaluated wind-induced galloping of a figure-of-eight fiber-optic cable / steel messenger wire system. Assessed aeroelastic instability, galloping amplitudes, and clearances to evaluate the potential for contact with adjacent power-line conductors.
- Shell Oil – U-shaped Well – Helical Buckling and Fatigue Evaluation: Evaluated helical buckling and fatigue behavior of a multi-string U-shaped heater well under operational loading conditions using finite element analysis.
- Wind Turbine Blade Fatigue Investigation: Performed structural and fatigue analysis of wind turbine blades to evaluate the effects of material and geometric variations on fatigue life and failure timing. Assessed test data and blade configurations to identify contributors to reduced fatigue performance and observed blade failures.
- SF BART – Ferry Plaza Marine Barrier Design Review: Performed independent technical peer review of the 65% design for a marine barrier system protecting the BART Ferry Plaza. Reviewed material selection, load combinations, and structural behavior under tidal, current, wave, buoyancy, and gravity loading.