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STEVEN FULMER, Ph.D., PE SENIOR FORENSIC ENGINEER, CIVIL/STRUCTURAL ENGINEERING SERVICES AUSTIN, TX

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SPECIALTIES

- Structural Evaluations
- Building Response to Earthquake
- Building Envelope Systems
- Roofing Systems
- Foundation Systems
- Loss-related Building Code Upgrades

BIOGRAPHY

Dr. Steven Fulmer is a licensed Civil Engineer in multiple states who specializes in forensic engineering investigations. Although classically educated as a structural engineer in building response to earthquake accelerations, his professional career has focused well beyond structural behavior to include the response of building envelope systems to water-based demands, roofing system behaviors related to events such as high winds and hail, the response of foundation systems to expansive soil demands, and the behavior of structures subjected to loads during improper construction sequencing.

Dr. Fulmer provides in-depth field investigations and documentation, historical review of building behaviors and various construction methods, field testing of building envelope components, as well as high-fidelity, finite element analysis where determined necessary. Additionally, his skill set includes high level consulting with insurance-based clients to help them navigate loss-related building code upgrade demands.

Dr. Fulmer earned his Ph.D. at North Carolina State University in Civil Engineering, where his research experience focused primarily on performance-based seismic design of structures. This work involved increasing the lateral displacement capacity of steel bridge pier systems by improving connection performance during earthquakes. Dr. Fulmer has also conducted research on the reverse cyclic flexural behavior of hollow steel pipe piles, seismic performance of a truss-style steel bridge pier, and the use of a direct displacement-based design procedure as a tool to investigate relationships between structural characteristics, performance limit states, and seismic hazard demands.

QUALIFICATIONS

Ph.D. Civil Engineering, North Carolina State University

M.C.E. Civil Engineering, North Carolina State University

B.S. Civil Engineering, The Citadel, The Military College of South Carolina, Magna Cum-Laude

INDUSTRY CERTIFICATIONS, LICENSES AND MEMBERSHIPS

- Registered Professional Civil Engineer, CA, FL, NC, TX, SC, WY

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- Earthquake Engineering Research Institute
- Tau Beta Pi National Engineering Honor Society

PROFESSIONAL EXPERIENCE

- Halliwell, Senior Forensic Engineer, Civil/Structural Engineering Services
- Thornton Tomasetti, Inc., Forensic Engineering Consultant
- Exponent Failure Analysis Associates, Structural Engineering Failure Analysis Consultant
- North Carolina State University, Graduate Research Assistant/Graduate Teaching Assistant
- Wetherill Engineering Inc., Structural Design/Analysis Consultant Engineer
- North Carolina State University, Graduate Research Assistant/Deans Fellow
- North Carolina State University, Graduate Teaching Assistant/Deans Fellow

REPRESENTATIVE ASSIGNMENTS

Fuel Storage Tank Collapse

Determined cause and origin of the collapse of a steel shell fuel storage tank and provided collection of field data and engineering assessment.

PEMB Collapse

Determined cause and origin of the collapse of a large wide-span pre-engineered metal building that experienced a collapse during a local wind event while under construction and provided collection of field data, engineering assessment, coordination of evidence retention, and laboratory testing.

Winter Storm Uri Response (Texas, 2021)

Performed structural and building envelope system evaluations in response to sub-freezing temperatures including commercial, healthcare, residential, and government facilities.

Oil Refinery Explosion/Fire

Evaluated the capacity of existing concrete foundation elements following explosion and subsequent fire at an oil refinery located near a large water source with difficult geotechnical conditions.

Vest Mine Building Collapse

Conducted field investigation, evidence retention, and advanced Finite Element Modeling to determine root-cause failure of a large pre-engineered metal building located at a sand mine in west Texas that collapsed during construction.

Steel Truss Failure Analysis

Conducted field investigations and analytical structural modeling to evaluate multi-span steel truss system that experienced a collapse of one span under service load conditions.

Stainless Steel Tank Explosion

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Performed structural analysis to correlate deflagration blast pressures with estimated tank trajectory information in a stainless-steel tank explosion incident that occurred at a facility during a planned shutdown.

Historic Wood Framed Roof Collapse

Conducted field investigations and traditional structural analysis calculations to determine the cause of a partial wood framed roof collapse over a pool.

PRESENTATIONS

- Dennies D.P., Fulmer S.J. "Modeling of the Plastic Constraint in an Undermatched Weld", Proceedings, Material Science and Technology Conference 2014, Failure Analysis Symposium, Pittsburgh, PA, October 12–16, 2014.
- Fulmer, S.J. "Seismic Evaluation of a Truss Style Steel Bridge Pier" North Carolina State University's Twelfth Annual Structural Engineering and Mechanics Symposium, Raleigh, NC, November 2012.
- Fulmer, S.J. "Seismic Performance of Steel Bridge Piers Containing Composite Connections" E – Poster, 15th World Conference on Earthquake Engineering, Lisbon, Portugal, September 2012.
- Fulmer, S.J. "Seismic Performance of Composite Steel Bridge Pier Connections" North Carolina State University's Eleventh Annual Structural Engineering and Mechanics Symposium, Raleigh, NC, October 2011.
- Fulmer, S.J. "Ductility of Welded Steel Pile to Steel Cap Beam Connections" ASCE/SEI Structure Congress Annual Conference, Orlando, FL, May 2010.
- Fulmer, S.J. "Behavior of Modified Bridge Bents Subjected to Reverse Cyclic Loading" North Carolina State University's Seventh Annual Structural Engineering and Mechanics Symposium, Raleigh, NC, November 2009.

RESEARCH EXPERIENCE

- *Ductility of Welded Steel Column to Steel Cap Beam Connections Phase 2, 2010- 2013.* Served as a Graduate Research Assistant at NCSU for this project funded by AK Department of Transportation and the Alaska University Transportation Center at the University of Alaska Fairbanks, to study modified welded steel pipe pile to steel cap beam connections which explicitly capacity protect critical welded regions of steel bridge piers. Large scale experimental testing, scaled dynamic shake table testing, and finite element modeling was utilized to develop appropriate concepts, verify their capabilities, and provide design recommendations.
- *Performance of Spirally Welded Pipe Piles in Coastal Regions, 2009 – 2010.* Served as Co-Graduate Research Assistant at NCSU for this project funded by LA Army Corps of Engineers, which utilized full scale experimental testing to evaluate the non-linear flexural capabilities of spirally welded pipe piles. The research project tested double submerged arc spirally welded piles as well as standard electric resistance welded single seam piles as control specimens. The study also considered multiple D/t ratios and provided recommendations in the form of a final report.

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- *Ductility of Welded Steel Column to Steel Cap Beam Connections Phase 1, 2008- 2009.* Served as Graduate Research Assistant at NCSU for this project funded by AK Department of Transportation, which studied the performance of welded steel pile to steel cap beam connections common in steel pier bridge construction. Full scale experimental testing of two pile bents was utilized to capture accurate behavior and predict the seismic capabilities this type of connection. Recommendations were made in the form a final report which considered the systems general capabilities as well as specific capabilities with regard to Direct Displacement-Based seismic design.
- *Effects of the 2006 IBC Updates on the Structural Design of Billboards, 2008.* Served as an undergraduate research assistant on this project which studied the design and economic effects of the 2006 IBC updates with regard to billboard structures. The project was funded by The Citadel.