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Engineering & Scientific Consulting

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Professional Profile

Dr. Freidenberg specializes in root cause failure analysis and structural forensics. He has investigated the quality of the design and construction of structures whose performance did not meet expectations, including investigation of the nature and scope of structural damage resulting from blast, impact, earthquake, wind, or construction loads. His past investigations include evaluation of structural damage to residential structures, structural failures of high-rise curtain walls, and collapses of vehicular bridges.

Dr. Freidenberg employs state-of-the-art engineering analysis and investigative techniques, including high-fidelity finite element analysis modeling. He has developed and published some of these investigative techniques on failure analyses of timber, concrete, and steel structures. Dr. Freidenberg also has expertise in dispute resolution, including domestic and international arbitration disputes in the energy and transportation sectors.

Prior to joining Exponent, Dr. Freidenberg was an Assistant Professor in the Department of Civil and Mechanical Engineering at the U.S. Military Academy in West Point, NY, where he taught a variety of mechanics courses and also served as Associate Director for the Center for Innovation and Engineering where he developed partnerships with other researchers.

Academic Credentials & Professional Honors

Ph.D., Structural Engineering, University of California, San Diego, 2013

M.S., Civil Engineering, Princeton University, 2009

B.S., Civil Engineering, University of Southern California, 2007

Licenses and Certifications

Professional Engineer Civil, California, #92528

Professional Engineer Civil, New Mexico, #30426

Professional Engineer Civil, Washington, #22009464

Academic Appointments

Assistant Professor, U.S. Military Academy, West Point, 2014-2019

Visiting Assistant Professor, Manhattan College, 2013-2014

Professional Affiliations

American Institute of Steel Construction (AISC)

Precast Concrete Institute (PCI)

Reviewer, Sage Journals

Structural Engineers Association of Washington (SEAW)

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.

Hunt J, Freidenberg A. Hanging Load Failures in Wood Beams. Proceedings, Forensic Engineering, Denver, CO, 2022.

Finch J, Deppe A, Cummins C, Segletes S, Jeffrey L, Freidenberg A. Buried Blast Performance and Analysis of Additively Manufactured TI-6AL-4V Truss Structures. Army Research Laboratory; Report No.: ARL-TR-8917. Aberdeen Proving Ground, MD, 2020.

Freidenberg A, Milliman LR, Parmer B, Olaolorun G, Pape E, Durant B. Validation of Prestressed Concrete High-Fidelity Finite Element Analysis. PCI Journal 2019; 64(5): 30-42.

Drummond R, Sun C, Valkenburg A, Freidenberg A, Bruhl JC. Computer Predictions of Tunnel Response to Blast. Proceedings, Structures Congress, Orlando, FL, 2019.

Bruhl JC, Gash RJ, Freidenberg A, Conley CH, Moody PM. Helping Students Learn Engineering Mechanics Concepts Through Integration of Simulation Software in Undergraduate Courses. Proceedings, ASEE Annual Conference, Salt Lake City, UT, 2018.

Freidenberg A, Bruhl JC, Conley CH, Randow CL. High Fidelity Structural Analysis for Undergrad Structural Engineering Students. Proceedings, Structures Congress, Fort Worth, TX, 2018.

Chansuk, P, Freidenberg A, Quadrato CE, Rogers MM. Influence of Plate Stiffener Geometries on LTB Capacity. Proceedings, Structural Stability Research Council (SSRC), Orlando, FL, 2016.

Stewart LK, Freidenberg A, Hegemier GA. Design and Testing of Steel Stud Wall Systems for Blast Mitigation. Proceedings, 13th Structures Under Shock and Impact (SUSI), New Forest, UK, 2014.

Freidenberg A, Aviram A, Stewart LK, Whisler D, Kim H, Hegemier GA. Demonstration of Tailored Impact to Achieve Blast-Like Loading. International Journal of Impact Engineering 2014; 71: 97-105.

Stewart LK, Freidenberg A, Rodriguez-Nikl T, Oesterle M, Wolfson J, Durant B, Arnett K, Asaro RJ, Hegemier GA. Methodology and Validation for Blast and Shock Testing of Structures using High-speed Hydraulic Actuators. Engineering Structures 2014; 70:168-180.

Freidenberg A, Stewart LK, Hegemier GA. Advancements in Blast Simulator Analysis. Proceedings, 84th Shock and Vibration Symposium (SAVE), Atlanta, GA, 2013.

Freidenberg A, Lee CW, Durant B, Nesterenko VF, Stewart LK, Hegemier GA. Characterization of the Blast Simulator Elastomer Material Using a Pseudo-Elastic Rubber Model. *International Journal of Impact Engineering* 2013; 60:58-66.

Herning G, Garlock MEM, Freidenberg A. Comparison of Welded and Post-Tensioned Steel Moment-Resisting Frames. *Proceedings, Steel Structures in Seismic Areas (STESSA)*, Santiago, Chile, 2012.

Presentations

Freidenberg A. Structural Forensics Case Studies. UCSD Department of Structural Engineering. La Jolla, CA, 2023.

Beyzaei, C, Freidenberg A. Structural and Geotechnical Engineering Failure Investigations. UCSD Department of Structural Engineering. La Jolla, CA, 2020.

Freidenberg A. Cadet Simulation-Based Engineering. Harvey Mudd College Department of Engineering seminar series. Claremont, CA, 2019.

Sun C, Valkenburg A, Barron C, Freidenberg A. Underground Reinforced Concrete Structures Subject to Above-Ground Blast. 26th Annual ARL/USMA Technical Symposium (AUTS). Aberdeen Proving Ground, MD, 2018.

Floam H, Hochfelder C, Lloyd J, Cummins C, Freidenberg A. Underbody Blast Protection: Service Academy Competition. 26th Annual ARL/USMA Technical Symposium (AUTS). Aberdeen Proving Ground, MD, 2018.

Freidenberg A. Running a Finite Element Analysis on a DoD HPC. U.S. Military Academy (USMA) seminar series. West Point, NY, 2017.

Freidenberg A., Lee CW. Simulating Rubber Impact: Pseudo-Elastic Material Model vs. UMAT. 24th Annual ARL/USMA Technical Symposium (AUTS). Aberdeen Proving Ground, MD, 2016.

Freidenberg A. Advancements in Blast Simulator Analysis. Army Research Lab Weapon and Materials Research Directorate seminar series. Aberdeen Proving Ground, MD, 2016.

Freidenberg A. Simulation-Based Engineering using LS-DYNA. USMA Department of Civil & Mechanical Engineering seminar series. West Point, NY, 2014.