

Lucas Pachal, PE, SE

Forensic Engineering Expertise

Structural Analysis/Design

Review appropriate documents, including project plans and specifications as it relates to the building structure for purposes of failure analysis and extent of resulting damages. In addition, being a licensed professional and structural engineer, replacement designs are provided upon request. Examples of past work include failure analysis of collapsed structures (concrete, steel, wood, masonry) and various building components (windows, doors, roofing, exterior and interior cladding), damage assessment of building structures after a fire, vehicle impact, snow overload, tornado, and hurricane.

Origin & Cause

Determine the source and responsible party or element related to the failure of a structural or architectural element. Examples of past work include failure of roofing and wall cladding causing moisture entry, humidity and condensation related losses, and groundwater entry.

Inspection and Evaluation of Roofing Systems

This includes steep and low slope roofs as well as various types of roofing materials, including both common and unique roofing applications. Past work involved offering opinions and repair methods related to installation deficiencies and storm-related damages including for hail and wind.

Building Pathology/Construction Defects

The building pathologist relies on an in-depth knowledge of building design, construction, use, and changes as well as assessing the environment of use and the materials and how these interrelate to systematically identify, investigate and diagnose defects in a building.

Building Fenestration/Building Envelope

The building envelope is a building's first line of defense to moisture entry. Identifying the type of system (single versus multiple barrier) and how the various adjoining materials' water and air barriers connect is key to effective moisture management. Examples of past work include storefront window exams, residential window installations, exterior cladding specification and installation and roofing materials and installation.

Construction Accidents/Slip and Fall

Determination of circumstances resulting in an accident. In-depth knowledge of the construction contracting process and the building codes is often the deciding factor in determination of cause and responsibility. Examples of past work include collapse of structures while under construction resulting in injury; slip, trip, and fall cases related to interior and exterior means of egress, stairs, dance floors, and public access areas; and personal injury-related falls from barrier protected elevated areas.

Qualifications & Training

- Water Entry Prevention and Moisture Control in Buildings, University of Wisconsin-Madison, March 2023
- Methods for Field Assessment of Biogenic Acid Attack in Concrete Structures, University of Texas-Austin, February 2023

- Understanding Pre-Engineered Metal Buildings through Forensic Investigation, University of Texas-Austin, February 2023
- Load Testing: by Design or Default, University of Texas-Austin, February 2023
- Surfside – Anatomy of a Complex Forensic Investigation, University of Texas-Austin, February 2023
- Surfside – Anatomy of a Complex Forensic Investigation, University of Texas-Austin, February 2023
- Shoring and Load Transfer, National Council of Structural Engineers Associations, November 2022
- Learning from Failures of Wood-Framed Structures, American Society of Civil Engineers, August 2022
- Engineering Investigations of Hurricane Damage: Wind versus Water, American Society of Civil Engineers, August 2022
- Engineering Laws, Rules and Ethics for Indiana Professional Engineers, Continuing Education & Development, Inc., July 2022
- Construction Vibrations, American Society of Civil Engineers, July 2022
- Curtainwall Primer for Design Professionals, American Society of Civil Engineers, July 2022
- ASCE 7-22: Snow/Rain, American Society of Civil Engineers, July 2022
- Tornado Design Using ASCE 7-16 Commentary, American Society of Civil Engineers, January 2022
- A Decade of Change: Recent Revisions to ASTM Stucco Standards, International Institute of Building Enclosure Consultants, October 2021
- Case Study in Service Life Prediction of a Post-Tensioned Concrete Parking Structure, Structural Engineers Association of Illinois, June 2021
- Understanding Wood Moisture Movement in Diagnosing Problems with Wood-Frame Structures, Structural Engineers Association of Illinois, June 2021
- Forensic Analysis of Failures in Plumbing Pipe, Structural Engineers Association of Illinois, June 2021
- Failure Stress of Glass Made Easy. Or Is It?, Structural Engineers Association of Illinois, June 2021
- Large Scale Parking Structure Vehicle Fire Damage Evaluation and Restoration, Structural Engineers Association of Illinois, June 2021
- Preserving the Beauty of Cast Iron during a Forensic Analysis, Structural Engineers Association of Illinois, June 2021
- Residences at Water Tower – Marble Façade Restoration, Structural Engineers Association of Illinois, June 2021
- TSD2: Computer Vision for Detection, Classification and Monitoring of Façade Damage Conditions, Structural Engineers Association of Illinois, June 2021
- Simplifying the Complicated Process of Wind Design for Roof Systems, International Institute of Building Enclosure Consultants, February 2021
- Applying Recent Building and Energy Code Advancements for Durable and Energy-Efficient Building Enclosures, International Institute of Building Enclosure Consultants, February 2021
- Air Barriers Meet NFPE 285 – Burning Issues, International Institute of Building Enclosure Consultants, February 2021
- Avoiding Ethical Pitfalls in Failure Investigations, American Society of Civil Engineering, March 2020
- Construction Vibrations, American Society of Civil Engineering, May 2019
- Introduction to Jet Grouting and its Applications, American Society of Civil Engineering, April 2019
- Renovation of Slabs on Grade, American Society of Civil Engineering, April 2019
- Evaluating Damage and Repairing Metal Plate Connected Wood Trusses, American Society of Civil Engineering, January 2019

- The Challenges of Advanced Framing: Learning from Past Experience, APA, November 2018
- The AISC 15th Edition Steel Construction Manual, American Institute of Steel Construction, March 2017
- Design of Industrial Buildings, American Institute of Steel Construction, January 2017
- Buckling Restrained Braced Frames, SE University, July 2017
- ASCE 37: Design Loads on Structures During Construction, American Institute of Steel Construction, March 2017
- Everything You Wanted to Know About Diaphragms, American Institute of Steel Construction, March 2017
- Retrofitting Design and Analysis of Existing Steel Joist-Framed Buildings, American Institute of Steel Construction, March 2017
- Wind Design Considerations for Joist and Joist Girders, American Institute of Steel Construction, March 2017

Education

Master of Science Degree in Civil Engineering – Structural Engineering
Lawrence Technological University, Southfield, MI
May 2014

Bachelor of Science in Civil Engineering
Michigan Technological University, Houghton, MI
April 2006
Graduated Summa Cum Laude

Educational Presentations

Water Entry Prevention and Moisture Control in Buildings
University of Wisconsin-Madison, College of Engineering Interdisciplinary Professional Programs, June 2024

Utilizing ASCE 7 to Determine Wind Speeds Required to Overturn a Structure
National Academy of Forensic Engineers 2023, Summer Conference, July 2023

Design of Underhung Hoist and Crane Beams/Girders
AISC NASCC: The Steel Conference, March 2017
AISC Webinar, May 2017

Licenses & Certifications

PE - Professional Engineer
Licensed by the State of Michigan - Number 6201057937
Licensed by the State of Arizona – Number 78596
Licensed by the State of Indiana – Number PE12100280
Licensed by the State of Maryland – Number 61418
Licensed by the State of Minnesota – Number 60729
Licensed by the State of New Jersey – Number 24GE06003600
Licensed by the State of Ohio – Number PE-86610
Licensed by the State of Washington – Number PE-23024387
Licensed by the State of New Mexico – Number 30568

SE - Structural Engineer
Licensed by the State of Illinois - Number 081007930

Employment History

Senior Forensic Engineer
Nederveld, Inc.
2017 - Present

Duties include forensic analysis relating to building pathology issues, fire loss damage, structural damage from vehicle impacts, storm damage (wind, snow, hail), seismic, construction vibration, and water loss events, calculations, and plan of repair design. Duties also include inspection and evaluation of roofing systems along with expert witness services and deposition related to above matters.

Senior Lead Structural Engineer
IBI Group, Southfield, MI
2016 - 2017

Duties included structural analysis and design of commercial and light industrial buildings. Designs included multi-story and foundation structures, including bridge crane and deflection-sensitive structures.

Lead Structural Engineer
Black & Veatch, Ann Arbor, MI
2006 - 2016

Duties included structural design and analysis of power generating facilities including design of high operating temperatures flue gas ductwork, structural steel multi-story buildings, deep and shallow concrete foundations, steel and concrete silos and chimneys, and rotating equipment foundations. Duties also included management of vendor and contractor contracts.

Structural Engineering Intern
Ruby & Associates, Inc., Farmington Hills, MI
2006

Duties included structural design and analysis of light industrial automotive manufacturing facilities.

Civil Engineering Intern
Strand & Associates, Inc., Madison, WI
2004 - 2005

Duties included site survey, roadway alignment design, municipal sewer layout and design.

Professional Affiliations

Member: American Institute of Steel Construction (AISC)
Member: American Society of Civil Engineers (ASCE)
Member: International Institute of Building Enclosure Consultants (IIBEC)
Member: National Society of Professional Engineers (NSPE)

Publications

Utilizing ASCE 7 to Estimate Wind Speeds for Forensic Evaluations
Journal of the National Academy of Forensic Engineers 40 (2), January 2024
A Simplified Approach to Lateral Force Resisting Systems in Ordinary Structures
Lawrence Technical University Thesis for the Master of Science Degree
2014
The Structural Design of Air and Gas Ducts for Power Stations and Industrial Boiler Applications
American Society of Civil Engineers, Air and Gas Duct Structural Design Committee, 2020

Expert Witness Experience

Deposition

October 2024

Provident Group-EMU Properties LLC and Preston Hollow Community Capital, Inc. and UMB Bank N.A. v The Board of Regents of Eastern Michigan University
Expert Witness for Provident Group-EMU Properties LLC and Preston Hollow Capital, Inc.

State of Michigan Court of Claims Case No. 2023-000039-MK

August 2024

Dorothy Wilkinson v Lowes Home Centers LLC

Expert Witness for Dorothy Wilkinson

Washington County Circuit Court Case No. 23-2377

June 2024

Woodward Development Company, LLC v Ronnish Construction Group, LLC, Booms Stone Company, Crystal Glass, Inc., Castle Commercial Carpentry, LLC, and Esko Maintenance Company

Expert Witness for Booms Stone Company

Oakland County Circuit Court Case No. 2023-199478-CB

April 2024

Auto-Owners Insurance Company v Mills Siding and Roofing, et al.

Expert Witness for Auto-Owners Insurance Company

Kalamazoo County 9th District Circuit Court Case No. 22-0211-NZ

March 2024

North Kent Sewer Authority v U.S. Specialty Insurance Company

Expert Witness for U.S. Specialty Insurance Company

United States District Court Western District of Michigan Southern Division Case No. 1:23-cv-317

October 2023

Amber Allison & Jefferey Hines v Auto-Owners Insurance Company

Expert Witness for Auto-Owners Insurance Company

Montcalm County Circuit Court Case No. 22-1402-GC

Recorded Trial Deposition Testimony

March 2023

Creekside Condominium Association v Home-Owners Insurance Company

Expert Witness for Home-Owners Insurance Company

Eaton County Circuit Court Case No. 22-314-CB

March 2023

Terra Firma/Auto-Owners v. Demolition Contractors, Inc. d/b/a Pitsch Wrecking

Expert Witness for Auto-Owners Insurance

Kent County Circuit Court Case No. 22-04880-NZ

October 2022

Brett Roberts, David W. Roberts and Sue E. Roberts v Superior Ag Manufacturing LLC, John Affourtit and RW Mercer Company

Expert Witness for Farm Bureau Insurance (Insurer for Brett Roberts)

Eaton County Circuit Court Case No. 20-500-NZ

October 2022

Leestma Management, LLC v Michigan Spray Foam, LLC and Will Matzen
Expert Witness for Michigan Spray Foam, LLC
Kent County Business Court Case No. 21-03175-CBB

June 2021

Sandra J. Rummel vs Ryan Showerman and Showerman Construction, LLC and Auto-Owners Insurance Company
Expert Witness for Sandra J. Rummel
Eaton County Circuit Court Case No. 21-185-CZ

March 2020

Pandemonium Inc and Astral Space, LLC vs Nationwide Mutual Insurance Company
Expert Witness for Nationwide Mutual Insurance Company
Wayne County Circuit Court Case No. 2019-000189-CB

August 2019

Jeff Wells and Clavel Wells v Auto-Owners Insurance Company
Expert Witness for Auto-Owners Insurance Company
Ionia County Circuit Court Case No. 18-S-33581-CK

December 2018

Mid-States General and Mechanical Contracting Corp vs The State of Illinois, acting by and through its Capital Development Board
Expert Witness for State of Illinois Capital Development Board
State of Illinois Court of Claims # 16-CC-1783

Arbitration

March 2023

Whitmore Homes, LLC. V Craig Scholten and Jessica Scholten
Expert Witness for Miller Johnson (Counsel for Mr. and Mrs. Scholten)
Miller Johnson File No. IMAN-MJ_DMS_FID2688891

January 2021

Lone Oak, Ltd. vs ROK Construction Services, Inc.
Expert Witness for Johnston, Szykiel & Hunt, P.C. on Behalf of ROK Construction Services, Inc.
AAA Case No. 02-19-0001-9808