



Daniel J. Roig, Jr., Ph.D., S.E., P.E.

Biomechanical/Structural Engineer

Professional Summary

Four decades of Structural and Professional Engineering practice with over a decade of Biomechanics expertise allow for investigations of both man and his environment.

Academic Background

| | |
|----------------------------------------------------------|-----------------------------------------|
| Ph.D. Bioengineering, Biomechanics | University of Illinois at Chicago (UIC) |
| M.S. Civil Engineering, Structural Design | University of Illinois at Chicago (UIC) |
| B.S. Engineering, Structural Design and Mechanics | University of Illinois at Chicago (UIC) |

Registrations

Registered Structural Engineer, State of Illinois, License No. 81-5094
Registered Professional Engineer, State of Illinois, License No. 62-37875
Registered Structural and Professional Engineer, State of Hawaii, License No. 11371
Registered Professional Engineer, State of Wisconsin, License No. 20290-006
Registered Professional Engineer, State of Michigan, License No. 27766
Registered Professional Engineer, State of Minnesota, License No. 15461
Registered Professional Engineer, State of Ohio, License No. 64311

Areas of Expertise

Structural Engineering Analysis & Design
Biomechanical Engineering Analysis
Design review / Inspection– Temporary and Permanent Structures
Accident and Injury Biomechanics - Pedestrian and Automobile
Origin and Cause Investigations
Premises/Product Liability
Failure Analysis
Construction Contracting and Management
Product Development
Orthopaedic Biomechanics Research – Lumbar Spine Disc Degeneration
Lecturer/Speaker – Wood Construction, Porch Design and Inspection
Wood Engineering Instructor
Finite Element Analysis

Professional Experience

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Solution Engineering Group- Naperville, Illinois Vice President, Biomechanics/Structural Engineering Forensic engineering investigations Accidents involving construction, structures, human injury | 2013 – Present |
| Roig Associates - Cary, Illinois Partner/Consultant Consulting engineering for all types of permanent and temporary structures Inspections, reports, analysis, design, review and approval | September, 2012-Present |
| CED Investigative Technologies - Oak Brook, Illinois Biomechanics/Structural Engineering Consultant Forensic engineering investigations Accidents involving construction, structures, human injury | February, 2012-September, 2012 |
| Packer Engineering - Naperville, Illinois Staff Biomechanics/Structural Engineer Engineering investigation, testing, R & D, Accidents involving construction, structures, human injury | January, 2011-January 2012 |
| KRW Consulting Group - Elk Grove Village, Illinois Partner/Consultant Consulting engineering for all types of permanent and temporary structures Inspections, reports, analysis, design, review and approval | April, 2001-January 2011 |
| AEP Consulting Services - St. Charles, Illinois Manager/Consulting Structural Engineer Truss design, equipment manufacturer, Metal plate connected floor/roof truss design, repair | May, 1988-April, 2001 |
| Advent Design Group Chicago, Illinois President Architectural, engineering, interior design consulting Residential, commercial and industrial buildings and interiors | January, 1984-May, 1988 |
| Alpine Engineered Products, Inc. - St. Charles, Illinois Chief Engineer Truss design, equipment manufacturer, Metal plate connected floor/roof truss design, repair | January, 1981-December, 1983 |
| Woodclaw, Inc. - Addison, Illinois Director of Engineering Truss design, metal plate fabricator, Metal plate connected floor/roof truss design, repair | October, 1979-December, 1980 |
| Custodis Construction Company - Chicago, Illinois Structural Designer/Design Engineer Power chimney designers, fabricators Design, analysis chimneys, liners, ducts, grillages | September, 1974-September, 1979 |
| Austin Company - Des Plaines, Illinois Structural Designer | December, 1973-September, 1974 |

Building design, construction
Steel, concrete warehouse and industrial buildings

Current Professional Society Memberships and Key Certifications

American College of Forensic Examiners Institute (ACFEI)
Society of Automotive Engineers, International (SAE)
Structural Engineers Association of Illinois (SEAOI)
Supported/Suspended Scaffold User Permit, *awarded by Construction Safety Council*,
OSHA 30 Hour Training Course - Construction Safety and Health, *awarded by OSHA*
Injury, Anatomy, Biomechanics & Federal Regulation - Prof. Dev. Program, *awarded by SAE*
Certified Forensic Consultant (CFC), *awarded by ACFEI*
Certified XL Tribometrist (CXLT), *awarded by Excel Tribometers, LLC*

Summary of Biomechanics Investigative Projects and Reports

Slip and Fall Cases

- *Determine cause and feasibility of plaintiff reported injuries from stair fall in a train station.*
- *Examine whether or not hotel room tub fall was caused due to surface that was too slippery.*
- *Investigate stair-fall accident in apartment complex to determine if construction, environmental and physical parameters contributed.*
- *Examine if plaintiff was capable of putting sufficient load on a towel rack in a hotel bathroom to exceed the towel rack's required capacity, which resulted in falling out of the tub after the towel rack failed.*
- *Determine if high heel footwear, store displays or lighting contributed to a fall in a department store in a shopping mall.*
- *Investigate origin and cause in **two cases** where plaintiff motion, environmental and physical conditions were suspected of contributing to a fall in a gas station service area.*
- *Determine if slip and fall accident in a health care facility is the result of employee negligence, code non-compliant lighting or clearance, or plaintiff infirmities.*

Fall from Height

- *Investigate whether a fall from a staircase in a university was an accident or an attempted suicide.*
- *Determine if owner or owner's agent is liable of a balcony fall where balcony railing collapsed, and whether or not fall by plaintiff as reported was feasible.*
- *Determine if height of work platform was sufficient to cause fatal injuries in the fall of a maintenance worker.*
- *Investigate **two cases** where either the actions of the plaintiff or a structural failure caused injuries from a fall involving a fire escape platform.*

Vehicular Accidents

- *Police investigation to determine if deceased occupant in a vehicle's driver seat after an accident was the driver or a passenger.*
- *Determine whether measured accelerations to a driver using heavy equipment meet governmental requirements.*
- *Investigation of **multiple cases** of low velocity rear collisions to determine if force was sufficient to cause injury to a cervical disc with pre-existing damage.*
- *Single investigation involving two independent low velocity rear vehicle collisions. Determine which one, if either, caused plaintiff's current injuries.*

- *Determine the velocity of the vehicles involved in a low speed collision and whether this velocity was sufficient to cause injury to the plaintiff who was a passenger in the second row of the stationary front vehicle.*

Other Personal injuries

- *Appraise whether debilitated wheelchair passenger was properly secured for travel, whether movement of wheelchair was excessive, and if entry threshold was compliant with code, where ultimately the plaintiff fell out of the wheelchair.*
- *Investigate whether client is criminally guilty for injuries to an infant who suffered indentations in the skull.*

Summary of Structural Investigative Projects and Reports

Roof Truss Structural Collapse Investigations

*Determined origin and cause of **over a hundred roof system collapses**, typically during construction, while working with the metal plate connected truss industry over a thirty-year period. These involved schools, churches, apartment buildings, restaurants, stores, arenas, agricultural and other buildings.*

Personal Accident Investigations

- *Investigation of a building floor to determine if inadequate material strength resulted in failure and subsequent injury.*
- *Appraisal of sidewalk to determine whether improper sidewalk use or maintenance, or adjacent building construction resulted in a crack that caused the plaintiff's fall.*
- *Slip and fall on pavement in an apartment complex due to suspected improper drainage of water.*
- *Origin and cause investigation of concert stage collapse during extreme weather event which caused multiple fatalities.*
- *Determination of whether slip and fall on apartment complex sidewalk is the result of improper design for biomechanical motions, code non-compliant design or improper maintenance.*

Building Damage/Collapse Investigations

- *Investigation of cracks on exterior brick wall surfaces associated with construction of adjacent highway bridge and use of rail lines.*
- *Bowstring-type roof truss shored due to failure. Investigation to determine load type that contributed to damage.*
- *Solar panels examined on the roof of high-rise building that had fallen down onto the roof.*
- *Investigation of deflecting roof beams following an ice storm.*
- *Investigation to determine whether deck stair collapse was accidental or intentional.*
- *Investigation to determine if exterior wall damage was due to recent weather event or long term damage.*
- *Investigate chimney tilt to determine if cause was weather event, long-term deterioration, or both.*
- *Movement and subsequent building damage attributed to road demolition in close proximity to the building.*
- *Determine cause of rear porch system stair collapse.*
- *Two phase investigation involving structural damage and partial wall collapse following a wind event, but determined to be the result of construction deficiencies.*
- *Response to collapse of automobile dealership roof to determine building safety and to determine cause of collapse.*
- *Investigate cause of roof collapse and determine safety of remainder of roof.*

- Investigate failure of brick fascia on midrise apartment building.
- Review and analysis of expert analysis and reports, provide separate analysis and opine on cause of highway culvert failure.

Water Intrusion Investigations

- Timber roof truss damage due to moisture intrusion.
- Determination of whether ice damming caused water intrusion to the building interior.
- House built on a hillside has corroded electrical connections suspected to be caused by water improperly draining away from the structure.
- Investigation of flooding in an apartment one floor from the top of a high-rise building.
- Numerous origin and cause investigations of water intrusion in basement attributed to improper plumbing systems.
- Evaluation of damage to exposed wood beams suspected to be a result of water intrusion.
- Determine if water damage to hotel was the result of a storm event or long term deterioration.

Fire Investigations

- Investigation of building's structural stability due to adjacent building destroyed by fire.
- Numerous Investigations for Fire Restoration Companies of structural integrity after a fire.
- Numerous Investigations for Insurance Companies of extent of structural compromise due to fire

Structural Design and Analysis Projects

- Encompassing **thousands** of construction projects world-wide over a forty-year period. Projects included commercial, industrial, residential, institutional and governmental buildings and other structural systems, using wood, masonry, concrete, light gauge and hot-rolled steel, plastics, cast iron and other materials, from single story to high-rise.
- Investigation of **hundreds** of City of Chicago porches to determine structural integrity and recommend repair or replacement.

Professional Highlights

Published Dissertation: Roig, D.J.; Solute Transport in a Normal and Degenerated Lumbar Intervertebral Disc: A Finite Element Study. Doctoral Dissertation, University of Illinois at Chicago, School of Engineering, Chicago, Illinois, 2011.

Published and Presented: D. Roig, R. Natarajan, G. Andersson. Effect of Disc Height and Diffusivity on the Diffusion Rate of Contrast Medium in a Lumbar Disc. International Society for the Study of the Lumbar Spine 36th Annual Meeting, Miami, Florida, May 4-8, 2009.

Member of Structural Engineering Association of Illinois (SEAOI) board of directors 2001 through 2003.

Teach the Timber Design section of the SE license exam refresher course offered by SEAOI from 2003 to present.

Received U.S. patent for EF5 tornado resistant housing structure, R-Evolution Living, 2012.

Taught Engineered Wood Design eight-hour seminar to Amerispec® building inspectors in RI, NV, NM and GA, 2005.

Led project team for Middle East construction of 5,000 homes, Modiin Development, Tel-Aviv, Israel, 1989.

Led task force for City of Chicago regarding porch failures after the Wrightwood porch collapse, 2003.

Interview with ABC Channel 7 News regarding the 2003 Wrightwood porch collapse in Chicago, IL (“The Cost of Compliance” aired June 24, 2008)

<http://abclocal.go.com/wls/story?section=news/local&id=6226176>

Taught 16-hour Wood Truss Council of America (WTCA) Seminar for Level III Truss Designers, 1998-2003.

Guest lecturer at SEAIO dinner meeting, Metal Plate Connected Roof Trusses, 2007.

Guest lecturer at SEAIO dinner meeting, Chicago Porch Construction, 2010.

Panelist for American Society of Civil Engineering (ASCE) annual convention, Structural Material Innovation, 2005.

Interview with CBS Channel 2 News at residence regarding June 2013 Deck Collapse in Miami, FL aired June 14, 2013 <http://chicago.cbslocal.com/2013/06/14/deck-dangers-can-be-hidden-expert-says/>

Investigated structural panels for use in grain bin rescue operations using analysis and field and laboratory tests.

Investigated FEMA cannon tests for hurricane and tornado force projectiles into proprietary barriers.