

MARK DUCKETT, P.E., S.I.
Structural Engineer and Special Inspector

ENGINEERING PROFILE

Over three decades of experience in the structural engineering industry designing and inspecting structures and structural components of all types of materials for residential projects ranging from single-family custom homes to high-rise apartment and hotel buildings; postal facilities, nursing home facilities, waste water treatment structures, auto dealership buildings; commercial projects including restaurants, office buildings, self-storage facilities and shopping centers; industrial buildings including fabrication shops, manufacturing facilities, production plants, pre-engineered metal buildings and metal building foundations; medical facilities including medical office buildings, hospitals, animal hospitals and helipad additions to hospitals; institutional facilities including schools, classroom buildings, churches, sanctuaries, dormitories, gymnasiums, auditoriums and correctional facilities; marine structures including sea-walls, docks, piers, boat-storage facilities and culverts; parking structures; historical building retrofitting and renovations; pedestrian bridges; shoring plan preparation; structural steel shop drawing preparation; renovations of all project types; concrete restoration and balcony restoration projects and a multitude of varying types of warehouse projects.

Provided demolition/engineering services to demolition contractors. Performed structural survey of existing structures to be demolished and created a demolition plan outlining sequence of demolition activities, inclusive of shoring requirements.

Inspector of threshold (special) buildings and non-threshold buildings. Prepared investigative reports, site observation reports, building envelope inspections and reports and performed peer reviews with accompanying reports. Special Inspector for masonry construction.

Acted as owner's representative on construction projects where he observed the contractor's actions, documented and verified the contractor's general progress to facilitate/approve pay requests by the contractor and reported safety and OSHA violations to the contractor when they were observed.

Proficient in the following structural systems: concrete (reinforced and non-reinforced) post-tensioned concrete, prestressed concrete, precast concrete, concrete "tilt-up," concrete masonry (reinforced and non-reinforced), structural steel, light-gauge steel, aluminum, wood (structural lumber and heavy-timber), composite floor systems, foundation systems including grade-bearing foundations (continuous footings, individual column footings and multiple column footings), "mat" foundations, monolithic foundations, pile-supported foundations with grade beams, driven piles (concrete, steel and wood) and auger-cast concrete piles, drilled caissons as well as vibroflotation and vibroreplacement foundation systems.

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Design Project Types:

- Vierendeel Truss Pedestrian Walkway Bridge. Steel truss (entire bridge) erected between existing Performing Arts Building and existing Parking Garage with less than 1" tolerance each end.
- Concrete, circular (unsupported 360 degrees) stairs. Also, similar steel and wood stairs.
- Post-tensioned, transfer beams and slabs. Post-tensioning was "staged" due to construction sequencing.
- Below-grade basement design (in Florida, below water table). Design needed to address buoyancy of below-grade structure.
- Designed over 4.6 million square feet of tilt-up buildings and their associated tilt-wall panels.
- Low-Rise, mid-rise, and hi-rise building design and inspection experience.
- Theater and Performing Art design; proscenium designs, stage designs, etc.
- Retrofitting and reinforcing of existing steel roofs to support new mechanical equipment and increased loads.
- Project Manager for nation's largest retail renovation project (at its time); Loehmanns Fashion Island, N. Miami Beach, FL.
- Designed nation's largest tilt panels (at its time); BHA Headquarters, Sunrise, FL.
- "Building-within-a building"; Hurricane-proof building design for N. Broward Hospital District to protect district's data center. Building designed for wind speeds exceeding 175 mph; Ft. Lauderdale, FL.
- 60 foot high, free-standing decorative arched frames serving as "sun-shades" for walkways at retail mall; Loehmanns Fashion Island, N. Miami Beach, FL.
- Helipad addition to Bethesda Memorial Hospital; Boynton Beach, FL.
- Churches efficiently designed utilizing tilt-up panels despite complex geometry and difficult lifting procedures.
- Shoring design and inspection.
- Numerous renovations and/or additions to existing structures. Often, existing structure required by code to be "brought up" to new code requirements, as well.
- Designed Threshold buildings, created Threshold Inspections plans and performed Threshold (Special) Inspections.
- Heavy Timber design (residential structures and retail structures).
- Designed job-site wood ladders.
- School with "playground" located on the 4th -story roof; exterior walls cantilevered 12'-0" vertically to provide safety "barrier" for playground.
- Designed skylight systems for skylight manufacturing company.
- Prototype residential design for numerous models for national homebuilder.
- Satellite dish support frames.
- Crane support design.
- Guardrail and Handrail Design; Systems guarding edges of stairs, balconies, loading docks, mezzanines, elevated platforms, docks, and decks. Designed systems constructed of masonry, concrete, steel, aluminum, wood, glass, and cables.

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- MRI Facility Designs.
- Casino design.
- Designed water treatment concrete tanks.
- Linear Accelerator Facility Designs.
- Design of Foundations and Support Pads for Printing Presses and other Vibrating Machinery.
- Concrete slab-on-grade design and analysis for industrial loadings (forklift, racks, posts, etc.).
- Heavy timber truss designs; structural frames and roof systems utilizing heavy timber members.
- Numerous field observations for construction defects, design defects, proper shoring, proper construction, etc.
- Historic Buildings: shoring design, retrofitting and renovations.
- Designed and inspected “Special Event” seating and stair structures.
- “Tunnel Form” design and construction of multifamily residential buildings.
- Provided structural plans for the relocation and “raising” of an existing 3 story building; physically relocated building approximately 100 meters from original site and raised building 5 feet in height.
- Provided prototype designs for “7-11” structures and their canopies.
- Provided prototype designs for “NationsRent” structures at “Lowe’s” home improvement sites.
- Provided expert opinions to the Florida Board of Professional Engineers in disciplinary cases. Examples include standard of care, negligence, and code-compliance issues.
- Provided peer-review reports for clients. Value engineering, code compliance and standard of care were paramount issues addressed.

Inspection/Investigation Project Types:

- Masonry Inspections; proper construction techniques and materials, proper reinforcing - size and location(s), proper mortar and grout, proper grouting technique (low-lift vs. high-lift), masonry inspections required for reinforced masonry construction in South Florida by Special Inspector.
- Concrete Member Inspections; check form size and structural adequacy, proper reinforcing, proper tying of reinforcing bars, proper concrete cover prior to pouring.
- Structural Steel Inspections; verify member sizes, proper connections, proper bracing.
- Steel Welding Inspections; verify weld type, weld size and length as well as weld quality in addition to verifying required welder certifications.
- Foundation Inspections; check for proper size, proper reinforcing and reinforcing cover, proper soil preparation/treatment.
- Door/Window Inspections; confirm proper installation inclusive of wood bucks, connectors and/or conformance to product approvals (new construction and retrofitting of existing).
- Wood Inspections; verify member sizes, species and grade, spacing, connections, connector size and quantity.
- Truss Inspections; observed placement of wood truss systems to ensure proper “lifting” techniques, proper bracing, proper connections, verified that safety procedures were followed.

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- Truss Plant Inspections; Performed (State required) monthly inspections of truss manufacturing facilities to verify workplace safety, proper truss manufacturing including proper lumber size, grade and species, proper connector size, gauge, orientation, placement, embedment and proper storage of completed trusses.
- Light Gauge Metal Inspections; verify member size, material thickness (gauge), spacing, orientation, location, connections, connector size and quantity, proper bracing.
- Seawall Inspections; verify proper pile size and embedment, proper wall reinforcing size, spacing and cover, proper cap size and reinforcing as well as proper backfilling.
- Roofing Inspections; confirm proper deck/substrate material and connections, “tin-tag” inspections, verify secondary waterproof membrane (required in South Florida), proper roofing connections and /or methods of adhering to substrate.
- Guardrail and Handrail Inspections; Confirm conformance with plans and specifications regarding material used, all dimensions, connections, height, location, and edge distances; verified welds, welder’s qualifications, bolt size, spacing and embedment.
- Canopy and Awning Inspections; confirmed conformance with plans and specifications, verified welder’s certifications, inspected welds (typically aluminum members and welding), verified proper decking and attachment.
- Shoring Inspections; verified conformance to plans and specifications related to layout, size, capacity(s), base and cap plates, intermediate framing.
- Building Envelope Inspections; Reviewed plans and/or performed field observations to determine source(s) of water intrusion and/or causes for cracking (residential, commercial, industrial and retail buildings).
- Steel Deck Inspection; verified proper deck material (thickness), orientation, laps, as well as connector type, size and spacing.
- Steel Joist Inspection; verified correct joists, spacing, proper bracing, proper connections.
- Metal Building Inspections; confirmed erection in accordance to plans and specifications, member thicknesses, sizes, orientations, locations and spacing as well as connector type, size and quantity.
- “30-Year Inspections”; verified structural adequacy and safety on “older” buildings, verified conformance to “checklist” of structural items and issues as required in South Florida municipalities.
- Settlement Investigations; investigated causes for settlement of buildings, pools, decks, seawalls, etc.
- Floor Cracking Investigations; investigated causes of floor cracks in slabs-on-grade and elevated floor systems.
- Wall/Building Cracking Investigations; investigated causes for wall and/or building cracking including settlement, faulty construction, improper soil consolidation, etc.

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PROFESSIONAL EXPERIENCE

- 2010 to present **Robson Forensic, Inc.**
Associate
Provide technical investigations, analysis, reports, and testimony towards the resolution of commercial and personal injury litigation involving construction practices, structural design, failure analysis, and code compliance in the commercial and residential construction industries.
- 2011 to present **Mark Duckett, P.E., S.I.**
Sole Proprietor
Consulting Structural Engineer and Special Inspector
- 1997 to 2011 **Duckett Engineering Group, Inc.**
President
Duties included all aspects of running a consulting structural engineering business (design, drafting, shop drawing review, contract negotiation and preparation, billing/collections, etc.).
- 1988 to 1997 **Jenkins & Charland**
Engineering Manager 1994-1997
Duties expanded to include management of entire professional staff, inspection personnel and clerical staff. Provided design review and quality control of all work leaving the office; answered directly to company president.
- Project Engineer* 1990-1994
Duties expanded to include management of larger projects, overseeing junior engineers and to include fee proposals and budgeting.
- Project Engineer* 1988-1990
Duties included running marine division (sea-walls, docks and piers), field inspections, client contact, small projects, flagpole and lightpole designs.
- 1985 to 1988 **Sullivan & Associates**
Project Engineer
Wood and wood truss design. Firm was a consulting firm to numerous local truss plants; provided solutions to complex truss designs, whether it was loading, modeling or actual truss designs. Also, performed state mandated truss plant inspections for quality control of truss plants.
- 1985 **Dean Steel Buildings**
Design Engineer
Designed pre-engineered, pre-fabricated metal building systems for both estimating purposes and for construction.

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PROFESSIONAL CREDENTIALS

Certified as a Florida Threshold (Special) Inspector. In Florida, Threshold Buildings are defined as those buildings that are greater than 3 stories or 50 feet in height, or which have an assembly classification that exceeds 5,000 square feet in area, or an occupant content of greater than 500 persons. These buildings have been so defined to qualify for a “higher” degree of inspection, based upon their implied importance. Certification as a Special Inspector is awarded after demonstrating years of proficiency in designing and inspecting “Threshold” Buildings under a Florida Professional Engineer who already is certified as a Special Inspector and upon the recommendation of professional references.

Member of a structural committee whose task was to re-write structural portions of the 1994 Florida Building Code. Participation in this committee was “invitation-only” and was comprised of local building officials, prominent engineering consultants and industry-based lobbyists. Code revisions were under-way prior to Hurricane Andrew although significant changes based upon experiences learned from the damage resulting from Hurricane Andrew were then incorporated into the code.

As a result of an opportunity to study under the “founders” of wind engineering (engineers and scientists who originally authored the Wind Loading Standard for the United States, now referred to as ASCE 7, and who chaired the Wind Loading Committee for its initial 12 years), expert knowledge of wind loading and engineering as it applies to structures was attained. Area of practice for over 25 years has been South Florida based, an area designated in the current code as a HVHZ (High Velocity Hurricane Zone), and subject to stringent code restrictions and requirements for design, construction, and inspection.

Consultant to the Florida Board of Professional Engineers providing expert opinions in the form of reports. In this capacity, opinions are provided on such issues as engineering negligence, standard-of-care, and code-compliance of plans for structural engineers brought to the Board for disciplinary investigation. Extensive knowledge of Building Codes, Building Standards and Florida Statutes as pertaining to the engineering profession is requisite for these activities.

PROFESSIONAL REGISTRATIONS

Professional Engineer: NCEES; Alabama, Colorado, District of Columbia, Florida, Georgia, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Virginia
Threshold (Special) Inspector: Florida

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EDUCATION

Bachelor of Science (Engineering Sciences), University of Florida, Gainesville, Florida, 1985

Continuing Education:

An Introduction to SDI NC-2010 Standard for Non-Composite Steel Floor, December 2021

An Introduction to SDI RD-2010 Standard for Steel Roof Deck, December 2021

Deep Foundations, December 2021

Avoiding Ethical Pitfalls in Failure Investigations, December 2021

Changes in One- and Two-Way Shear (ACI 318-19), November 2021

Durable Repair of Corroding Structures; Case Studies Part 1, November 2021

Troubleshooting Concrete Formwork and Shoring; Forming Systems and Forming Economics, June 2021

Troubleshooting Concrete Forming and Shoring: Loads and Pressures and Reshoring of Multistory Buildings, June 2021

Troubleshooting Concrete Forming and Shoring: Form Removal and Tolerances, June 2021

Failures Related to Concrete Volume Change and Restraint, 2021

Troubleshooting Concrete Forming and Shoring: Forming Systems and Forming Economics, 2021

Troubleshooting Concrete Forming and Shoring: Loads and Pressures and Reshoring of Multistory Buildings, 2021

Troubleshooting Concrete Forming and Shoring: Form Removal and Tolerances, 2021

Response of Concrete Structures Subjected to Blast Loading-Introduction, 2021

A Case Study of the Design of Curb-Mounted Rooftop Unit Support Frames, December 2020

Blast Protection of Buildings-Blast-Resistant Design of Systems, and Components, December 2020

Avoiding Problems in Masonry Construction, December 2020

Applied Structural Vibration Analysis: Design and Troubleshooting, November 2019

Texas ASCE Guidelines for the Evaluation and Repair of Residential Foundations, June 2019

An Introduction to ASCE 7-16 Wind Loads – Three Part Series, Parts I, II, III, June 2019

Building Structures and Sustainability, June 2019

Deflection Calculation of Concrete Floors, June 2019

Design of Building Structures for Serviceability, June 2019

Design of Adhesive Anchors, June 2019

Design of Building Floors for Concentrated Loads, June 2019

Evaluating Damage and Repairing Metal Plate Connected Wood Trusses, October 2018

Foundations for Metal Building Systems, October 2018

Scaffold Competent Person Certification, October 2018

Ethics for Professionals, June 2018

Design for Lateral-Load Resistance in Structural Steel, June 2018

Assessment and Evaluation Methods and Tools of Structural Forensic Investigations, June 2018

Alternative Designs for Steel Ordinary Moment Frames, June 2018

Design of Masonry Anchors, June 2018

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Deciphering Building Code Provisions for Structural Renovations, June 2018
Corrective Work in Steel Structures, December 2017
Alternative Designs for Anchorage to Concrete, December 2017
Investigation, Analysis, and Remediation of Building Failures, March 2017
Significant Changes from ASCE 7-10 to ASCE 7-16, March 2017
Florida Laws & Rules for Professional Engineers, February 2017
Avoiding Failures of Retaining Walls, December 2016
Laws, Rules and Ethics for Indiana Professional Engineers, July 2016
Ethical Decision Making for Engineers #4, June 2016
Structural Condition Assessment of Existing Structures, March 2016
2014 Florida Building Code; Advanced Building Structural Design; Chapter 16, June 2016
ASCE 7-10 Snow Load Provisions, December 2015
Significant Changes to the Wind Load Design Procedure of ASCE 7-10, December 2015
Design of Reinforced Concrete Liquid Structures, December 2015
The Role of the Specialty Engineer from the Wood Truss Industry's Perspective, December 2015
Hurricane Damage: Wind vs. Water Determination, October 2015
International Building Code & More: Occupancy Classification and Loads, October 2015
Ethical Decision Making for Engineers #3, October 2015
Ethical Decision Making for Engineers #2, October 2015
Design of Reinforced Concrete Using ACI Code: Serviceability, October 2015
Laws, Rules and Ethics for Texas Engineers, June 2015
Dynamically Loaded Machine and Equipment Foundations, March 2015
ACI 318-14 Building Code Seminar, February 2015
Florida Engineers Laws and Rules, February 2015
Wind Load Calculations and Other Wind Issues, May 2014
Wind Load Calculations; Structural Applications, May 2014
Ethical Decision Making for Engineers, April 2014
Wood Design: Properties of Wood & Lumber Grade, April 2014
Reinforced Concrete Tilt-Up Panels, April 2014
Masonry Design: Clay and Ceramic Products, April 2014
Design of Commercial/Industrial Guardrail Systems for Fall Protection, Oct. 2013
Design Loads on Structures during Construction Using ASCE 37, June 2013
Antiquated Structural Systems, June 2013
Building Information Modeling (BIM) in Structural Engineering Practice, May 2013
Wind Loads, May 2013
Ethical Behavior – The Key to Earning Trust, May 2013
Seismic Design/Performance of Building Structures, 2012
Seismic Loads for Buildings and Other Structures, 2012
OSHA #510 course (30-hour) – Occupational Safety and Health Standards for the Construction Industry, 2011
OSHA 10-hour course, 2011
ASTM Workshop on Conducting Periodic Façade Inspections, 2011

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PROFESSIONAL MEMBERSHIPS

American Society of Civil Engineers (ASCE)
American Concrete Institute (ACI)

PUBLICATIONS

“Anchoring Tilt-Wall Braces with Helical Ground Anchors; a Structurally Unstable Condition,” BOAF (Building Officials Association of Florida), Summer 2010

MEDIA

Live national telephone interview with Arthel Neville, host of *America’s News HQ on Fox News* on the evening of September 10, 2017. The subject of the interview was the vulnerability of construction site tower cranes left standing during a hurricane event and the recent collapse of two (2) of those tower cranes in Miami due to winds from Hurricane Irma

Regarding Structural Steel Retrofitting of Texas A&M’s Football Stadium:
Interview, HOUSTON CHRONICLE, College Park, TX, “[Kyle Field Reinforces Swaying Aggies’ Concerns](#),” July 5, 2015.

EXPERT NOT RETAINED