

Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

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

ENGINEERING PROFILE

Over twenty-five years 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.

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.

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.

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.

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- 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)..
- 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.
- MRI Facility Designs
- 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.

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- 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.
- 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.
- 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.

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- 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.

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.

1997 to 2011 **Duckett Engineering Group, Inc.**
President

Duties include 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

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.

1994-1997

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- 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 be 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.

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

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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 are requisites for these activities.

EDUCATION

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

Continuing Education:

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

PROFESSIONAL MEMBERSHIPS

American Society of Civil Engineers (ASCE)

PROFESSIONAL REGISTRATIONS

Professional Engineer: NCEES; Florida, Virginia, North Carolina, South Carolina, Georgia

Threshold (Special) Inspector: Florida

PUBLICATIONS

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