



## **ALAN J. SCHWEICKHARDT, P.E.**

*Structural and Ocean Engineer*

Alan J. Schweickhardt has over 24 years of engineering experience including 17 years of work in the field of structural engineering. As a structural engineer Mr. Schweickhardt has worked on the design of industrial, commercial, residential, and municipal facilities as well as marine equipment. He has worked on the assessment and refurbishment of coastal condominiums, residential structures, coastal and offshore structures, reinforced concrete buildings, reinforced concrete masonry buildings, reinforced concrete waterways, and timber docks, piers, pedestrian bridges, and trusses. He also has 14 years of experience in the assessment, analysis and design of commercial and residential building envelopes including wall cladding and roofs.

### ***Education***

- Master of Engineering in Civil Engineering, Clemson University Graduate School of Engineering, 1994; emphasis in structural engineering.
- Bachelor of Science in Ocean Engineering, United States Naval Academy, 1986.

### ***Registration***

- Professional Engineer in South Carolina, North Carolina, Georgia, Indiana, and Maryland
- Structural Engineering Certification Board – Certified in the Practice of Structural Engineering.

### ***Professional Organizations***

- American Society of Civil Engineers (ASCE)
- International Concrete Repair Institute (ICRI)
- Structural Engineering Institute (SEI)
- American Concrete Institute (ACI)
- SC Structural Engineers Association (SCSEA)

### ***Previous Experience***

- Applied Building Sciences, Inc. June 2004 to Present
- Campbell, Schneider and Associates, LLC, 1999- June 2004
- Alan O. Campbell, P.E., Inc., 1996-1998

- Oceaneering Technologies, Upper Marlboro, MD, 1994-1996
- Davis and Floyd Engineers, Charleston, SC, 1993-1994
- US Navy, Charleston, SC 1986-1993

### ***Papers/Presentations/Awards***

- ICRI, Carolinas Chapter, 2005 Structural Repair Project of the Year, Atalaya Towers
- ASCE, South Carolina Section, 2009-2010 Technical Merit Award, Bethel United Methodist Church Renovation.
- Presentation, ASCE, South Carolina Section, Assessment and Repair of 155-Year Old Heavy Timber Truss, Fall Conference, October 22, 2010
- Paper, *Structural Restoration of Multi-Wythe Brick Walls of 155 Year Old Historic Building*, The Masonry Society

### ***PRINCIPAL AREAS OF PRACTICE***

- Building Envelope Investigation
- Structural Inspection and Assessment
- Structural Design
- Roof Investigations
- Computer Aided Structural Design and Analysis
- Coastal and Marine Structures
- Window and Door Investigations

***Building Envelope Investigation and Design***

- Analysis of leaking aluminum curtain wall systems, Industrial Office Facility and College Facility, Charleston, SC.
- Wind damage assessment of over 50 commercial and residential structures following Hurricanes/Storms from 1996 to present.
- Exterior cladding and concrete investigation of several mid-rise condominiums, Myrtle Beach, SC
- Modified bitumen roof designs, Hilton Head Island, SC and Myrtle Beach, SC
- Oceanfront concrete deck and parking garage investigations, Hilton Head Island, and Myrtle Beach, SC
- Conventional and synthetic stucco investigation of over 100 residences and commercial buildings
- Water intrusion investigations at numerous residences, townhouses and condominiums in the Charleston area, including cladding and window field checking and testing
- Window installation construction phase services
- Steep slope composition shingle roof investigation, analysis, and design of over 10 condominium complexes in NC following Hurricanes Fran and Bonnie
- Provided design, specification, and construction phase services for building envelope repairs for several coastal mid-rise condominiums in SC and NC.
- Clay/Concrete Tile roof investigations at two mid-rise condominiums in Charleston area and Hilton Head Island
- Brick veneer investigations and repair designs for numerous residences and townhouses in the Charleston area

***Structural Assessment***

- Investigation of construction vibration damage claims of several buildings and churches in downtown Charleston adjacent to new construction
- Investigation of seismic and construction vibration damage claims of several residences in North Charleston, Summerville, and Hanahan

- Hurricane damage assessment of over 90 residences and commercial buildings following storms between 1996 to present.
- Hurricane Bertha wind versus flood damage assessment of collapsed or damaged residences, North Topsail Beach, NC
- Four US Navy OCEANA TACTS towers, including design of steel and fiberglass repairs, offshore NC
- Underwater Shasta Dam, CA using Remotely Operated Vehicle (ROV)
- Prestressed Concrete Bridge, US Naval Weapon Station, Goose Creek, SC
- Damage assessment of 10 residential structures damaged by 1998 Mother's Day tornado, Summerville, SC
- Settlement analysis and repair design of several residences and townhouse units in Charleston area
- Analysis of Oceaneering Warehouse Slab, Upper Marlboro, MD
- Analysis of Georgia Pacific Warehouse Structure, including slab, Chicago, IL
- Analysis of Concrete Slab on Grade Problems at Quozel Warehouse, Goose Creek, SC and North Myrtle Beach Middle School.
- Investigation of manufactured metal building warehouse and slab on grade, Wando, SC
- Analysis of Seismic Requirements due to Code Changes, Myrtle Beach Hotel and Goose Creek Restaurant.
- Analysis of Manufactured Steel Building collapse/failure from snow load. Includes cold-formed steel Z-purlin analysis.
- Investigation of damage to over 50 residential and commercial wood framed structures caused by moisture and/or insects/termites.
- Investigation and structural analysis of termite damage to wood trusses in historic Church of the Holy Cross, Sumter, SC and historic Bethel United Methodist Church, Charleston, SC.
- Investigation of wood destroying organism damage to wood framing and wood windows in Cumberland United Methodist Church, Florence, SC

- Investigation and analysis of alleged structural and construction issues of five modular home systems.
- Analysis of above ground concrete wastewater treatment plant existing conditions and repairs for Richland County, SC.
- Analysis of autoclaved aerated concrete (AAC) walls for a residential townhouse in Beaufort, SC.
- Analysis and repair of damage due to steel roof bar joist collapse on commercial building in Charleston, SC due to ponding rain.
- Analysis of collapse of metal-plate-connected, manufactured wood roof trusses on a church and commercial building in SC.
- Analysis of light gauge steel roof collapse due to fire at commercial building, Charleston, SC
- Seven residential concrete pools in Coastal Wave Velocity Zone
- Design of structural components and slab or pile foundations for several residences in Charleston, Myrtle Beach and Hilton Head Island, SC area
- Design of repairs for over 10 residences with fire or storm damaged trusses
- Television Transmitter Station, Charleston, SC and Illinois
- Structural Design of Berkeley County Water Treatment Plant Concrete Waterways and Processing Pools, Goose Creek, SC
- Light commercial, manufactured metal building (Sunco Pool), including analysis of concrete slab, Myrtle Beach, SC
- Design of structural repairs to wood framing damaged by moisture and/or termites in over 50 residences and condominiums.
- Design of roof truss replacement for termite damage trusses and top plate, Mt. Zion Church in North Charleston, SC
- Design of major structural renovations or new structure for four residences.
- Design of Elderly Transportable (ET) Homes for United Methodist Relief for Charleston, Berkeley and Georgetown Counties.
- Design of framing repairs for several fire-damaged, apartment/condominium buildings in Pawley's Island, North Myrtle Beach, Orangeburg, and Columbia.
- Design of helical and pipe pile supports for new and existing foundations for several commercial and residential structures.
- Design of concrete strengthening using stainless steel external reinforcement for Richland County Wastewater treatment plant SBR and Digester tanks.
- CFRP strengthening design for concrete floor slab, Medical University of South Carolina, Charleston, SC
- New construction, wood-framed apartment building, Lakecrest Apartments, Greenville, SC

### ***Structural Design***

- Concrete and CMU repairs/strengthening for several Oceanfront Condominiums, Charleston, Hilton Head Island and Myrtle Beach, SC, including strengthening using carbon fiber materials.
- Weir foundation; Craney Island Disposal Area, Portsmouth, VA
- 160 foot spreader bar for lifting Geotextile Bag; Ports Authority, Brooklyn, NY
- 10 ton Cable Laying Sea Plow A-Frame, Upper Marlboro, MD
- Timber Pedestrian Bridge, West Ashley, SC
- Charleston County Library, Charleston, SC
- Reinforced CMU Building, Ports Authority, SC
- Steel and Reinforced Masonry Gymnasium, US Naval Weapons Station, Goose Creek, SC
- Heavy Timber Member, Bolted Joint Trusses for Carolina Truss and Atlantic Specialty Truss, Summerville, SC (Six different residential or commercial projects)
- Design and specification of repairs to historical heavy timber trusses and brick masonry walls at Bethel United Methodist Church, Charleston, SC
- Design of repairs to historic timber structure and masonry/stone exterior of Wagener Building (Southend Brewery, Charleston, SC)

***Computer Aided Structural Design and Analysis***

- Heat and Moisture Transfer Analysis of Motel Walls, N. Charleston, SC
- 10 ton Cable Laying, Sea Plow, A-Frame, Upper Marlboro, MD
- Remote Minehunting Vehicle Pressure Vessel
- Charleston County Library, Charleston, SC
- Impact Analysis, 400 Passenger Lifeboat
- Metal Plate Connected Wood Truss Structural Analysis
- Building frequency and period analysis, St Philips Episcopal Church, Charleston, SC
- Hydrostatic wastewater load analysis on concrete tanks and analysis of retrofit structural repair using external steel tube reinforcement.

***Marine Structures***

- Wind versus flood/wave damage analysis and assessment of numerous fixed and floating docks and piers in Jacksonville, NC and Charleston SC
- PVC retaining wall failure analysis, Isle of Palms, SC
- Underwater construction at Shasta Dam, CA using ROV
- Designed, supervised fabrication of, and operated various heavy equipment handling systems, pressure vessels, underwater remotely operated vehicles, and a steel pile foundation for a weir built by the Army Corps of Engineers.
- Structural design of repairs to Oceana TACTS Towers offshore Outer Banks, NC
- Assisted in design of Folly Beach Pier
- Wave force analysis of floating breakwater, Remley's Point, Mt Pleasant, SC
- Storm surge and wave force analysis on floating barges of Hardrock Casino, Biloxi, MS.
- Analyzed existing fiber-cement sheet pile retaining wall and designed new rip rap revetment, Elliotts Cut, Intracoastal Waterway, Charleston, SC

***Window and Door Investigations***

- Designed details and material specifications for Aluminum Window Frames for Boyd Aluminum to resist ASTM E330 pressure test. Witnessed field testing at Dune Ridge Condominiums, Wrightsville Beach NC
- Investigated deteriorated Marvin wood windows at residence in Mt Pleasant including field disassembly and laboratory testing for preservative in accordance with NWWDA I.S. 4
- Field tested Capitol Vinyl Windows in accordance with AAMA 502, Cape Cottages, Wilmington NC
- Field tested aluminum windows at Trident Technical College in accordance with AAMA 501.2 – Palmer Campus, Charleston SC
- Field tested aluminum windows at Westvaco Technical Center, North Charleston, SC
- Investigated deteriorated Bestline Wood Doors at The Gates Townhouses, Mt Pleasant, SC. Included field disassembly and laboratory testing for preservative in accordance with NWWDA I.S.-4
- Field tested Capitol Vinyl Windows in accordance with AAMA 502, Marais Townhomes, Mt Pleasant SC
- Consulting expert for Brannon Millworks Custom Wood Windows in Copeland vs Brannon Millworks regarding residence at 15 Orange Street, Charleston SC
- Consulting expert for Caoba Windows at 15 Orange Street, Charleston, SC
- Windows have been included in the issues in over 50 residential cases over the years where the window issues required research of manufacturer's installation instructions, code requirements, and treatment requirements.
- Investigated and replaced windows/specified new windows in six oceanfront midrise condominiums

***Continuing Education Courses/Seminars***

- Roof Consultants Institute (RCI), *Advanced Roof Consulting*, May 29-31, 1997
- ASCE Day Course in Existing Building Seismic Design, June 20, 1997
- Southern Building Code Congress International (SBCCI) *Hurricane Resistant Residential Construction*, November 18-20, 1997
- American Institute of Architects (AIA) *Construction Lien Law*, May 8, 1998
- RCI Building Envelope Symposium, August 5-6, 1998
- Carlisle Syntec Roofing Design Program, October 20, 1998
- NC State Wind Design Requirements for Structures under the NC Building Code/Wind Pressures for Windows, December 10-11, 1998
- Roofing Industry Education Institute (RIEI) Roofing Technology Seminar, April 20-23, 1999
- International Concrete Repair Institute (ICRI), Carolinas Chapter, Concrete Repair Seminar, October 7, 2000.
- Clayton Edu-Tech *Troubleshooting and Repair of Brick Veneer and Masonry*, March 21-22, 2001
- ICRI, Carolinas Chapter, Balcony/Walkway Repair/Restoration Demonstrations, April 27, 2001
- ICRI, Carolinas Chapter, Surface Applied Protection, Oct 6, 2001
- Geotechnical Earthquake Engineering in Mid-America, Nov 15-16, 2001
- ASCE *Structural Condition Assessment of Existing Structures*, Sep 19-20, 2002
- ICRI, Carolinas Chapter, Industrial Floor Design and Analysis, Oct 4, 2002
- ACI Seminar, *Concrete Slabs on Grade*, May 22, 2003
- ACI Seminar, *Troubleshooting Concrete Floor Problems*, May 23, 2003
- IBC Structural/Seismic Short Course, February 12, 2004
- CCMA Seminar, *Designing, Specifying and Building Masonry Wall Systems*, April 20, 2004
- Brick SouthEast Seminar, *Brick – Design, Specifying & Construction Techniques*, March 30, 2005
- American Forest & Paper Association Seminar, *Design of Wood Frame Buildings*, February 8, 2006
- Research Engineers Course, *Structural Analysis and Design using STAAD.Pro Computer Software*, April 24, 2006
- Charleston County Seminar, *Residential Masonry Framing and Wind-Borne Debris Protection for Glazed Openings*, May 24, 2006.
- Structural Masonry Design Systems Version 4 Seminar, April 24, 2007
- Renovation of Masonry Façade Webinar, May 22, 2007
- Design for Cold Formed Steel Structures, 2-day Seminar, June 14 and 15, 2007.
- Lightweight Insulating Concrete Roof Deck Workshop, Siplast, June 2008
- Renovation of Wood Trusses Webinar, August 26, 2008
- Avoiding Problems in Hot Humid Climates, Seminar, October 23, 2008
- Investigation and Repair of Fire-Damaged Framing, Webinar, September 30, 2009
- Ground Modification Seminar, October 8, 2009
- ICRI Conference, *Historical Restoration*, October 9 and 10, 2009
- American Concrete Institute Web-Based Courses, *Contractor’s Guide, Structural Crack Repair by Epoxy Injection,, and Slab Jacking*, May 17, 2010
- ASCE Webinar, *Deciphering Building Code Provisions for Structural Renovation*, May 21, 2010
- SC Engineering Conference, *Legal Aspects of Shop Drawings Review and Seismic Masonry Evaluation*, June 10, 2010
- ASCE SC Fall Conference, *Structural Steel and Fire Damage Assessment*, October 22, 2010
- ICRI Spring Conference and Mega Demonstration, *Coastal Concrete Repair*, May 5-6, 2011

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