



WARREN

**THE WARREN GROUP, INC.** FORENSIC ENGINEERS & CONSULTANTS  
7805 ST. ANDREWS ROAD | PO BOX 1608 | IRMO, SOUTH CAROLINA 29063  
TEL 803.732.6600 FAX 803.732.7576 ↓↓ WARRENFORSICS.COM

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***ALLAN A. ABBATA, P.E.***

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Civil/Structural Engineer

**Building Codes and Standards**

**Concrete Systems – Cracks, Settlements and Failures**

**Construction Defects and Claims**

**Foundation Issues**

**Site Design and Storm Water Runoff Control**

**Structural Design**

**Structural Collapse and Failure Analysis**

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## EDUCATION

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**1971**                      **Bachelor of Science, Civil Engineering**  
Trine University (formerly Tri-State College, Angola, Indiana)

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## EXPERIENCE

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**APRIL 2013  
TO PRESENT**      The Warren Group, Inc., Columbia, South Carolina. Senior Civil/Structural Consulting Engineer performing specialized consulting and training related to property loss analysis and the analysis of civil/structural designs with regard to health, welfare and safety of the public.

- Conduct technical investigations of construction defects, incidents or losses related to residential, commercial, industrial and historic structures
- Inspect concrete systems with cracks, settlements and failures in various types of construction including footings, foundations, and retaining walls, concrete slabs-on-grade, elevated concrete slabs, sidewalks, driveways, ramps and miscellaneous proprietary systems
- Perform assessments of damage resulting from weather events including hurricanes, hail, high winds, tornados, flooding and excessive ice build-up
- Inspect various types of construction and building materials including, but not limited to site work grading, drainage and stormwater runoff control systems, underground utilities, wood framing, load-bearing masonry walls, and steel framing members and structures
- Additional building and structure related evaluations including but not limited to, assessment of fire-related structural damage, moisture intrusion and fungal growth issues
- Analyze building and structural design construction and installation issues related to governing and applicable codes, standards, rules and regulations
- Provide technical reports or verbal opinions with observations, analysis, research, conclusions and recommendations for repair when requested

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## EXPERIENCE, Continued

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- DECEMBER 2012 TO APRIL 2013** US Forensic, LLC, New Orleans, Louisiana, assigned as a contractor to perform specialized Consulting Engineer services related to property loss from Hurricane Sandy and provide property inspection information sheet, flood report, and building floor plan(s), to determine and analyze of losses from flood water criteria.
- Performed over 50 visual inspections and technical investigations of potential losses on residential structures related to Hurricane/Super Storm Sandy in the New York and New Jersey areas
  - Performed personal interviews with building owners to gather essential information on the residential buildings to include, age, ownership, construction history, flood water depth, damages or conditions prior to and after the flood event and any repairs or cleaning of the property and buildings
  - Performed over 75 relative elevation measurements of floor framing members to estimate and predict levelness and sloping of floor surfaces
  - Performed verticality measurements of exterior walls on over 50 residential buildings to determine relative plumbness of the buildings
  - Extracted from websites soils and weather information on over 50 building sites inspected
  - Evaluated and provided “Scope of Repair Work” assessments for over 35 residential buildings requiring repair work from hurricane flood water damage
  - Use of photography to document site conditions and to provide evidence of flood water damage to buildings
  - Provided over 50 technical reports with observations, analyses, research, conclusions and recommendations for repair when requested
- 2005 - 2012** Consolidated Systems, Inc., Columbia, South Carolina. Manager, Engineering - R & D Group responsible for researching, developing, testing, certifying and implementing new and/or existing roof and floor deck products and systems. Managed and mentored a team of 5 to 7 degreed engineers to help achieve company profitability goals through increased sales and market share. Prepared and presented yearly fiscal budgets, annual business meeting R & D updates and assisted in processing and obtaining Intellectual Property (five patents issued). Prepared monthly newsletters and reports, weekly communication status reports and other social media information

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**EXPERIENCE, Continued**

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- 1999 - 2005** Consolidated Systems, Inc., Columbia, South Carolina. Director of Engineering - Metal Dek Group under the supervision of Sales Group's Senior Manager. Responsible for all engineering and technical design aspects associated with metal deck products, accessories and building components. Performed calculations, analyzed and designed cold-formed structural steel products such as composite floor deck, roof deck, form deck, bridge deck and other framing components such as closures, purlins, girts columns and base plates as applied to specific customer projects. Also performed duties as director to manage and assist a 40-person Drafting and Engineering Group. Coordinated product information for Sales Group and Deck Customers in providing a consulting service that met or exceeded the Corporate Quality Policy and client's specifications on a day-to-day basis. Reviewed and interpreted customer architectural, structural and mechanical design drawings and/or product shop drawings
- 1994–1998** Malcolm Pirnie, Inc. / Manpower Inc. / Tad Resources, Inc. / Olver Inc. Syracuse, New York, Buffalo, New York, and Charlotte, North Carolina. Senior Project Manager / Field Representative / Environmental Engineer developed strategic business plans, established new clients and performed structural analysis and working drawing design of concrete and steel framing systems including foundations. Prepared project specifications and written engineering reports, cost estimates, bid evaluations and construction inspection procedures for closure plans of several municipal landfills. Developed and designed site plans and storm drainage systems, and other site related work activities to include road layout/alignment and soil erosion controls. Provided and coordinated on-site job inspection/design assistance of hazardous/non-hazardous sites for remedial action throughout the Eastern United States. Functioned and performed duties as Design Leader on various industrial site remediation projects planning and conducting job safety and weekly progress meetings and other associated duties to coordinate the various on-site working trades
- 1982–1994** National Grid (formerly Niagara Mohawk Power Corporation), Syracuse, New York. Associate Senior Structural Engineer / Engineer 3 performed structural analysis and working drawing design of steel and concrete framing systems for industrial/commercial building projects. Conducted feasibility studies; organized project specifications, performed bid evaluations and construction inspections; prepared written reports and conducted informal peer reviews of unionized designers and draftsmen; developed, designed and permitted two industrial landfills in NY State; created site remediation plans, geotechnical Quality Assurance and Quality Control (QA/QC) programs, and Spill Prevention Control and Countermeasure Plans (SPCC)

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## EXPERIENCE, Continued

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**1972–1982** Trautman Associates, Buffalo, New York, R.M. Brown Engineering, Jamestown, New York, Klaus Associates, Dunkirk, New York, and Naetzker, Thorsell & Gostomski Architects/Engineers, Jamestown, New York. Civil/Structural Engineer performed structural analysis, working drawing design and basic layout of roof and floor steel and concrete framing systems and other civil/site work projects including drafting of structural plans, details, sections, and schedules. Also provided cost estimating, review and approval of shop drawings, project specifications, engineering reports, and bidding documents. Civil Engineer work in designing site grading and contouring plans, storm drainage systems, road layout and alignment, water, gas and sewer lines, and electric utility duct banks and appurtenances. All designs were achieved using local building code and engineering standards and specifications, consulting services, business development, and construction supervision with inspection. Performed duties as a department head supervising engineers, designers and draftsmen

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## SUMMARY OF SELECT DESIGN EXPERIENCE

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### Civil/Structural Engineer

Developed, designed, tested, certified and implemented two pneumatic operating tools for connecting and fastening metal deck panels in a roof or floor application with interlocking side lap profiles (Dek-Lok® ISL Tool) and hidden side lap profiles (Dek-Lok® HSL Tool)

Developed, designed, tested, certified and implemented several roof deck profiles (Fab-Dek® V2, Fab-Dek® 3.5LS, Curve-Dek™, Versa-Dek® 3.5LS, Super Versa-Dek® 5LS, Super Versa-Dek® 6.5LS, and Deep-Dek® 4.5, 6 and 7.5), floor deck profiles (Versa-Dek® Composite 3.5LS, Deep-Dek® Composite 4.5, 6 and 7.5 and Deep-Dek® HD 4.5 and 6) and bridge deck (BD 4.5) profiles including recommended installation guidelines and Standard Operating Procedures (SOP) for field installation of these products

Established relationship with International Code Conference-Evaluation Services (ICC-ES), Underwriters Laboratories (UL), Factory Mutual (FM) and City of Los Angeles Research Report (LARR) in obtaining certification of decking products and accessories

Designed roof framing systems consisting of (wide flange beams, channels and angles, etc.), bar joists (K, LH, and DLH series) and supported by steel columns (wide flange members, channels, angles, structural tubes, pipes, etc.)

Designed platforms, pipe hangers, trenches, storm drainage systems, access roads, storm water retention systems, and oil separation/containment systems

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## SUMMARY OF SELECT DESIGN EXPERIENCE, Continued

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Performed engineering studies and analyses for alternate deep water intake structures, maximum loading parameters of overhead crane rail systems, floor loading on steel and concrete framing members

Prepared working drawings and specifications for industrial park complex in Massena, Syracuse, Franklinville, and Jamestown, New York, and revitalization programs for reconstruction of roads, parking lots, storm drainage systems, municipal water and sewer lines and pedestrian bridges

Performed field investigations and analytical surveys for residential and commercial properties on potential liability claims against known adversaries/contractors for various clients

Developed and designed combined residential and industrial water district (over 5 miles of underground piping) for Middle Road in Sheridan, New York, and provided daily job inspection during construction

Complete structural design with drafted engineering plans of one-story and multiple story steel, concrete and wood framed or masonry wall bearing structures for schools and colleges, hospital and nursing home, and industrial and commercial facilities as listed below:

- North and South Board of Cooperative Educational Services (BOCES) Centers (School)
- Lutheran-Presbyterian Complex (Nursing Home)
- Women's Christian Association (WCA) Hospital
- Weber-Knapp Company Jamestown, NY (Commercial)
- Jamestown Community College Jamestown, NY
- American Sterilizer Company Jamestown, NY (Industrial)
- Fisher-Price Company Irving, NY (Industrial)
- Dunkirk Senior Citizen Center Dunkirk, NY
- North Buffalo Community Center Buffalo, NY
- Father Belle Community Center Buffalo, NY
- Buffalo Circuits, Inc. Orchard Park, NY (Industrial)
- Ralco Development Company Dunkirk, NY (Commercial)
- Dunkirk Police Department Dunkirk, NY
- "In a Nutshell" Dunkirk, NY (Commercial)
- Mulligan's Restaurant Irving, NY
- Gert's Restaurant Dunkirk, NY
- One Temple Square Fredonia, NY (Commercial)
- Dunkirk Senior High School Dunkirk, NY
- Chautauqua Golf Course Club House Chautauqua, NY
- KOA Campground Swimming Pools Westfield, NY
- Westfield Police Station Renovation Westfield, NY

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## SUMMARY OF SELECT DESIGN EXPERIENCE, Continued

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Special design features associated with these projects included 400 concrete caisson foundation mat system, cantilevered steel roof trusses, 70' steel trussed bridge span, 60' wide by 100' long by 25' deep concrete pit with retaining walls adjacent to major waterway system, above ground indoor running track, long spanning laminated wood beams, 120' span roof joist system, steel space (geometric) frame system, floating concrete slab system with 3,000 caissons and multi-story masonry wall bearing structure located in a Zone 3 earthquake area

Design analysis of a heavy timber municipal pier built on wood pilings on Lake Chautauqua in Mayville, New York. Project also included design of wooden ice breakers to divert ice floes around existing pier structure

Design and layout of individual and multiple (120-unit, 100-unit, 25-unit and 9-unit) mobile home trailer courts including water/sewer lines, waste treatment (septic) systems, underground electrical and gas lines, roads, and site development facilities/areas

Design and loading analysis and capacity of a second floor mezzanine area for the Red Wing Company, a food processing facility in Fredonia, New York, including installation of packaging equipment and conveyor system. Project also included the loading analysis of a roof structure to convert into a second floor storage and processing area

Developed, designed and engineered 100-Lot Housing Subdivision in Amherst, New York, including permit approvals, engineering reports, sanitary and storm drainage systems, site grading and roads, cut/fill analysis, sewerage pumping station, and comprehensive storm water management program

Performed structural analyses on an existing (abandoned) warehouse building for conversion into school classrooms in Olean, New York, and major renovation and building additions to an existing three-story Middle School in Dunkirk, New York

Develop and design engineered working drawings for renovation of the Municipal City Pier (60' wide by 1200' long) in Dunkirk, New York, using steel sheet piling system and asphalt road resurfacing. Project also included design of pumping and filtration systems for public and commercial swimming pools including repairs and resurfacing of pool walls

Served a medium size village community (population 16,000+) as a part-time Zoning Enforcement Officer in Fredonia, New York, for a four year period reviewing structural plans and specifications, issuing building permits and performing final inspection and certificates of occupancy

### **Environmental Engineer**

Developed, designed and permitted two industrial (flyash) landfills (60 acres and 125 acres in size) in Buffalo and Dunkirk, New York; including geotechnical Quality Assurance and Quality Control (QA/QC) Landfill Liner programs, facility operations manual and contingency plan, fill progression plans for waste disposal, and closure plans for final cover and reclamation, Spill Prevention Control and Countermeasure Plans (SPCC) and State Pollutant Discharge Elimination System (SPDES) Permits. Created site remediation plans for Niagara Mohawk Power Corporation substation sites across New York State

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## SUMMARY OF SELECT DESIGN EXPERIENCE, Continued

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Provided on-site job oversight/inspection and design assistance/coordination, performed site-specific safety meetings, and project management duties such as daily logs, weekly reports, approving invoices, contract change orders and as-built drawings for various construction related remediation projects in New York (Love Canal), Pennsylvania (Occidental Chemical Plant), Kentucky, Maryland, North Carolina (Occidental Chemical Plant) and New Jersey

On-site field representative/Project Monitor for an Asbestos Abatement Program and the Demolition of an existing chemical (iron oxide) facility in Perryville, Maryland

Project Engineer/Liaison for Quality and Environmental Laboratory Renovation project in Buffalo, New York, programming/prioritizing items for six testing labs with various supporting facilities and obtained cost estimates for budget approval including preparation of specifications/bid documents for renovation work

Performed overall review of construction drawings and specifications for remedial design projects at Columbia Mills, Inc. Landfill facility in Minetto, New York, and Ferdula Landfill facility in Frankfort, New York

Coordinated and prepared "Design/Build/Operate" documents and served as Project Design Leader for an industrial site remediation project, Pump & Treat System, in Fulton, New York

Prepared Phase 1 and 2 Final Closure Plan documents for Squaw Island Landfill located in Buffalo, New York

Designed/prepared final construction drawings for a twenty million gallon Pulp & Paper Lagoon Renovation Project in Lyons Falls, New York

Prepared/certified complete Spill Prevention Control and Countermeasure (SPCC) Plans for four steam generating stations owned and operated by Niagara Mohawk Power Corporation in Dunkirk, Buffalo, Oswego, and Albany, New York, and associated facilities in accordance with 40 CFR Part 112 of the EPA Regulations

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## PATENTS

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*Composite Deck System*, (Divisional) U.S. Patent #7,743,446, Issued June 29, 2010, with Assignee Consolidated Systems, Inc.

*Composite Deck System*, U.S. Patent #7,555,800, Issued July 7, 2009, with Assignee Consolidated Systems, Inc.

*Deck Tool*, U.S. Patent #7,353,584, Co-Inventor with Michael Defreese, Issued April 8, 2008, Assignee Consolidated Systems, Inc.



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## **PATENTS, Continued**

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*Panelization Method And System*, U.S. Patent #8,205,412, Issued June 26, 2012, with Assignee Consolidated Systems, Inc. And W & W Steel

*Deck Assembly With Liner Panel*, U.S. Patent #8,240,095, Issued August 14, 2012, with Assignee Consolidated Systems, Inc.

*Panelization Method and System*, U.S. Patent Pending with Assignee Consolidated Systems, Inc.

*Form Deck System*, U.S. Patent Pending, as Inventor with Assignee Consolidated Systems, Inc.

*High Sheer Roof Deck System*, U.S. Patent Pending with Assignee Consolidated Systems, Inc.

*Built-Up Deep Deck Unit*, U.S. Patent Pending with Assignee Consolidated Systems, Inc.

*Metal Deck Strut System*, U.S. Patent Pending with Assignee Consolidated Systems, Inc.

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## **PROFESSIONAL ORGANIZATIONS AND AFFILIATIONS**

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Steel Deck Institute (SDI)

International Code Council - Evaluation Services (ICC-ES)

American Society of Civil Engineers (ASCE)

American Iron and Steel Institute (AISI)

American Institute of Steel Construction (AISC)

American Concrete Institute (ACI)

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## **REGISTRATIONS**

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Professional Engineer in South Carolina (#19030)

Professional Engineer in North Carolina (#23730)

Professional Engineer in Alabama (#45323)

Professional Engineer in Virginia (#34788)

Professional Engineer in Florida (#55562)

Professional Engineer in Michigan (#46298)

Professional Engineer in Pennsylvania (#56496)

Professional Engineer in Texas (#87417)

Professional Engineer in Georgia (#26179)

Professional Engineer in Missouri (#147792)

Professional Engineer in New York (#056481)

Professional Engineer in Tennessee (#23730)

National Council of Examiners for Engineering and Surveying (NCEES #16067)

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## CONTINUING EDUCATION

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### **June 4, 2015**

“Structural Forensic Engineering,” presented by HalfMoon Education Inc., Columbia, South Carolina

### **February 26, 2015**

“Gravity Flow in Pipes, The Manning Formula” a course by William C. Dunn, P.E., presented by SunCam, Inc., Online Course

### **February 26, 2015**

“Open Channel & Box Culvert Flow, The Manning Formula” a course by William C. Dunn, P.E., presented by SunCam, Inc., Online Course

### **February 24, 2015**

“Water Flow in Pipes, The Hazen-Williams Formula” a course by William C. Dunn, P.E., presented by SunCam, Inc., Online Course

### **February 3, 2015**

“Laws & Rules Online” a course presented by SunCam.com, Online Course

### **January 30, 2015**

“Fundamentals of Helical Anchors/Piles” a course by Thomas B. Watson, III, P.E., presented by SunCam, Inc., Online Course

### **January 29, 2015**

“Introduction to the Design of Wood Trusses” a course by Derek Rhodes, P.E., presented by SunCam, Inc., Online Course

### **August 18, 2014**

CAL-EMA Safety Assessment Program, 5-Year Damage Assessment Certification, presented by the CAL-EMA National Database in Irmo, South Carolina

### **March 18, 2014**

Property Loss Research Bureau (PLRB), 2014 Claims Conference & Insurance Services Expo, Indianapolis, Indiana

- Earthquake Damage Assessment & Repair

### **February 3, 2014**

“Investigation and Repair of Fire-Damaged Framing (8101W2014),” online webinar presented by the American Society of Civil Engineers (ASCE)

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## CONTINUING EDUCATION, Continued

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**November 18-20, 2013**

Property Loss Research Bureau (PLRB), 2013 Large Loss Conference, Jacksonville, Florida

- Adjusting Large Building Losses at Manufacturing Facilities
- Superstorm Sandy workshop: Analysis of Large Loss
- Construction Defect Litigation Management: A Novel Approach

**October 4, 2013**

North Carolina Association of Defense Attorneys (NCADA), 2013 Fall Seminar for Insurance Claims - Managers & Defense Counsel, Concord, North Carolina

- OSHA: The Great and Powerful

**October 29-30, 2013**

Property Loss Research Bureau (PLRB), 2013 Eastern Regional Adjusters Conference, Concord, North Carolina

- Hail Damage to Buildings, Roofs, Siding and Vehicles
- Building Code Issues and Challenges

**September 9, 2013**

“Cold-Formed Steel Frame Design for Residential and Small Commercial Buildings,” presented by HalfMoon Education Inc., Columbia, South Carolina

**August 8, 2013**

“Professional Conduct and Ethics for Texas Engineers,” online course presented by McKissock

**May 6, 2013**

“Florida Engineers’ Laws and Rules [V.11],” online course presented by RedVector.com

**May 6, 2013**

“Masonry Design: Installation and Workmanship,” online course presented by RedVector.com

**April 2013**

“Building in Coastal Areas”, “Ethics, Professionalism & Disciplinary Actions”, “Fire Protection Engineering for Buildings”, “OSHA Fatal Facts” and “Roofing Systems” presented as online courses by The PDH Discount Store

**April 2012, April 2011, April 2010, April 2006, April 2009, April 2008, April 2007, April 2006**  
Consolidated Systems, Inc. Annual Business Meeting, Program for Sales Group R & D Updates  
Annual Business Meeting prepared & presented in Columbia, South Carolina

**November 11, 2011**

“Three Phase Systems,” online course presented by SunCam.com, Online Course

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**CONTINUING EDUCATION, Continued**

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**January 18-19, 2011**

Everblue Training Institute, 14 Hours of Leadership in Energy and Environmental Design (LEED) Green Associate (GA) Training Course, Concord, North Carolina

**December 1, 2010**

Steel Framing Alliance, Cold-Formed Steel Engineers Institute (CFSEI) Webinar - Connection Design in Cold-Formed Steel Framing

**November 30, 2010**

North Carolina Structural Engineers Association (NCSEA) online credit course entitled Power Fasteners, Inc., Columbia, South Carolina

**November 15, 2010**

ActivEngineer.com (Online Course No. 0004735), Florida Laws and Rules for Engineers – Renewal Cycle 2009-2011

**October 7, 2010, September 27, 2010**

American Society of Civil Engineers (ASCE), Webinar Roofing Systems: A Primer for Engineers and Design of Steel Building Structures Symposium: “Preliminary Building Design To Completion”, Discussion on the IBC, Computer Models, and Validation of Results, Traditional and Newer Residential Framing Systems, Skyhooks, Virtual Prototyping and Simulation in Long Span Structures, Surviving in the World of Design and Engineering Idea: The Design of the Burj Khalifa, at VTech in Blacksburg, Virginia

**June 2, 2010**

PDHonline.org, Inc. /PDH Center (Course No. S187), 2006 International Building Code (IBC) - Structural Design

**March 30, 2010**

American Institute of Steel Construction (AISC), “Design Steel Your Way II, *Efficient Analysis for Steel Design using the 2005 AISC Specification*” by Lou Geschwindner in Columbia, South Carolina

**February 20, 2009, December 8, 2008**

SunCam, Inc. and RedVector.com, Inc., online courses for Florida Engineers' “Laws and Rules”

**October 2, 2008**

Virginia Polytechnic Institute & State University, “The Thomas M. Murray Seminar”

**February 20, 2008**

Hilti, Inc., Powder Actuated Decking Fastener Design Program

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## CONTINUING EDUCATION, Continued

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**February 28, 2007, January 23, 2007, December 6, 2004, October 22, 2004, October 14, 2004**

RedVector.com, Inc., online courses for Leadership and Management, Ethical Decision Making for Engineers Part I, Title II: State & Local Government & Complying with the ADA, OSHA Demolition and OSHA Fire Protection & Prevention, Ethical Decision Making for Engineers #2, Structural Analysis I: An Introduction and Structural Analysis III: Shear and Moment Diagrams

**Jan-May 2007, Jan-December 2006, Jan-Dec 2005, May-Dec 2004**

Steel Deck Institute, Roof Deck Committee Chairperson

**September 2007, September 2006**

Consolidated Systems, Inc. In-House Training Program, Multi-Story Residential (MSR) Metal Deck Design and Practice Program for Sales Group

**January 23, 2007**

RedVector.com, Inc. online Florida Engineers' Laws and Rules [V.06]

**August 3-6, 2006**

Midlands Technical College, Project XP (Microsoft Office Project) in Columbia, South Carolina

**February 24, 2005, February 15, 2003**

SunCam, Inc., online courses for "Laws and Rules", in accordance with Florida Statute Chapter 471 and Rules Chapter 61G15, Florida Administrative Code and Laws and Rules FBPE Meeting of April 24, 2002 and June 17, 2004

**November 4-5, 2004, October 19-20, 2000**

University of Missouri at Rolla, 15<sup>th</sup> International Specialty Conference on Cold-Formed Steel Structures in St. Louis, Missouri and 17<sup>th</sup> International Specialty Conference on Cold-Formed Steel Structures in Tampa, Florida

**December 27, 2003**

PDHcenter.com/PDHonline.org, Technical Report Writing and Basic Project Management

**December 4, 2003**

American Iron and Steel Institute (AISI), online course for Engineers and Architects, "An Overview of Cold-Formed Steel Structures" by Helen Chen, PhD., PE

**June 3-6, 2003, May 14-17, 2001**

Consolidated Systems, Inc., In-House Training Program and presentation entitled, "Decknowledgy Course for Engineering and Sales Groups", Columbia, South Carolina

**September 25, 2002**

South Carolina Society of Professional Engineers (SCSPE), Building/Structural Core Training on the Unified Florida Building Code and Applied Research Associates, Inc., Technical Core Transition Training in Columbia, South Carolina

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## **CONTINUING EDUCATION, Continued**

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### **February 7, 2001**

American Institute of Steel Construction (AISC), “Floor Vibration Seminar” by Thomas M. Murray, Ph.D., P.E., in Charlotte, North Carolina

### **October 20-22, 1999**

University of Missouri at Rolla, Cold-Formed Steel Structures, 3-day short course on the design of tension members, compression members, beam-columns, and connections in St. Louis, Missouri

### **May 5-6, 1999**

Tri-Tech Services, Inc., Quality Assurance/Management Processes/Training for successful completion of workshops in “Internal Auditor” and “Lead Auditor” in Columbia, South Carolina

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## **COURSES, SEMINARS AND LECTURES PRESENTED**

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### **September 18, 2014**

“Wind and Hail Roofing Damage” presented at the Charleston Area Claims Association, Charleston, South Carolina