

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

PRESIDENT

- EDUCATION:** Bachelor of Science Civil Engineering
Clemson University
Clemson, South Carolina; 1983
- PROFESSIONAL REGISTRATION:** Professional Engineer in Texas, #70234
Professional Engineer in North Carolina, #15291
RCI Registered Roof Consultant #197
- ASSOCIATION MEMBERSHIP:** Roof Consultants Institute (RCI)
Roofing Contractors Association of Texas (RCAT)
Gulf Coast Chapter of RCI
- SPECIALIZED TRAINING:** Certified Roofing Torch Welding Applicator Instructor by MRCA

Better Understanding of Roofing Systems Institute (BURSI)

Operator of Nuclear Moisture Gauge
- PUBLICATIONS:** "Staying on Top of Roof Maintenance"; Cleaning and Maintenance Management, May 1996.

"Roof Moisture Surveys: An Effective Tool for New Construction and Maintenance Programs"; Roofer Magazine, March 1996.

"Granulated Cap Sheets", Architectural Specifier, Jan/Feb 1997.

"Guidelines for Achieving Long-performing Seams for Granule Surfaced Roofing Materials" RCI Interface, April 1997.

"Roof Moisture Surveys: An Effective Tool for the Industry", RCI Interface, March 1997.

"A Roofing Alternative: Lightweight Insulating Concrete", Texas Architect, Sept./Oct. 1997

"Testing of Lightweight Insulating Concrete", The Roofing Specifier, November 1997.

"Rx For Roofs", Civil Engineering, December 1997.

"Don't Tread on Me: Guidelines & Helpful Hints for Walking on Roofs", RCI Interface, April 1998.
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KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

“Walkways”, RCI Interface, June 1998.

“Minimizing Odors & Fumes”, Contractors Guide, August 1998.

“Sealant Specs That Work”, The Roofing Specifier, April/May 1999.

“The Use of Sealants in Roofing”, RCI Interface, May 2001.

“Cool Roofing – A Component of the Cool Houston Plan”
September 2003.

“Garden Roof in the Southwest for Environmental Benefits”,
Greening Rooftops for Sustainable Communities, June 2004.

“The Art of Detailing and Specifying”, RCI Interface, April 2005.

“The Environmental Benefits of a Texas Garden Roof”, RCI Interface, December 2005.

“The Underlying Facts: Product Types, Standards, and Characteristics of Underlayments”: Part 1 of 2, RCI Interface, February 2006.

“Industry Guidelines & Recommendations for Underlayments”:
Part 2 of 2, RCI Interface, April 2006.

CAREER SUMMARY

Since 1983, Karl Schaack has maintained employment in the engineering consulting field where he has provided professional consulting services related primarily to roofing and waterproofing projects. Mr. Schaack, a Klein, Texas resident, joined Price Consulting, Inc. (PCI) in May 1992. Mr. Schaack's role in PCI is to provide leadership in the technical, management, and business development area regarding roofing, waterproofing, and exterior restoration related services.

ROOFING AND WATERPROOFING EXPERIENCE

Mr. Schaack has conducted numerous moisture and condition surveys for a variety of roof systems including built-up, modified bitumen, single-ply, metal, spray-applied polyurethane, tile, and shingles. Mr. Schaack has also performed condition surveys on a variety of waterproofing systems including, but not limited to, EIFS, stucco, stone/masonry, window wall systems, plaza decks and sealants. These evaluations typically include repair/replacement recommendations and associated opinions of construction costs for each type of system. He has also performed life cycle cost analyses to assist in determining replacement and/or repair options. Mr. Schaack

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

has prepared plans and specifications and provided contract administration for a variety of roof and waterproofing repair/replacement projects. He has performed roof failure studies and roofing material testing and analyses. He has also performed and supervised construction monitoring during new and renovation activities. Mr. Schaack has performed peer review on roofing and waterproofing specifications as prepared by others. Mr. Schaack has participated in seminars, technical/training schools and plant visits sponsored by industry entities and various material manufacturers.

CONSTRUCTION MATERIAL TESTING EXPERIENCE

Mr. Schaack has directed engineering, inspection, and testing activities for commercial and industrial projects during construction. Mr. Schaack's involvement has included technical analyses for soil, concrete, pavement, deep and shallow foundations, fireproofing, and roofing. Mr. Schaack's role consisted of performing the actual testing or supervising engineering technicians performing the testing.

REPRESENTATIVE PROJECTS

Roof Evaluations – Multiple Facilities

Spring Independent Schools, Houston, TX: Performed and managed roof moisture and visual conditions surveys for approximately 1,570,000 square feet of existing roof systems at 14 campuses with various roof systems. Prepared an engineering report prioritizing repairs and/or replacements for the subject school buildings.

Duke Power Company, Charlotte, N.C.: Developed and performed annual roof condition surveys of existing roof systems for nuclear (three), fossil (six), and hydro power generating facilities (thirty-five) encompassing over 2 million square feet located throughout North and South Carolina. Prepared engineering reports presenting the priority for performing repairs or replacement.

City of Houston – Police Department, Houston, TX: Performed a roof evaluation for eighteen facilities with over 250,000 square feet of roof, and prioritized roof maintenance and repair activities for five years and developed computerized database program.

United States Airforce Air Combat Command, Langley AFB, VA: Performed engineering evaluation roof condition study and developed computerized data base for a Roof Maintenance Management Program at Mountain Home AFB, Cannon AFB, Seymour Johnson AFB, Beale AFB, Offut AFB, Whiteman AFB, Hollaman AFB, Langley AFB, Nellis AFB, Minot AFB, Moody AFB, Dyess AFB, Ellsworth AFB, Barksdale AFB, Shaw AFB, Davis Monthan AFB, & Lajes AFB encompassing over 5,200 buildings and 50 million square feet.

Houston Independent School District, Houston, TX: Performed evaluations, developed computerized data base for a Roof Maintenance Management Program for 248 schools campuses and 21 Administration buildings encompassing over 18 million square feet.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

BellSouth, Various Locations: Performed evaluations, moisture survey and material testing and prepared five year plan for roofs on 180 facilities in Louisiana. Managed personnel in the collection of data/evaluation of over 500 facilities in four states.

United States Postal Service – Houston District, Houston, TX: Perform engineering evaluation roof condition studies and repair/replacement prioritization surveys for multiple facilities and developed computerized data base for Roof Maintenance Management Program encompassing over 100 facilities and 3,000,000 square feet.

Asphalt Built-up Roofing

San Rafael Apartments, Santa Fe, NM: Performed a condition survey, test cuts, and evaluation of existing built-up roofs with cap sheet surfacing on ten apartment buildings that had experienced premature roof failure and extensive leaking.

Spring ISD/Smith Elementary School, Spring, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of a 4-ply asphaltic gravel surfaced built-up roof over two layers of rigid board insulation over a steel deck encompassing approximately 65,000 square feet.

Crosstimbers One Warehouse, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of a 4-ply asphaltic gravel surfaced built-up roof over lightweight insulating concrete deck assembly encompassing 200,000 square feet.

Point West Office Building, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of a 4-ply asphaltic gravel surfaced built-up for over a "Loadmaster" Deck assembly encompassing 40,000 square feet.

US Postal Service: Beaumont GMF, Beaumont, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of a 4-ply built-up roof membrane with a modified bitumen cap sheet over rigid board insulation and cementitious fibrous plank deck assembly encompassing approximately 170,000 square feet.

Coal-tar Built-up Roofing

Southwestern Bell Telephone, Capitol Central Office, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of an aggregate-surfaced coal-tar built-up roof assembly, rigid insulation, and concrete deck on a 12-story high-rise telecommunications building encompassing approximately 25,000 square foot.

Parker Elementary School, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of an aggregate surfaced coal-tar built-up roof membrane, tapered insulation, and concrete deck on approximately 65,000 square feet.

West University Elementary School, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of an aggregate surfaced coal-tar built-up roof assembly and concrete deck encompassing approximately 20,000 square feet.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

Delphi Harrison Thermal System, Tuscaloosa, AL: Prepared specifications/drawings for roof replacement consisting of an aggregate-surfaced four-ply coal-tar built-up roof, insulation, and steel deck encompassing approximately 120,000 square foot on a manufacturing facility.

Modified Bitumen Roofing

Walgreen's Distribution Center, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement utilizing 2-ply SBS modified bitumen roof membrane and two layers of insulation set in asphalt over pre-cast concrete deck on approximately 150,000 square foot distribution facility.

River Oaks Bank Building, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement utilizing 2-ply SBS modified bitumen roof membrane and two layers of insulation installed with hot asphalt over concrete deck on 14-story high-rise office building.

Bell South Miami Data Center, Miami, FL: Prepared specifications/drawings and performed QAI/CA for replacement system consisting of two-ply SBS modified bitumen roof membrane over a new tapered lightweight insulating concrete fill substrate, over a secondary roof membrane on a concrete deck for 48,000 square feet on a telecommunications building.

SBISD/Memorial Middle School, Houston, TX: Prepared specifications/drawings and performed QAI/CA for replacement system consisting of two-ply torch-applied SBS modified bitumen roof membrane over new lightweight insulating concrete fill substrate over a secondary membrane for 130,000 square feet.

Huntsville Memorial Hospital, Huntsville, TX: Prepared specifications/drawings and performed QAI/CA for replacement system consisting of torch-applied and cold-process applied two-ply SBS modified bitumen roof system.

USPS/Clute Main Post Office, Clute, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement utilizing two layers of rigid insulation board and two-ply APP modified bitumen roof membrane applied with cold-process adhesive on approximately 12,000 square feet.

PM Realty Group: Houston Club Building, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement utilizing a two-ply APP modified bitumen roof membrane applied with cold-process adhesive on 14-story high-rise building in downtown Houston.

PISD/Jamison Middle School, Pearland, TX: Prepared specifications/drawings and performed QAI/CA for roof replacement consisting of two layers of rigid board insulation installed with foam adhesive and a two-ply torch-applied APP modified bitumen roof membrane over existing lightweight insulating concrete fill substrate for 60,000 square feet.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

IRMA

United States Department of State, Arlington, VA: Performed evaluation of existing EPDM single-ply roof system and prepared specifications/drawings and performed QAI/CA for replacement and installation of new IRMA roof assembly consisting of two-ply modified bitumen membrane on concrete deck, drainage board, extruded polystyrene insulation and concrete pavers for US Embassy in Gabarone, Botswana.

United States Department of State, Arlington, VA: Performed evaluation of existing EPDM single-ply roof system and prepared specifications/drawings and performed QAI/CA for replacement and installation of new IRMA roof assembly consisting of a coal-tar pitch built-up roof membrane on concrete deck, drainage board, extruded polystyrene insulation and concrete pavers for six buildings at the US Embassy in Amman, Jordan.

Single-ply Roofing

PISD Maintenance Building and Transportation Building, Pearland, TX: Prepared specifications/drawings and performed QAI/CA for application of new mechanically attached PVC single-ply over existing corrugated metal panel roofing on approximately 24,000 square feet of two office/administration/general services buildings.

Klein Independent School District, Klein, TX: Prepared specifications/drawings and performed QAI/CA for installation of new mechanically-attached and fully-adhered TPO single-ply roof membrane assembly over existing built-up roofs in a recovery application and in replacement applications for 15 school facilities encompassing over 1,500,000 square feet.

TCB/Phelan, Beaumont, TX: Prepared specifications/drawings and performed QAI/CA for application of new mechanically attached PVC single-ply over existing corrugated metal panel roofing on approximately 12,000 square foot commercial building.

Aramco Towers, Houston, TX: Prepared specifications/drawings and performed QAI/CA for replacement of EPDM single-ply with new PVC single-ply, including insulation board, drain board and concrete pavers for 12-story office building.

Angleton ISD, Angleton, TX: Prepared specifications/drawings and performed QAI/CA for replacement of single-ply with new insulated PVC single-ply membrane for Northside ES and Southside ES, encompassing approximately 80,000 square feet.

UTHSC/Operations Center Bldg., Houston, TX: Prepared specifications/drawings and performed QAI/CA for application of new mechanically attached PVC single-ply membrane and insulation over existing standing-seam metal panel roofing on approximately 185,000 square foot office/warehouse building.

Texas Department of Criminal Justice, Huntsville, TX: Prepared specifications/drawings for application of new mechanically attached PVC single-ply membrane and insulation over existing corrugated metal panel roofing on approximately 275,000 square feet of office/warehouse building.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

Circuit City Stores, Inc., Various Locations in Texas: Performed design review, pre-roofing meeting, construction monitoring, and punch list surveys for several new facilities in which roof systems included EPDM single-ply roofing (mechanically attached or ballasted).

Spray-applied Polyurethane Foam Roofing

Greensboro Coliseum Exhibition Hall, Greensboro, N.C.: Performed an infrared thermographic roof moisture survey on an existing spray-applied polyurethane foam roof system encompassing approximately 70,000 square feet.

J&W Properties Warehouse, Houston, TX: Performed visual condition survey and core sampling for coating thickness measurements of existing spray-applied polyurethane foam roof covering.

Parker Elementary School, Houston, TX: Performed visual condition survey of existing spray-applied polyurethane foam roof on approximately 60,000 square feet.

Metal Roofing

Houston Independent School District- Milam Elementary School, Houston, TX: Prepared specifications/drawings and performed QAI/CA for replacement of shingle roof with pre-finished standing seam metal panel roof system over a plywood substrate.

City of Sugar Land, City Hall, Sugar Land, TX: Prepared project documents for both repairs and replacement of existing metal panel roof system over structural steel purlins.

USR Realty, Warehouse Facility, Baytown, TX: Performed field investigation to document conditions and identify possible causes to "blow-off" of standing seam metal panel roof system.

Lighthouse of Houston, Houston, TX: Provided consultation and specifications/drawings for roof renovation documents of existing standing seam/batten metal panel roof system over a plywood substrate.

HISD/Codwell Elementary School, Houston, TX: Prepared specifications/drawings and performed QAI/CA for roof renovation documents of removal of existing built-up roof system and installation of new standing seam metal panel roof system over a sloped lightweight insulating concrete fill substrate.

Butler Manufacturing, Kansas City, MO: Performed final inspections on newly installed Standing Seam Metal Panel roof systems for purposes of issuing a warranty on various types of buildings at numerous locations.

Tile Roofing

University of Houston, Science Building, Houston, TX: Performed visual roof evaluation of existing clay barrel tile roofing originally installed in 1926. Provided review and commentary of specifications for reroofing and provided quality assurance inspection during reroofing.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

Apartment Complex, Las Vegas, NV: Performed final inspection of newly installed concrete mission tile roofing on over thirty buildings.

Meridian Townhomes, Houston, TX: Performed visual survey to document inherent problems and substandard conditions of "newly" installed clay barrel tile. Prepared specifications/drawings and performed QAI/CA for salvaging and re-installation of the tile on three residential-type buildings.

University of Houston, Roy Cullen Building, Houston, TX: Performed visual roof evaluation of existing clay barrel tile roofing originally installed in early 1920's. Prepared specifications/drawings and performed QAI/CA for salvaging and re-installation of tile.

Shingle Roofing

Memorial Baptist Church, Baytown, TX: Prepared specifications/drawings for repairs and replacement for an existing dimensional strip shingle roof and copper flashings.

USAA Property and Casualty, Various Projects, Houston, TX: Performed field inspections of over forty residential dwellings to document possible storm related damage of existing three-tab (organic and fiberglass reinforced), dimensional laminated strip shingles, wood shingles, and metal shingles.

Stevenson Elementary School, Houston, TX: Performed evaluation, prepared specifications/drawings and performed QAI/CA for roof replacement of new laminated strip shingle roof.

Lighthouse Living Center I and II, Houston, TX: Performed evaluation and prepared specifications/details for replacement of shingle roof at two residential complexes.

Specialty Roofing

University of Texas Health Science Center, School of Public Health, Houston, TX: Prepared specifications/drawings and performed QAI/CA for an extensive garden roof assembly consisting of a two-ply modified bitumen membrane, growing medium, insulation/pavers, and vegetation for roof replacement on a 12-story medical educational building encompassing approximately 21,000 square feet.

City of Houston, Police Academy, Houston, TX: Prepared specifications/drawings and performed QAI/CA for a composite roof system consisting of a multi-ply built-up roof membrane and a fleece-back single-ply membrane top ply over tapered insulation for roof replacement on two 2-story educational/office buildings encompassing approximately 45,000 square feet.

U. S. Department of State, US Embassy: Ambassador's Residence, Dar Es Salaam, Tanzania: Prepared specifications and drawings for a preformed metal panel system simulating clay tile for roof replacement on a residential-style building encompassing approximately 3,000 square feet.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

Roof Moisture Surveys

U of H/Downtown – Classroom Building, Houston, TX: Performed infrared thermographic moisture survey on approximately 35,000 square feet of newly installed modified bitumen roof assembly over perlite insulation board.

L.B. Johnson Space Center, Houston, TX: Performed infrared thermographic moisture survey on eight buildings encompassing over 250,000 square feet of built-up roof assemblies over perlite insulation board over lightweight insulating concrete fill.

U.S. Postal Service: North Houston GMF, Houston, TX: Performed infrared thermographic moisture survey on large distribution building encompassing over 640,000 square feet of modified bitumen roof membrane over polyisocyanurate insulation and steel deck.

HBU/Brown Administration Building, Houston, TX: Performed visual and infrared roof moisture survey on existing 46,000 square foot facility with a modified bitumen roof assembly over fiberboard insulation and concrete deck.

UTHSC School of Nursing, Houston, TX: Performed infrared thermographic moisture survey on new fully-adhered TPO single-ply membrane over fiberboard insulation and concrete deck on a newly constructed building encompassing approximately 35,000 square feet.

Miscellaneous Testing

Bleyl Junior High School, Houston, TX: Performed test cut analysis of existing built-up roof membrane with fiberglass felts and coal-tar pitch interply bitumen.

Silbernagel Elementary School, Dickenson, TX: Performed test cut analysis of existing built-up roof membrane with fiberglass felts and coal-tar pitch interply bitumen.

Alliance and Mickey Leland Federal Buildings, Houston, TX: Managed and performed quality assurance inspection, field sealant adhesion testing, polymer mortar cube testing and field water spray testing of glass/stone curtainwall high-rise renovation projects.

Valeron Strength Film Manufacturing Facility, Houston, TX: Performed over twenty field wind uplift testing of newly installed fully-adhered single-ply membrane roof assembly utilizing plastic "bubble" negative pressure chamber.

PVAM/Nick's Field House, Prairie View, TX: Performed visual condition survey, slit sampling and compression tests of samples from a spray-applied polyurethane foam roof covering on approximately 65,000 square feet.

West Regional Library, Mobile, AL: Performed surface temperature data collection and thermal analysis of an existing 34,000 square foot EPDM single-ply roof system.

USPS Harlingen Station, Harlingen, TX: Performed testing of existing PVC single-ply membrane samples to confirm diminishing of performance characteristics including plasticizer loss, flexibility, hail impact resistance, etc.

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

Waterproofing

Marriott Courtyard, Ft. Meyers, FL: Performed visual evaluation and thermal/vapor flow analysis of existing EIFS exterior wall system.

Ivey's Department Store, Charlotte, N.C.: Performed field investigation and prepared guideline repair specifications for repairing below-grade waterproofing on vertical walls.

Galleria I, Houston, TX: Performed site investigations and prepared guideline repair specifications for a fluid-applied parking deck membrane.

San Jacinto Methodist Hospital, Baytown, TX: Performed evaluation and renovation documents (specifications and drawings) for repairs to through-wall flashings, copings, and sealants of existing masonry exterior walls.

Barbara Jordan High School, Houston, TX: Performed evaluation and prepared project documents for renovation/repairs of existing sloped and vertical aluminum framed window wall system.

River Oaks Bank Building, Houston, TX: Prepared Bid Documents and provided quality assurance inspection for installation/renovation of self adhered sheet membrane in planters.

Design Review

UTHSC Institute of Molecular Medicine, Houston, TX: Performed a technical review for the Owner of drawings and specifications prepared by an Architect related to the roofing system for a new medical education/research facility.

Cy-Fair ISD Richard Berry ESC & Stadium, Houston, TX: Performed a technical review for the General Contractor of drawings and specifications prepared by an Architect related to the roofing and waterproofing systems for a new multi-use and athletic facility.

Crate & Barrel Store, St. Louis, MO: Performed a technical review for the General Contractor of drawings and specifications prepared by an Architect related to the roofing and waterproofing systems for a new retail store.

Mobile County Metro Jail, Mobile, AL: Performed a technical review for the Owner of drawings and specifications prepared by an Architect related to the roofing system for reroofing an existing criminal detention facility.

Forensic & Dispute Resolution

Pharr High School, Pharr, TX: Performed a visual condition assessment, infrared thermographic moisture survey, and roof cores for representation of a roof material manufacturer as a defendant in a dispute (Quilling, Selander, Cummiskey, & Loundes).

KARL A. SCHAACK, PROFESSIONAL ENGINEER, RRC

Bartlett Residence, Hockley, TX: Performed a visual condition assessment, water spray testing, and sampling for representation of a roofing contractor as a defendant in a dispute (Phillips & Akers).

Warehouse Facility, Houston, TX: Performed a visual condition assessment and roof core sampling for representation of a roofing contractor as a defendant in a dispute (Daw & Ray).

Warehouse Properties, Houston, TX: Performed a visual condition assessment for representation of a tenant as a defendant in a dispute (Crain, Caton & James).