

# **CURRICULUM VITAE**

## **PHILIP D. DREGGER, PE, RRC, FELLOW IIBEC**

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### **SUMMARY**

Phil Dregger is a Professional Engineer, Registered Roof Consultant, and Fellow of the International Institute of Building Enclosure Consultants (formerly RCI). Mr. Dregger has provided expert testimony (>50 depositions / arbitrations / trials) regarding a wide range of roofing, waterproofing, and building enclosure systems. Phil has special expertise in code compliance; wind/hurricane damage; roof drainage; and condensation problems; including hygrothermal analysis of potential biological growth, decay, and corrosion using WUFI Pro, ASHRAE Std 160, and ASTM E3054. Phil lectures often to industry groups, has authored many articles on roof technology, and is a recent recipient of the ASTM D08 William C Cullen Award and the IIBEC/RCI Lifetime Achievement Award.

### **EDUCATION**

- 1978      Master of Science in Civil Engineering  
            University of Minnesota - Minneapolis
- 1976      Bachelor of Science in Civil Engineering  
            University of Minnesota - Minneapolis

### **REGISTRATIONS**

Professional Engineer (PE), State of Nevada, No. 20121, June, 2009  
Registered Roof Consultant (RRC), No. 0027, March, 1993  
Professional Engineer (PE), State of California, No. C45646, August, 1990  
Professional Engineer (PE), State of Minnesota, No. 14746, February, 1981

### **PROFESSIONAL SERVICE (beyond simple memberships)**

- RCI (Roof Consultants Institute) - Director (1990 - 1993), Fellow (1997),  
Education Task Force (1992 – 1997)
- CRRC (Cool Roof Rating Council) - Board of Directors (2010 to 2018)
- SIGDERS (Special Interest Group for Dynamic Evaluation of Roofing Systems)  
Board of Directors (RCI Liaison) (2009 – Present)
- RICOWI (Roofing Industry Committee on Weather Issues)  
Executive Committee, RCI Representative (1992 - 2010)  
Researcher, Wind Event Investigation Program (1996 - 2013)  
Researcher, Hail Investigation Program (2011)
- RIEI (Roof Industry Educational Institute) - Faculty Member (1993 - 2001)

## **EMPLOYMENT**

- 1991 - Present      Vice President  
Technical Roof Services, Inc., a Salas O'Brien Company, Concord, California  
Provide full range of roof, waterproofing, building envelope, and solar photovoltaic (PV) consulting services including condition evaluations, failure investigations, defect inspections, expert witness, construction documents, condensation analysis (WUFI, ASHRAE Standard 160, ASTM E3054), and roof moisture surveys.
- 1989 - 1991      Senior Engineer  
Wiss Janney Elstner Associates Inc., Emeryville, California  
Conducted condition surveys of exterior building enclosures and developed repair recommendations. Investigated roofing, waterproofing, stucco, and masonry failures and provided expert testimony. Served as project manager responsible for project cost control, client liaison, and quality assurance during construction.
- 1988 - 1989      Manager, Construction Materials Department  
Twin City Testing Corporation, St. Paul, Minnesota  
Developed strategic business and marketing plans. Monitored and controlled financial performance of department's four profit centers. Restructured department and implemented total quality system. Investigated concrete, masonry, roof, and waterproofing failures.
- 1984 - 1988      Supervisor, Roofing Department  
Twin City Testing Corporation, St. Paul, Minnesota  
Guided development and growth of roof engineering and testing services. Provided expert testimony on roofing failures, technical and administrative supervision for department and training of engineering staff.
- 1981 - 1984      Project Engineer, Soils and Geology Department  
Twin City Testing Corporation, St. Paul, Minnesota  
Coordinated and directed QC testing services (i.e. soils, concrete, reinforcing steel and NDT) for major construction projects. Investigated and recommended repairs for foundation and materials related problem conditions including moisture intrusion.
- 1978 - 1981      Civil Engineer, Soils and Geology Department  
Twin City Testing Corporation, St. Paul, Minnesota  
Performed engineering and construction observations on geotechnical and earthwork projects. Expertise in embankments, building foundations, retaining walls, below-grade waterproofing, and pre-stressed rock anchors.

## **INDIVIDUAL HONORS/AWARDS (partial list)**

- 2019      "Lifetime Achievement Award"  
International Institute of Building Enclosure Consultants (formerly RCI)
- 2018      "William C Cullen Award"  
ASTM International Committee D08
- 1997      "Fellow of the Institute"  
Roof Consultants Institute

## **PUBLICATIONS (partial list)**

- "Crowd Consulting Conundrum – KEE Membrane Fractures", RCI Interface, September 2017.
- "Leaky" Exhaust Vents – The 500-lb Gorilla of Condensation Problems, RCI Interface, April 2017.
- "Good But Potentially Misleading Guidelines", RCI Interface, May/June 2014.
- "Rain Collapse – A Roof Consultant's Nightmare", RCI Interface, October 2013
- "Cool Roofs Cause Condensation – Fact or Fiction?" Western Roofing, Jan/Feb 2012.
- "Rooftop Photovoltaics" Proceedings 24<sup>th</sup> RCI International Convention, March 2009.
- "California Energy Code – 2008 Updates" Western Roofing, Nov/Dec 2008.
- "California Cool Roofs: A Snapshot of Installed Costs," Western Roofing, Nov/Dec 2006.
- "Hurricanes Charley and Ivan Investigation Report," RICOWI Wind Investigation Program Report, March 2006, authored 1 of 9 Report Sections.
- "The Wind Investigator – How to Approximate Wind Velocities at Roof Level," RCI Interface, October 2005.
- "Air Infiltration–The Enemy of Wind Resistance & Condensation Control", RCI Interface, June 2002. (Listed as reference document in 2011 Baskaran paper "Air Intrusion and Its Effect on Moisture Transport" and in 2009 ASTM Manual 18, Chapter 16 "Roofs" by Wayne Tobiasson.)
- "Steep Roofing-Underlayment Upgrades that Sometimes Aren't", Western Roofing, Jan/Feb 2001 (reprinted in Copper and Common Sense, 8<sup>th</sup> Edition, 2005, 5.A.4ff).
- "Comparing SBS and SEBS Polymers – Factual Statements Can Still Be Misleading", RCI Interface, October 1998.
- "Lightweight Decks and FMRC Approvals", RCI Interface, September, 1996.
- "Roof Coatings – Selection of Roof Coatings can be Confusing", Western Roofing, Mar/Apr 1995.
- "Asking the Impossible — Merging Wood Decks and FM Approved Assemblies is Sometimes Impossible", Western Roofing Magazine, Jan/Feb, 1994.
- "Hurricane Force, Understanding and Minimizing the Risk of Wind Damage", Western Roofing, Nov/Dec 1992 (Part I) and Jan/Feb 1993 (Part II).
- "Role of Air-Retarders Deserves Closer Scrutiny", Professional Roofing, October, 1991 (Listed as reference document in ANSI/SPRI RP-4-1997 (thru current version) "Wind Design Standard for Ballasted Single Ply Roofing Systems").
- "Acrylic Roof Coatings — Not a Quick Fix for Bad Damage", RSI Magazine, October, 1990.
- "Cold Weather Roofing Failures", Proceedings - ASCE Cold Regions, Engineering Conference, University of Minnesota, February, 1989, co-author Richard Knatterud.
- "What Seams to be the Problem?", Roofer Magazine, February, 1988.

## **PRESENTATIONS AND LECTURES (partial list)**

- 2020 "Three Roof Jobs Gone Wrong – Power Washing Tile, Type B Gas Vents, and Induction Heat Welding" Western Roofing Expo 2020, webinar.
- 2019 "Rooftop Fire Resistance - Lessons from Northern California Fires and Elsewhere", RICOWI Seminar, Orlando, FL.
- 2018 "Hurricane Maria – Tips For Investigating Not So Obvious Wind Damage", RICOWI Seminar, Houston, TX.
- 2017 "Hygrothermal Modeling – Explaining the Past Is Not the Same as Predicting the Future", Advanced WUFI Pro Workshop, Napa, CA (with Andre Desjarlais, ORNL and Achilles Karagiozis, Owens Corning).
- 2017 "Common Sense Approaches to Reducing Condensation Problems Associated with Reflective Roofing on Western Wood Framed Decks", IRE (trade show), Las Vegas.
- 2017 "Well Installed Roofs That Aren't – Four examples where following common practice was not good enough", RCI SoCal Winter Workshop – Honolulu.
- 2016 "Advanced Roof Wind Forensics – Navigating the changing seas of roof wind design requirements", RCI SoCal Winter Workshop – Maui.
- 2014 "Hygrothermal modeling involving wood decay and mold growth", Advanced WUFI Pro Workshop, Napa (w Andre Desjarlais, ORNL & Achilles Karagiozis, Owens Corning).
- 2014 "2013 California Energy Code – Will Higher Reflectance Requirements Cause Condensation?" 2014 NRCA International Roofing Expo, Las Vegas, NV
- 2012 "Roof Drainage – What You Don't Know CAN Hurt You", WSRCA/RCI Convention, Las Vegas, NV; RICOWI Fall Seminar Fort Collins, CO
- 2009 "Condensation – The Overwhelming Impact of Air Intrusion", RICOWI Fall Seminar, Portland, Oregon
- 2008 "Rooftop Photovoltaics – How To Save Money on Energy and Avoid Spending It All On Roof Repairs", RICOWI Fall Seminar, Charleston, South Carolina.
- 2007 "Wind Design - ASCE 7, Minimum Design Loads for Buildings and Other Structures" RCI SoCal Chapter 'Road to the RRC' Lecture Series, Los Angeles, California
- 2006 "Cool Roofs and Code in California – A Consultant's Perspective," RCI Convention, Phoenix, Arizona
- 2005 "Performance of Low-Sloped Roofs during Hurricane Ivan – Team 4," Preliminary Report, RICOWI Wind Investigator Program, Miami, Florida
- 2003 "Roof Moisture Surveys – How Do Different Methods Compare?" RCI/WSRCA Convention, Las Vegas, Nevada
- 2002 "Retrofitting with Lightweight Insulating Concrete – Tips to Avoid Surprises" RCI Winter Workshop, Honolulu, Hawaii
- 2002 "Condensation – The Hidden Source of Moisture" ASCE Forensic Engineering Technical Group, Irvine, California
- 1999 "Roof Wind Design" and "Thermal Insulation" Lectures RCI Advanced Roof Consulting, Oakland, California
- 1998 "Condensation in Non-Vented Roofs" RCI Building Envelope Symposium, Chicago and Oakland
- 1996 "Ways to Limit Contractor Liability" National Roofing Legal Resource Center, Palm Springs, California

## **PRESENTATIONS (continued)**

1995-1996	"Roof Wind Damage – How It Begins and Progresses" RICOWI WIP Training – ORNL Oak Ridge TN and NRCC, Ottawa, ON.
1995	"A Survey of Built-Up Roof Systems" American Institute of Architects, Oakland California Chapter
1995	"Failures Due to Sun, Wind and Salt Air" RCI Building Envelope Symposium, Southern California
1994	"Roof Coatings — A Consultant's Perspective" Roof Coating Manufacturers Association
1994	"Roof Tile Fastening Considerations" Roof Consultants Institute, Oakland, California
1993	"Assessing Wind Damages - Hurricane Iniki" Roof Consultants Institute, Honolulu, Hawaii
1993	"Roping In An Ally — The Professional Roof Consultant" Single Ply Roofing Institute's 11th Annual Conference

## **ACADEMIC HONORS**

- Graduated with "high distinction", Civil Engineering, Class of 1976, University of Minnesota
- Sommerfeld Grant for Academic Achievement, 1976-1978
- 1976 American Society of Civil Engineering Student Award

## **SPECIAL PROJECTS**

2018 – 2019	<b>Performance Based Design for Wind</b> - Peer review of "Pre-Standard for Performance-Based Design for Wind" research report by Charles Pankow Foundation and ASCE.
2012	<b>Roof Drain Research</b> - Peer review of ASPE Foundation Research project report, "Flow Rate Through Roof Drains" by Julius Ballanco, PE, CPD, FASPE.
2012	<b>Overseas Federal Project</b> - Consulting services, including wind uplift calculations, for new construction at USAG Camp Humphreys in Pyongtaek, South Korea.
2005 – Present	<b>Solar PV (Roof Covering Related)</b> – Project development, construction related services, technology assessment, advanced support, and dispute resolution services. Clients include San Francisco Public Utility Commission (thru AEPC), PowerLight Corporation, SunLink Corporation, and individual property owners.
2006 – 2019	<b>Patent Analysis</b> – Infringement and validity analyses of patents involving roof tile, roof ventilation, and roof mounting systems.
2005 – 2011	<b>CA Title 24 Part 6</b> – Technical assistance to association of roof manufacturers regarding California Energy Code (CA Title 24 Part 6)
2000 – Present	<b>Manufacturer's Advisory Panels</b> - Participated on consultant advisory panels to manufacturers regarding attributes and limitations of current and proposed roof system products (e.g., Johns Manville, Georgia Pacific, Durolast, Carlisle, GAF).
1989 – Present	<b>University of California</b> - Condition evaluations, leakage investigations, specifications and drawings, repair recommendations regarding roof and waterproofing considerations for several Halls on the Berkeley campus.

## **SPECIAL PROJECTS (continued)**

- 1999 – 2008      **County of Santa Cruz** - Schematic design, contract documents and construction observations for several reroof projects over critical facilities. Design requirements included completion of documents in a three-week period and restrictive controls on "fume" and "noise" generation during reroof work.
- 1996 – 1998      **San Francisco City Hall Restoration** - Member of consultant team for project that received the Building Design and Construction "Reconstruction Project" Award and the National Trust for Historic Preservation Honor Award.
- 1991 – 1998      **Mervyn's Stores** – Technical assistance on several projects including leak investigation, condition evaluation, reroof consideration, and earthquake damage.
- 1992 – 1997      **Pacific Bell Facilities, Northern California** – Contract documents and construction observations for reroof projects on critical facilities including high-rise metropolitan and remote mountainous sites. Special design requirements to maintain weather protection during code level windstorms and moderate seismic events.
- 1997      **Spelling Mansion, Los Angeles, California** – Expert consulting and trial testimony regarding roof systems on Los Angeles, California, Spelling Residence.
- 1991 – 1994      **Kaiser Medical Centers** - Roof management programs for seven (7) medical centers with over 300 roofs and more than 800,000 square feet of roofing.
- 1995 – Present      **Historic Preservation** - Technical consulting and reroof document preparation regarding reroofing of historic structures. Roof systems include clay tile, sculpted wood shingles, slate, tin and flat-seam copper.
- 1989 – Present      **Dispute Resolution** – Expert consulting and expert witness assistance regarding roof and waterproofing legal claims. Participated in mediations, settlement conferences, arbitrations, depositions and/or trial testimony in over 50 actions.
- 1989 – Present      **Insurance Claims** – Investigation into causes and extent of damage to low-sloped roofs, steep-sloped roofs, and to waterproofing systems due to hail, wind, and fire.
- 1997      **NFPA Firewise Construction** – Technical input and peer review for National Fire Protection Association (NFPA) task group "Firewise Construction" videotape series.
- 1996 - 2013      **National Wind Design Standards** – Served on canvassing committees and assisted in development of commentaries. **ANSI/SPRI ES 1**, "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems, 2013. **ANSI/SPRI RP-4**, "Wind Design Standard for Ballasted Single Ply Systems, 1996 – 2001.
- 1994 - 1996      **Wind Research Project** – Served on Steering Committee for Roof Edge Metal Research at Texas Tech University in Lubbock, Texas.
- 1996      **NRLRC Mock Trial** – Invited to participate as expert witness in mock trial as part of National Roofing Legal Resource Center Seminar "Ways to Limit Contractor Liability" in Palm Springs, California.
- 1994      **Earthquake Damage** – Assistance to client on Southern California low-sloped and steep-sloped roof projects after Northridge Earthquake.
- 1993 - 2018      **Hurricane Damage** – Assessment of roof wind damage in Kauai Hawaii following Hurricane Iniki, in Pensacola Florida following Hurricane Ivan, in Houston Texas following Hurricane Ike, and in Puerto Rico following Hurricane Maria.