

*A comprehensive three-day workshop applying to roofs in all United States' climates*

## **Low Slope Roofing Systems Membrane, Metal, Sprayed Foam, plus Latest Roofing Technologies**

**December 11–13, 2013  
Madison, Wisconsin**

- Design
- Construction
- Repair and maintenance
- Codes and standards
- Roof asset management
- Actual roofing construction demonstration

For owners' representatives, designers and specifiers, consultants, contractors, and manufacturers

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Department of Engineering Professional Development  
432 North Lake Street Madison, Wisconsin 53706

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# Low Slope Roofing Systems

## Membrane, Metal, Sprayed Foam, plus Latest Roofing Technologies

December 11–13, 2013 in Madison, Wisconsin

### You Will Learn

If you design, install, maintain or repair low slope roofing systems or provide consulting services, this workshop will show you techniques for ensuring trouble-free roofs.

During three, fast-paced days you will:

- Receive information and training essential to the understanding of roofing problems and their solutions, whether for new construction, preventive maintenance, repairs, or re-roofing
- Focus on practical topics ranging from roofing fundamentals to some of the newest and most advanced concepts in roofing design and construction
- Have an opportunity to participate in class exercises and an actual roofing construction demonstration
- Be able to discuss with instructors and other participants your specific roofing concerns

### Who Will Benefit

Workshop topics are based on our instructors' many years of experience and on comments from the attendees of our previous workshops. Anyone involved in roofing design, construction, and maintenance or repair will benefit by attending this workshop. This includes owners' representatives, consultants, designers and specifiers, contractors, and manufacturers.

## Workshop Outline

### Wednesday, December 11

#### 7:30 Registration

The Pyle Center  
702 Langdon Street  
Madison, WI

#### 8:15 Principles of Low Slope Roofing— Materials, Design, Installation, and Maintenance

- Roof decks
  - steel decks—types and construction
  - wood decks
  - poured-in-place concrete decks
  - precast concrete decks
- Roof insulation
  - wood fiberboard
  - polystyrene
  - polyisocyanurate
  - cover boards
- Roofing membranes
  - built-up membrane
  - modified bitumen
  - single-ply membranes
  - metal
- Surfacing
- Coatings
  - selecting appropriate coating for the project
  - application recommendations

#### 10:45 Current Roofing Industry Issues

#### 11:30 Lunch at The Pyle Center

#### 12:30 Let's Talk Roofing Codes—What They Are and Their Impact On Owners, Designers, and Contractors

- Understanding codes and standards
- New developments—"Green" roofing code – 2012
- Expected future developments

#### 2:00 Latest Roofing Technologies

- Emerging technology systems defined
- Solar reflectance
- Thermal emittance
- Reflective, photovoltaic, and vegetative systems
- Design and construction issues
- Basic configurations
  - modular systems
  - built-in-place systems
- Trade conflict issues
- Expected maintenance and repair requirements
- Incentive programs—government rebates, tax incentives, local, and other incentives
- Initial and life cycle costs
- Anticipated market demands—what the future holds

#### 3:30 Understanding and Responding to the Impact of Water Entry and Moisture in Low Slope Roofs

- Sources of moisture
- Key design considerations
  - slope to drain
  - flashings and penetrations
  - vapor retarders and air barrier systems
  - venting
  - compact vs. framed roofing systems
- Construction and workmanship issues
- Occupancy issues (inspection and maintenance)
- Finding wet insulation and leaks
- How wet is wet?
- What to do with wet materials?
- Condensation of indoor moisture
  - psychrometrics and stack effect
  - diffusion vs. air leakage
  - vapor traps and smart vapor retarders
  - self-drying roofs
- Design guidelines for control of condensation

#### 6:00 Adjournment

### Thursday, December 12

#### 8:00 Report on Single Ply Roofing Performance and Latest Developments

- Understanding materials, properties, and details
- Product update
- Self-adhered single ply roofing system
- TPO systems—what can be expected
- Why single ply roofs fail
- Ensuring high-level performance
- Guidelines for performing single ply roofing maintenance and repair

#### 10:30 Polymer-modified Bitumen Systems— Design and Installation Guidelines

- The impact of modified bitumen roofing systems on the roofing industry
- Cold applied vs. torched systems
- APP systems vs. SBS systems
  - materials: membranes, attachment, flashing, and surfacing
  - installation techniques
- Benefits of modified bitumen systems
- Key limitations of using modified bitumen systems
- Maintenance issues

#### 12:30 Lunch at The Pyle Center

### 1:30 Metal Roofing Systems with an Emphasis on Structural Metal Roofs

- Drainage concepts
  - hydrokinetic (water shedding/architectural)
  - hydrostatic (water resisting/structural)
- Materials: aluminum, steel, and metal shingles
- Principles of thermal cycling
- Coatings
- Flashings, sealing joint, and seam technologies
- Panel anchorage
- Selection and integration of underlayment
- Systems selection criteria
- Maintenance and repair of metal roofing systems
  - identifying potential failure areas
  - guidelines for effective metal roof maintenance/repair procedures
- Design and application precautions
- Re-roofing with metal
- Application of photovoltaic panels

### 5:30 Adjournment

## Friday, December 13

### 8:00 Sprayed Polyurethane Foam Roofing—A System Gaining Momentum

- Material properties
- Where to use polyurethane and where not to
- Coatings for polyurethane roofs
- Application techniques—a critical factor
- Failures to expect and how to avoid them
- “Greening” applications

### 9:00 Guarding Against Causes of Roofing Failures—A Contractor’s Perspective

- Improper design resulting in inadequate drainage and wind and fire damage or loss
- Non-performing materials
- Poor workmanship
- How to do it right

### 10:30 Roof Asset Management (RAM)

- What is Roof Asset Management
- Components and goals
- Life cycle analysis
- Information management

### 12:00 Lunch at The Pyle Center



### 1:00 Actual Roofing Construction Demonstration and Discussion

You will visit Tilsen Roofing Company, Inc. to observe the actual construction demonstration of a number of roofing systems. See firsthand how roofing components should be installed to ensure optimal, trouble-free performance. This session will demonstrate:

- Construction of thermoset and thermoplastic systems including installation of EPDM and PVC membranes
- Construction of modified bitumen systems including installation of cold process and self-adhering systems
- Integration of different roofing components including flashings, insulation, insulation attachment, membrane securement, expansion joints, and lap joint construction

During the demonstration period you will have an opportunity to actively participate by making comments, asking questions, and obtaining advice on your specific concerns.

**Note:** We will provide round-trip transportation, as needed, between Tilsen Roofing Company, located 10 minutes away, and our conference center.

### 3:30 Final Adjournment

Daily schedules will include lunches and midmorning and midafternoon refreshment breaks.

## Expert Instructors

**Richard P. Baxter**, President, CRS, Inc., Monroe, North Carolina

An experienced and progressive roofing contractor, Baxter has served with Owens Corning where he was responsible for product and specification development, manufacturing coordination, development of technical manuals, and training of in-house personnel. Baxter is also a past director of the National Roofing Contractors Association (NRCA) and has contributed to numerous publications, including the second and third editions of the NRCA Energy Manual.

**Rene M. Dupuis, PhD, PE, CSI**, President, Structural Research, Inc., Middleton, Wisconsin

Dupuis is a leading international authority on roofing systems and has been involved in materials research since 1974. This research had an emphasis on roofing systems. A frequent speaker at seminars and conferences, he has written extensively on roofing technology, conducted numerous investigations for building owners and architects, and consulted on many major

projects. Dupuis’ memberships include ASTM and the ASTM Committee on Roofing and Waterproofing, the Construction Specifications Institute, the Single Ply Roofing Institute, the International Committee on Single Layer Roofing, and ASCE.

**Richard L. Fricklas**, Roofing Consultant, Englewood, Colorado

Fricklas is former director of the Roofing Industry Educational Institute and an honorary member of the Roofing Consultant Institute (RCI). He is also a member of the Institute of Roofing and Waterproofing Consultants (IRWC), the ASTM Roofing Materials and Systems Committee, RILEM-CIB Committee on Single Layer Roofing, and National Paint and Coatings Society. He is the co-author of the textbook, *The Manual of Low Slope Roof Systems*. Fricklas’ awards include ASTM’s Walter C. Voss Award, MRCAs James Q. McCawley Award, and IRWC’s Outstanding Achievement Award.

**Mark S. Graham**, Associate Executive Director of Technical Services, NRCA, Rosemont, Illinois

Graham is an experienced project engineer with expertise in the investigation, design, and repair of roof and waterproofing systems. With NRCA, he is responsible for developing and maintaining his association’s technical documents including the NRCA Roofing and Waterproofing Manual. Graham is also a contributing editor to *Professional Roofing Magazine*, as well as an active member of ASTM’s Roofing and Waterproofing, Thermal Insulation, Fire Standards, and Performance of Buildings Committees. Other memberships include ASHRAE, International Code Council, and NFPA.

**Rob Haddock**, Director, Metal Roof Advisory Group, Ltd., Colorado Springs, Colorado

Haddock has a background in the “nuts and bolts” of contracting, having operated one of the nation’s largest metal roofing companies for 15 years. He has authored a number of training and educational curricula for various trade groups. A prolific technical author, Haddock served as a faculty member of the Roofing Industry Educational Institute and holds several US and foreign patents. He is a member of NRCA and ASTM, as well as a lifetime honorary member of the Systems Builders Association and the Metal Construction Association.

## Four Easy Ways to Enroll



**Internet:**  
epd.engr.wisc.edu/webN869

**ENROLL ONLINE TODAY!**



**Phone:**  
800-462-0876 or  
608-262-1299 (TDD 265-2370)



**Mail to:**  
The Pyle Center  
Attn: Engineering Registration  
702 Langdon Street  
Madison, Wisconsin 53706



**Fax:**  
800-442-4214 or  
608-265-3448

### Course Information

- Please enroll me in **Low Slope Roofing Systems Membrane, Metal, Sprayed Foam, plus Latest Roofing Technologies Course #N869** December 11–13, 2013 in Madison, Wisconsin Fee: \$1195
- Team Discount: Save \$100, \$1095 each when two or more enroll from the same organization
- I cannot attend at this time. Please send me brochures on future courses.

### Personal Information (Please print clearly.)

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_  
Phone (\_\_\_\_) \_\_\_\_\_ Fax (\_\_\_\_) \_\_\_\_\_  
E-mail \_\_\_\_\_

### Additional Enrollees

Name \_\_\_\_\_  
Title \_\_\_\_\_  
E-mail \_\_\_\_\_  
Name \_\_\_\_\_  
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**David J. Tilsen**, President, Tilsen Roofing Company, Inc., Madison, Wisconsin  
Providing contracting services on commercial, industrial, and institutional low-slope and residential steep slope roofs, the firm specializes in built-up, single ply, modified bitumen, metal, asphalt and wood shingle roofing and offers roof maintenance and roof management programs. Tilsen is a past Vice President of the National Roofing Contractors Association (NRCA) and a past president of the Wisconsin Roofing Contractors Association and the Midwest Roofing Contractors Association. He currently serves on the NRCA Board of Directors and is a Chairman of the Technical Operations Committee.

**Wayne Tobiasson, PE**, Civil Engineer/Moisture Consultant, Etna, New Hampshire  
Tobiasson formerly served as a senior research civil engineer for the Cold Regions Research and Engineering Laboratory (CRREL), US Corps of Engineers. His expertise focuses on building technology with emphasis on controlling moisture in roofing systems. His work has taken him to Alaska, Canada, Greenland, Scandinavia, Siberia, and Antarctica. Tobiasson was the Corps' Engineer of the Year in 1992, and in 1998 he received a National Roofing Foundation fellowship to further his studies of roof ventilation. He is a member of ASCE and an honorary member of the RCI.

## Continuing Education Credit

### University of Wisconsin:

1.8 Continuing Education Units (CEU)

### American Institute of Architects (AIA):

18 Learning Units (LU); qualifies for Health, Safety, Welfare (HSW) and Sustainable Design credit

### Engineering Professionals:

18 Professional Development Hours (PDH)

## Need to Know More?

Call toll free **800-462-0876** and ask for

**Program Director:** John G. Davis, PE  
jgdavis@epd.engr.wisc.edu

**Program Associate:** Gail Geib  
ggeib@epd.engr.wisc.edu

Or e-mail [custserv@epd.engr.wisc.edu](mailto:custserv@epd.engr.wisc.edu)

## General Information

**Fee Covers** Notebook, workshop materials, break refreshments, lunches, and certificate.

**Cancellation** If you cannot attend please notify us seven days in advance of the course, and we will refund your fee. Cancellations received after this date and no-shows are subject to a \$150 administrative fee. You may enroll a substitute at any time before the course starts.

**Location** The Pyle Center, 702 Langdon Street, Madison, WI. Phone messages: 608-262-1122.

### Accommodations

We have reserved a block of guest rooms (rates starting at \$89, including continental breakfast) at Lowell Center, 610 Langdon Street, Madison, WI. Reserve a room online at [epd.engr.wisc.edu/lodgingN869](http://epd.engr.wisc.edu/lodgingN869) or call 866-301-1753 or 608-256-2621. Room requests after November 12 will be subject to availability. Other fees and restrictions may apply.

We have reserved a second block of guest rooms (rates starting at \$89, including parking and Madison Taxi's sliver cab from airport) at Campus Inn, 601 Langdon Street, Madison, WI. Reserve a room online at [epd.engr.wisc.edu/lodgingBN869](http://epd.engr.wisc.edu/lodgingBN869) or call 800-589-6285 or 608-257-4391 and indicate that you will be attending this course under group code 137518. Room requests after November 26 will be subject to availability. Other fees and restrictions may apply.

We have reserved a third block of guest rooms (rates starting at \$118, including shuttle) at Madison Concourse Hotel and Governor's Club, One West Dayton Street, Madison, WI. To reserve a room call 1-800-356-8293 or 608-257-6000 and indicate that you will be attending this course under group code 327796. Room requests after November 21 will be subject to availability. Other fees and restrictions may apply.

**Additional lodging information** may be found at [www.visitmadison.com](http://www.visitmadison.com).

**ENROLL ONLINE TODAY! Or visit our Web site.**