

*A practical course focusing on advanced applications of the commissioning process...*

# **Commissioning Building Enclosure Assemblies and Systems**

**May 28–30, 2014  
Madison, Wisconsin**



**WISCONSIN**  
UNIVERSITY OF WISCONSIN–MADISON

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

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# **Commissioning Building Enclosure Assemblies and Systems**

**May 28–30, 2014  
Madison, Wisconsin**

Gain the knowledge to successfully implement and perform the commissioning process for building enclosures

- Building enclosure fundamentals
- Building science fundamentals
- Building envelope functional performance testing
- Commissioning of building enclosure assemblies



# Commissioning Building Enclosure Assemblies and Systems

May 28–30, 2014 in Madison, Wisconsin

## Gain the Knowledge to Succeed

This in-depth course provides the professional practice, building science, and building enclosure knowledge needed to successfully implement the commissioning process for building enclosures. The course will focus on a range of topics, including:

- Building enclosure fundamentals, architectural details, and specifications
- Building science fundamentals
- OPR development for building enclosures
- Building construction practices
- Building enclosure functional performance testing, test mock-ups, and field testing methods
- Building enclosure design and analysis tools
- Design reviews
- Systems manual requirements
- Post occupancy enclosure maintenance

## Who Should Attend

- Commissioning authorities and agents
- Building enclosure commissioning providers or agents
- Commissioning process managers
- Building owners and operating staff
- Project managers and planners
- Construction managers and contractors
- Architects, designers, and engineers
- Developers

## Limited Enrollment!

We limit enrollment in this course to 32, maximizing opportunities to interact with our expert instructors. To ensure your place, we recommend that you enroll early by calling toll free 800-462-0876 or going online at [epd.engr.wisc.edu/webP308](http://epd.engr.wisc.edu/webP308).

## Benefits for You

Learn from instructors who have extensive experience commissioning building enclosures. They will share with you their proven expertise and provide valuable insights, tips, and best practices. You will leave this course with a sound understanding of:

The building enclosure commissioning process

- Key building enclosure design and maintenance requirements
- Important enclosure architectural details and interfaces
- Test methods for the building enclosure
- Typical building enclosure problems and how to avoid them
- A basic understanding of building science transport phenomena
- An appreciation for the relative importance of the different barrier systems (rain, air, and vapor)

## Course Outline

### Registration

The Pyle Center  
702 Langdon Street  
Madison, WI

### Overview of the Commissioning Process

- What is the commissioning process?
- Current best practice
- Shades of commissioning
- What is a quality delivery process?
- ASHRAE/NIBS Guideline 0-2005
- What occurs in each phase of project delivery?
- Benefits of the commissioning process
- On-going commissioning process

### Understanding the Basics of Building Enclosures

- Evolution of building enclosures and materials
- Codes
- Enclosure design principles
- Design and material selection
- Building enclosure failure modes

### Building Science Fundamentals

- The 2nd Law in layman's terms
- Rain control
- Psychrometrics

## Past Attendees Say...

**"I ENJOYED THE SEMINAR. THERE WAS A LOT OF GOOD EXPERIENCE IN THE ROOM."**

**"I LIKED THE OVERALL CONTENT AND HEARING THE VIEWPOINTS OF OTHERS IN THE INDUSTRY."**

**"HELPED ME UNDERSTAND THE COMMISSIONING PROCESS FOR ENCLOSURES, AND HOW IT ALL FITS TOGETHER IN THE DESIGN AND CONSTRUCTION PROCESS."**

- Water vapor transport
- Moisture control
- Interstitial condensation
- Confusion about diffusion
- Moisture and materials and sustainability
- Air transport
- Airflow control
- Pressures and IAQ
- Interaction with mechanical equipment
- Heat transfer
- Heat transfer control
- Thermal bridging
- ASHRAE Standard 160
- Moisture control design analysis
- Integrated design for the control of heat, air, and moisture
- Avoiding stupid mistakes
- Learning from past successes and failures

### The Building Enclosure Commissioning Process

- Commissioning process roles and responsibilities
- Pre-design phase commissioning activities
- The OPR and BOD
- The BECxP plan
- Design and submittal reviews
- Construction phase verification
- The BECx test plan
- Systems manual requirements
- Owner training
- Lifetime persistence plan
- Close out report
- Overview of NIBS guideline 3-2012
- Overview of LEED v4 EA Envelope Commissioning
- Overview of ASTM E2813
- Benefits and impact of BECx for stakeholders
- Staffing requirements and cost guidelines

### OPR Workshop

### Architectural Details and Interfaces

- Water barriers
- Air barriers and the importance of continuity
- Vapor barriers
- Impact of climate and geography

Course Outline continues...

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### Course Outline continued...

- Transition and interface details
- Walls and facades
- Flashings
- Windows and doors
- Curtain walls
- Roofs
- Slab on grade, foundations, and basement walls
- Sustainable assemblies/high performance details
- Coordination with other building systems and assemblies
- Enclosure penetrations

### Design Review Workshop

#### Building Enclosure Commissioning Tests

- The BECx test plan
- Test standards and guidelines
- Qualitative and quantitative tests
- Verification means and methods
- Performance criteria
- Laboratory tests
- Component, assembly, and whole building tests
- Water tests
- Air tests
- Mockups
- Testing roofs, flashing, and roof penetrations
- Testing walls, windows, and doors
- Testing penetrations
- Infra-red and whole building testing after construction

### Testing Workshop

#### Construction Phase BECxP Case Study

- Building description
- CxP plan and activities
- Construction sequence
- Construction checklists for BECxP
- Mock-ups and constructability review
- Schedule
- Building performance and whole building testing
- Summary of scope of work and the close out report
- Examples of completed checklists and test results

#### Post Occupancy – First Year and Lifetime CxP Program

- First year activities
- Develop the lifetime BECxP program
- Transition of OPR to CFR
- Enclosure O&M

### Status of the Industry - Panel Discussion

## Daily Schedule

Course registration will be at 7:30 am on the first day. Classes are held from 8:00 am until 5:00 pm. Each day's schedule will include a continental breakfast, midmorning and midafternoon refreshment breaks, and lunch. The optional certification exam will be proctored between 8:00 am and noon on Saturday, May 31.

## Course Instructors

**Peter Adams, PEng**, Principal, Morrison Hershfield Limited, has specialized in the field of building science since 1992. His work has included building element testing, design review, quality assurance, building component design, field/lab instrumentation, indoor environment studies, thermographic studies, indoor air quality assessment, thermal comfort assessments, mold abatement, forensic investigations, sustainable design, and building research. He is currently the Vice-Chair of ASHRAE TC 4.04, Building Materials and Building Envelope Performance, and was a founding member of the CSA Z320 Standard on Building Commissioning.

**Fiona Aldous** is an Associate Principal with Wiss Janney Elstner Associates. She has performed comprehensive building enclosure commissioning on numerous buildings and a variety of building enclosure projects throughout North America. Aldous holds a post-graduate Master of Architecture, Bachelor of Architecture, and Bachelor of Science degrees. She was a prime author of the BECx industry's founding document, NIBS/ASHRAE Guideline 3-The Building Enclosure Commissioning Process. She serves on ASHRAE technical committees encompassing Building Materials and Building Envelope Performance and Building Commissioning. She serves as the Building Enclosure Council's (BEC) National Chair, and is a member of the Building Enclosure Technology and Environment Council (BETEC). She is a founding member of the Building Enclosure Commissioning Collaborative (BECxC) and works to educate and promote the implementation of BECx.

**John G. Davis, PE**, Assistant Faculty Associate and Program Director in the Department of Engineering Professional Development at the University of Wisconsin-Madison, College of Engineering, has twenty-four years of engineering experience with increasing and diverse responsibilities in the building industry. His employment history includes strategic and tactical positions with a full service architectural/engineering consulting firm, HVAC product manufacturers and a mechanical contractor. He holds a BSME degree and MS degrees in Engineering and Engineering Management. He is an ASHRAE member, registered PE, and LEED AP.

**Garth Hall, AIA**, Principal, Rath, Rath & Johnson, Inc., specializing in architectural engineering, building science, material and system applications, and building component diagnostics. Hall holds a Master of Architecture, as well as a Master of Science in Civil Engineering specializing in Construction Management. Hall is a member of AIA, ASHRAE, ASTM International, and BETEC. He is a Certified Third Party EIFS Inspector through Exterior Design Institute. Hall is currently the Chairman of ASHRAE TC 04.04—Building Materials and Building Envelope Performance and Chairman of ASTM Committee E06.41.04—Moisture Control. He is also active as a member and ASHRAE liaison of ASTM Committee E06.55.09—Exterior Enclosure Commissioning.

**Joseph Lstiburek, PhD, PEng**, Principal, Building Science Corporation is a forensic engineer who investigates building failures and is an internationally-recognized authority on moisture-related building problems and indoor air quality. He is the former chairman of ASTM E241—Increasing the Durability of Building Assemblies from Moisture-Induced Damage and a reviewer of Chapters 21 and 22 of ASHRAE Handbook of Fundamentals. He is an ASHRAE fellow and member of ASHRAE 62.2—Ventilation for Acceptable Indoor Air Quality. Lstiburek has been called the “dean of North American building science” by the Wall Street Journal and has appeared on PBS NOVA (“Can Buildings Make You Sick?”). He is the author of the US Department of Energy Handbook on Moisture Control and a special contributor to the EPA guidance document on Building Air Quality: A Guide for Building Owners and Facility Managers.

## Four Easy Ways to Enroll



**Internet:**  
epd.engr.wisc.edu/webP308



**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

**ENROLL ONLINE  
TODAY!**

### Course Information

- Please enroll me in **Commissioning Building Enclosure Assemblies and Systems Course #P308** May 28–30, 2014 in Madison, Wisconsin Fee: \$1495
  - Team discount: \$1395 when two or more enroll from the same organization.
- Enrollment is limited to 32. Enroll early!**
- Please enroll me in **Building Enclosure Commissioning Examination Course #P309** May 31, 2014 in Madison, Wisconsin Fee: \$775
  - I cannot attend at this time. Please send me information 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 \_\_\_\_\_  
Title \_\_\_\_\_  
E-mail \_\_\_\_\_

### Billing Information

- Bill my company  P.O. or check enclosed (Payable in U.S. funds to UW – Madison)



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## Earn Certification

**Accredited Building Enclosure Commissioning Process Provider (BECxP)  
Accredited Commissioning Authority + Building Enclosure (CxA+BE)**

The building enclosure is frequently the most costly aspect of a new building and is usually the most difficult and costly to correct after construction. To achieve the requirements of the total building commissioning process, it is extremely valuable to have someone on the project who is an expert in the design, construction, and maintenance of building enclosures. The BECxP and CxA+BE certifications were developed to recognize and encourage the use of the Commissioning Process principles for building enclosures.

All applicants who have completed the building enclosure educational requirement and successfully passed the Building Enclosure CxP examination will be awarded either the BECxP, CxA+BE, or both.

The Building Enclosure CxP examination is divided into two parts: Commissioning Process Principles (Part 1) and Building Enclosure Principles (Part 2).

The BECxP is awarded to those who achieve a minimum of 60 on Part 1 and 80 on Part 2, while the CxA+BE is awarded to those who achieve a minimum of 80 on Part 1 and 60 on Part 2. If a person scores 80 or over on both parts, they are awarded both designations. The BECxP and CxA+BE will be valid for 5 years. At the end of five years, the candidate will have the option to renew the certification. Further details on these educational certifications can be found at: [cx.engr.wisc.edu](http://cx.engr.wisc.edu)

**Note:** an optional certification exam will be offered on the morning of May 31, 2014.

## Need to Know More?

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

**Program Director:** John G. Davis  
[jgdavis2@wisc.edu](mailto:jgdavis2@wisc.edu)

**Program Associate:** Mary Danielson  
Or e-mail [custserv@epd.engr.wisc.edu](mailto:custserv@epd.engr.wisc.edu)

## General Information

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

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

**Earn PDH, CEU, GBCI CE, and LU** By participating in this course, you will earn 21 Professional Development Hours (PDH), 2.1 Continuing Education Units (CEU), 21 GBCI Continuing Education (CE) hours, or 21 AIA Learning Units (LU).

### 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/lodgingP308](http://epd.engr.wisc.edu/lodgingP308) or call 866-301-1753 or 608-256-2621. Room requests after April 29 will be subject to availability. Other fees and restrictions may apply.

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