

The Three R's: Repairs, Renovations and Retrofits

The Three R's is a two-day seminar that teaches the basic knowledge needed to repair, renovate & retrofit existing buildings. Dr. Joseph Lstiburek and Dr. John Straube will discuss building science principles (such as the control of heat, air and moisture and IAQ) and show you how to apply them to the repair and retrofit of existing buildings. All building types will be covered: residential, commercial and institutional. The Three R's is designed for builders, architects, engineers, building science consultants, building code officials, facility managers, building product manufacturers, government officials, and disaster and damage restoration professionals who specialize in water loss. See full seminar agenda below.

Dates, Locations and Online Registration

To register for the seminar please select one of the dates below. Once you click on the link you will be re-directed to our Building Science Bookstore website.

[July 7-8 Westford, MA](#)

[July 14-15 Seattle, WA](#)

[September 21-22 Chicago, IL](#)

[October 20-21 Vancouver, BC](#)

[November 3-4 Toronto, ON](#)

Cost

The registration fee for this seminar is **\$795 USD**.

The fee includes lunch but does not include travel or accommodations.

Agenda

Day 1		
Schedule	Session	Speaker
8:00 - 9:00	Historical Perspective The evolution of building systems, enclosures assemblies and materials The role of disaster and failure in the evolution of building design Why codes have difficulty dealing with existing buildings	Joe Lstiburek
9:00 - 10:00	Environmental Separation The purpose and historic basis of environmental separation Appreciate the effect of climate on environmental loadings on building enclosures Enclosure design principles	John Straube
Break		
10:15 - 11:15	Rain Control Understanding rain as a design load Rain control strategies The consequences of failure	Joe Lstiburek
11:15 - 12:15	Air Control Airflow control in terms of smoke, energy, durability, health, and comfort Buildings as 3-D airflow networks Controlling pathways and pressures	John Straube
Lunch		



Schedule	Session	Speaker
1:15 - 2:15	Pressures and IAQ Air quality problems in terms of people, pollutants, paths and pressure Pollutant sources due to material breakdown caused by heat, moisture and UV light Diagnostic procedures for IAQ problems	Joe Lstiburek
2:15 - 3:15	Heat, Air and Moisture Movement Mechanisms of heat, air, and moisture movement The role of heat, air and moisture in building failure Integrated design for the control of heat, air and moisture	John Straube
Break		
3:30 - 4:30	Walls Selecting appropriate enclosure repair and renovation strategies for different climates and occupancies Identifying critical elements Avoiding stupid mistakes	Joe Lstiburek
4:30 - 5:30	Prioritizing Repair, Renovation and Retrofit Approaches Durability, comfort, then energy The temperature (not the heat loss) is key Cost constraints	John Straube

Evening Session - Building Science Clinic

At the end of an intense first day, enjoy an informal discussion over beer and pizza with Drs. Straube and Lstiburek. Bring drawings, specifications, and photos and ask questions about your most outlandish cases and projects...or just enjoy the pizza and beer.

Day 2

Schedule	Session	Speaker
8:00 - 9:00	Roofs How to select appropriate roof systems for different climates and occupancies How to identify critical elements Learning from past successes and failures	Joe Lstiburek
9:00 - 10:00	Foundations Understanding how to keep ground water and soil gas out of building foundations Environmental control for building assemblies The conflict between structural engineering approaches and environmental control approaches	John Straube
Break		
10:15 - 11:15	HVAC Understanding the primary function of HVAC The effect of climate on HVAC design and operation Understanding and managing the conflict between green architecture, IAQ and energy efficiency	Joe Lstiburek
11:15 - 12:15	Slabs and Flooring Vinyl composition flooring Wood and tile systems Negative side waterproofing	John Straube

Lunch



Schedule	Session	Speaker
1:15 - 2:15	Windows Temperature index for windows Selecting windows Glazing versus frames	John Straube
2:15 - 3:15	Mass Walls and Rubble Foundations Insulating mass buildings and freeze-thaw damage Foundation retrofits Interior and exterior enclosure repair approaches	Joe Lstiburek
Break		
3:30 - 4:30	Green Building and Sustainability Understanding the green architect as master builder What green typically means and what green should mean How green building and sustainability can either destroy or save architects	John Straube

Reading Material

The reading material for the course consists of 31 documents relating to each of the course sessions. You are welcome to view or print all of them if you choose. You can find them by following the links below to our [Building Science Information](#) website.

A link to a downloadable PDF document of the presentation slides will be emailed to all registrants once each seminar is complete.

Please note that we will not be providing printed hard copies of this material at the course.

Reading Material		
Historical Perspective		
BSD-007: Historical Development of the Building Enclosure	html	pdf (0.5 MB)
BSD-144: Increasing the Durability of Building Constructions	html	pdf (0.2 MB)
BSI-035: We Need to Do It Different This Time	html	pdf (0.1 MB)
Environmental Separation		
BSD-018: The Building Enclosure	html	pdf (0.2 MB)
BSI-033: Evolution	html	pdf (0.2 MB)
Rain Control		
BSD-013: Rain Control in Buildings	html	pdf (0.5 MB)
BSD-105: Understanding Drainage Planes	html	pdf (1.4 MB)
BSD-111: Flood and Hurricane Resistant Buildings	html	pdf (2.8 MB)
Air Control		
BSD-014: Air Flow Control in Buildings	html	pdf (1.1 MB)
BSD-104: Understanding Air Barriers	html	pdf (1.3 MB)
Pressures and IAQ		
BSD-109: Pressures in Buildings	html	pdf (1.2 MB)
BSI-002: The Hollow Building	html	pdf (1.9 MB)



Reading Material

Heat, Air and Moisture Movement

BSD-138: Moisture and Materials [html](#) [pdf \(0.3 MB\)](#)

Walls

BSD-106: Understanding Vapor Barriers [html](#) [pdf \(3.4 MB\)](#)

BSI-028: Energy Flow Across Enclosures [html](#) [pdf \(3.4 MB\)](#)

BSI-001: The Perfect Wall [html](#) [pdf \(1.1 MB\)](#)

Prioritizing Repair, Renovation and Retrofit Approaches

BSD-011: Thermal Control in Buildings [html](#) [pdf \(0.3 MB\)](#)

BSI-018: Westford House [html](#) [pdf \(3.9 MB\)](#)

Roofs

BSD-102: Understanding Attic Ventilation [html](#) [pdf \(3.6 MB\)](#)

BSD-115: Wood Pitched Roof Construction [html](#) [pdf \(0.8 MB\)](#)

BSD-135: Ice Dams [html](#) [pdf \(0.6 MB\)](#)

Foundations

BSD-103: Understanding Basements [html](#) [pdf \(1.2 MB\)](#)

BSI-011: Capillarity - Small Sacrifices [html](#) [pdf \(1.3 MB\)](#)

HVAC

BSD-110: HVAC in Multifamily Buildings [html](#) [pdf \(0.7 MB\)](#)

BSD-107: Understanding Ventilation in Hot Humid Climates [html](#) [pdf \(0.8 MB\)](#)

Slabs and Flooring

BSI-003: Concrete Floor Problems [html](#) [pdf \(1.4 MB\)](#)

Windows

BSI-004: Drainage, Holes and Moderation [html](#) [pdf \(2.1 MB\)](#)

Mass Walls and Rubble Foundations

BSD-108: Investigating and Diagnosing Moisture Problems [html](#) [pdf \(1.4 MB\)](#)

BSD-114: Interior Insulation Retrofits for Load-bearing Masonry Walls in Cold Climates [html](#) [pdf \(0.8 MB\)](#)

Green Building and Sustainability

BSD-005: Green Building and Sustainability [html](#) [pdf \(0.4 MB\)](#)

BSD-010: Looking at Tomorrow [html](#) [pdf \(0.1 MB\)](#)

Continuing Education

Continuing education credits for this course are pending.

