

SEMINAR 33: Optimized Control Strategies for Chilled Beams and Radiant Panels

Tuesday, January 21, 8:00 AM-9:30 AM

Seminar 33 (Intermediate)

Track: Systems and Equipment

Room: Mercury

Sponsor: 06.05 Radiant Heating and Cooling, 05.03 Room Air Distribution

Chair: Devin A. Abellon, P.E., Member, Uponor, Phoenix, AZ

As building owners and design engineers continue to explore hydronic systems as part of an energy efficient design solution in high performance buildings, they are faced with a variety of control strategies to optimize the systems while ensuring that surface condensation does not occur. While there are similarities in how chilled beams and radiant systems are controlled, there are important differences as well. This session covers various strategies and includes a number of case studies.

Learning Objectives:

1. Describe how radiant cooling systems and chilled beams can be used as part of an energy efficient design solution, citing case study examples.
2. Understand the radiation and convective components of heat transfer for both chilled beams and radiant panels.
3. Describe the various water temperature mixing control strategies used for both radiant panels and chilled beams to avoid surface condensation.
4. Explain the conditions and scenarios where surface condensation can occur.
5. Describe typical control strategies, for both water and air when managing minimum ventilation rates through an active chilled beam system.
6. Understand how to control a combination system that includes radiant panels and a secondary airside system.

1. Radiant Heating and Cooling System Fundamentals and Applications

Robert Bean, Member, Healthy Heating, Calgary, AB, Canada

In-slab radiant heating and cooling systems continue to gain momentum on high performance buildings. A radiant design strategy embodies the integration of architectural design and HVAC systems design with overall energy efficiency and comfort in mind. This seminar explores the fundamental concepts of how in-slab radiant systems work, how they are designed, constructed and controlled, and how they can be used as part of an energy efficient design solution to maximize energy performance.

2. Chilled Beam Application Fundamentals

Kenneth J. Loudermilk, P.E., Member, TROX USA, Cumming, GA

The fundamentals of active and passive chilled beam systems, as well as the popular applications of the technology are covered. These applications include laboratories, healthcare and educational facilities. Each application focuses on the benefits that can be derived by using chilled beam systems.

3. Control Strategies for Chilled Beams vs. Radiant Panels

Peter Simmonds, Ph.D., Stantec, Sherman Oaks, CA

Both chilled beams and radiant slabs can be used to significantly reduce the overall energy usage of a building's HVAC system by displacing fan energy with pump energy. Many system designers and building owners, however, are hesitant to incorporate either of these technologies due to the fear of surface condensation. This seminar covers chilled water temperature control strategies, along with the associated airside system controls, for both chilled beams and radiant slabs. Case studies showing how these systems have been successfully incorporated are also presented.