

Cool Flavors of Radiant Air Conditioning

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ABSTRACT

Efficient HVAC Systems like Radiant Heating and Cooling have widespread usage in Europe, however their application in North America is still limited, sometimes due to the notion that they are too complex to control or that they have a significant cost premium. We have consistently challenged this notion by identifying opportunities to integrate innovative radiant systems cost effectively in projects.

Radiant heating and cooling systems take advantage of water's ability to transfer larger amounts of energy in a smaller space than air to provide energy savings, and reduced HVAC equipment footprint in diverse building types. These systems control surface temperatures within a space, providing enhanced comfort when compared to traditional all-air systems.

Radiant systems actually offer unique construction benefits that can keep costs down; there are numerous opportunities in retrofit and new construction projects. The ability to adapt to a small floor to floor height can make radiant systems an extremely viable design solution in existing buildings; it can also keep a new construction project within its set budget or provide additional leasable space within the same building volume.

Further, a properly designed radiant system can provide low-maintenance and high-comfort performance. It is critical to select the appropriate configuration for the application at hand whether it is a radiant slab, a chilled ceiling, an exposed panel system or radiant tubes embedded in a composite metal deck. Early-phase finite element analysis and comfort simulation can help inform radiant system selection by ensuring a system's ability to meet necessary loads and maintain desired thermal parameters while meeting design aesthetics and first cost goals; later phase detailed energy modeling can help fine tune control strategies that reduce energy and provide focused conditioning for continuous comfort throughout the building.

Through multiple case studies the presenters will share how they have been able to integrate innovative radiant system design options that enhance comfort and reduce operating costs while meeting project budget requirements.

BIOGRAPHIES

Arvinder Dang is an Associate Principal at dbHMS who leads the East Coast practice in Philadelphia. She is a senior leader with 15 years of professional and research experience in energy-efficient, high performance building design and operations, as well as environmentally sustainable urban communities. She works across multiple disciplines Architecture, MEP, and Urban planning integrating and delivering efficient high performing technologies, systems and solutions. She has worked on numerous sustainable international developments with a strong focus on demand management and clean efficient closed loop infrastructure systems. Prior to joining dbHMS, Arvinder was a Performative Design Group Studio Head and led the sustainable design practice at the Chicago office of Skidmore, Owings, and Merrill (SOM).

Ajit Naik, Building Performance Specialist at dbHMS, has a background in mechanical engineering and offers diverse experience in thermal energy system design. As a certified Building Energy Modeling Professional, Ajit places special importance on simulation-informed design throughout the entire process, and is focused on translating results from whole-building energy simulation, comfort modeling, and daylight analysis into meaningful design decisions. His experience working with both North American and European design firms and projects brings a multi-faceted perspective to new and innovative projects. Ajit also has a strong teaching background, and has presented on such topics including finite-element heat transfer analysis and daylighting software and techniques.