

Mean Radiant Temperature

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EXECUTIVE SUMMARY

This research on the mean radiant temperature (MRT) contrasted two paradigms. The first is the familiar HVAC approach to building conditioning technologies typical of modern architecture. This paradigm views structure, enclosure, surface, material, energy, and human comfort as discrete systems. These systems are taught, developed, designed, engineered, and installed by separate entities. In this paradigm, the role of the architect is one of endless coordination of the discrete systems. When a new problem or conditions emerges, typically another layer is added. With each added layer, the quality of each layer is often sacrificed.

The seemingly innocuous shift from this HVAC-based approach to the other paradigm—MRT systems—yields a cascading set of effects. MRT systems collapse the multiple physical and organizational layers of contemporary building practices with a single, integrated layer of construction that yields enormous benefits for the energy, economics, and architecture of building production.

RESULTS:

My research focused on three efforts:

- the history of conditioning and the psychrometric chart
- the energy modeling of various MRT building envelopes
- the design of a demonstration case (to be fabricated and monitored in summer 2007)

The research identified, tested, and evaluated appropriate construction/operation systems based upon radiant transfer rather than convective transfer. I will use structural insulated concrete with embedded solar-powered hydronics to fabricate the test case in the summer 2007.