
Strategies for Use of the Building Envelope as a Dynamic Element in Thermal Performance

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ABSTRACT

The end of the era of cheap energy has not brought an end to the practice of sealing buildings off from the outdoors, but has instead increased and spread it from artificially conditioned curtain-walled offices to residential construction. Almost every strategy for improving the thermal performance of buildings begins with energy conservation implemented through insulation and weather seals. Designers must concern themselves with the removal of toxins from the indoor environment, usually by mechanical ventilation. The building envelope has become a barrier to any interaction with the outdoors.

This presentation will examine alternative strategies to a design of the building envelope, grouped as follows: 1) designing the envelope, not as a static element, but as a dynamic system that can be used to adjust thermal performance; 2) using the envelope, not as a barrier between indoors and out, but as a buffer between the conditioned space of the interior and unconditioned space outside—using the perimeter of the building as an occupiable but only partially conditioned space. Benefits of these strategies include: 1) improved thermal performance of the building over the long run, without sacrificing environmental quality to toxins and the means of their removal; 2) the ability to reduce construction costs by allowing the economy of unconditioned occupied space, not within the building envelope, but as part of the envelope; 3) improved environmental quality.

The strategies are empirical; for a number of reasons, they do not lend themselves to a prior scientific evaluation. Evidence of their effectiveness is, nevertheless, intuitive and well founded in standard building practice and in my experience as a designer and builder.

This presentation will evaluate uses of the following types of spaces in modifying the performance potential of the building envelope.

- 1. "Tempering spaces"—included in the design to effect changes in the conditioning of the building's interior;*
- 2. Transitional spaces—normal buffers between outside and in;*
- 3. Spaces used for marginal activities, unnecessarily included with the conditioned space of the building;*
- 4. Unconditioned or partially conditioned spaces into which activities can be expanded on a seasonal basis.*

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