

Cellular Shades in Commercial Buildings

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Need

- Windows cause ~1.7 quad of heating and cooling energy consumption in the United States.
- Although generic venetian blinds, roller shades, and curtains block solar radiation, they do not improve window thermal resistance.
- The effects of residential cellular shades have been studied, but little exists for commercial settings.
- Data on the effects of cellular shades on daylighting and glare are lacking.

Current Research

- Collaboration with Hunter Douglas, a global window attachment manufacturer
- Single-cell light filtering cellular shades tested for energy, glare, and daylighting performance
- Experiment performed in real commercial building with north/west-facing and south/east-facing windows
- Experiment monitored heating/cooling load, room temperature, relative humidity, illuminance for daylighting, and glare
- Annual simulation performed to compare the shade performance against a generic window, roller shades, and blinds at three locations

Major Findings

- Experimental testing
 - North/west orientation reduced cooling load by 4.6% and heating load by 24%
 - South/east orientation reduced cooling load by 9.3% and heating load by 57%
 - Increase in useful daylight illuminance (UDI) from use of cellular shades up to 95% and reduction in glare up to 91%
- Simulation showed annual HVAC energy savings from cellular shades to be 19% to 27%



Two-story Flexible Research Platform building



Sensor setup in a room

