

Lighting in Federal High-Performance Green Buildings



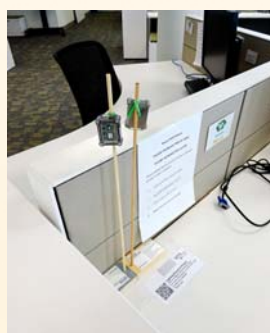
In 2013, the U.S. General Services Administration (GSA) awarded a contract to the LRC to study the correlation of daylighting with health and wellbeing, to assess the building occupant experience of light, and to identify health outcomes linked with measured light exposure in federal high-performance green buildings.

Five buildings were evaluated during both summer and winter seasons:

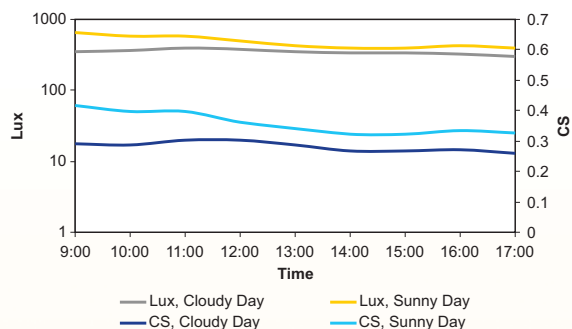
- Edith Green-Wendell Wyatt Federal Building: Portland, OR
- Federal Center South Building: Seattle, WA
- Wayne N. Aspinall Federal Building: Grand Junction, CO
- GSA Central Office Building: Washington, DC
- GSA Regional Office Building: Washington, DC

During site visits, LRC researchers performed photometric measurements at several desks,

repeatedly throughout the day. The same or nearby desks were evaluated on follow-up visits at most of the buildings. Light levels varied for many reasons: daylight access, weather conditions, blinds use, desk orientation, partition height, electric lighting design, photosensor controls, and presence of task lights. Some desks had lower light levels than the 30 fc recommended for visibility.



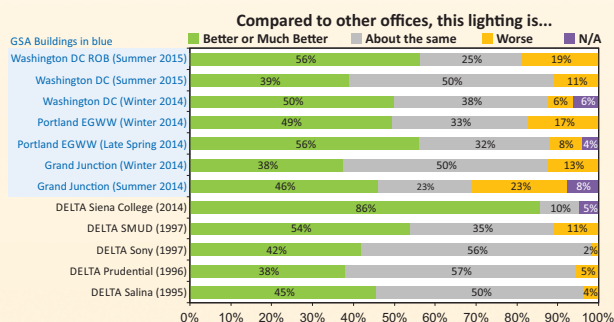
Daysimeters were placed in several locations throughout the workspaces to measure illuminance and light for circadian stimulation.



Stationary Daysimeter results for one desk in summer showing typical illuminances (lux) and circadian stimulus (CS) levels for sunny and cloudy days.

In addition to visiting the sites in person, the LRC also installed stationary Daysimeter devices to continuously measure vertical illuminance and light for circadian stimulation for several weeks. The stationary devices were positioned on several desks and windows at each site and re-installed for the subsequent season. The results did identify some desk spaces with sufficient light for circadian stimulation. Most desks with high circadian stimulus (CS) values were in close proximity to glazing. A few desks showed high CS values due to unusually high electric light levels. Many desks in this study, however, did not have sufficient light for circadian stimulation.

At most of the sites, LRC researchers approached the office building occupants to answer a questionnaire; occupant feedback about the lighting was largely positive in both summer and winter. Results from the five study buildings can be compared to several other office buildings in the LRC database.



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