

Light Scoops Provide Balanced Daylight in Transitional Spaces

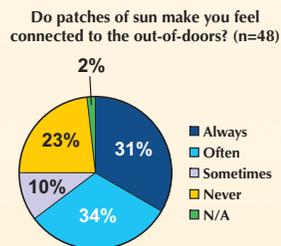
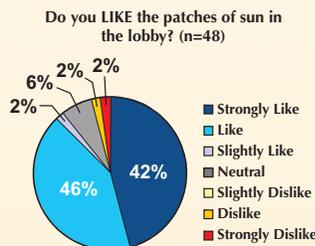
Conventional, diffuse skylights provide more light in summer and less in winter. Light scoops are roof monitors that use tilted panels of transparent glass to bring daylight into transitional spaces such as corridors and atriums. LRC researchers designed the light scoop to increase sun penetration in the winter when direct sunlight is desirable, but reduce sun penetration in the summer. Fourteen light scoops were installed at Welch Allyn corporate headquarters in Skaneateles, NY.



Several light scoops installed atop a commercial building.

Why use light scoops?

Light scoops are best used in predominantly overcast climates. The tilted, transparent glazing (glass) provides an optimal balance of daylight under both sunny conditions and overcast conditions. In overcast conditions, the light scoop receives light from the brightest part of the sky – the sky zenith. Even in predominantly overcast climates, there are still some sunny days, and the clear glazing ushers sunshine in when it is most welcomed. In addition, the tilted glazing receives more solar radiation in the winter months than vertical or horizontal glazing.



Designing Light Scoops

The size and placement of the light scoops are designed to meet the target light levels in the building during occupied hours. This methodology, along with the specification of daylight harvesting controls, allows electric lights to be turned off, thus improving economics. Using photometrically accurate lighting simulation tools, daylight penetration is predicted throughout the year and the light scoops are modeled to light the spaces to the target light levels. High visible-transmittance glazing and white finishes for the light scoop interior and roof membrane are used to increase the light scoop efficiency.



Clear glazing in the light scoops allows sun patches to fall within the space, allowing occupants to feel connected with the outside environment.

Evaluating Light Scoops

Light levels in the Welch Allyn atrium were measured over the fall and winter months to determine how well the light scoops performed relative to the software predictions. Under partly cloudy skies, the measured illuminance varied only 5%-25% from the software predictions.

In addition, occupant surveys were conducted to determine the satisfaction of the Welch Allyn staff with the daylighting in the atrium. Some of the results are shown at left.

Sponsor

New York State Energy Research and Development Authority (NYSERDA)



The publication, *Light Scoops — A Design Guide*, may be downloaded at:
http://www.lrc.rpi.edu/researchareas/pdf/LightScoopsDesignGuide_Final.pdf

