Full Cutoff Lighting Demonstration Project

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Summary

The UW-Madison-Arboretum, McKay Visitor Center outdoor lighting demonstration project, sponsored by the University of Wisconsin and Madison Gas and Electric (MG&E), showed the advantages of using full-cutoff light fixtures. Five of the McKay Center's six parking and security lights were retrofitted by MG&E with Hubbell Skycap full cutoff shields. Measurements taken before and after the retrofit showed a doubling of illumination under the Skycaps, with no increase in power consumption. In addition, one unshielded 150w high pressure sodium fixture was replaced with a shielded 100w fixture, resulting in a 30% reduction in electric power use, with no redcution in illumination. In all cases, the Skycaps eliminated upward and outward glare.

Demonstration Site

The University of Wisconsin-Arboretum is an ecological research and teaching facility located on 1200 acres adjacent to Lake Wingra, in Madison, WI. The McKay Visitor Center parking lot accommodates approximately 50 cars in two parking aisles separated by a large median. Security lighting for the parking lot and visitor center entrance is provided by six 150w NEMA style lights on five 30 foot poles (one pole holds two fixtures).

Measurements

Illumination measurements were taken before and after the installation of Hubbell Skycaps, using a Gossen-Panlux Electronic light meter held six feet above ground level and perpendicular to the incident ray from each fixture.

Before Skycaps
Pole A) Two 150w NEMA style fixtures - unshielded
0 ‘ = 1.9 footcandle (fc)
20' = 1.25fc
60' = 0.5fc
100' = 0.1fc

Pole B) One 150w NEMA style fixture - unshielded
0 ‘ = 1.2fc
20' = 1.7fc
60' = 0.5fc

Locations equidistant between poles A & B
100' = 1.5fc
128' = 0.1fc

After Skycaps
Pole A) Two 150w NEMA style fixtures - retrofitted with Hubbell Skycaps
0 ‘ = 3.7fc
20' = 2.5fc
60' = 0.3fc
100' = 0.05fc

Pole B) One 100w NEMA style fixture - retrofitted with Hubbell Skycap
0 ‘ = 0.7fc
20' = 1.1fc
60' = 0.2fc

Locations equidistant between poles A & B
100' = 0.05fc
128' = less than 0.05fc

Parking Lot Before Skycaps

Parking Lot After Skycaps

Results

Illumination Engineering Society (IES) recommendations for low usage parking lots are an average illumination of 0.8fc, with a minimum illumination of 0.2fc. Initially, the 150w unshielded lights (Pole A) provided illumination levels of 1.9fc - .5fc, or about two times the recommended values. Retrofitted 150w lights (Pole A) now give illumination levels of about 3.7fc - 0.3fc, or about four times the recommended values. Lowering the shielded fixture wattage to 100w (Pole B) resulted in illumination levels approximately 25% above recommended levels, with a 30% savings in energy usage. Cutoff of stray light is excellent with the Hubbell Skycaps, which give an effective illumination radius of about 50 - 60'.

Prior to the retrofit, glare from the Arboretum parking lot lights could be easily seen from 1.2 miles across Lake Wingra. After the retrofit, only glare from the remaining unshielded fixture is visible

*** For More Information**
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