

Parking Lot Security and Brightness

Providing impressions of security is central to outdoor lighting design. Current parking lot lighting recommendations are based upon photopic illuminances, regardless of spectrum. Scene brightness perception is directly related to impressions of security, and depends upon both light level and spectrum. A provisional model was used to predict scene brightness for three parking lots, each illuminated to different levels by different sources.



A lot illuminated by light-emitting diodes (above) was compared to lots illuminated by high-pressure sodium and by metal halide lamps.

Observers judged scene brightness, security, and other factors of three lots — one illuminated by light-emitting diodes (LEDs), one by high-pressure sodium (HPS) lamps, and one by metal halide (MH) lamps. The provisional model accurately predicted both scene brightness and security judgements. The lighting associated with the best subjective ratings also had the lowest power density.

More Information

Download the project brief:
www.bpa.gov/Doing%20Business/TechnologyInnovation/TIPPProjectBriefs/2015-TIP-329.pdf



Sponsor

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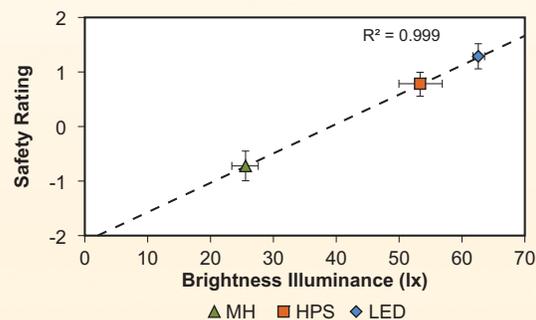
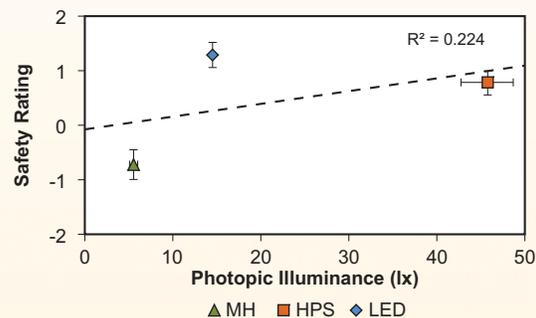


A design method using “brightness illuminance” is presented, which can lower system costs while maintaining a sense of security by users.



A panel of observers judged the quality of lighting in each parking lot.

The results of this field demonstration show that the spectral characteristics LED lighting systems can provide additional leverage over HPS systems by providing greater scene brightness and perceptions of safety and security at lower power densities. From a practical perspective, there are substantial opportunities to use less energy, produce lower peak power demand, and reduce lighting system costs by designing outdoor lighting that supports perceptions of safety and security when LED sources are considered in comparison to HPS sources.



Judgments of how safe each parking lot appeared were not strongly related to the average photopic light levels (top), but were strongly correlated with the average “brightness illuminance” in each lot (bottom).

