

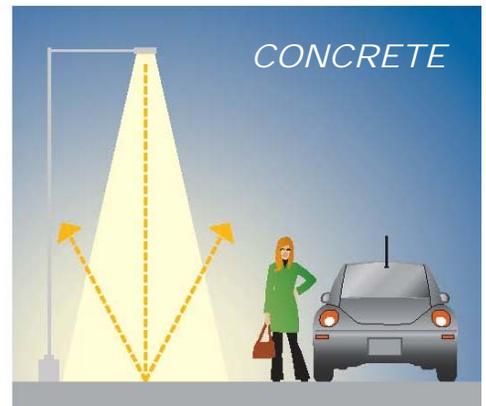
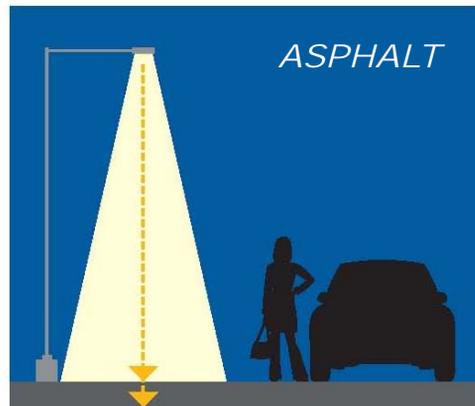
# Enlightened

## Shining a Light on Pavement

Concrete is naturally brighter and more reflective than other pavement surfaces. This requires less energy to illuminate comparable areas, which is good for the environment.

A rule of thumb is that for every 10% increase in light

reflectance, 10% more light will reflect up to the objects on the surface. Surface reflectance readings on concrete are four to five times higher than asphalt, which means drivers can see the road, other vehicles and pedestrians clearer and sooner.



## It's Easy to See



Asphalt roadway showing limited surface reflectance

Concrete's superior reflectance improves night time visibility, saves money on street lighting, and is better for the environment!

Same roadway after concrete resurfacing shows clearer, brighter view

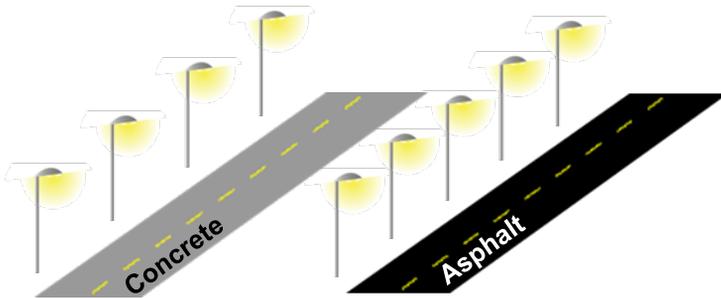


## The Cost of Lighting Streets and Highways

To overcome the lack of light reflectance, an asphalt pavement requires either: (1) more street lights per mile than a concrete pavement, or (2) higher watt light bulbs at the same light pole spacing as a used on a concrete pavement. In either case, more energy is consumed to illuminate the asphalt roadway. Where more light poles are installed then the initial costs are higher too.

### Case 1 – More Light Poles:

Highway requires 250w light every 210 ft for concrete and every 170 ft for dark surface (asphalt).



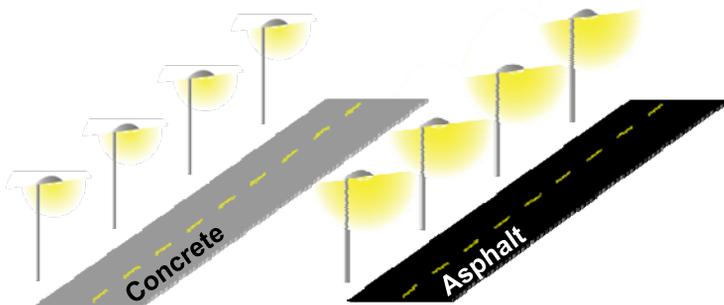
- Asphalt requires 24% more poles
- Initial costs, maintenance costs, and energy costs are 24% higher



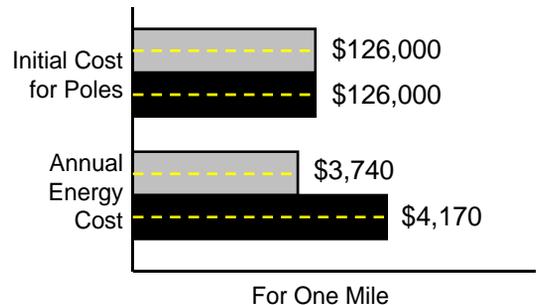
Assumes: Initial cost = \$5,000/pole; Maintenance cost = \$100/pole/year; Energy cost = \$0.0814/kwh; Operating time = 4,000 hours/pole/year

### Case 2 – Higher Watt Light Bulbs:

Local road requires 150w light for concrete and 200w light for the dark surface, both at 210 ft spacing.



- Initial and maintenance costs similar
- Asphalt requires 33% higher energy costs each year.



Assumes: Initial cost = \$5,000/pole; Maintenance cost = \$100/pole/year; Energy cost = \$0.0814/kwh; Operating time = 4,000 hours/pole/year

### References

1. McIntosh, Bruce, "Do Concrete Streets Really Reflect Up?", Concrete International, v. 9, n. 7, July 1987, pp. 24-25.
2. Adrian, W., Jobanputra, R., "Influence of Pavement Reflectance on Lighting for Parking Lots", PCA R&D Serial No. 2458, 2005.
3. Public Works, "Traffic Standards", Springfield, CO, [http://www.ci.springfield.or.us/pubworks/design/05.00\\_Traffic\\_Standards.pdf](http://www.ci.springfield.or.us/pubworks/design/05.00_Traffic_Standards.pdf).