

STREET LIGHTING MAINTENANCE

Use of Induction Lighting to Reduce Maintenance

By Tom Baker



IL at the Port of Bremerton Marina outer breakwater.

One of the choices designers make for Roadway Lighting is the type of light source. The traditional choice has been High Pressure Sodium (HPS) due to its long lamp life. LED sources are starting to be used for roadway lighting, but are limited by LED's low lumen levels compared to HPS.

Another source that should be considered is Induction Lighting (IL). IL operates fundamentally differently from conventional sources or incandescent lamps. Light generation is by means of induction instead of filaments. The energy is transmitted by way of a magnetic field.

While still relatively unknown to the public, these lamps have been available since 1990. Unlike an incandescent lamp or conventional fluorescent lamps, there is no electrical connection going inside the glass bulb; the energy is transferred through the glass envelope solely by electromagnetic induction.

In other conventional gas discharge lamps, the electrodes are the part with the shortest life, limiting the lamp lifespan severely. Since an induction lamp has no electrodes, it can have a very long service life. For induction lamp systems with a separate ballast, the service life can be as long as 100,000 hours, which is 11.4 years of continuous operation, or 22.8 years (based on 11 hours usage per day, 7 days per week) when used at night or day only. Extremely high-quality electronic circuits are needed for the ballast to attain such a long service life.

Induction Lighting Advantages:

- Nearly maintenance free - perfect for hard to reach applications.
- Instant on to 80% of initial lumens - perfect for security lighting.
- Bright white light, CRI of 80+.
- Starting not effected by ambient temperature.

The Port of Bremerton Marina outer breakwater has IL. The IL provides an even, bright white illumination for the walkway. The luminaires are a cutoff type, minimizing glare across the water. The long lamp life is an advantage in this hard to reach area on the water.

Induction Lighting Disadvantages:

- Lamps are not standardized and the size varies between manufacturers. The lamps are wired in and are not easily replaced, however with the long lamp life this is not a significant disadvantage.
- There is a limited selection of luminaires available in an induction source.
- More expensive than HPS.
- The light source can be best described as a "blob" of light. The lamp is not a point source and is hard to control. For general area lighting this is not a disadvantage.
- Available lumen levels are low compared to HPS.

Note: for any light source, compare illumination based on lumen, not wattage.



200 Watt, HPS wall pack. This luminaire produces a high amount of glare



The same building with a 127 watt, IL.

This luminaire is a cutoff type and minimizes glare. Note how details, such as the sign are more visible. These luminaires were installed as part of a security project, as the backup electrical power is from a generator and the induction luminaires provide instant restrike when the power is restored.



IL with cover removed. The lamp is large and precise distribution is difficult to obtain.

IMSA Member Tom Baker is a Master Electrician, and is certified as an IMSA Level II Traffic Signal and Roadway Lighting Level I. His business, Puget Sound Electrical Training, provides classes on the NEC, Grounding and Bonding, and other electrical subjects. He is the IMSA representative to the Illumination Engineering Society. Contact him via email by visiting www.psetraining.com.