



'Self-reporting' fixtures can help take the guesswork out of streetlight maintenance

GETTING A FIX ON STREET LIGHTING ASSETS

BY TERRY UTTERBACK AND MARC TRITSCHLER

How much does it cost to fix your garden variety streetlight? By some estimates, the total cost to dispatch a maintenance crew and repair a lighting system outage can be as much as \$350 per trip. When you consider that at any given time more than 10 percent of public streetlights may not be functioning properly, the potential repair costs in a major city with hundreds of thousands of streetlights can be astronomical.

The problem is rooted in inefficient reporting of outages.

Typically "human intervention" is required, with outages called in by the public to customer service centers. But these calls often reflect human error, since the caller may not be exactly sure where the pole/luminaire is located. As a result, "windshield time" for the maintenance crew increases, as they search for the light in question. To supplement citizen calls, some municipalities also rely on "drive-by" night patrols to track outages. But these, too, can be inefficient, since only certain areas can be patrolled on any given night. The disadvan-



Wireless monitoring devices are attached directly to luminaires to detect outages.
 (Right) Outage reporting is often left to the public or drive-by night patrols, meaning outages can go unreported for long periods.



tage to both methods described above is that outages can go unreported for a significant period of time.

One key to a more successful streetlight management program is to reduce human reporting, in favor of “machine-to-machine” outage reporting. A number of cities have recently adopted automated asset management systems designed to remotely monitor and control outdoor lighting systems. Small, wireless monitoring devices attached directly to each luminaire can detect outages, describe the outage condition and provide information to the lighting operator via a secure web portal. GPS locations of these devices—captured on installation—enable the system operator to provide the service crew with accurate information regarding the failure mode and the materials required to repair the inoperative lamp. Finally, outage data can be imported into an existing customer work management system.

What’s created, in effect, is a network of “self-reporting” fixtures. The fixture in need of a fix gets fixed; inefficient, scattershot strategies (e.g., group relamping programs) are eliminated.

SAFE STREETS

Another key attribute of remotely monitored lighting systems is improved public safety and security. IESNA, in its *American National Standard Practice for Roadway Lighting* (RP-8-05), lists among the reasons for lighting roadways, “the provision for safety and comfortable visibility for both pedestrians and drivers who use the streets after daylight hours.” Safety for pedestrians involves not only a degree of protection from vehicular accidents, but also from criminal activ-

ity. Designers of street and roadway lighting typically use the IESNA RP-8-05 tables of illuminance or luminance (Tables 2 or 3) as the criteria for design. These tables list not only the minimum maintained lighting levels that are required, but also the minimum requirements for lighting uniformity and glare.

To control both energy usage and fixed capital costs, street lighting poles are typically spaced as far apart as possible while still meeting RP-8-05 criteria. When a luminaire is not operating properly, not only is the light level decreased, but the uniformity and glare ratios are changed drastically. The human eye can adapt well to minor changes in luminance levels, but when the luminance uniformity changes dramatically due to a missing light source, the eye does not adapt as well. Objects on or adjacent to the roadway are not as readily detected and incidents may occur.

Being able to detect objects is often critical to avoiding accidents. From the point of view of the pedestrian, it is as important to be seen as it is to see approaching objects. Dark areas on or adjacent to the roadway can be a cause of concern, therefore, to both a driver and a pedestrian. Consequently, some municipalities have written contracts specifying that inoperative luminaires must be made operative within a short period of time—often within 72 hours of being reported. Remote monitoring systems can make this turn-around time more attainable.

STREETLIGHTS AS ASSETS

The day-to-day maintenance advantages of smart fixtures are apparent: crews operate more efficiently; mean time to

repair (MMTR) improves; resources are deployed more efficiently; and customer call volume is reduced. Perhaps more important is the ability to establish a lighting asset management database. A database can capture fixture type and wattage; pole type; and pole locations through the GPS coordinates. This information can enable a city or utility to develop trend analyses on equipment performance, service efficiencies and manufacturer warranty claims, as well as provide an ongoing system audit and billing validation.

Among the streetlight management systems currently in use is the Remote Operations Asset Management (ROAM) system from Holophane/Acuity Lighting Group. ROAM recently earned a LIGHTFAIR Innovation Award (“Best of Category Award” in the Controls, Daylight Integration & Systems category) and is compatible with any light fixture with a NEMA twistlock receptacle. The only exception being the rare instance when the NEMA twistlock is housed inside of a metal enclosure, which occurs on some decorative fixtures.

Today, there are approximately 10 ROAM customer deployments with the largest (an installation across 54 sq mi) in the City of Glendale, AZ, which is scheduled to be completed later this year.

As systems like this continue to advance, the public sector’s goal of creating a truly “smart grid” moves a step closer to fruition. 🍷

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About the Authors: Terry Utterback is a senior member of the utility industry and is leading the ROAM program within the Acuity Lighting Group.



Marc Tritschler is the product manager of the ROAM program for Acuity Lighting Group and has significant experience in the wireless and machine-to-machine industries.