Moving Towards a Solid State Future

INDOT Lighting Design Procedure Changes

David Boruff
Designing with LED- Luminaire Types

• Categorized into 5 Types, based on INDOT’s existing lighting systems

• Luminaire type identified on plans, corresponding pay items used
Designing with LED- Luminaire Types

High Mast
Pay Item # 807-12201
Designing with LED- Luminaire Types

Roadway

High Lumen- Equivalents to 400 Watt High Pressure Sodium - Pay Item # 807-12119
Low Lumen- 250 Watt HPS Equivalents- Pay Item # 807-12202
Low Lumen-Low Mounting- 250 W HPS equivalents at 25-30 ft Mounting Heights- Pay Item # 807-12203
Designing with LED- Luminaire Types

**Underpass**

Pay Item # 807-12206
Designing with LED - Photometric Analysis

- Photometric Analysis: performed only with INDOT approved models
  
  Estimate of light distribution at the end of service life (100,000 hrs)

LED High Mast Example:
At 100 ft mounting height
(units in foot-candles)
Designing with LED- Approved Models

- Approved in accordance with Indiana Test Method 957
  - Meet Standard Specification requirements
  - Pass INDOT testing
    - In Field, at 1 of 9 test sites across state
    - In Lab, at the Purdue Office of Energy Efficiency & Reliability (OEER)
  - Expect first approvals within a month or two.
Designing with LED - Light Loss Factors

- Light Loss Factors
  - Listed for each approved model
  - Developed by Purdue
  - Estimate light level at 100,000 hour service life
  - Incorporate dirt depreciation, based on
    - Material used in the lens/refractor
    - Manufacturer’s cleaning method & 5 year cleaning cycle
    - IES Publication RES-1-16
Designing with LED- Life Cycle Costs

- Service Cost Per Year Analysis - no longer needed
  - Had been used to compare advantages of different light source types
  - Energy savings from LED “Built In” with models that are approved
    - 33% to 50% reduction in energy consumption
Change in Lighting Policy

• Deactivation/Removal Policy
  • INDOT District Offices will have authority to decide/implement
  • Decision still based on:
    • Reverse warrant analysis- looking at recent nighttime crash experience
    • Trial turn off period- tracking changes in nighttime crashes for 3 years
LED Lighting- Design Procedure Changes

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