SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

This article has two objectives:

1. To test the useful life of four different types of LEDs according to IESNA LM 79 standards
2. To present the costs of using LED lighting in a hospital room in Kolkata, India

Study and Implementation of White Power-LED Based Indoor Lighting Application for the Healthcare Sector

Chakraborty, A. & Ganguly, R. 2015 /*Advances in Optical Science and Engineering, Pages 521-531*

Key Concepts/Context

The authors consider the gradual transition of LED technology from electronic to electrical lighting in the last decade as a paradigm shift. They cite the example of two organizations that are cutting costs and the consumption of electricity after shifting from incandescent and fluorescent to LED lighting. Their paper touches on the benefits of LED lighting in the context of energy savings, better light quality, reduced maintenance costs, sustainability/environment-friendly (because of the absence of mercury), and potential issues that may affect long-term savings and reliability of LED lighting.

Methods

Four different types of LEDs (two of each) are connected in a series and the same current flow is maintained throughout the test period. Two of the LEDs were obtained from standard manufacturers and other two are commercial grade. The lumen depreciation data was gathered for the four LED types and analyzed statistically. After determining which of these LEDs had a better useful life, it was recommended for use in the waiting room of a hospital in Kolkata, India. The authors present a comparison between the previously-used CFL lighting with the newly-implemented/-installed LED lighting. No systematic method is presented in this article.

Findings

Towards the first objective, the study found:

- The commercial-grade LED lights had a faster lumen depreciation as compared to the standard-grade ones.
- The useful life of the LEDs were calculated to be:

DESIGN IMPLICATIONS

LED lights may be considered as a viable alternative to incandescent and fluorescent lighting, as they are environment-friendly and incur lower costs.

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  - >50,000 hours for the two standard-grade ones
  - About 30,000 hours for one commercial-grade one and about 20,000 hours for the other
- So standard-grade LEDs were installed in the waiting room of a hospital in Kolkata, India.

In comparison to the CFLs, the authors show that in the case of LEDs:

- Initial investment is higher.
- Energy costs are lower.
- Maintenance costs are lower.
- Operational lifetime is longer.
- Lifetime cost is much lower.
- Payback is less than one year.
- Energy consumption is lower, leading to lower carbon dioxide emissions.

Limitations

The authors do not mention the reason behind choosing the waiting room of this hospital for their study.