SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

The objective of this project was to provide energy-efficient and effective lighting for a super specialty/teaching hospital under construction.

Computer Aided Lighting Requirement Analysis and Design for a Better Health Care Facility

Tanuja, S., & Shailesh, K. R. 2016 | *International Journal of Computer Applications*. Volume 78, Issue 11, Pages 12-18

Key Concepts/Context

This project pertains to assessing the lighting requirements of a super specialty/teaching hospital and generating lighting solutions that are also energy efficient for some of the key spaces in the facility.

Methods

The methodology involved the use of computer simulations to assess the illuminance requirements for the different types of rooms and choose a luminaire according to BIS standards. There were five areas in the under-construction hospital for which lighting was to be designed–classroom, consultation room, surgery department, floor waiting hall and corridor, and scanner rooms.

Findings

Classroom:

- Indirect lighting system for low-brightness and shadow-free illumination
- LED down-lighters for a glare-free lighting of the blackboard

Consultation room:

- Indirect lighting combined with accent lighting
- Low-powered halogen examination light with a reflector would be effective for patient examination.

Surgery department:

- Nurse Station:

    - Multi-level lighting
    - Task lighting to supplement general illumination of the nurse station
- Common Patient Area:
    - Similar to office lighting
    - Recessed louver-type luminaire for uniform distribution of light
- Examination rooms:
    - The color of the light should not change the natural appearance of a patient's skin.
    - Shadowless lighting
    - Lighting to be confined to the bed area
    - Adequate lighting over a circular area, 2 feet in diameter
- Consultation room: As mentioned above

Floor Waiting Hall and Corridor:

- Polished and highly reflective floors should be avoided in these areas as they generate glare.

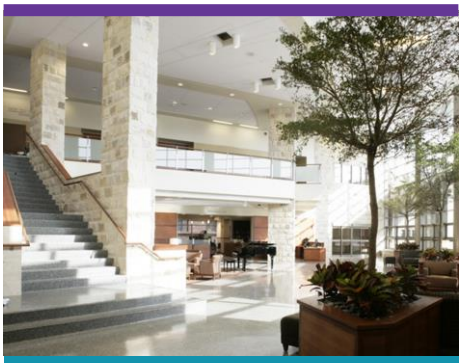
Scanner rooms:

- Lighting to be indirect and light source to be away from patient's direct line of sight.
- General lighting controlled by dimmer, as low illuminance is required during procedures and high illuminance during maintenance.
- MRI rooms should have incandescent, non-ferrous, or LED lighting so that the magnetic field of the MRI equipment does not affect the lighting system.
- Balanced luminance distribution is required near the computer monitor and the keyboard.

Limitations

The authors identify a limitation of their project that the simulations were done for rooms without furniture or occupants.

Other limitations of this study:



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- The authors provide very few specifications and requirements of the project.
- There are several inconsistencies in the article pertaining to the standards followed for the lighting – the text mentions adherence to IENSA, ANSI, and NLC norms, and the flow chart refers to BIS standards.
- There is no information about the software used to create the simulations.
- It is not clear why the simulations were done for vacant rooms.

Design Implications

Designers may consider using the following kinds of lighting for different spaces in super specialty/teaching hospitals, keeping in mind the limitations identified above:

- Indirect lighting (low-brightness, shadow-free, and glare-free) for classrooms and consultation rooms
- Low-powered halogen lights with reflectors for patient examination and light to be confined to the bed area
- Multi-level and supplemental task lighting in surgical nurse station
- Uniform distribution of light in the common patient area
- The color of the light should not be such that a patient's skin appears different.
- Indirect lights in the scanner rooms
- Lights in MRI rooms should be incandescent, non-ferrous or LED.

Also, flooring material may be anti-reflective and glare-free.

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