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LEED GREEN ASSOCIATE EXAM
REFRESHER
ONLINE TRAINING BY KRISHNAJI PAWAR
LEED AP(BD+C),GSAS CGP,GCP,ISO 14001
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MODULE 14

Indoor Environmental Quality

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This chapter focuses on the indoor environment, including thermal conditions and acoustics, as detailed in the Indoor Environmental Quality (EQ) category of the LEED green building certification program.

Learning Objectives +

- Water efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation and Regional Priority
- Project Surroundings and Public Outreach
- Summary and Resources
- LEED GA : Practice test

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INTRODUCTION

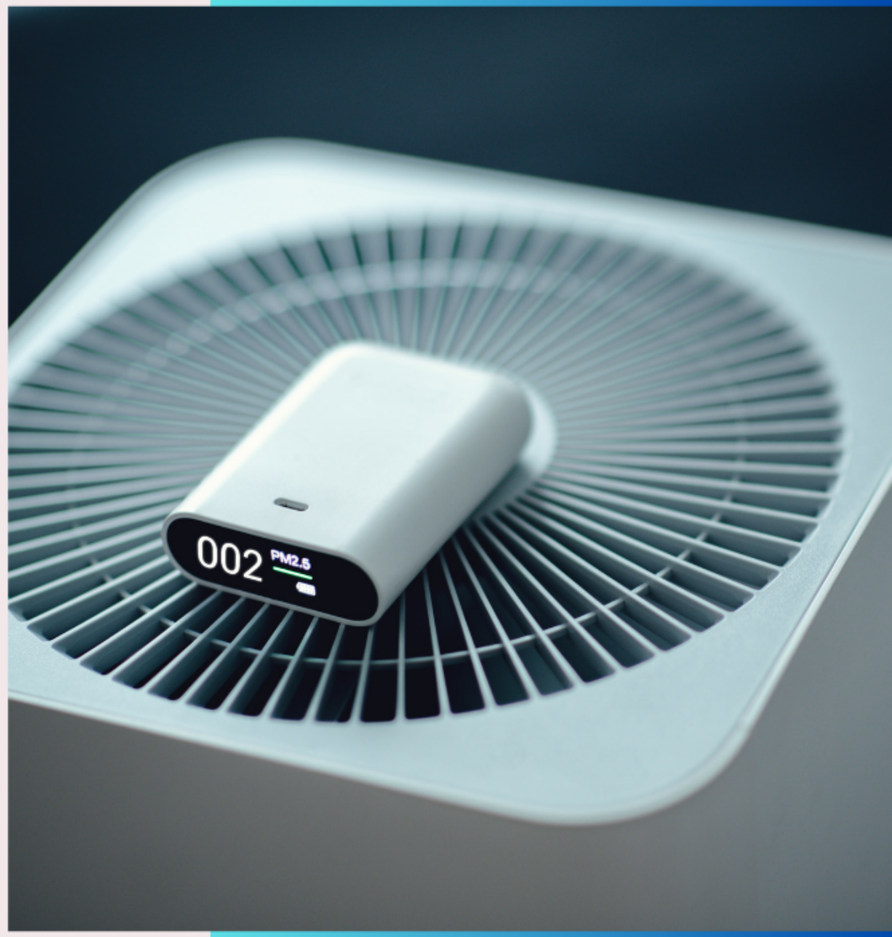
- Emphasizes the importance of indoor environments, with Americans spending about 80% of their time indoors.
- The chapter aims to enhance the lives of building occupants, increase the resale value of the building, and reduce liability for building owners and designers.
- Green buildings typically have lower indoor pollutants and greater satisfaction with air quality and lighting than conventional buildings.
- Emphasizing the satisfaction and health of occupants is crucial as employee salaries and benefits are the biggest cost for businesses.
- The LEED green building certification program offers strategies to improve indoor environments, including indoor air quality, lighting, acoustics, and occupant experience.

INDOOR ENVIRONMENTAL QUALITY IN LEED GREEN BUILDINGS

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"A The LEED green building certification program offers the following strategies to improve indoor environments:

1. Indoor Air Quality
2. Lighting
3. Acoustics
4. Occupant Experience





INDOOR AIR QUALITY OVERVIEW



- Common sources of air contaminants include tobacco smoke, building materials emitting VOCs, combustion processes in HVAC equipment, fireplaces, stoves, and vehicles.
- Mold, cleaning products, radon or methane off-gassing from soil underneath the building, pollutants from labs, hospitals, and factories, and pollutants tracked in occupants' shoes.
- Poor indoor air quality can lead to respiratory diseases, allergies, asthma, and sick building syndrome, impacting employee performance and productivity.
- The LEED green building certification program addresses these issues from a triple-bottom line perspective to improve air quality during construction and operations.
- The EQ category addresses the challenge from both a prescriptive and performance-based approach.

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DESIGNING FOR GOOD INDOOR AIR QUALITY (IAQ) STRATEGIES

- Prohibit smoking inside and around buildings.
- Properly size ventilation systems considering occupant activity.
- Protect air intakes by locating them away from exhaust sources.
- Design ventilation systems to remove contaminants with air filtration.
- Test for radon.
- Design entryway systems to reduce contaminants.
- Specify low-emitting materials with low or no VOCs.





STRATEGIES FOR IMPROVING IQ DURING CONSTRUCTION



- Maintain building cleanliness.
- Protect absorptive materials from moisture and dust.
- Conduct a pre-occupancy flush-out to eliminate off-gassed contaminants.
- Ductwork should be flushed out with large amounts of outside air.

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INDOOR ENVIRONMENTAL QUALITY IN LEED GREEN BUILDINGS

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- Monitoring indoor air pollutants during operations and maintenance.
- Incorporating green cleaning products with low or no VOCs.
- Regular changes to MERV filters and monitoring of carbon dioxide levels.
- Implementing low or no VOC products in maintenance strategies.
- Implementing integrated pest management strategies to eliminate human exposure.
- Designing adequate ventilation for occupants without compromising energy use efficiencies.
- Mechanical systems should thermally balance outdoor air with every air change.
- Using ASHRAE 62.1, Ventilation for Acceptable Indoor Air Quality, to appropriately size mechanical systems.





INDOOR AIR QUALITY MAINTENANCE STRATEGIES



- Ensure adequate ventilation, incorporating ASHRAE 62.
- Monitor airflow using airflow measurement devices.
- Monitor carbon dioxide through demand-controlled ventilation.
- Calibrate sensors.
- Prohibit smoking and enforce no-smoking policy.
- Employ green cleaning products, adhering to environmental standards like Green Seal and California Code of Regulations.
- Conduct a Custodial Effectiveness Assessment.
- Maintain entruwau sustems.
- Use integrated pest management to eliminate indoor contaminants.

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THERMAL COMFORT IN BUILDINGS

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- Temperature settings should vary with seasons.
- Buildings should allow occupants to control thermal conditions.
- Control is critical for comfort and satisfaction.
- Satisfied and comfortable occupants are more productive.
- LEED requires occupants to control one of the three components of thermal comfort.





THERMAL COMFORT STRATEGIES FOR OCCUPANTS



- Install operable windows for fresh air access.
- Provide occupants with temperature and ventilation control.
- Use strategies like raised access floors for mechanically supplied air.
- Conduct occupant surveys to assess overall thermal comfort satisfaction and identify improvement areas.

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LEED GREEN BUILDING CERTIFICATION PROGRAM

- Discusses lighting in terms of naturally available and artificially supplied light.
- Advises life-cycle cost analysis for incorporating daylighting strategies.
- Sensors can trigger alternative light sources, reducing up-front costs.
- Energy savings during operations offset costs.
- Daylighting improves occupant satisfaction and health, affecting economic bottom line over time.





GREEN BUILDING LIGHTING STRATEGIES



- Utilize daylighting for passive design benefits.
- Provide occupants with lighting control for energy savings and improved satisfaction.
- Conduct occupant surveys to understand overall satisfaction and identify improvement areas.

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ACOUSTICS

- Appreciation for proper acoustic design components.
- Impacts effective communication in person or via telecommunications.
- High-performing interior acoustic environments enhance building occupants and employees' satisfaction.





GREEN BUILDING STRATEGIES FOR ACOUSTICS IMPROVEMENT



- Consider acoustical impacts: interior finishes, building geometry, and duct insulation.
- Conduct occupant surveys: assess satisfaction of interior acoustic quality to identify improvement areas.

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