Confederation of Indian Industry

Technical Bulletin
Green Hospitals

From Indian Green Building Council, CII-Sohrabji Godrej Green Business Centre

Indian Green Building Council
Greening India since 2001

Can a building help cure you?

Research shows that a well-designed hospital building can actually accelerate the curing process. Increasingly therefore, designers are focusing on green strategies to enhance the positive impacts on patients and staff in hospitals. Design professionals need to know how their buildings will enhance the cure - through spatial and physical ambience.

Benefits of Green Hospitals:

- Can reduce patient recovery time
- Eliminates Sick Building Syndrome (SBS) for both patients and staff
- Reduces stress levels in hospital workers, thus improving quality of care
- Lower energy and water consumption

Green Hospitals Defined :

A Green Hospital Building can be defined as one which enhances patient well-being, aids the curative process, while utilising natural resources in an efficient environment - friendly manner.

Focus Areas for Green Hospital Design:

1. Lighting
2. Indoor Air Quality - Passive & Active Measures
3. Green House Keeping
4. Clean & Green Interior Building Materials
5. Gardens & Landscape

In Architectural Planning & Design of Green Hospitals, an over arching consideration is to ensure that the floor plate facilitates efficiency. An efficient floor plate design will reduce the construction foot print of a hospital – thus benefitting both the owner (lowered construction cost) and the patient (fast, smooth and the efficient transit through the hospital).

1. Lighting

A good hospital design should maximize day light and optimize the artificial lighting requirement. Day lighting is the controlled admission of natural light from the sky (direct & diffused), into a building, so as to reduce the use of electrical energy for lighting.

Benefits of Day-lighting & Views in Hospitals:

- Day-lighting has been proven to have positive effects on patients in hospitals
- Enhance health & well-being of the patients and reduce stress levels of hospital employees, thus improving quality of care
- Combats seasonal affective disorder, or winter depression, through view connectivity to natural vistas
- Improves facility's overall operational efficiency

Do You Know?

- Humans synthesize 90% of their body's requirement of Vitamin-D, naturally – from the skin's exposure to sunlight
- Buildings can save upto 20% of cooling energy load by optimally substituting artificial lighting with day-lighting

Artificial lighting is required in sensitive areas of the hospital – including operation theatres, medical dispensaries, interior corridors & passages. However, with rising energy costs and high initial investment, it is imperative to reduce operational cost of lighting in hospitals – by combining natural lighting and efficient artificial lighting.

Recommended Lighting Levels for Hospitals:
(ASHRAE 90.1-2007)

Type of Room	LPD (Lighting Power Density) (W/sq.ft)
Emergency	2.7
Recovery	0.8
Nurse Station	1.0
Examination /Treatment	1.5
Pharmacy	1.2
Patient Room	0.7
Operating Room	2.2
Nursery	0.6
Medical Supply	1.4
Physical Therapy	0.9
Radiology	0.4
Laundry-Washing	0.6

Few of the passive design aspects to enhance natural lighting in hospitals :

- Design glazing facades so as to have both view & daylight
- Install translucent skylights having soothing colours
- Have transparent & operable openings to green courtyards
- Consider ledge seating at windows – engaging nature in the curative process

Few of the design aspects to enhance efficiency of artificial lighting in hospitals:

- Use occupancy sensors in passageways, storage rooms, labs, etc.
- Install low-energy LED lighting to save on Indoor lighting energy cost (Upto 40%)
- Use task lights to provide illumination in task areas like consulting rooms, labs, wards

2. Indoor Air Quality by Passive & Active Design

As restoring and safeguarding health is the main purpose of healthcare facilities, indoor environmental quality is considered critical to green hospitals.

Must Do's for good indoor environment:

- Install Permanent entry-way systems to capture dust particle like slotted systems, grates or grilles at all primary entrances
- Use certain species of indoor plants which not only produce oxygen but also reduce indoor pollutants like VOC (Volatile Organic Compound) from air
- Improve fresh air by providing courtyard spaces with native & adaptive plant species, which are free from any allergic effects
- Use zero -VOC interior materials

Outdoor Fresh Air Requirements for Ventilation of Health-Care Facilities:
(In Cubic Feet per Minute - CFM)

Applications	Estimated Occupancy/ 100 Sq.m	Outdoor Air Requirements		Comments
		CFM/ Person	CFM/ Sq.ft	
Patient Rooms	10	25		Procedures generating contaminants may require higher rates
Medical Procedure	20	15		
Operating Rooms	20	30		
Recovery and ICU	20	15		
Autopsy Rooms	20		0.5	Air shall not be re-circulated into other spaces
Physical Therapy	20	15		

3. Green House Keeping

Accumulation of dust, soil, and microbial contaminants on surfaces is a potential source of nosocomial (Hospital-borne) infections. Effective & efficient cleaning methods and schedules are therefore necessary to maintain a clean & healthy environment in health-care buildings.

Today housekeeping policies & procedures increasingly bring in a focus on making a positive environmental impact. Typical measures include :

- Insist on cleaning products that meet environmental standards
- Provide personnel training for safe handling and disposal of hospital waste
- Consider waste recycling, wherever feasible

Do You Know? - Lack of proper insulation in the roof, walls, etc., can lead to patient discomfort in summer months through solar heat conductance. High-performance Insulation such as Extruded Polystyrene, Poly Urethane Foam, in the Hospital Building Envelope can significantly reduce energy consumption.

4. Clean & Green Interior Building Materials

Hospitals may inadvertently contribute to illness by exposing patients and staff to a host of pathogenic germs & toxins that enter the hospital premises through the medium of a large number of infected patients.

- Ensure that the hospital surfaces have the property of repelling or resisting the growth of pathogenic germs and bacteria. Patented interior surfaces are now available which resists bacterial and fungal growth. These include countertops, tiles, vinyl flooring, etc.

- Consider using copper based interior materials. Recent research also shows that copper is a good material for common 'touch' surfaces in hospitals (door handles, light switches, faucets, countertops, etc.) due to its microbial resistant properties.
- Use indoors & flooring which do not emit / absorb / re-release indoor pollutants such as VOC's and dust.

5. Gardens & Landscape

Gardens & landscape are an aesthetic delight and promotes wellness of patients in hospitals. Persons exposed to plants have higher levels of positive feelings (pleasantness, calm) as opposed to negative feelings (anger, fear).

Various research studies show that recuperation from stress is faster and complete when patients are exposed to natural settings than any other form of built environment.

ESI Hospital, Peenya, Bengaluru - Going Green

Research has shown that noise in hospitals poses problems for patients and also leads to nursing errors. Some positive Acoustic measures include – better insulation between rooms, the use of vibrating / low volume communicating devices (intercom & pagers), use of quiet fans, design of back-to-back restrooms and location

Examples of Green Hospitals in India :

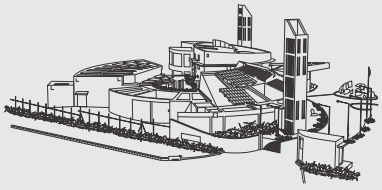
Max Balaji Super Speciality Hospital, New Delhi, Gold Rated

Kohinoor Hospital, Mumbai, Platinum Rated

Benefits achieved by the rated Green Hospitals :

- Better indoor air quality
- 20-40% energy savings
- 35-40% water savings
- Good day lighting
- No sick building syndrome
- Faster patient recovery

Govt. Mohan Kumaramangalam Medical College & Hospital
Salem, Tamil Nadu, Gold Rated



For more on Green Buildings, kindly contact:

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