Lighting design in hospital wards
Design parameters for a pleasurable light atmosphere
- Presentation

- Hospitals in Denmark

- Design parameters for a pleasurable light atmosphere in hospital environments
  - User
  - Environment
  - Light
  - Time
  - Atmosphere

- Future plans and documentation
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“Aesthetics and the physical environment affects the human body, mind and wellbeing. Patients, relatives and staff are affected directly and indirectly by the surroundings.”

“The interior should be designed with attention to existing knowledge and experience on how light, art, colors, and outdoor and green areas affects patient health and wellbeing.”


**Guidelines for hospital design**
Domestic and attractive Lighting

paragraph 2: General requirements for lighting.

For the remaining lighting, the colour temperature must be selected according to patient needs for an attractive “domestic” lighting, which in most cases is color temperature no higher than 3000 K and a reasonably good color rendering of Ra> 80th

Danish Standard 703

The Standards
Light atmosphere

Light characteristicia
- Daylight - Artificial
- Variation, dynamic, intensity, colour

Light information:
- Expectations
- Experience

Effect
- Functional
- Aesthetic
- Symbolic

Location
- Angle
- Distance
- Geographic

Spatial composition
- Object and placements

Environment

User

Time

Behaviour
- Social, locomotion

Human performance
- Expectations and goals

Group characteristics
- Patients
- Staff
- Visitors

To see
- Visual system
- Circadian system
- Perceptual

On the time
- Day and year

Period of influence
- Adaptation
- Before, under, after

Atmosphere

Sensory indications
- Appearance
- Surface caracter
- The functional effect
- The aesthetic effect
- The symbolic effect

Boyce, PR. 2003, “Human factors in lighting”
"Contact with the outside"
Wetton, E. (1986) "Daylight and windows in hospital wards"
Dalke, 2006 presents a guideline for colour and lighting design in hospitals environments.

According to James Turrell (1992) our brain will seek order and meaning and it begins to interpret and sort things out, and seek for meaning if there is no accordance between our ideas and expectations of the light. James Turrell (1999) "The other Horizon"
Environment: composition - spatial structure - surface
Jorden er en af ni planeter som kredser om solen. Et tur rundt tager et år og i det tidsrum roterer den om sin egen akse cirka 365 gange. Når vi her i Danmark har udsigten vendt ind mod solen, er det dag. Hvis Jordens rotationsakse stod vinkelret på baneplanet, ville en dag vare 12 timer og natten ligeså. Men aksen hælder 23,5 grader og det betyder at vi en del af året hælder lidt væk fra solen så det tidsrum vi kan se solen er kortere end 12 timer.

Det er aksehældningen som skaber årstiderne og meget af Jordens vejr.

Figuren herover viser situationen når det er vinter på den nordlige halvkugle. Sydpolen er belyst både dag og nat, mens nordpolen ligger i konstant mørke. Jo længere nordpå man er, jo mere af døgnet er nat. Rotationen om aksen er mod uret når globen betragtes over nordpolen. Det vil sige at det landområde som herover ligger ved "DAG" bevæger sig mod højre ind i "NAT".

Rotationshastigheden svarer til at kloden drejer 15° i timen, det er netop inddelingen på den viste globus.


De cirkler som er spændt rundt om Jorden parallelt med ækvator kaldes for breddeparalleller. De er nummererede så de nord for ækvator kaldes 1°N, 2°N,.., 89°N og syd for 1°S, 2°S,.., 89°S.
Time
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User: Patients-Staff-Visitors

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The physical environment, the organizational structure, and the organizational culture can influence affect. Lighting is clearly part of the physical environment and lighting conditions such as the illuminance and the correlated colour temperature of the lighting have been shown to change mood and to change behaviour in a way consistent with positive affect.

Mc Clughan C.L.B. (1999) *“The impact of lighting on mood”*
User: Visual-Circadian-Perceptional system
Atmospheres is defined as "spheres of presence". Atmosphere is the manner in which we experience a space. They are not bound to a place but nonetheless poured out into, thus shaping, the space.

Gernot Böhme
Atmospheres can not be seen - It must be experienced through other senses and an atmosphere occurs rarely through one sense alone, but in an interaction between several senses. Atmosphere affects people emotionally.

Niels Albertsen "Urban Atmosphere"
Atmosphere is not a question of moral. Atmosphere is everywhere and always present.
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Gernot Böhme (1937), Philosopher, Atmosphere. Introduces in 1995 the new concept of atmosphere and a relation between body and environment.
Gernot Böhme display 3 kinds of space:

**The space as medium of presentation**
Mathematic, objective analyse of the space separated from the subject.

**The bodily presens in space.**
Mathematic, subjective analyse of the space: The experience of “being here” and “being present”.

**The bodyspace**
The subject in the center of the space. Based on the way the subject is involved in space “space of action”, “the space of mood” and “the space of sensing”
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Sensing
Peter Dalsgaard og Karen-Johanne Kortbak (University of Aarhus) introduce a social parameter and technologi to the concept of atmosphere in the context of design.

In addition, they point out that the concept of time is an essential factor because atmospheres must be seen as a processual phenomenon.

"Staging atmospheres in interaction design", Nordes (2008)
Adding the parameters Time and socio-cultural value as essential factors in understanding the concept of atmosphere.
Atmosphere environmental analysis

Atmosphere

- Functions
- Functional ecstasy
- Between people
- Sensing
- Relation between objects
- Light supporting both public and private atmosphere at the hospital ward:
- The patients opportunity to actively transform the room atmosphere through intelligent lighting control systems
**Research through design**
- Researching: Atmosphere, User, Light, Environment, Time
- Developing concept for lighting design at hospital wards.
- Testing the concept at Odense University Hospital

**Publications:**
- Conference proceeding: Lighting Qualities in Wards: Design Parameters for a Pleasurable Light Atmosphere.
- Poster: Lighting Quality in Wards.

http://vbn.aau.dk/research/(19079507)

**Plans and documentation**

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