

## LIGHT, ARCHITECTURE AND HEALTH – A METHOD

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This thesis focuses on the relationship between *light and health in architecture*. Light and health is an area which in recent years has undergone major changes and gained increasing attention in architectural planning. However, it is still a relatively new area, which is why a lot of effort and work is put into defining the different health aspects of light and how to better utilize them in the architecture.

Much recent research reveals new beneficial aspects of light, while other research merely seems to confirm the ideas of healthy architecture in the early 20th century.

The point of departure of the thesis is based on historical sources. Through a literature study, the thesis unfolds what can be described as *forgotten knowledge*. Subsequently, the thesis reviews recent and evidence-based knowledge on *light and health*. Here the influence of light on health is conceptualized, also relating the role of architecture to various diseases.

This is followed by field studies of modernist buildings, all based on health aspects. The original intentions are described and subsequently evaluated with contemporary eyes based on the knowledge obtained about light and health.

The overall lesson to be learned is that a strategy of unilateral exposure to sunlight often fails, simply because it over-emphasizes the sunlight. Instead a balance between *exposure to sunlight* and *protection from sunlight* is suggested.

This balance is investigated through two practical light experiments. In the first experiment glass is examined, seen from a health perspective. Here the thesis presents a new concept, *the unhealthiness factor* of glass. The

second experiment seeks to find a balance between exposure to and protection from the sun, based on studies of the geographical orientation, the weather and the circadian rhythm during the day and year. This is done through a setup of 8 scale models in controlled test and control trials comparing and representing *the differences in light* over time and place. For this purpose the thesis develops a new method of representation, *simultaneous-timelapse-photography*, depicting differences in the light over time and space, according to E, S, W and N, depicting the differences in the light respectively at summer solstice, equinox and winter solstice.

Based on the light experiments the thesis introduces an overall architectural strategy for healthier light in buildings, a strategy that responds to the asymmetrical light of the sun. It does this by, in itself, being asymmetrical.

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Thereby the thesis restores the importance of the geographical orientation, that is, the aspect of morning sun, evening sun, summer sun and winter sun and the fundamental importance of light for temporality, place and body.

The thesis emphasizes the importance of two factors, when we talk about light, architecture and health, namely the differences in light during the day and the clear, low-iron glass. Two factors, which in a healthy and sustainable architecture seem to go hand in hand.

In the thesis, a new method to better cater a healthier planning of light in the architecture is developed. A method which can complement existing methods, such as the daylight factor, its greatest weakness being that it overlooks both time and place, only working from the concept of *a cloudy sky*.

The conclusion of the dissertation is that it is possible to plan a healthier daylight, if the architecture is planned deliberately both according to E, S, W and N, and according to the circadian rhythm of the body.

Architecturally, this is suggested done by differentiating the architecture according to the asymmetrical light of the sun. Be it in the form of an asymmetric planning of building form, facades, apertures or artificial lighting.