

Creating change through daylight

*Original*

Creating change through daylight / Pellegrino, Anna. - In: DAYLIGHT & ARCHITECTURE. - ISSN 1901-0982. - Autumn 2015:24(2015), pp. 65-66.

*Availability:*

This version is available at: 11583/2623291 since: 2015-11-20T15:53:55Z

*Publisher:*

The VELUX Group

*Published*

DOI:

*Terms of use:*

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

*Publisher copyright*

(Article begins on next page)

# D/A

DAYLIGHT & ARCHITECTURE MAGAZINE BY  
VELUX GROUP AUTUMN 2015 ISSUE 24 10 EURO  
DAYLIGHT AS A DRIVER OF CHANGE



DAYLIGHTING HAS ALWAYS been an essential and irreplaceable resource in the field of architecture.

It can be considered a resource from a design perspective, since it contributes significantly to the character and appearance of indoor spaces in buildings, due to such features as quantity, distribution and direction, through effects of light and shadow, and as a result of its variability in space and time.

It is a resource from an economic perspective, since daylight availability and the quality of daylighting design contribute to the economic value of buildings, whilst the quantity of daylight available during the occupancy hours of spaces leads to a reduction in the use of electric lighting and consequently in energy costs.

But natural light is also a resource for the people who use the buildings. A daylight luminous environment and the presence of openings towards the outside are essential for the health and well-being of the users, from both a physiological and a psychological point of view. The beneficial effects of views outside include eye relaxation, perception of the flow of time, spatial relation to the outdoor context, and many more. Furthermore, the intensity, spectrum and variability of daylight can positively affect human circadian rhythms and reduce seasonal affective disorder.

Daylight can also affect productivity and comfort when carrying out visual tasks. In terms of visual comfort, it leads to both benefits and drawbacks. The large amount of light that can reach the workplace, its high colour rendering and spectral variability are generally perceived as benefits. Conversely, the high luminance of daylight sources can produce direct glare or reflected glare on glossy surfaces.

Given all its benefits, daylighting is a fundamental part of sustainable architecture, and new developments in daylighting research and technology are influenc-

ing the way buildings are being made or will be designed in the future.

One development area concerns the metrics adopted to assess daylighting. Since the beginning of the last decade, climate-based metrics have been proposed to take into account the annual daylight potential of a building. In 2012, the Illuminating Engineering Society of North America (IESNA) proposed two new metrics to assess indoor daylighting performance: spatial Daylight Autonomy (sDA), which indicates the percentage of area in a room where the illuminance by daylight alone is  $\geq 300$  lux for at least 50% of the time; and Annual Sunlight Exposure (ASE), which is an indicator of the potential risk of glare over the course of a year. It indicates the percentage of area in a room where the illuminance by direct sunlight is greater than 1,000 lux for at least 250 hours a year.

These two dynamic metrics have now been included in the latest version of the LEED program for green building certification (LEED v4). Furthermore, researchers are even trying to conceive new metrics that are based not only on visual comfort issues but also on non-visual effects of light or on aesthetic and perceptual aspects of illumination. For the future, the consolidation of effective daylighting metrics, which consider all the aspects related to daylight rather than just those based on workplace illuminance, will be essential for the overall assessment of building performance.

The development of technologies for building envelopes is another important driver of innovation related to daylighting. High-performance, transparent envelopes or building openings are being conceived to reduce energy loads and increase human comfort. These innovations are often associated with the concept of adaptive technologies, which can be active or passive, and generally influence both the thermal and visual



performance of buildings. Some examples are glazed facades with integrated, complex solar control components, passive daylight redirecting systems, phase change materials or even more traditional solutions such as electrochromic glazing, which is now undergoing a revival thanks to the potential size of the building retrofit market. In the case of complex systems, particular attention should be paid to their interaction with, and acceptability by, the user. This is another aspect that could influence the overall building performance to a great extent.

Although natural light has always been recognised as an inherent building material, new goals should be pursued in future buildings: daylighting for human health, well-being and space enhancement rather than only for proper workplace illumination; daylight control for the optimisation of both visual and thermal comfort; daylight maximisation in order to reduce the overall (both electric and thermal) energy use in buildings.

All these aspects are already targeted in building design practice, but often at a late stage of the process and by different professionals or experts. Daylighting design should be approached in a more holistic way: developing solutions that are part of the architectural concept, while meeting visual, thermal and energy needs. Furthermore, daylighting should be a major focus area of the design process, right from the early stages, and should be comprehensively studied on all scales from urban design to building components.

**Anna Pellegrino** is an Associate Professor at Politecnico di Torino, Italy. She holds a degree in Architecture and a PhD in Energetics from the same university. Currently, Anna Pellegrino is a member of the research group TEBE (Technology Energy Building Environment: [www.polito.it/tebe](http://www.polito.it/tebe)) at the Department of Energetics of the Politecnico di Torino. Her main research interests are all within the field of lighting: from lighting and control technologies to lighting applications and energy use, from lighting design to issues of light and health, visual comfort and material damage.



**DAYLIGHT & ARCHITECTURE  
MAGAZINE BY VELUX GROUP**  
AUTUMN 2015 ISSUE 24

Publisher: VELUX Group, Michael K. Rasmussen  
VELUX Editorial team: Per Arnold Andersen,  
Christine Bjørnager, Lone Følter

Editorial & creative advisor: Torben Thyregod  
Editor: Jakob Schoof/DETAIL  
Photo editor: Torben Eskerod  
Art direction & design: Stockholm Design Lab @  
Per Carlsson, Björn Kusorfsky, Christopher West

Translation: Sean McLaughlin  
Proof-reading: Tony Wedgwood

Front, back and inside cover photography by  
Ole Christiansen

Print run: 72,000  
ISSN 1901-0982

The views expressed in articles appearing in  
Daylight & Architecture are those of the authors  
and not necessarily shared by the publisher.

© 2015 VELUX Group.  
© VELUX and VELUX logo are registered  
trademarks used under licence by  
the VELUX Group.  
E-mail: [da@velux.com](mailto:da@velux.com)  
[da.velux.com](http://da.velux.com)  
Ipad version available in App store



**Ole Christiansen** (born 1955) is a Danish photographer who lives and works in Copenhagen. His areas of particular interest are music and portrait photography, but also photographs of urban landscapes that are characterised by vivid black-and-white contrasts and a strong graphic emphasis. So far, his work has mainly been exhibited in Denmark and the USA, at such locales as the Royal Danish Library in Copenhagen, Brandts Klædefabrik in Odense and the Scandinavia House in New York.

**Thekla Ehling** (born 1968) is a German photographer based in Cologne. She studied photography in Dortmund, Germany, and Limerick, Ireland, and has worked for numerous magazines in Germany and abroad, including *Der Spiegel*, *Die Zeit*, *GED*, *de Volkskrant*, *Brand Eins* and *NEON*. In one of her previous assignments for the VELUX Group, she documented the works of SANAA, Will Bruder Architects, Jaromund/Misgases, and Lacaton & Vassal in *Daylight/Architecture 15*.