Personal Daylight

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INTRODUCTION

Of the buildings designed according to the Danish standardized regulations (BR08), reference year 2008, approximately 70% of the energy consumption is due to electrical powered installations, where as artificial lighting accounts for 20-30%. Heating consists of less than 30%.

This study offers a conceptual solution, which adds value to its users and investors, moreover reducing artificial lighting whilst securing better lighting conditions, in shape of more moderate and consistent daylight distribution.

- A daylight system installed into both new and existing constructions

THEORY

Daylight is collected and lead through the façade via light tunnels and divided into independent ceiling cells. From the cells, the daylight is distributed through two perforated panel, allowing only a certain amount of daylight to pass. The panels are mechanically adjusted by a photovoltaic powered motor, which slides the top panel to secure a distribution value ranging from 100 to 0 percent.
Workzones are established with sensors to measure current light values. From software the user's position is determined and preprogrammed preferred daylight-values are maintained.

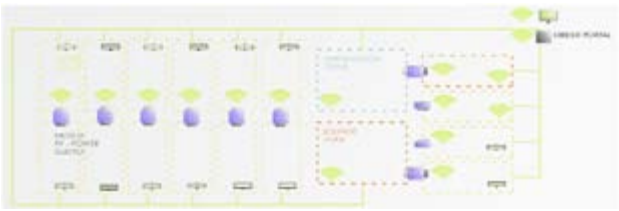

Figure 1 – Wireless system communication map

METHODS

Computer simulation – using a 1:1 virtual environment

Software used for geometric studies: Daylight Visualizer version 2.6
Software used for daylight measurements: IES – Integrated Environmental Solutions

RESULTS

Reference day: Overcast 12am 1. June – destination: Copenhagen
Average lux-value: 388
Max deviation: 13.35%

Overall artificial lighting reduction (7am-7pm): 63%

CONCLUSION

This concept delivers a significant reduction in artificial lighting. Further studies might indicate that less unwanted heating is generated, improved work efficiency is gained and better health conditions among users are achieved.