DAYLIGHT: A CONCEPT AND A DESIGN DERIVER

THE CASE STUDY OF ENKÖPING NEW SCHOOL

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• Integrating the simulation process with the design process
• Simulation tools and interoperability between software
• Simulation results (Sunlight, Daylight, and Comparison with European Standard)
• Conclusions and recommendations
White is Scandinavia’s leading architectural practice and the third largest in Europe, with projects across Europe, America and Africa.
ARCHIETECTURE TEAM

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TOOLS & METHODOLOGY: INFORM

URBAN LEVEL

MICROCLIMATE

DAYLIGHT & SUNLIGHT

BUILDING LEVEL

DAYLIGHT

ENERGY

INTEROPERABILITY BETWEEN TOOLS

Division of primary energy (kWh/m2)
The primary energy is 118.6 which is greater than 80 therefore it is not acceptable.
DAYLIGHT CONCEPT & FORM FINDING

- Six building forms
- Five Vertical Sky component (VSC simulations)
- Three Daylight Factor simulations
- Six Sunlight hours simulations
SUSTAINABILITY CONCEPT

- Maximising unshaded roof area for photovoltaic cells
- Maximising sun exposure in outdoor areas
- Green roof for biodiversity
- Protecting outdoor spaces from prevailing wind

Wooden & energy efficient construction

Daylight concepts
SUNLIGHT HOURS

21ST MARCH

5 HOUR THRESHOLD (BOVERKET)

2 HOUR THRESHOLD (BRE)
SUNLIGHT HOURS

21ST MAY

5 HOUR THRESHOLD (BOVERKET)

2 HOUR THRESHOLD (BRE)
Results below 12-15% means that the façade will not receive enough daylight.
• 1.2% Daylight Factor threshold for Miljöbyggnad silver
• 30-35% Window to wall ratio as a recommendation based on steady state energy calculation
SUMMARY OF THE RESULTS

Area (m²)

Floor plan

Non-Daylit area
Daylit area
Areas with daylight requirement

82% 74% 75% 54% 69% 69% 72% 79% 85% 78% 78% 93% 88% 81%
COMPARISON WITH EUROPEAN STANDARD

Plan 2

40% Glass to Wall Ratio

80% Glass to Wall Ratio

Median Daylight Factor

DF (%)

≥ 5
(4-5)
(3-4)
(2-3)
(1-2)
(0-1)

Maximum room depth

1.2% DF line
CONCLUSIONS AND RECOMMENDATIONS

• Optimizing the use of tools within the design process is a key factor towards a daylit space and comfortable outdoor spaces.
• Working Interdisciplinary is essential at an early stage
• It is a challenge to meet the European Standard in the Swedish Climate.
THANK YOU

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