

ROOM-LIGHT 1:1 NEW PSYCHIATRIC CENTER BISPEBJERG

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BACKGROUND

In the field of health there is a growing focus on daylight and artificial lighting as measures which can support conventional medical treatment. New knowledge suggests that both daylight and dynamic LED technology may help improve the overall conditions and the recovery of patients at Psychiatric Centres.

AIM

The aim of this project is to plan and optimize the overall indoor climate of a new psychiatric center The New PC Bispebjerg in Copenhagen, Denmark. A full scale rotatable 1:1 model of a single bed room is built in order to test a new architectural concept including the following parameters:

- Natural daylight optimized quality
- Natural ventilation
- Dynamic LED artificial lighting
- Acoustic materials with a focus on natural materials, e.g. wood

Built in the new Building Class 2020 the New PC Bispebjerg will contribute with useful knowledge when it comes to future state of the art healing architectural design in low energy buildings. The long term aim of this project is to implement the results at New PC Bispebjerg and to test the effect of the architectural interventions on future patients in full scale post occupancy studies. We hope that the research project will contribute to new research-based knowledge about indoor climate, particularly the effect of light on inpatient patients with mental disorders.

METHOD

The rotatable 1:1 mock-up is corresponding to a singlebed patient room at New Psychiatric Center Bispebjerg. The mock-up is placed on the roof of a 8 floor building in order to ensure free access of daylight into the patient room.

Specially optimized window glass transmitting ultraviolet light (290 – 315 nm) and natural short-waved light (460 – 480 nm), stimulating the light-sensitive ganglia cells (ipRGCs) in the retina, is implemented in order to stimulate the circadian rhythm and sleep-wake cycle.

The specially optimized glass transmits more heat from the sun and to vent the heat to avoid overheating – and to optimize the air quality – a new natural ventilationsystem is developed and tested in the form of ventilation principles based on pressure-controlled ventilation. New LED artificial lighting is implemented and tested (based on ROOM-LIGHT project by the NID Group). In this way, the artificial lighting is planned in relation to the geographical orientation with the natural sunlight used as a reference in a newly developed dynamic LED artificial lighting mimicking the natural sunlight in a SE-facing patient room. A concept we call *Latitude Compensated Architectural Lighting* (L-CAL). See Wardlight-project also from the NID Group.

Through this method, efforts are made to create optimal conditions in a patient room, regardless of the geographical orientation. Continuous data on intensity and spectral light composition are collected in the 1:1 model at different positions of the mock-up relative to the four different corners of the world and relative to the sunlight at different seasons, both summer and winter.

RESULTS

We await results of light and indoor registrations. Final results are expected to be completed by the end of 2018.

PERSPECTIVES

We hope to contribute with knowledge of the effects of daylight, artificial lighting and indoor climate in order to concretize and optimize the healing environment for hospitalized patients at New Psychiatry Center Bispebjerg.

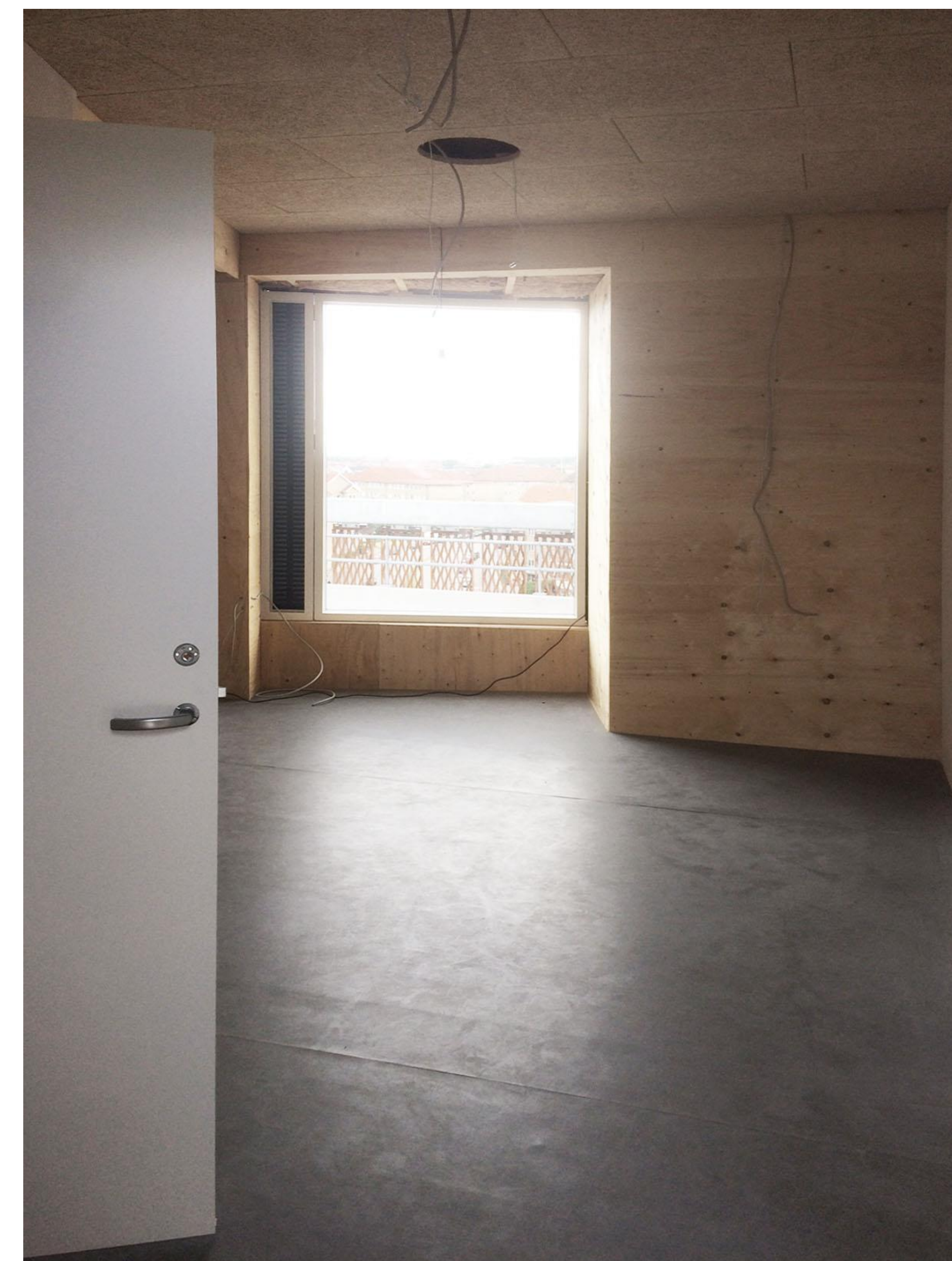
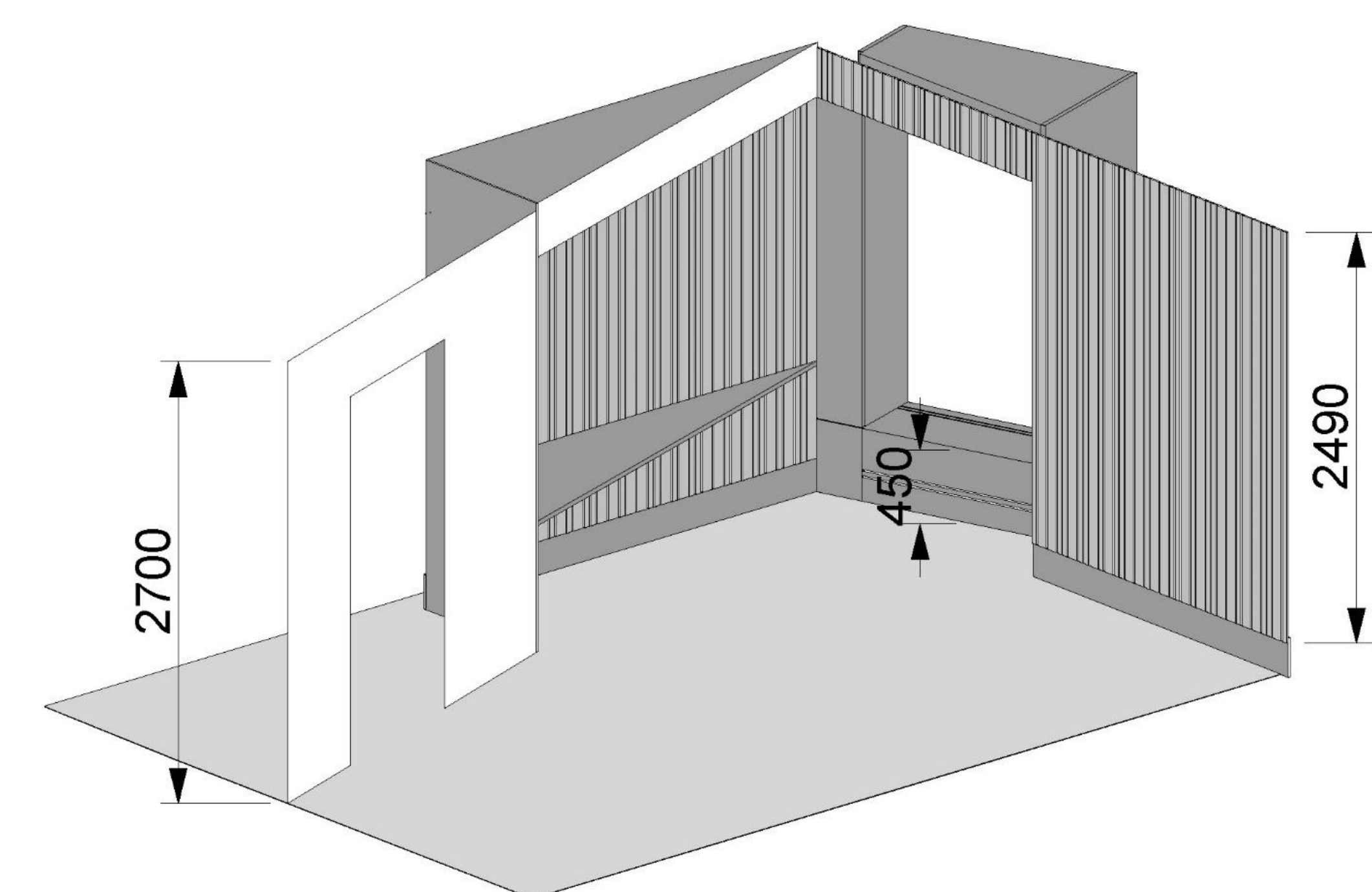
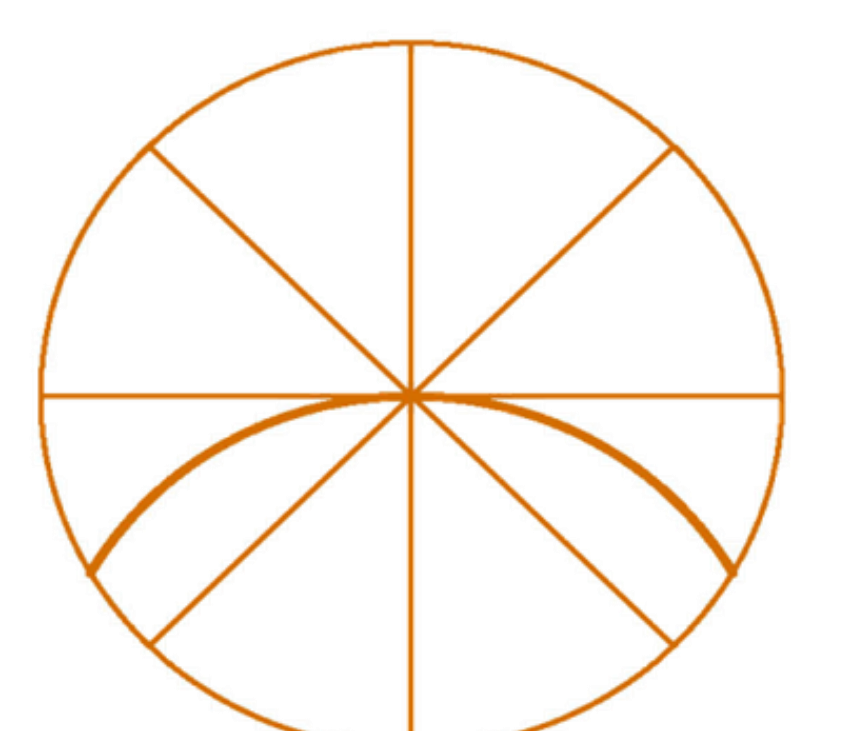
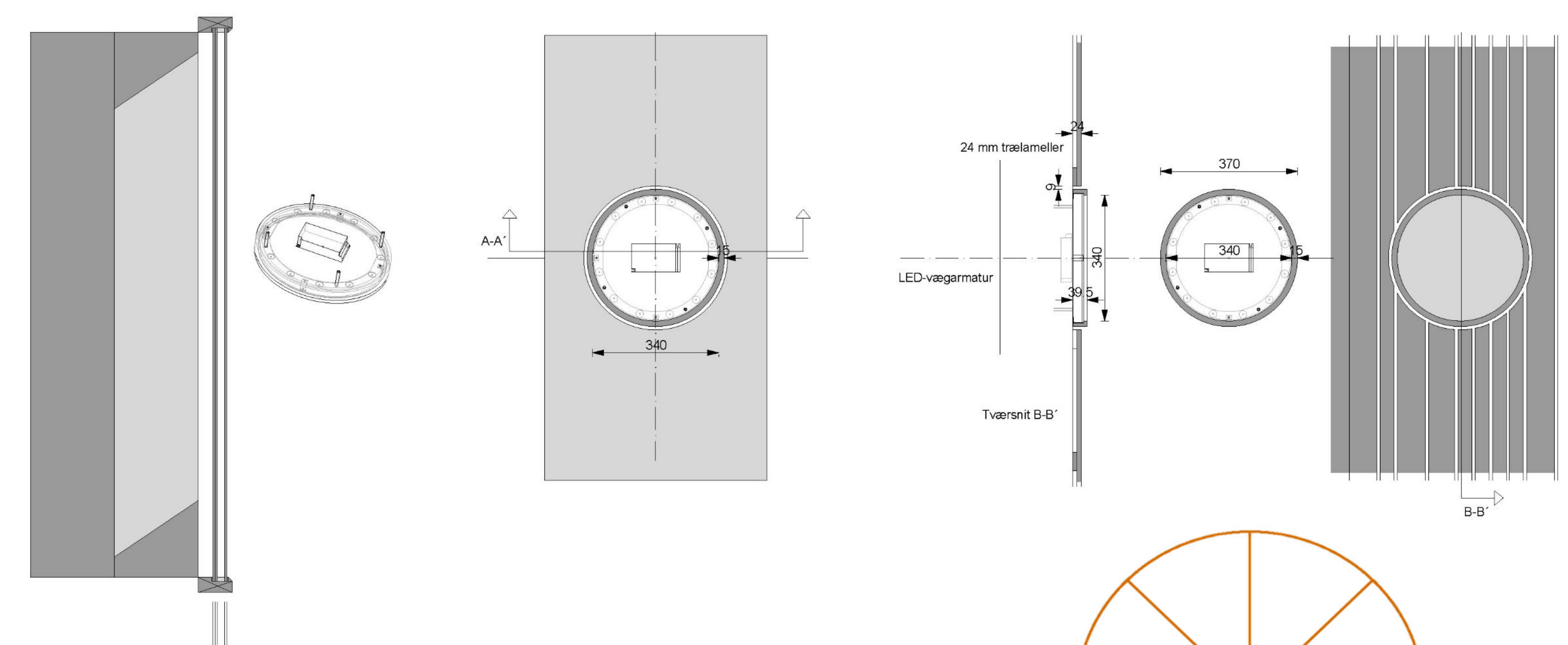


Figure 1
New Psychiatric Center Bispebjerg

Figure 2 og 3
Visualization of the 1:1 scale model at Psychiatric Center Bispebjerg. The orientation of the building relative to the four corners of the world, N, S, E and W is investigated in the rotatable mockup. Data on light intensity, spectral composition and general indoor climate is collected and recorded in the rotatable 1:1 model

Figure 4
Illustration of the LED fixtures in the 1:1 mockup; LED light panel near the window glade (left), LED fixture in the ceiling (center) and LED fixture in the wall (right)



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