

SynthLight Handbook

Chapter 5: Case Studies

Part 3: Courtyard facade with heliostats in Karl-Scharnagl-Ring Street in Munich, Germany

Authors: Andreas Zimmermann, Wilfried Pohl
Bartenbach LichtLabor

About

This is part 3 of chapter 5 of the handbook for the SynthLight on-line course on lighting:

1. Fundamentals
2. Daylighting
3. Artificial Lighting
4. Integrating Artificial Light and Daylight

5. Case Studies

For more material and the other chapters, please visit the SynthLight web site at:

<http://www.learn.londonmet.ac.uk/packages/synthlight/index.html>.

This site also has an on-line test consisting of 15 questions each for each of the four main chapters. If you answer more than 80% of questions correctly, you will be sent a Certificate of Virtual Attendance.

Acknowledgements

SynthLight was part-funded by the European Commission under the SAVE programme. The project number is 4.1031/Z/01-123/2001.



Disclaimer

Although much care has been taken in ensuring that all facts and concepts laid out in this document are correct, the author can not be held liable for any mistakes that might have crept in. If you discover any inconsistencies, please notify <andreas.zimmermann@bartenbach.com>, so future revisions of this document can be corrected.

Project Title: Courtyard facade with heliostats in Karl-Scharnagl-Ring Street in Munich
('Karl-Scharnagl-Ring München')

This project describes a group of three administration buildings situated at Altstadttring in the centre of Munich. Bartenbach LichtLabor were responsible for the design of both, daylighting and artificial lighting. All office spaces were equipped with state-of-the-art daylighting systems to provide shading as well as glare protection. The luminaires are low-glare CAT5 fittings. The glazed atrium covering the central courtyard is one of the features of the buildings.

Owing to the building's geometry, the 600m² of office space located around the central atrium have a limited daylight availability. In order improve this situation, the use of direct sun light was taken into consideration. The impact of a heliostat system was investigated with a number of scale model experiments and computer simulations. The results of those investigations, both in their improved lighting quality and incread daylight availability, convinced the developer to give the go-ahead for this innovative project. The sunlight system consists of 7 heliostatic sun trackers which focus the direct sun light onto secondary mirrors situated above a highly transparent PVC roof. These mirrors redirect the sunlight onto individual reflector systems attached to the facade inside the courtyard of the buildings. The sunlight is directed onto the white, diffuse ceiling priving glare-free natural lighting. This achieved optimum daylight in the offices overlooking the courtyard, along with an improvement to the working conditions of the inhabitants.

The innovative daylighting system installed into the property at Karl- Scharnagl-Ring is an investment which improved the rentability of the office space resulting in a better return of investment to the owner.

Type of building: administrative building (approx. 12.000 m² office area)

Completion: 2003

Buidling owner: Bayerische Immobilien Management GmbH

Architect: Hilmer Sattler & Albrecht München

Heliostats: Bomin Solar



Figure 1: Initial architectural drawings

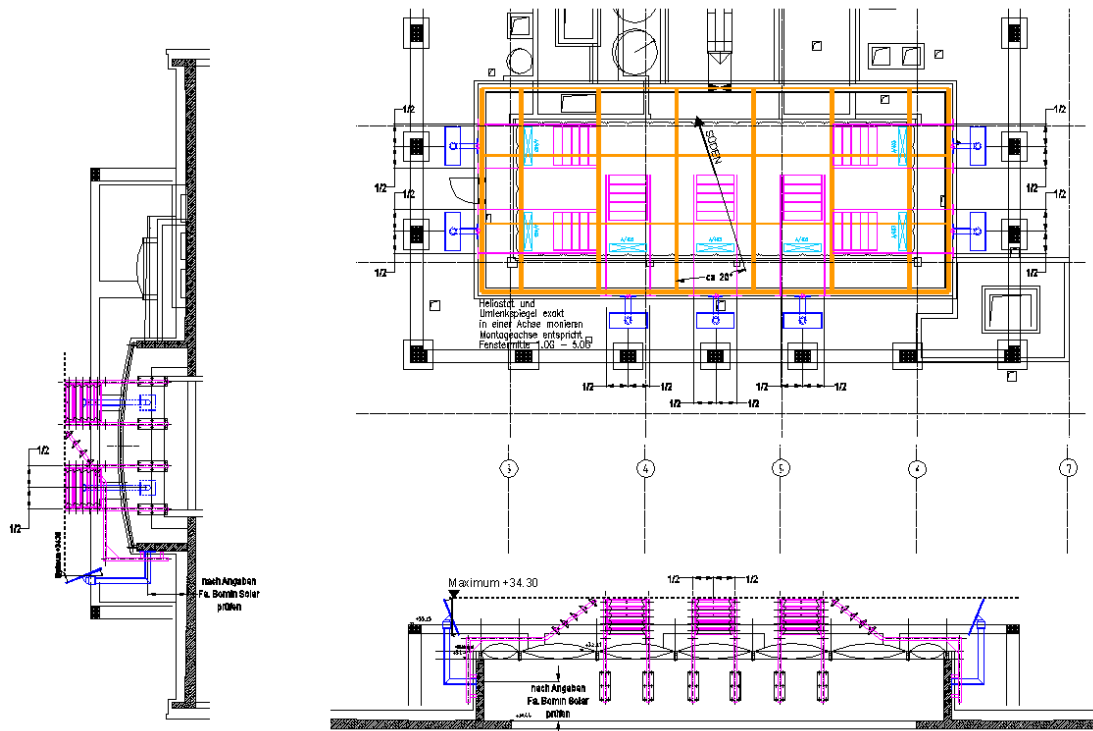
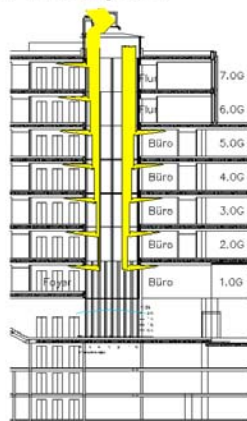
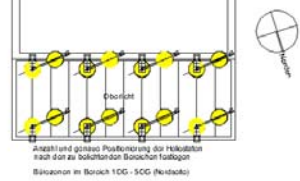


Figure 2: Initial architectural drawings

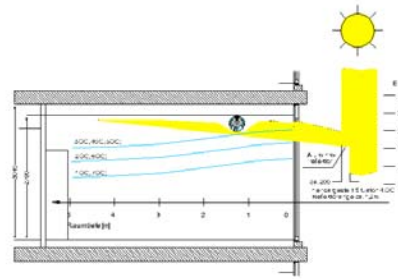
conceptual design
daylight court yard



roof

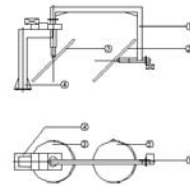


Heliostat



Bartenbach
L'chtLabor

daylight system



- 1) Schwärzlampe
- 2) Primärspiegel hochglanz
- 3) Sekundärspiegel hochglanz
- 4) Aufstellvorrichtung sekundärelektrode

Karl-Scharnagl-Ring München2002

Figure 3: Conceptual design drawings of the lighting concept

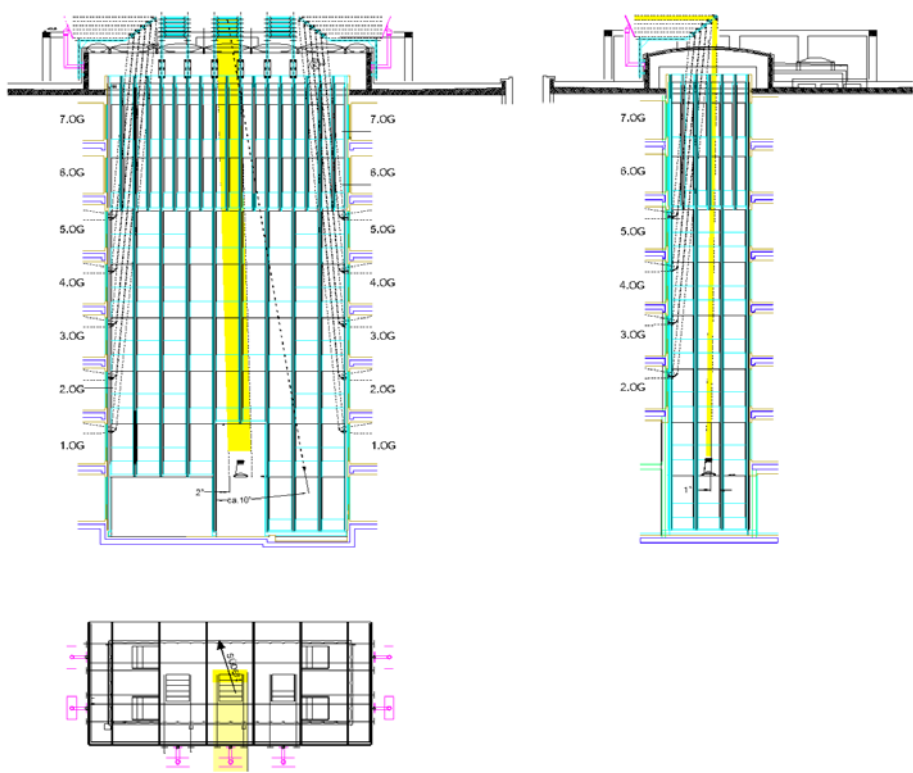


Figure 4: Conceptual design drawings of the lighting concept



Figure 5: pictures of the scale model of the inner courtyard with redirecting mirrors

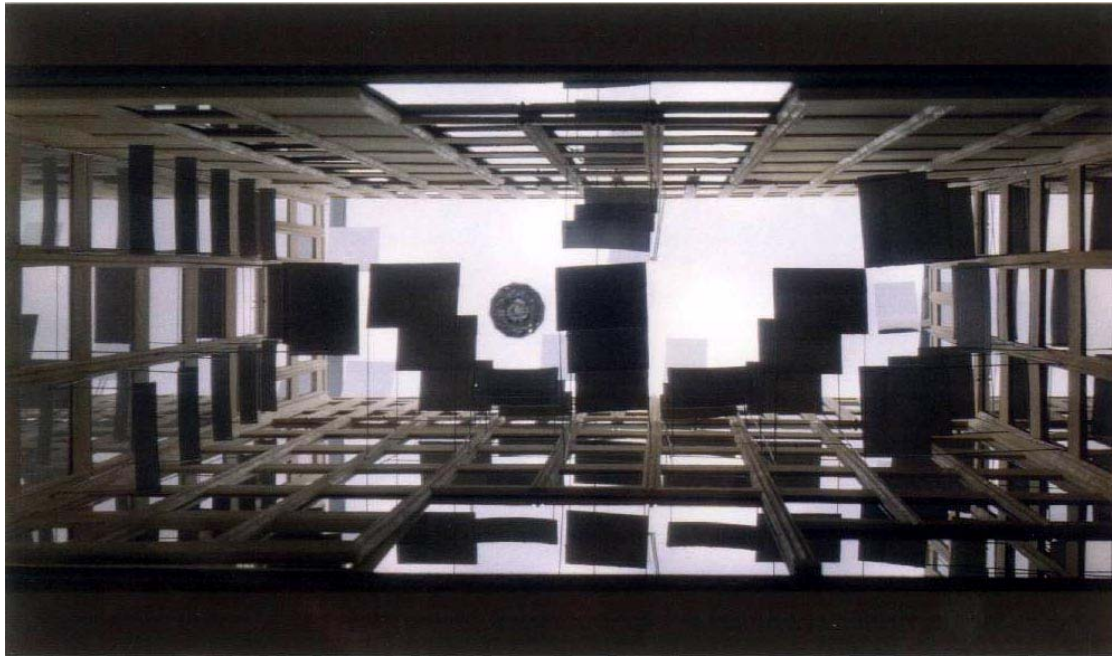


Figure 6: pictures of the scale model of the inner courtyard with redirecting mirrors



Figure 7: picture of the scale model of the Heliostat systems with redirecting mirrors on the roof



Figure 8: picture of the scale model of the Heliostat systems with redirecting mirrors on the roof



Figure 9: Picture of the completed inner courtyard , view from the ground level to the roof



Figure 10: Facade at night



Figure 11: Picture of the redirecting mirrors installed on the roof



Figure 12: View down from the roof into the inner courtyard onto the second redirecting mirrors