Glass architecture is light architecture

A symbiosis of architecture, structural engineering and - last but not least - lighting design!

From Paxton’s Crystal Palace for the Great Exhibition in London a century ago to the present day, glass and steel are a favourite combination of materials in modern architecture. Transparency, openness and flexibility in modern buildings have taken a step further towards light and luminescence in defining the architectural philosophy of present times.

In the technology-conscious world we live in, it is the architects and civil engineers who push the limits of glazing technology to the unbelievable. Murphy / Jahn is one such unique architectural firm who have discovered how to create architecture that is experientially rich, complete, ever changing. According to Helmut Jahn: “Perfection is achieved not when nothing is to be added, but when nothing can be taken away.” This shows that their architectural work today is more evolutionary than revolutionary. Progress is incremental, advancing from project to project, as new technical ideas are tested.

For Helmut Jahn, transparency and lightness are conceptual and intellectual ideas that can be realised with new materials. He strives for architecture of clarity and order, he wants his buildings to be comprehensible and rational. For these purposes, glass is the material of his choice. It allows spaces to be layered, to be read as overlapping realms that slide past each other.

The Kaufhof project in Chemnitz/D is one such project where the architect has proved that creativity has to do more with the elimination of the inessential, than inventing something new. The lighting design concepts for the façade, staircases and underground tunnel were developed by Michael F. Rohde, L-Plan, Berlin/D in close collaboration with the architect, and the light artist, Yann Kersalé, AIK, Paris/F.

The city of Chemnitz suffered a lot in the second world war and later on under the communist regime. The town centre was rebuilt with large open spaces devoid of any urban activity. The main challenge offered by this project in the town centre of Chemnitz was to restore the Neumarkt and reinstate scale and urbanity to an area which was once an urban wasteland. This concept also shows how an urban space assumes an important role in Helmut Jahn’s work. The architect recognises that the function of new urban centres is different from those of the past decades. Today, urban design is linked more to entertainment and product consumption.

The Kaufhof (25,000 square metres of sales space) occupies a large parcel of land between a historic city square, the Neumarkt, and Bahnhofstrasse. The department store is oriented towards the Neumarkt and separated by a galleria from a multi-storey car park with shops at ground level. The entrance to the car park is via ramps in Bahnhofstrasse and covered by glazed canopies. They lead to a tunnel enhanced with light art by Yann Kersalé, giving the user a sense of orientation. To the north is the central terminal for cars and buses, which is covered by a large cantilevered roof extending to Neumarkt to form an urban loggia, like a stage.

All over the world, commercial buildings and shopping malls are generally closed buildings. The façade is generally made of opaque material. The only exception is the ground floor, which has to cater for pedestrians and mark the entrance of the building. One of the primary goals of this project was to make light the essence of the design by creating an urban scenography and transforming the shopping mall from an introverted to an extroverted piece of architecture. This was achieved by making a totally glazed store, where the
display of products is integrated with signage. The building thus becomes a transparent “Stadt Pavillon”, glowing from the inside outward, which is especially striking at night. This design concept is extended to the roofs of the adjacent Central Station and the canopies to and from the parking garage.

Innovative engineering and performance, and an interest in material and construction are the generators of form and aesthetics in Helmut Jahn’s architecture. In this project, he has designed the façade so that the glass is read as a thin, form-covering screen, which acts as a fabric to moderate both the natural and artificial light. The insulated glass panels run like a taut membrane applied to the edges of the vertical structural panels. The glass is point-held through the panel joints, with cables and horizontal glass-fins added where slabs do not exist. Stretched metal screens enclose the car park and define the edge of the cantilevered structure at the roof, changing between transparency and an opaque surface. The brief from the client and the architect was to illuminate the glass façade and the steel structure. Lighting clear glass is difficult, since it is transparent and poses no chance for reflection.

Michael Rohde and his design team solved this problem by providing accent lighting to the advertising panels directly behind the façade. The ground floor, being the most important for pedestrian interaction, has received special attention. The mannequins are placed on light podiums and are additionally lit by adjustable, wide-beam downlights for interest and effect. For the upper floors, one narrow-beam downlight (HIT-CRI 70 watt) and one wide-beam uplighter (HIT-DE 70 watt) are used per window to illuminate the poster screens. Metal halide lamps have been used to enhance the quality of the colourful posters that add to the lively quality of the facade. During the day, the high-tech glass facade takes the primary focus. After dark, the facade slips into the background and the interior comes to the fore, primarily the light reflected by the vertical surfaces determining the structure. The building is virtually turned inside out.

**LIGHTING DESIGN**

**Galeria Kaufhof in Chemitz/D**

Each steel beam of the cantilevered roof is accentuated by a continuous band of light comprising cold cathode lamps with an aluminium reflector.

The fire-escape staircase becomes a decorative element during the night. The underside is lit using T5 luminaires.
Different lighting has been designed for the different functions performed by the building – staircases, entran-
ces and ground floor – which is visible through the
façade. The main entrance is accentuated by bands of
T5 luminaires that are flush-mounted with the floor slabs
and provided with a glass diffuser. This is a clear exam-
ple of how light can be used in the urban context to
guide people through spaces.

The Kaufhof Chemnitz has a well defined protruding
head in the form of a cantilevered roof supported by
steel beams. Cold cathode lamps with asymmetric ref-
ectors are installed all along the contours of these sections
to accentuate them, and form a continuous line of light
along the beam canal. Aluminium reflectors are used be-
hind these lamps for consistent illumination. LMT Leuch-
ten + Metal Technik GmbH produced the cold cathode
lamp installation (reflector design: L-Plan).

Custom-made, angular, asymmetrical luminaires for
communication lighting are used in the main entrance
area and the access bridges. The highly efficient projectors
equipped with metal halide lamps (HQI-TS 400 watt/D/36000)
were chosen for glare-free, wide area
flood-lighting. Groups (two/four) of these luminaires are
mounted symmetrically to the steel beams in a repetitive
pattern along the central axis of the access bridges. The
five floors of the shopping centre are connected by the
centrally located atrium and escalator shaft. The lighting
designers decided to highlight this major communication
hub. This was done by lighting the edges of every floor
slab using three rows of T5 (21 watt/39 watt) lamps
flush-mounted in baffles behind the glass handrails,
thereby enhancing the concept of transparency from a
macro to a micro-level. General lighting was also provi-
ded using eight industrial high-bay wide-beam lumi-
naires arranged in a regular grid.

The exit access routes connecting the car park and the
shopping centre are lit on the underside by water-
resistant (IP 65) T8 luminaires arranged in parallel to the
structural members of these sections along the central axis of
the access bridges. The four cardinal directions are repre-
sented by a different light colour to help the user find his
way in and out of the building. The coloured light also
adds drama to the rather monotonous driving experi-
ence in these tunnels. The exits are marked by canopies
made of steel and glass. The structural members of these
canopies are up-lit using linear projectors equipped with
metal halide lamps (HQI-TS 350W). Apart from high-
lighting the steel structure perfectly, these luminaires are
absolutely glare-free for the traffic using the garage.

Use of glass as a building material gives efficient, eco-
logical and aesthetic opportunities for Transparency,
Re-
fection, Opacity and Refraction. Transparency allows for
minimal form and aesthetics of construction. The buil-
ding develops a luminescent quality, glowing from wit-
in. In the urban environment light brings out the poetic
essence of the design after dark.

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Photos: Roland Hable

Products applied

- Underground car park and tunnel lighting:
  - Light tubes of extruded satin acrylic PMMA (Ø250mm., IP20) equipped with metal halide lamps (400 watt/250 watt/150 watt Se’lux SPLL-16, T5 LS, 58 watt (G5 01900474), planned with Spectral
- Atrium: 6602 IP20 HQI-TS 1000 watt Industrial HI-BAY luminaire, planned with Spectral
- Fire-escape staircases: SPLBK-16, T5 LS, 54 watt, planned with Spectral
- Façade: Dancer 33 QT – DE 12300 300 watt, PRIO 30 100 watt and Sill
- Cantilevered roof-structure: Klinger Neon SFM 50/6 TR-SFMX-00015, LMT Leuchten + Metal Technik GmbH, planned with Spectral
- Entrance light bands: T5 LS 58 watt, planned with Spectral
- Underground car parks and tunnels: Klinger Neon SFM 50/6 TR-SFMX-00015, LMT Leuchten + Metal Technik GmbH, planned with Spectral

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The lighting concept is further extended by lighting elements outside the building, such as the
glass and steel canopy for the parking.

The underside of the exits are illuminated by moisture resistant T8 luminaires.