

NordWestZentrum Extension, Frankfurt/Main



Architect/overall design: *JSK Dipl.-Ing. Architekten, Frankfurt/Main*
Client: *KG Nordtrakt Verwaltungsgesellschaft, Frankfurt/Main*
Metalwork and curtain walling: *Anders Metallbau GmbH, Fritzlar*

Mission

Fully in the spirit of contemporary modern architecture, the use of glass, stone and stainless steel is a signature element in the work of JSK Architekten. Drawing on a sensitive mix of materials, the practice exercises a delicate style with masterful detailing, to which the new NordWestZentrum stands as a paradigm.

■ NordWestZentrum, Frankfurt/Main – an ever-evolving shopping mall

Commissioned by the city of Frankfurt/Main, the NordWestZentrum (NWZ for short) was built between 1965 and 1968. After acquiring the shopping centre in the late 1980s, a private



NordWestZentrum: high-rise

investor fully refurbished and reshaped the building, which by then had fallen into serious disrepair. The renovation scheme, involving the installation of enormous glass roofs over the two shopping arcades, earned the NWZ the architectural award of the International Council of Shopping Centers (ICSC) for the "world's best shopping centre remodelling".

■ Shoppers' paradise covering 55,000 sqm

In 2001, KG Nordtrakt Verwaltungsgesellschaft commissioned the Frankfurt/Main-based architectural practice JSK Architekten to extend the shopping centre. The brief called for the addition of a 3,000 sqm "shopping street" flanked by 37,000 sqm of new retail and catering space. Not only did the NWZ expand, it also gained immensely in attractiveness: the pulsating emporium, which pulls in 40,000 visitors a day, boasts high-grade stone flooring and facades, glass roofs and a string of green resting areas.



NordWestZentrum: shopping mall

The third NWZ extension, likewise designed by JSK Architekten, followed in the summer of 2002. This involved the addition of a new arcade, creating an extra 15,000 sqm of retail space. The scheme also embraced a 13-storey, commercial and residential high-rise with a lettable area of approx. 7,600 sqm. The new concept also necessitated an increase in parking capacity to over 3,500 car spaces.

The revamped NordWestZentrum was unveiled to the public and media at a major inauguration gala in September 2004. The new gallery now unites 150 specialist stores, themed catering outlets, diverse service providers, medical practices, cultural and leisure facilities, and municipal agencies/amenities (residents' registration office and city library) under a single roof.



Top: High-rise glass facade, covered shopping mall with shopfronts; Bottom: Shopping mall, stone facade with ribbon windows

Structural & Facade Design

With its emphasis on facade transparency and sophisticated technical details, the design concept of JSK Architekten placed high demands on our design team. The mall facade with its four degree inclination posed a particular challenge.

■ Design work underpinned by component tests

The architectural concept for the new shopping mall necessitated extensive design work. The structural investigations conducted at this stage included a wide range of component tests.

- Facade glazing to mall at first-floor level: The University of Kassel was commissioned by us to test the human impact safety performance of 2.5 x 5.0 m glazing units.
- Walkable glass floor to intermediate floor slab in mall: The residual strength of the glazing was tested by the University of Kassel.
- Facade with all-glass corners in mall: Of particular complexity was the formation of all-glass corners with a free glass edge spanning 5.0 m in the inclined facades. The design process involved an in-house component test with bonded glass joints.



■ Anders Metallbau: expert in facade construction

After its third extension, the NordWest-Zentrum now ranks as one of Germany's biggest shopping centres. The most recent modernization, like the previous schemes, was based on a sophisticated architectural concept. In February 2003, Anders Metallbau was contracted by KG Nordtrakt Verwaltungsgesellschaft in Frankfurt/Main to perform the following works ...

- New mall extension: Curtain walls spanning two storeys, shopfronts, stainless-steel cladding, ribbon windows

- Existing mall: Reconstruction of existing retail spaces, facade cladding (including reflective glass, stainless-steel trims, smoke walls)

- High-rise: Facade, window units, copings, louvred cladding to rooftop plantroom

In developing the structural concept for the new mall curtain walling, our engineers needed to consider slab deflections resulting from self-weight, facade loads and snow loads. The curtain wall facade is suspended from the upper reinforced-concrete slab.

Allowance was made for the up to 4 cm deflection, caused by live loads, in the intermediate reinforced-concrete floor slab at the junction between this and the facade.

Another tricky feature resulting from the architectural concept was the four degree inclination of the mall-side facade.

The client also required the inclusion of multiple glass and stainless-steel surfaces to reinforce the transparent character of the shopping centre exteriors. Structural calculations were needed to design the steel support frame for the curtain walling.



Shopping mall interior



Shopping mall exterior



High-rise facade

Facade Design & Fabrication

Our engineers started work on the technical design for the extension scheme in February 2003. In addition to the structural concept for the curtain walling and ribbon windows, we also developed numerous customized systems. The multifarious facade components were fabricated at Anders Metallbau's own workshops.



Shopping mall, passageway flanked by shops

■ Mall facade

Based on the structural analysis of the building shell, the decision was taken to suspend the mullions from the floor slab. The mullions were fixed by means of a three-dimensionally adjustable bracket, developed by our engineers, which allowed their horizontal and vertical alignment at all times.

The structural concept also provided for subsequent insertion and bolting of the up to 2.5 m long transoms between the pre-installed and aligned mullions.

The loose supports at the intermediate slabs, which simultaneously carry the walkable glass areas, are provided by cantilevered steel beams.

The human-impact-safety curtain wall glazing was supplied by Interpane in Lauenförde in standard sizes of 2.5 m x 5.0 m. The glass units, which are supported on all sides, slope inwardly towards the mall at an angle of around four degrees.

A walkable glass floor was inserted at the junction with the intermediate slabs to bridge the approx. 0.4 m wide



Shopping mall, curtain wall detail

void between slab and curtain walling. The glass floors between front slab edge and facade are supported on three sides and run directly behind the mall glazing. For safety reasons, the walkable glass units are provided with an anti-slip coating.

A continuous, 1.0 m high handrail was fitted on the inner side of the first-floor facade areas.

The mall facade connections were designed such as to accommodate any kind of shopfront in special sections at head and base. This allows incorporation of the particular facade type required by individual tenants.

A wide variety of these tenant-specific shopfront installations, subsequently incorporated at ground-floor level, were also handled by Anders Metallbau.

Special facade systems were fitted at the junctions with the existing mall. A 6 m by 8 m wall area was covered with point-fixed reflective glazing, each of the 1.2 m by 1.0 m panes being held in place by four clamps.

Segmented smoke walls, made from a glazed, uninsulated Schüco window system, are installed as a fire precaution between the new and existing arcades.



Junction of mall facade with glass roof

All components for the various facades were fabricated at our own workshops. Due to the special folds in the stainless-steel framing members, many of these required custom metalworking.

Stainless-steel sheet, cut to size with high dimensional accuracy using laser or water jet systems, was supplied by a specialist contractor.

Installation

During the 18-month contract period, up to 20 of our installers were present on site at any time to carry out the various project works. Experienced site managers ensured the technical co-ordination of all tasks in accordance with the construction programme: supreme workmanship and adherence to deadlines were always the top priority.

■ Mall facade installation

We fabricated and installed some 450 m of facade in the form of a steel add-on construction. The adopted site procedure provided for a preliminary phase during which all brackets were fixed to the floor slabs and aligned.

This was followed by the installation of the mullions, which had standard lengths of approx. 6.0 m. A track was mounted on the mall ceiling for the individual stages of installation to facilitate movement of all curtain wall sections and glazing units. The materials for the various sections were transferred to the point of installation through the mall roof.

To allow incorporation of the large-format, 630 kg panes, the facade was completely enclosed by scaffolding on the mall side. At times, up to eight installers were positioning the glazing units suspended from the track and securing these to the inclined supports. The four-side-supported glazing was secured in place by screwed perimeter clamping bars.

• Mall facade cladding

The concrete columns in the mall are clad with natural stone units. These

are surmounted by partly high-gloss-polished stainless-steel cladding. A welded steel sub-frame serves as support frame.

• Junction with mall roof

Folded trims out of polished stainless-steel sheets were installed at the junction between curtain walling and glass roof. With a stepped soffit projecting from the facade, these create a layered composition that stretches up to the mall roof.

Provision was made for recesses at each facade axis to house luminaires. Like the cladding, the trims below the mall roof are supported by a steel frame.

• Ribbon windows and facades

Our installers also fitted ribbon windows in the shopping centre's stone-clad exterior. Fixing of the units to the precast aerated concrete required the use of special angle brackets and anchors. The necessary sunshading is provided by venetian blinds fitted behind the natural stone exterior.

We installed approx. 720 sqm of partly double-height glass curtain walling in the area of Walter-Möller-Platz. The

facade incorporates a revolving door that leads into the high-rise plus ten doors and two sliding doors providing access to the individual rental units. For fire-safety reasons, a W90-grade smoke curtain wall was installed below the first-floor ceiling in the area near the high-rise.

• High-rise

The stone-clad high-rise was fitted with 738 no. window units. Both the sunshading devices and the sills of the punched windows are concealed behind the stone cladding. Provision is also made for the downward drainage of water between the insulation layer and the external cladding.

During installation, top priority was given to the neat perimeter bonding of the window units. Other works to the high-rise included the louvre cladding to the rooftop plantroom.

• Reconstruction of existing retail spaces

The prompt fabrication and installation of shopfront systems ensured the smooth completion of alteration and modernization works to specific retail spaces.



Stone cladding in shopping mall



Double-height shopfronts in shopping mall

Interiors

The NordWestZentrum shopping mall impressively demonstrates how the design of new shopping emporia can be enriched by aesthetic and artistic inspiration. Key architectural features include the bold contrasts between glass, stone and stainless steel, masterfully styled forms and innovative lighting design.

- Number one on the popularity scale: NordWestZentrum attracts up to 40,000 visitors a day – a figure that is set to rise

The NordWestZentrum owes its exceptional popularity to a diversity of factors. Apart from a cleverly balanced mix of retailers, wide-ranging services and customer-friendly opening times, the architecture has been a major success factor for the shopping mall. The overall architectural concept for the NordWestZentrum has twice earned the International Council of Shopping Centers (ICSC) design award.

The NordWestZentrum is a city within a city, offering a pleasurable shopping experience regardless of weather and daylight conditions. The glass roof generates a light-flooded, welcoming environment and a relaxing atmosphere. Elegant shopping galleries and planted resting areas are spread across three spacious malls. Over 150 retail and service providers invite shoppers to buy and to linger.

Other major assets of the state-of-the-art emporium include its central location and excellent transport links. The NordWestZentrum is served by six bus routes and one underground railway line. The shopping centre also has its own taxi rank together with 3,500 visitor car parking spaces.



Facts and figures: the essentials in brief

Client:	KG Nordtrakt Verwaltungsgesellschaft, Frankfurt/Main	Glass/facade systems:	
Operator:	Nordwest Zentrum Verwaltungsgesellschaft mbH, Frankfurt/Main	Steel add-on construction:	Schüco International KG, Bielefeld
Architect/overall design:	JSK Dipl.-Ing. Architekten, Frankfurt/Main	Glazing:	Interpane, Lauenförde
Site supervisor:	JSK Bauleitung, Frankfurt/Main	Other systems/components:	
Curtain wall/window package:	Anders Metallbau GmbH, Fritzlar	Sunshading systems:	Warema Renkhoff GmbH, Marktheidenfeld
Structural engineering/component tests:	Ingenieurbüro Stahlklar GbR, Steelwork Faculty of University of Kassel	Sliding door system:	Automatische Türanlagen Burmann GmbH, Kassel
		Revolving door system:	Blasi GmbH, Mahlberg
Works completed by Anders Metallbau:		Project data:	
• Mall facades, shopfronts:	Approx. 3,000 sqm (1F), approx. 600 sqm (GF)	• Shopping mall extension:	Approx. 15,000 sqm floorspace
• Ribbon windows:	Approx. 590 sqm	• Architectural components/mall:	1 covered mall, 2 shopping levels, 1 administrative level, 4 parking decks
• High-rise facade:	Approx. 720 sqm	• High-rise:	Approx. 7,600 sqm on 13 storeys; storeys 11 to 13: 36 apartments with a total 1,300 sqm lettable area; storeys 1 to 10: office space with 6,300 sqm lettable area
• Copings:	Approx. 730 m		
• High-rise window units:	738 no.		

